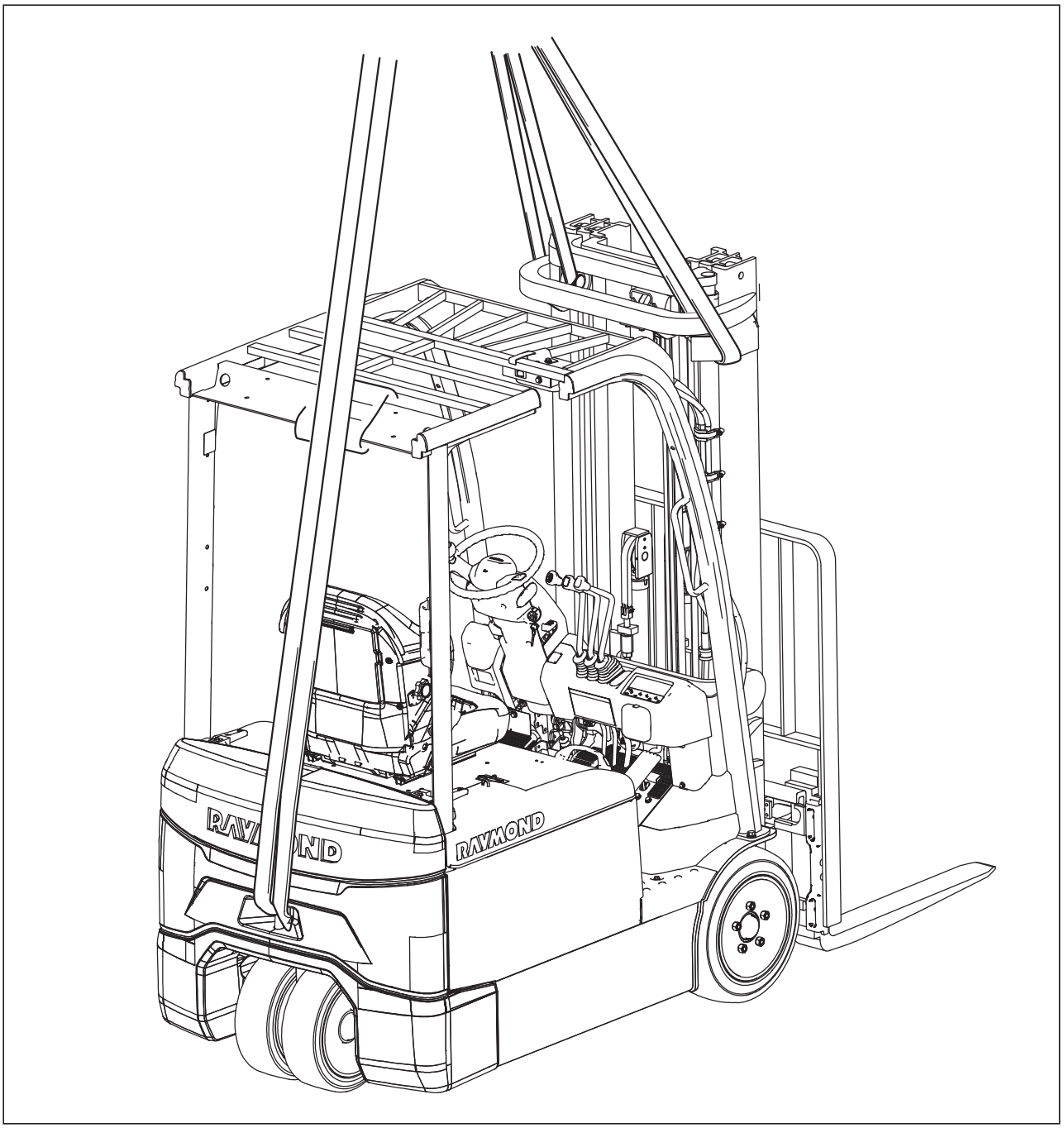
Maintenance Manual

Model 4460 3-Wheel Sit-Down Counterbalanced Lift Truck

Publication: 1237640A **Issued: 26 May 2017**

RAYMOND

1.5.2 HOISTING THE VEHICLE

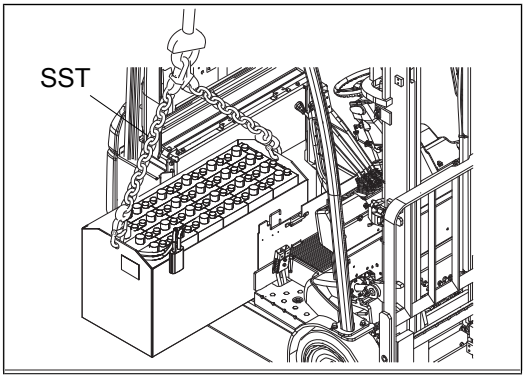


NOTICE

- Position the mast in the full rearward tilt position.
- Remove any Optional Lamps that are installed at the rear of the overhead guard.
- When preparing the lift truck for hoisting (and the lifting straps are tight), confirm that the draw bar has not moved upward. If the draw bar has moved upward, push the draw bar downward.
- The length of lifting straps are different based on the specification of the lift truck and mast. When hoisting the lift truck, adjust the length of the lifting straps to prevent deformation of the overhead guard at the contact points with the overhead guard
- Use protective padding if there is contact between the lifting straps and the overhead guard.

Inspection Period (Accomplish based on operating hours or months, whichever is soonest.)		Every 6 weeks	Every 3 months	Every 6 months	Every 12 months
Item		**Every 250 hours**	**Every 500 hours**	**Every 1000 hours**	**Every 2000 hours**
Hydraulic oil tank	Oil level and contamination	I*1	I	*	*
	Tank and oil strainer			C	*
	Oil leak	I*1	I	*	*
Hydraulic filter	Filter clogging				I
Control lever	Loose linkage	I*1	I	*	*
	Operation	I*1	I	*	*
Oil control valve	Oil leak	I*1	I	*	*
	Relief pressure measurement				M
	Relief valve and tilt lock valve functions	I*1	I	*	*
Hydraulic piping	Oil leak	I*1	I	*	*
	Deformation and damage	I*1	I	*	*
	Loose joint	T*1	T	*	*
SAFETY DEVICES, ETC.					
Overhead guard	Cracks at welded portion	I*1	I	*	*
	Deformation and damage	I*1	I	*	*
Back-rest	Loosening of mounting	T*1	T	*	*
	Deterioration, cracks and damage	I*1	I	*	*
Lighting system (Option)	Function and mounting condition	I*1	I	*	*
Horn	Function and mounting condition	I*1	I	*	*
	Grease horn contact ring and horn contact spring				L
Turn signals (Option)	Function and mounting condition	I*1	I	*	*
Instruments	Functions	I*1	I	*	*
Buck-up buzzer (Option)	Function and mounting condition	T*1	I	*	*
Rear-view mirror (Option)	Dirt, damage	I*1	I	*	*
	Rear reflection status	I*1	I	*	*
	Deformation, cracking and damage	I*1	I	*	*
PSS	Functions	I*1	I	*	*
	Loosening and damage at sensor mounting portion	I*1	I	*	*
	Damage, deformation, oil leakage and loosening of the mounting of functional parts	I*1	I	*	*
	Loosening and damage of wire harnesses	I*1	I	*	*
	Rusting and corrosion of load sensor				I
Operator Presence Sensor System	Functions	I*1	I	*	*
Seat	Loosening and damage of mounting	I*1	I	*	*
	Seat damage and function	I*1	I	*	*
	Operating condition of seat switch	I*1	I	*	*

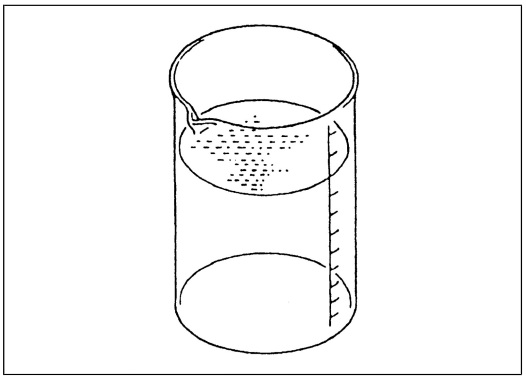
Point Operations



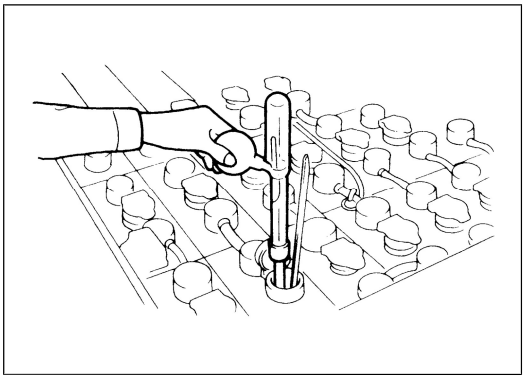
[POINT1]

Removal and Installation:
SST 979-001/276

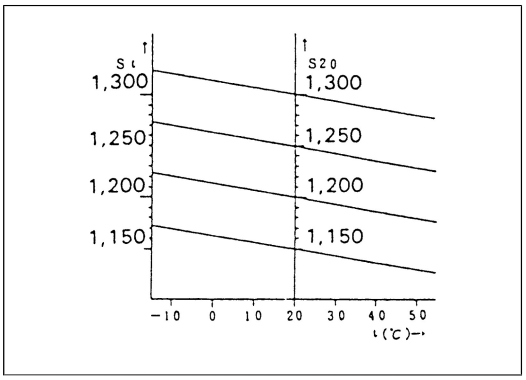
2.5.2 INSPECTION



1. Electrolyte inspection
The battery electrolyte is normal when it is transparent. Check turbidity when inspecting the specific gravity. If it cannot be checked clearly, put the electrolyte in a beaker for inspection.



2. Battery electrolyte specific gravity inspection
Use a hydrometer to measure the specific gravity of the electrolyte.
Specific gravity upon complete charging .... 1.280 [68°F (20°C)]
Specific gravity upon end of discharge .... 1.150 [68°F (20°C)]



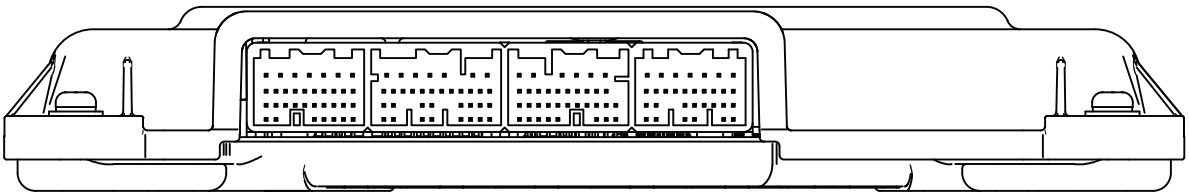
The specific gravity of the electrolyte at 68°F (20°C) is used.
Equation for converting specific gravity
S_{20}=St+0.0007 (t-20)

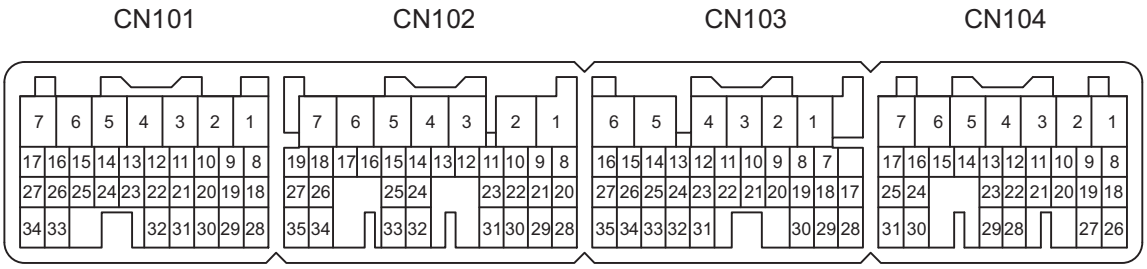
S_{20}: Specific gravity at 68°F (20°C)

St: Specific gravity at t°C

t: Electrolyte temperature upon measurement (°C)

Main controller





Conventional Lever

CN101 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN101-1 (3, SOLLU+)	CN102-16 (4, SLLL-)	Lift lock solenoid (OFF operation with ACTIVE TEST)	Approx. 0.0V	
		Lift lock solenoid (ON operation with ACTIVE TEST)	Approx. 11V	
CN101-2 (6, SLTFB+)	CN102-19 (7, SLTFL-)	Tilt forward solenoid (OFF operation with ACTIVE TEST)	Approx. 0.0V	
		Tilt forward solenoid (ON operation with ACTIVE TEST)	Approx. 11V	
CN101-3	-	Unused	-	
CN101-4 (41, VBBT)	CN104-4 (N2, N2)	-	Battery voltage	
CN101-5	-	Unused	-	
CN101-6	-	Unused	-	
CN101-7	-	Unused	-	
CN101-8	-	Unused	-	
CN101-9	-	Unused	-	
CN101-10	-	Unused	-	
CN101-11	-	Unused	-	
CN101-12	-	Unused	-	
CN101-13	-	Unused	-	
CN101-14	-	Unused	-	
CN101-15	-	Unused	-	
CN101-16	-	Unused	-	
CN101-17	-	Unused	-	
CN101-18	-	Unused	-	
CN101-19 (43, VBKY)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0.0V	
		Key switch ON	Battery voltage	

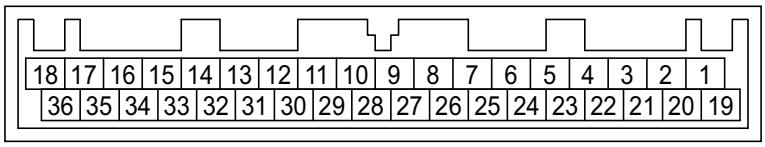
Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN137-3 (19, VBMBSL)	P3 terminal (P3, P3)	Battery plug disconnected, and the CN137 connector disconnected	Approx. 0 Ω	

CN138 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN138-1 (303, CSBAT+)	CN138-2 (305, CSBAT-)	Apply the negative probe to the CN138-2 to measure voltage.	Approx. 5V	
CN138-2 (305, CSBAT-)	-	-	-	
CN138-3 (304, CSBAT)	CN138-2 (305, CSBAT-)	Apply the negative probe to the CN138-2 to measure voltage. Drive motor, pump motor, all auxiliary machines OFF	Approx. 2.5V	

Multi-function display

CN70



CN70 connector basic conditions (battery plug connected, key switch ON)

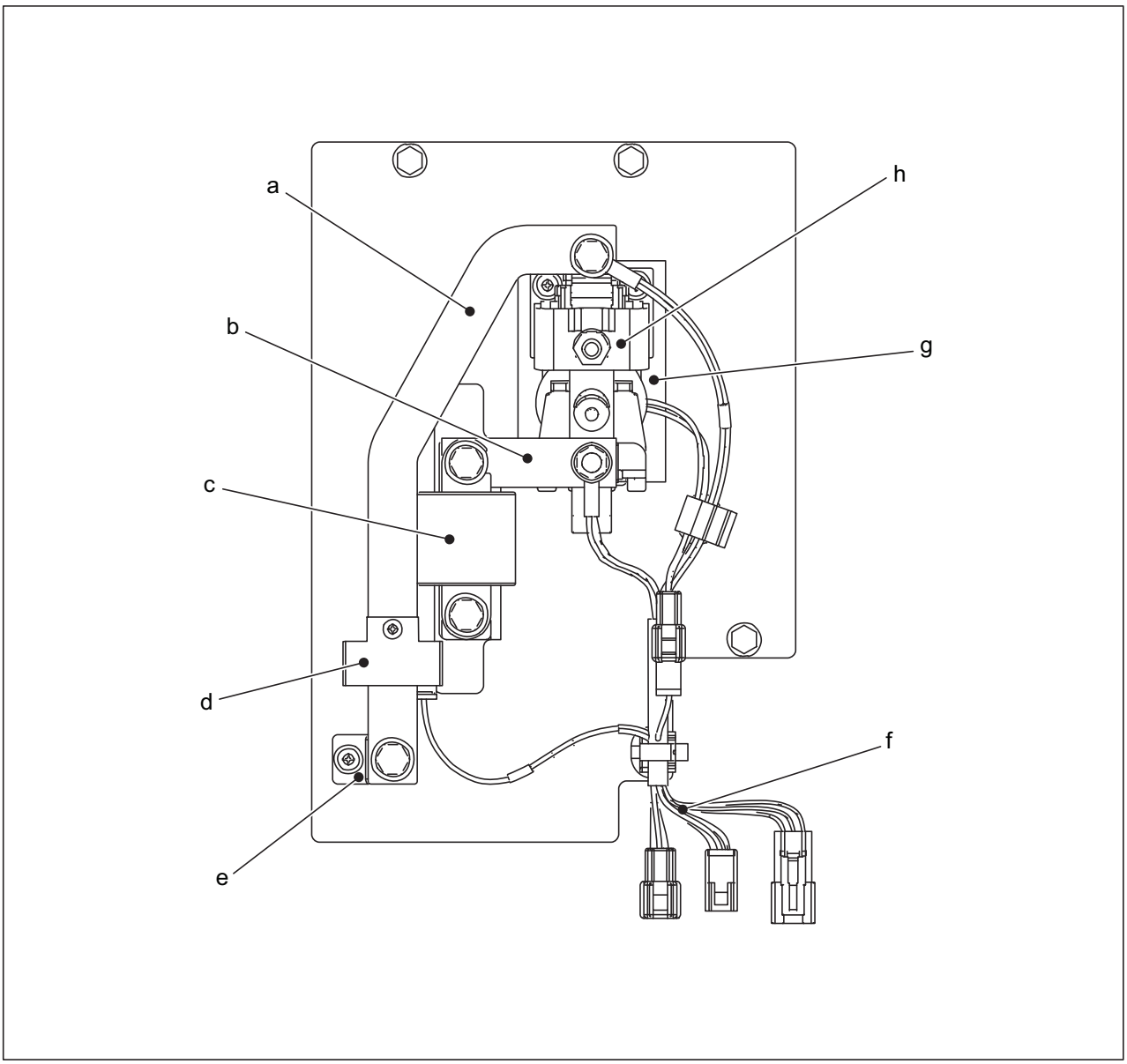
Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN70-1	-	Unused	-	
CN70-2	-	Unused	-	
CN70-3 (169, TGND)	-	-	-	
CN70-4 (14, DGND)	-	-	-	
CN70-5 (16, D7V)	CN70-4 (14, DGND)	-	Approx. 6.3V	
CN70-6 (162, ITKY3)	CN70-3 (169, TGND)	-	Approx. 5V	*1
CN70-7	-	Unused	-	
CN70-8 (160, ITKY1)	CN70-3 (169, TGND)	-	Approx. 5V	*1
CN70-9 (166, OTKY3)	-	Immeasurable	-	
CN70-10 (165, OTKY2)	-	Immeasurable	-	
CN70-11 (164, OTKY1)	-	Immeasurable	-	
CN70-12 (167, LEDTKY1)	CN70-3 (169, TGND)	-	Approx. 0.0V	*1
CN70-13	-	Unused	-	
CN70-14	-	Unused	-	
CN70-15 (146, CAN1L)	-	Immeasurable	-	
CN70-16 (145, CAN1H)	-	Immeasurable	-	

Installation Procedure

The installation procedure is the reverse of the removal procedure.

3.10 CONTACTOR PANEL (STANDARD)

3.10.1 COMPONENTS

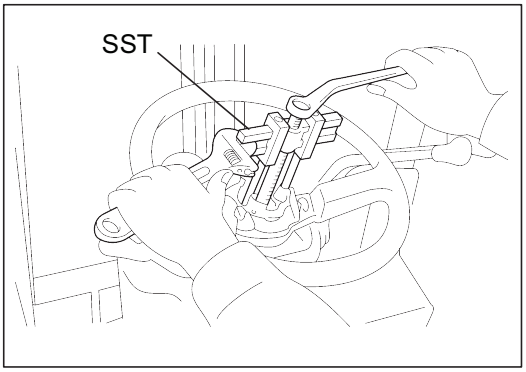


a : P1 - P2 Copper bar
b : P3 Copper bar
c : F1 Fuse
d : Current sensor
e : Terminal
f : Harness
g : Insurating sheet
h : Contactor ASSY

Installation Procedure

The installation procedure is the reverse of the removal procedure.

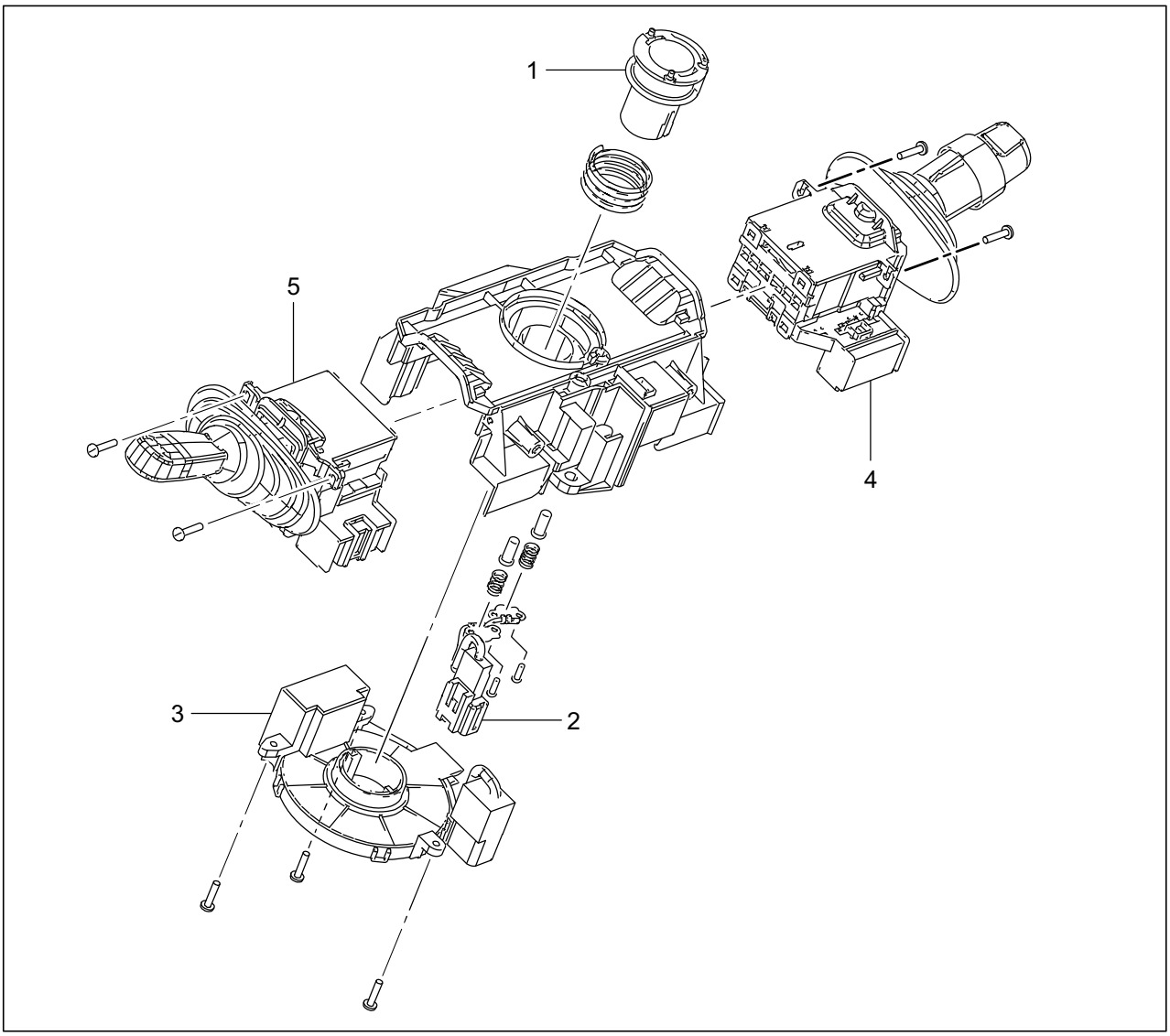
Point Operations



[POINT 1]

Remove:
Use the SST to remove the steering wheel.
SST 979-001/181

3.13.2 DISASSEMBLY, INSPECTION AND REASSEMBLY

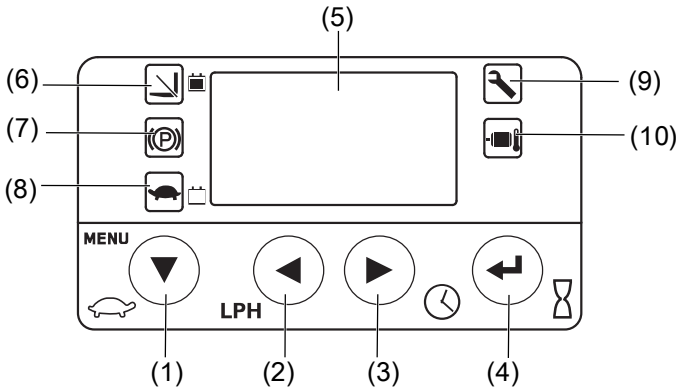


4 DISPLAY

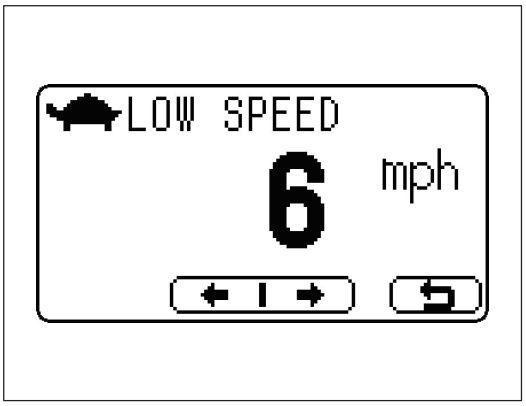
4.1 GENERAL 79
4.2 GENERAL FUNCTIONS 80
4.3 SERVICE FUNCTIONS 95
4.4 MULTI-FUNCTION DISPLAY ASSY 169

4.1 GENERAL

The multi-function display has various functions that indicate/notify the lift truck's information such as lift truck speed, the battery discharge level, and so on. The operator or administrator can set the lift truck performance with this display. Furthermore, it has functions to perform maintenance, feeling adjustments and specification setting as a service function.
On this model, a graphic LCD (Liquid Crystal Display) has been adopted. This provides various easy-to-understand information with expressive capability.

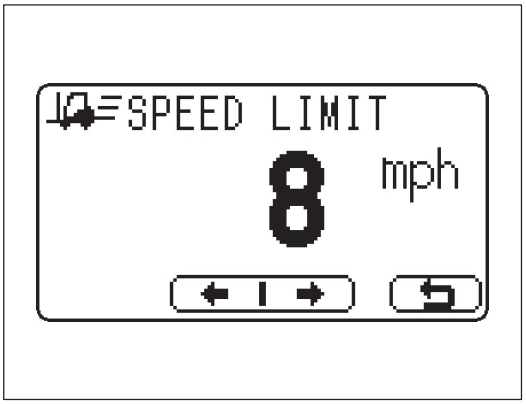


No.	Description
(1)	Switch (1): Low speed setting switch / Down switch
(2)	Switch (2): Power select switch / Left switch
(3)	Switch (3): Time or date select switch / Right switch
(4)	Switch (4): Meter mode select switch / Enter switch
(5)	Multiple screen display area
(6)	OPS indicator
(7)	Parking brake indicator
(8)	Low speed setting indicator
(9)	Spanner indicator
(10)	Overheat warning indicator



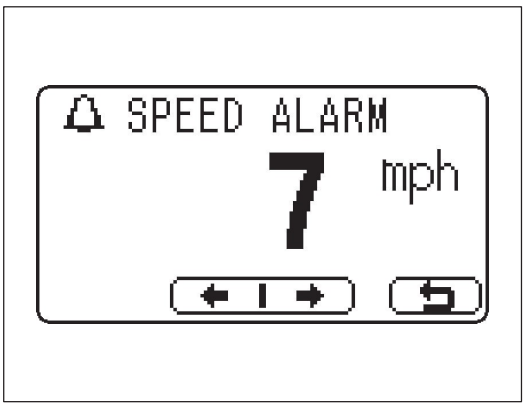
- Low speed setting screen

  The speed limit of the Low speed setting function can be changed.
  Switch (2): Setting speed limit down.
  Switch (3): Setting speed limit up.
  Switch (4): Returning to setting menu screen.
  It is adjustable from 2 to 12 mph by 1 mph. When MPH setting is “NO” in option set, it is adjustable from 2 to 20 km/h by 1 km/h.
  If the operator set the speed to more than 12 mph (20km/h), the low speed function is disabled. In that case “OFF” is displayed.



- Maximum speed limiter setting screen

  The speed limit of the Maximum speed limitation can be changed.
  Switch (2): Setting traveling speed limit down.
  Switch (3): Setting traveling speed limit up.
  Switch (4): Returning to setting menu screen
  It is adjustable from 2 to 12 mph by 1 mph. When MPH setting is “NO” in option set, it is adjustable from 2 to 20 km/h by 1 km/h.
  If the operator set the speed to more than 12 mph (20 km/h), the low speed function is disabled. In that case “OFF” is displayed.



- Overspeed alarm setting screen
- The speed to activate the overspeed alarm function can be changed.
  Switch (2): Setting threshold speed down.
  Switch (3): Setting threshold speed up.
  Switch (4): Returning to setting menu screen
  It is adjustable from 3 to 12 mph by 1 mph. When MPH setting is “NO” in option set, it is adjustable from 5 to 20 km/h by 1 km/h.
  If the operator set the speed to more than 12 mph (20 km/h), the low speed function is disabled. In that case “OFF” is displayed.

	OTHERS MENU screen	This allows you to: ▪ Start each meter*. ▪ Switch demo mode*. ▪ Initialize the settings. ▪ Set a service second password. ▪ Clear the administrator's second password. ▪ Adjust the contrast of the LCD display.
	END of SERVICE MENU	From this screen, you can move to a status screen.

*: After completing the hour meter start setting, “METER START” and “DEMO MODE” will not be displayed on the OTHERS MENU screen.

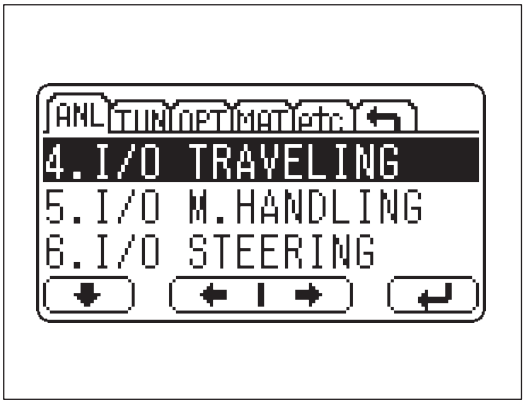
In/Out Monitor Function (I/O MONITOR)

This function displays the analog input voltage from traveling, material handling, PSS and Operator Presence Sensor switches, sensors and actuators.
The circuit or their quality can be judged by monitoring the displayed value.

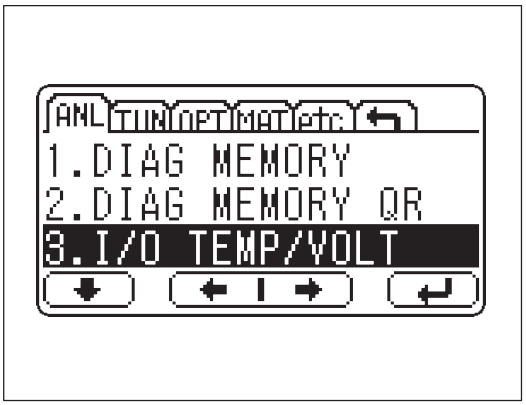
In/Out Monitor (1) (I/O TEMP/VOLT)

Displays the temperature of each electrical functional part and the analog input voltage detected by each controller.

Operating Procedure



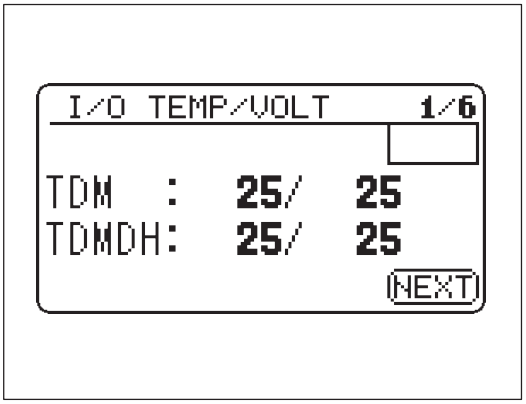
1. Display the ANALYZER MENU screen.



2. Press switch (1) to select the “3. I/O TEMP/VOLT” and press switch (4) to display “I/O TEMP/VOLT 1/6” screen.

3. After that, “I/O TEMP/VOLT 2/6” to “I/O TEMP/VOLT 6/6” display sequentially every time switch (4) is pressed. Press switch (4) on “I/O TEMP/VOLT 6/6” screen to return to the ANALYZER MENU screen.

NOTICE! : You cannot move directly from the I/O TEMP/VOLT screen to other screens. Return to the ANALYZER MENU screen, then move to the next screen.

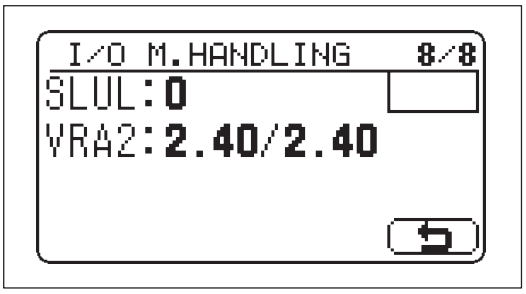


“I/O TEMP/VOLT 1/6”

TDM: Drive motor L/R temperature: °C
Temperature of the drive motor L/R is displayed.

TDMDH: Drive motor driver L/R heat sink temperature: °C
Temperature of the drive motor driver L/R heat sink is displayed.

Switch (4): To “I/O TEMP/VOLT 2/6” screen



"I/O M.HANDLING 8/8"

SLUL: Unload solenoid
See "I/O M.HANDLING 1/8"

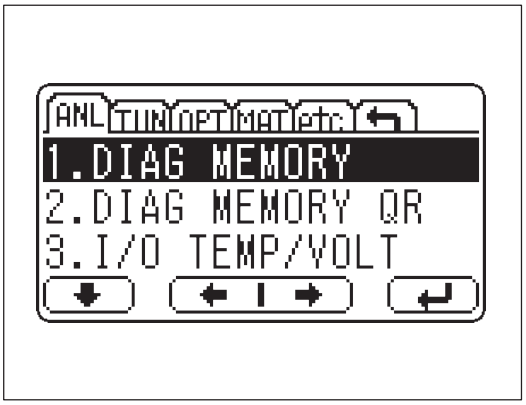
VRA2: Attachment (2) lever angle sensor 1 / 2 voltage: V
Displays input voltage from the attachment (2) lever angle sensor 1 / 2 to the controller.
Standard:
Attachment 2 lever angle sensor 1
Lever pull position: 0.30 to 2.87V
Lever push position: 1.65 to 4.50V
Lever neutral position: 1.65 to 2.87V
The voltage increases during lever backward operation, and it decreases during lever forward operation.
Standard:
Attachment 2 lever angle sensor 2
Lever pull position: 1.52 to 4.50V
Lever push position: 0.30 to 3.01V
Lever neutral position: 1.52 to 3.01V
The input voltage decreases during lever backward operation, and it increases during lever forward operation.

Switch (4): Returning to the ANALYZER MENU screen

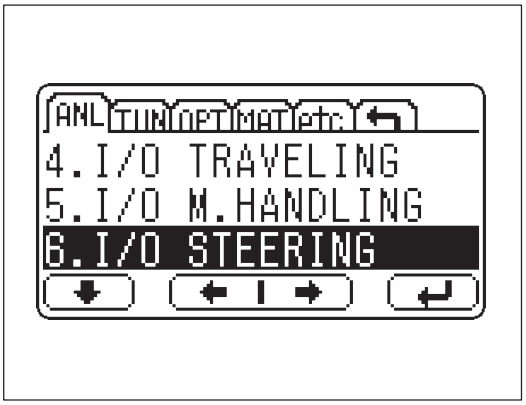
In/Out Monitor (4) (I/O STEERING)

Displays the ON/OFF states of synchronized steering and the analog input voltages from respective sensors.

Operating Procedure



1. Display the ANALYZER MENU screen.

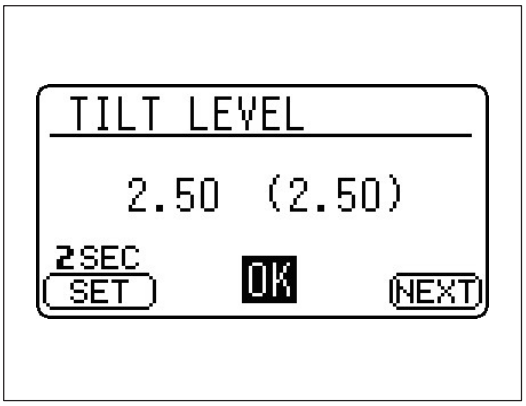


2. Press switch (1) to select the "6. I/O STEERING" and press switch (4) to display the "I/O STEERING 1/1" screen.

NOTICE! : You cannot move directly from the I/O STEERING screen to other screens. Return to the ANALYZER MENU screen, then move to the next screen.

Menu	No.	Item	Lever	Level (●: Initial setting value)							
			STD	1	2	3	4	5	6	7	8
LIFT UP	START	Play at the beginning of lift up operation	-	Wide				●			Narrow
	INCH	Inching speed during lift up operation	○	Slow				●			Fast
	MAX	Maximum speed during lift up operation	-	Slow				●			Fast
	ACC	Acceleration speed during lift up operation	○	Weak				●			Strong
	DEC	Deceleration speed during lift up operation	○	Weak				●			Strong
TILT FWD	START	Play at the beginning of tilt forward operation	-	Wide				●			Narrow
	INCH	Inching speed during tilt forward operation	-	Slow				●			Fast
	MAX	Maximum speed during tilt forward operation	-	Slow				●			Fast
	ACC	Acceleration speed during tilt forward operation	○	Weak				●			Strong
	DEC	Deceleration speed during tilt forward operation	○	Weak				●			Strong
TILT BWD	START	Play at the beginning of tilt backward operation	-	Wide				●			Narrow
	INCH	Inching speed during tilt backward operation	-	Slow				●			Fast
	MAX	Maximum speed during tilt backward operation	-	Slow				●			Fast
	ACC	Acceleration speed during tilt backward operation	○	Weak				●			Strong
	DEC	Deceleration speed during tilt backward operation	○	Weak				●			Strong

Indication	Description	Switching settings			
		Indication	Setting content	Indication	Setting content
BUZZER SPEC*	Setting for the mode of the buzzer sound when the Operator Presence Sensor and Return-to-neutral operate	A: Except US / B: Not in use / C: US			
SEAT BUZZER	Setting to enable/disable the buzzer sound when the seat switch is off	YES	Enabled	NO	Disabled
PKB BUZZER	Setting to enable/disable the parking brake off warning	YES	Enabled	NO	Disabled
SPD ALM2	Setting to enable/disable the overspeed alarm 2	YES	Enabled	NO	Disabled
WHEEL IND	Reserved	A / B / C			
POWER METER	Setting display mode of the power meter	YES	Enabled	NO	Disabled
ASC W/LOAD	Setting to enable/disable the auto speed control	YES	Enabled	NO	Disabled
MODE	Setting to enable/disable the traveling speed limit of auto speed control	S	Enabled	A	Disabled
CURVE CONT	Setting to enable/disable the turn speed control with load and height sensing	YES	Enabled	NO	Disabled
D-LIM MODE	Setting the traction limitation mode at over-discharge warning	A	Traction restrictions regardless of discharge level	B	Traction restrictions according to discharge level
P-LIM MODE	Setting the material handling limitation mode at over-discharge warning	A	Lift interrupt	B	Lift interrupt while travelling
T FWD LIMIT	Setting to enable/disable the active mast front tilt angle control	YES	Enabled	NO	Disabled
T BWD LEVEL	Setting to enable/disable the backward tilt automatic leveling control	YES	Enabled	NO	Disabled
T F-SPD LIM	Setting to enable/disable the forward tilt speed limit control	YES	Enabled	NO	Disabled
L UP-SPD LIM	Setting to enable/disable the lifting speed limitation with mast forward-tilted	YES	Enabled	NO	Disabled
KNOB CONT*	Setting to enable/disable the steering knob synchronizer	YES	Enabled	NO	Disabled
POWER KEEP	Setting to enable/disable the power keep control	YES	Enabled	NO	Disabled
H-SELECTOR	Reserved	YES	-	NO	-
MOTION ALM	Setting the directions of the motion alarm	F: Forward / R: Reverse (Default) / F&R: Forward and Reverse / OFF			
DIR-SW/MVT*	Setting the mode of the motion alarm	D: Direction / MVT: Speed Detection / D&MVT: Direction and Speed Detection / D/MVT: Direction or Speed Detection			
STOP LAMP	Reserved	A	-	B	-

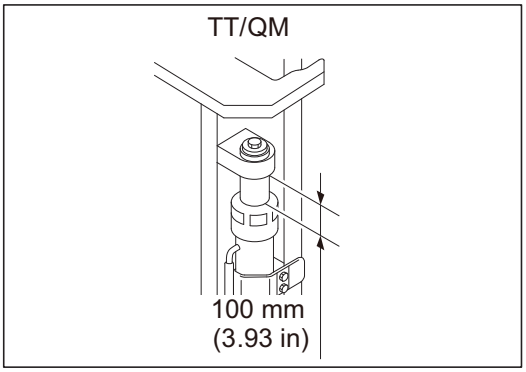


“TILT LEVEL” Screen

Values in the bracket ( ) are currently stored values. Values outside the bracket ( ) are current lift truck condition values.

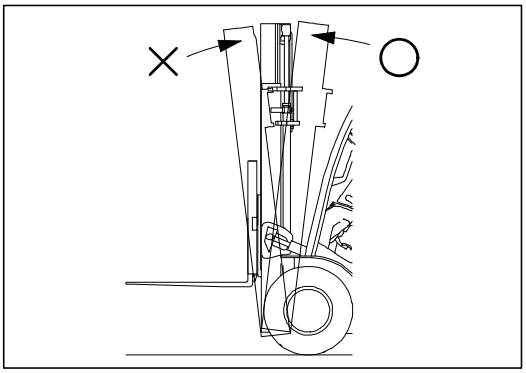
Switch (1): Pressing this for more than 2 seconds will perform matching.
Switch (4): To “TILT FWD LIMIT” screen

If matching is performed, “OK” is indicated on the display.

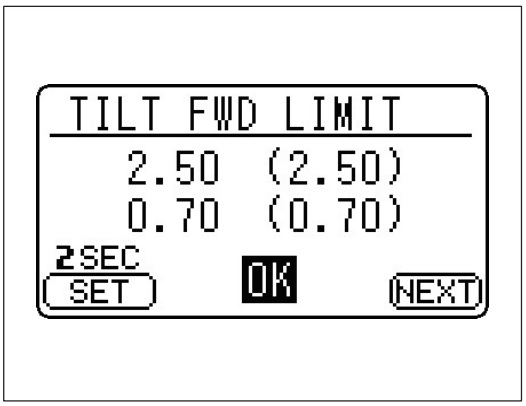


Lift truck condition

- This procedure should be done with all equipment, including forks or attachments, mounted as specified.
- The lift truck should be with no load and on level ground.
- For TT/QM mast: The rear lift cylinders should be raised to a height of approximately 3.93 in. (100 mm).



- The mast should be adjusted to the base position by tilting only forward.
  Tilt the mast backward enough and adjust again, when the mast is tilted beyond the desired position.
- In special cases when the execution of "the other procedure" is specified, the mast should be lifted to the top and the hydraulic oil control valve should be relieved.



“TILT FWD LIMIT” Screen

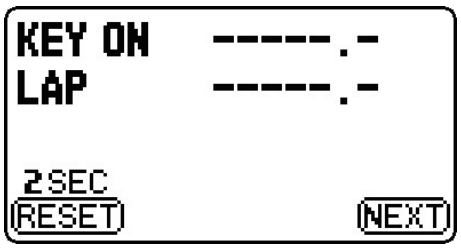
Values in the bracket ( ) are currently stored values. Values outside the bracket ( ) are the current lift truck condition values.

Switch (1): Pressing this for more than 2 seconds will perform matching.
Switch (4): To “TIRE POSITION” screen

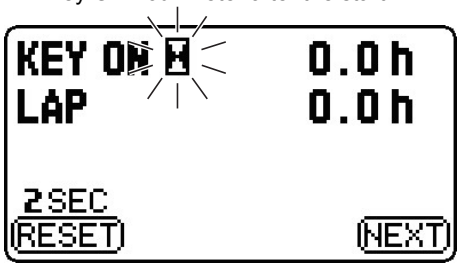
If matching is performed, “OK” is indicated on the display.

Hour meter

Key ON hour meter before the start



Key ON hour meter after the start



NOTICE! : On completion of the hour meter start operation, the hourglass icon on the key ON hour meter blinks to indicate that the hour meter has started to count up.

DEMO MODE

This menu item is used to enable or disable the demo mode.
Before starting the hour meter, you can enable the following functions temporarily in the demo mode.

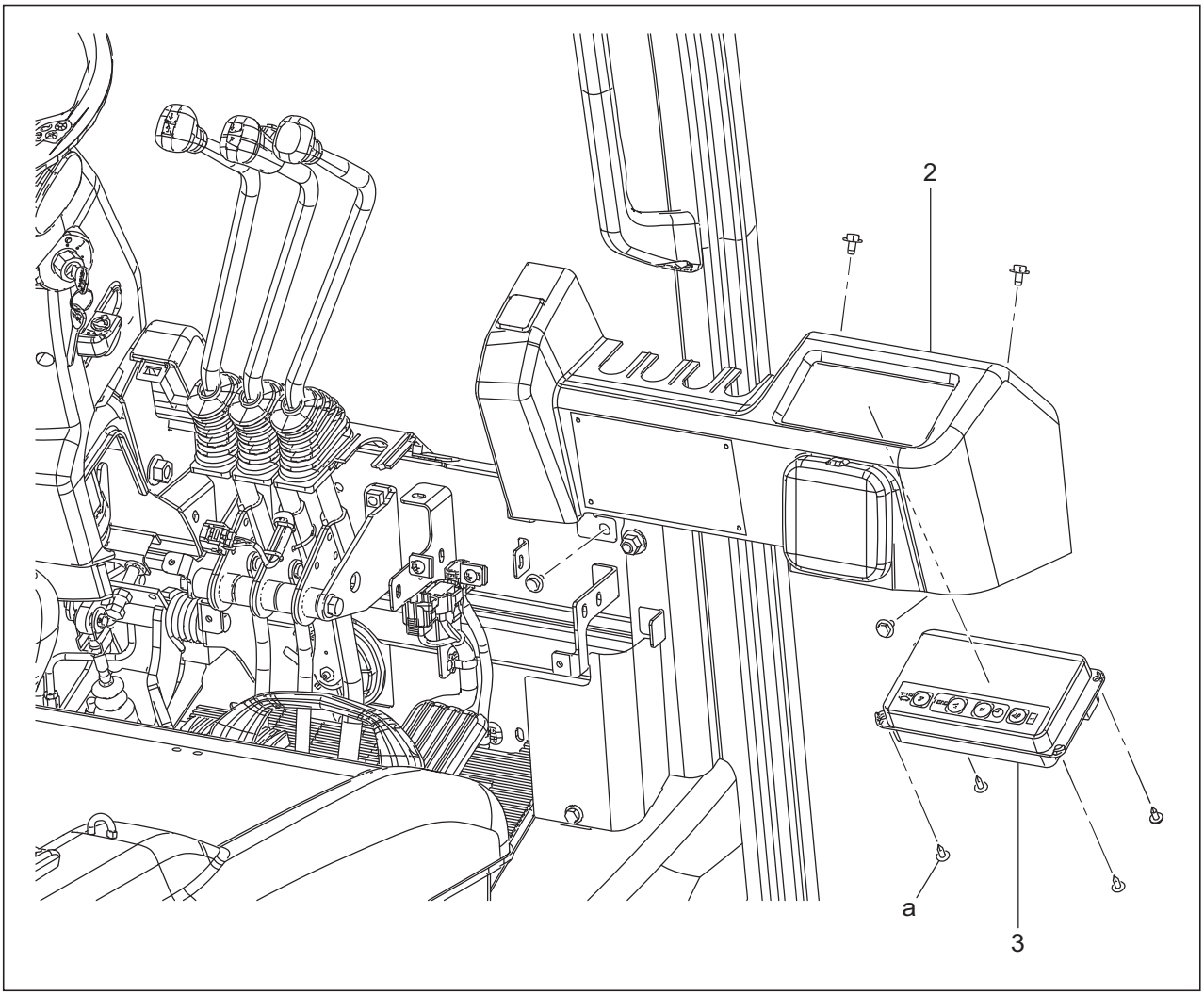
Demo mode		Yes (enabled)	No (disabled)
Material handling during traveling		Allowed	Not allowed
Parking brake OFF warning		Enabled	Disabled
PIN code entry system (OPT)	Authentication function	Authentication possible only for registered authentication numbers	Authentication possible by simply pressing the log-in switch
	Registration, change or deletion of authentication number	Enabled	Disabled

NOTICE

- **Even after the demo mode has been disabled, the data recorded and the settings made during the demo mode are all retained.**
- **After the start of the hour meter, no settings can be made in the demo mode.**

4.4 MULTI-FUNCTION DISPLAY ASSY

4.4.1 REMOVAL AND INSTALLATION



a: T = 0.7 to 0.8 ft-lbf. [0.9 to 1.1 N·m]

Removal Procedure

1. Remove the battery plug.
2. Remove the instrument panel RH.
3. Remove the display from the instrument panel RH.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

Indication	Memory	Indicator	Detection ECU	Error mode	Page
6904	6904	Spanner blinking	Main controller	Backward lock solenoid (open / short) abnormality	page 480
7101	7101	Spanner blinking	Main controller	Tire angle sensor open abnormality	page 483
7102	7102	Spanner blinking	Main controller	Tire angle sensor short abnormality	page 485
7103	7103	Spanner blinking	Main controller	Tire angle sensor anchoring abnormality	page 487
7201	7201	Spanner blinking	Main controller	Tire angle sensor anchoring abnormality	page 489
7202	7202	Spanner blinking	Main controller	Steering-wheel angle sensor SS2 open abnormality	page 494
7203	7203	Spanner blinking	Main controller	Steering-wheel angle sensor SSC open abnormality	page 499
7204	7204	Spanner blinking	Main controller	Steering-wheel angle sensor : sensor power source open abnormality	page 503
7301	7301	Spanner blinking	Main controller	Steering knob position synchronizer solenoid open abnormality	page 506
7302	7302	Spanner blinking	Main controller	Steering knob position synchronizer solenoid short abnormality	page 509
7303	7303	Spanner blinking	Main controller	Steering knob position synchronizer solenoid power-circuit abnormality	page 512
7304	7304	Spanner blinking	Main controller	Steering knob position synchronizer solenoid (open / short) abnormality	page 515
7401	7401	Spanner blinking	Main controller	Tire angle matching : matching value abnormality	page 520
H101	H101	Spanner blinking	Main controller	Lift lever potentiometer open abnormality	page 522
H102	H102	Spanner blinking	Main controller	Lift lever potentiometer short abnormality	page 525
H103	H103	Spanner blinking	Main controller	Lift lever potentiometer : sensor output declination abnormality	page 527
H104	H104	Spanner blinking	Main controller	Lift lever potentiometer neutral abnormality CAUTION	page 530
H105	H105	Spanner blinking	Main controller	Lift lever potentiometer matching value abnormality	page 532
H201	H201	Spanner blinking	Main controller	Tilt lever potentiometer open abnormality	page 534
H202	H202	Spanner blinking	Main controller	Tilt lever potentiometer short abnormality	page 536
H203	H203	Spanner blinking	Main controller	Tilt lever potentiometer : sensor output declination abnormality	page 538
H204	H204	Spanner blinking	Main controller	Tilt lever potentiometer neutral error abnormality	page 541
H205	H205	Spanner blinking	Main controller	Tilt lever potentiometer matching value abnormality	page 543
H301	H301	Spanner blinking	Main controller	Attachment 1 lever potentiometer open abnormality	page 545
H302	H302	Spanner blinking	Main controller	Attachment 1 lever potentiometer short abnormality	page 547
H303	H303	Spanner blinking	Main controller	Attachment 1 lever potentiometer : sensor output declination abnormality	page 549

[ANL] I/O TEMP/VOLT 3/6 TPMDH

Check the pump motor driver power-circuit temperature and compare to the recorded value.

Judgment

Result	Procedure
It has lowered by 41°F (5°C) or more.	Go to step 3
It has not lowered by 41°F (5°C) or more.	**Pump motor driver defect**

STEP5

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113 and the crimped portion of the wire whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check the rotary condition.

[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	Go to step 6

STEP6

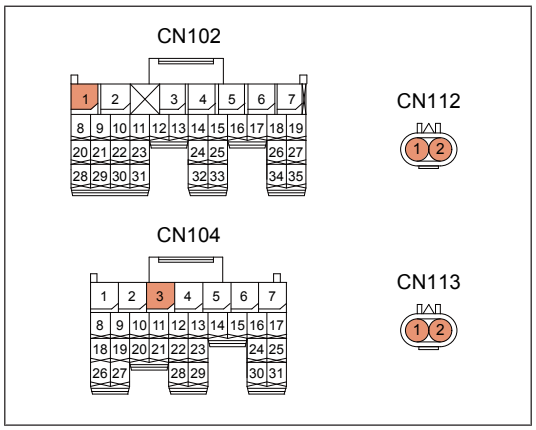
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112 and CN113 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the crimped portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Measurement terminals	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity

Error Code: A201

Failure mode: Main controller overheating abnormality

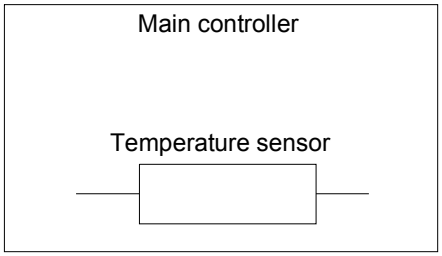
⚠ CAUTION

- **Do not leave the lift truck standing in a hot place.**

Probable cause

- Overheating (continuous overload operation)
- Temperature sensor defect (Main controller defect)

Related portion



STEP1

Inspection :

Reconfirm the error.

Turn on the key switch and check that error occurs.

Judgment

Result	Procedure
"C/R" occurs.	Go to step 2
"C/R" does not occur.	**Overheating (continuous overload operation)** **When the temperature of the drive motor driver drops, "C/R" goes away and the truck can be operated as usual. Continuously running the lift truck in an overloaded condition will cause this error. Limit running the lift truck in an overloaded condition.**

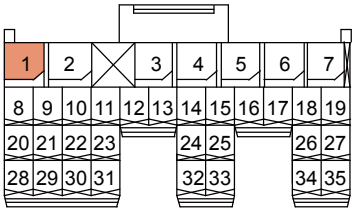
STEP2

Inspection :

Check the main controller board temperature and reconfirm the error.

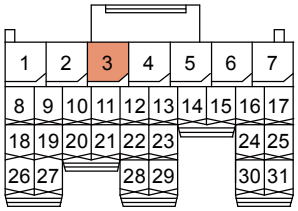
[ANL] I/O TEMP/VOLT 4/6 TMCB

CN102



CN112

CN104



CN113

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the crimped portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

STEP7

Inspection : Cooling fan

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Error Code: A802

Failure mode: F6 fuse open abnormality

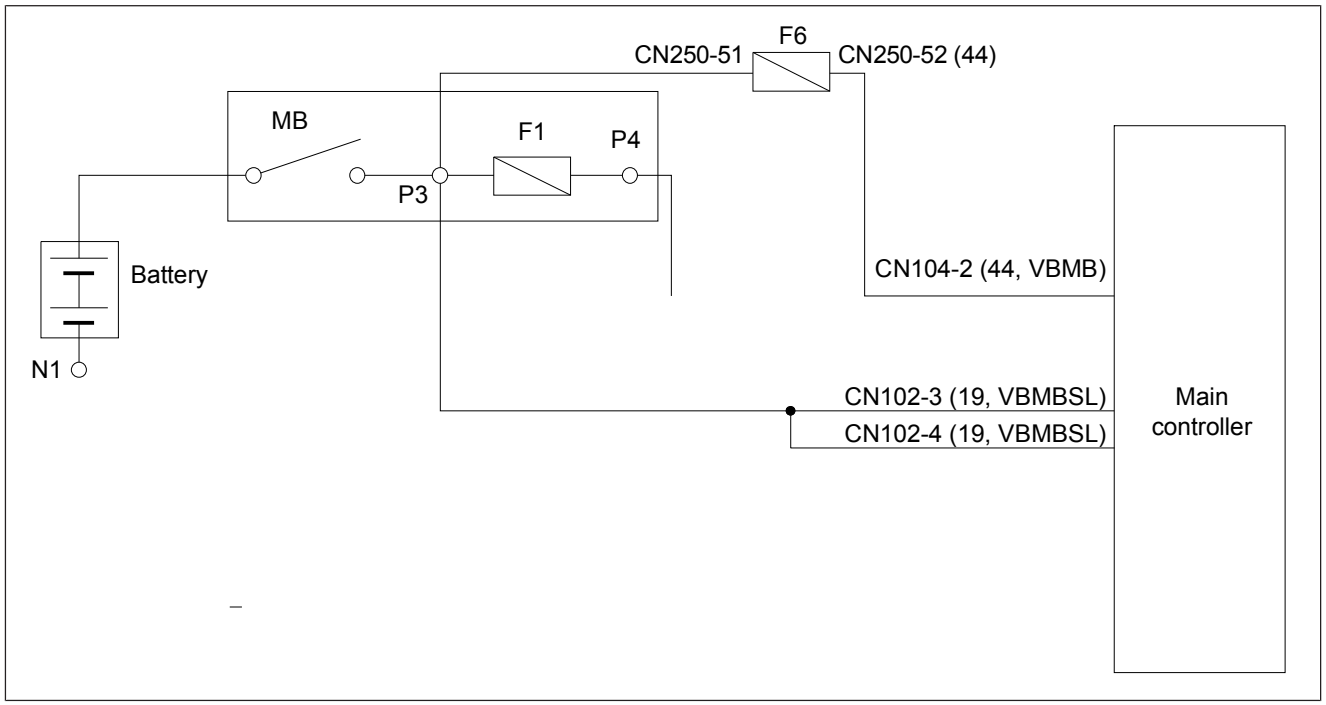
⚠ CAUTION

- **If CB01, CB03 or CB05 occurs, perform troubleshooting with priority given to CB01, CB03 or CB05.**

Probable cause

- Connector contact defect
- F6 fuse installation defect
- F6 fuse defect
- F6 fuse box defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN104 connector and F6 fuse, check the inside of the connector and the crimped portion of the wire to see whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

Error Code: AB01

Failure mode: Cooling fan overcurrent

⚠ CAUTION

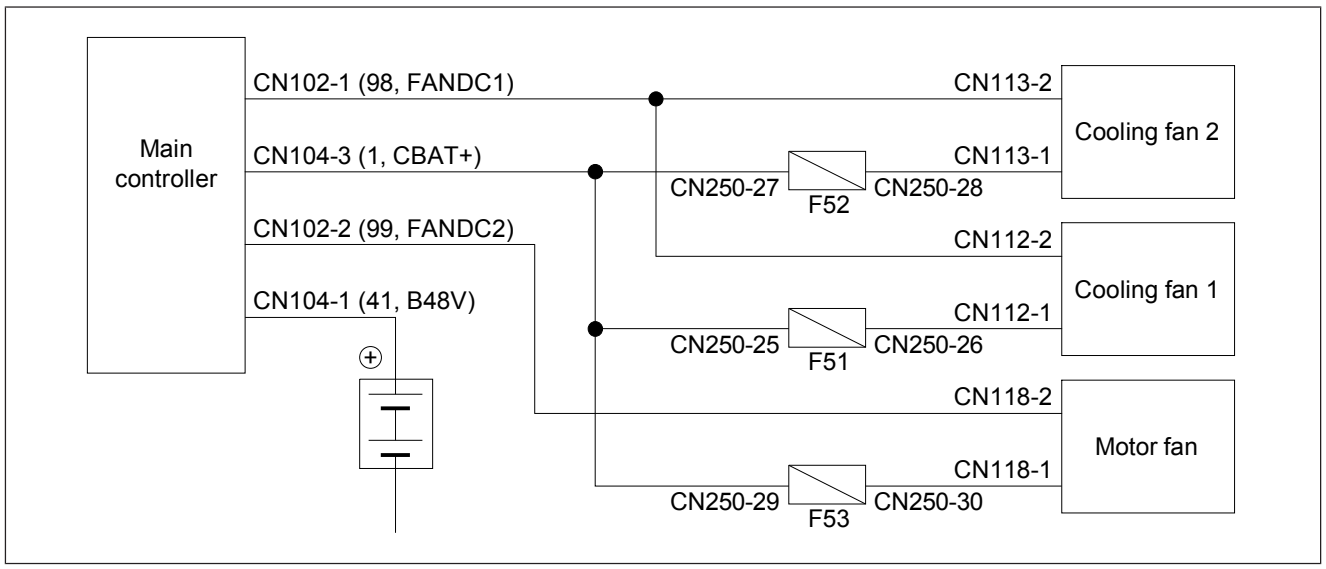
- **When checking if AB01 error occurs, wait 100 seconds after turning on the FAN1, FAN2 by using Active Test.**

(It takes 100 second to confirm the error AB01)

Probable cause

- Connector contact defect
- Motor driver cooling fan 1 defect
- Motor driver cooling fan 2 defect
- Motor cooling fan defect
- Harness defect
- Main controller defect

Related portion



STEP1

Inspection :

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112, CN113, CN118 and the crimped portion of the wire to see whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check if an error occurs.

Turn off the key switch and disconnect the battery plug.

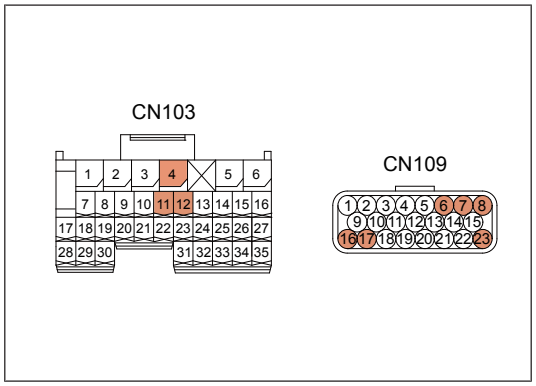
Disconnect the CN110 and CN111 connectors.

Reconnect the battery plug and turn on the key switch. Record the occurred error.

2. Check the harness

Turn off the key switch and disconnect the battery plug.

Connect the CN110, CN111 connectors, and disconnect the CN103, CN109 connectors.



Inspect the harness by the error recorded at STEP4.

[Inspection procedure and standard]

1. Check if the connector plug CN109 is wired correctly. The connector plug could be connected to the wrong controller.

2. Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103, CN109 connectors disconnected, and visually check inside the connector and the crimped portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

*1: Perform if "AD-4 error does not occur and AD-6 error occurs" or "AD-4 error occurs and AD-6 error does not occur".

*2: Perform if "AD-4 and AD-6 error occur".

Portion to be inspected	Standard:	Remarks
CN109-7 to CN109-23	No continuity	*1
CN109-6 to CN109-23	No continuity	*1
CN109-7 to N2	No continuity	*1
CN109-6 to N2	No continuity	*1
CN103-4 to CN109-8	Continuity	*2
CN103-11 to CN109-17	Continuity	*2
CN103-12 to CN109-16	Continuity	*2

Judgment

Result	Procedure
NG	Go to step 5 **Harness defect**
OK	Go to step 5 **Drive motor driver LH defect**

Make sure that an incorrect model motor driver was not installed if the motor driver was recently replaced.

Judgment

Result	Procedure
Wrong part number	**Wrong motor driver type**
Correct part number	Go to step 2

STEP2

Turn off the key switch, disconnect the battery plug, disconnect the CN110 connector, and visually check inside the connector and the crimped portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm the error.

Check if the connector is connected correctly, especially if the motor driver has just been replaced.

Judgment

Result	Procedure
AD03 or AD04 error does not occur.	**Connector contact defect**
AD03 or AD04 error occurs.	Go to step 3

STEP3

Inspection :

Confirm the identification of drive motor driver RH.

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109 and CN111 connectors.

Reconnect the battery plug and turn on the key switch. Confirm the occurred error.

[Inspection procedure and standard]

Check if the connector plug CN109 is wired correctly. The connector plug could be connected to the wrong controller.

Judgment

Result	Procedure
AD02 or AD06 error occur.	Go to step 4
AD02 and AD06 error occur.	Go to step 5

STEP4

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110 connector and check the harness.

Error Code: AF05

Failure mode: Main controller CPU error

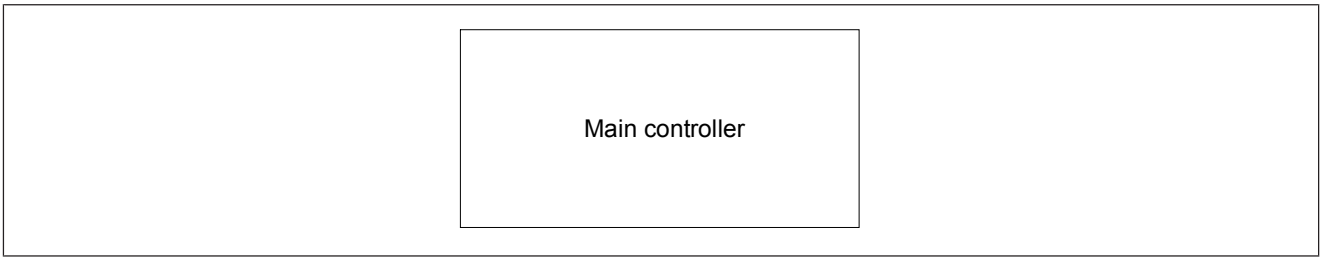
⚠ CAUTION

- **If AF05 occurs, the Main controller is defective. Replace it.**

Probable cause

- Main controller defect

Related portion



Error Code: C101

Failure mode: Drive motor driver LH current sensor neutral voltage error

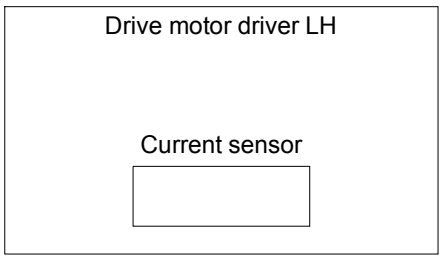
⚠ CAUTION

- **If C101 occurs, the drive motor driver LH is defective. Replace it.**

Probable cause

- Drive motor driver LH defect

Related portion



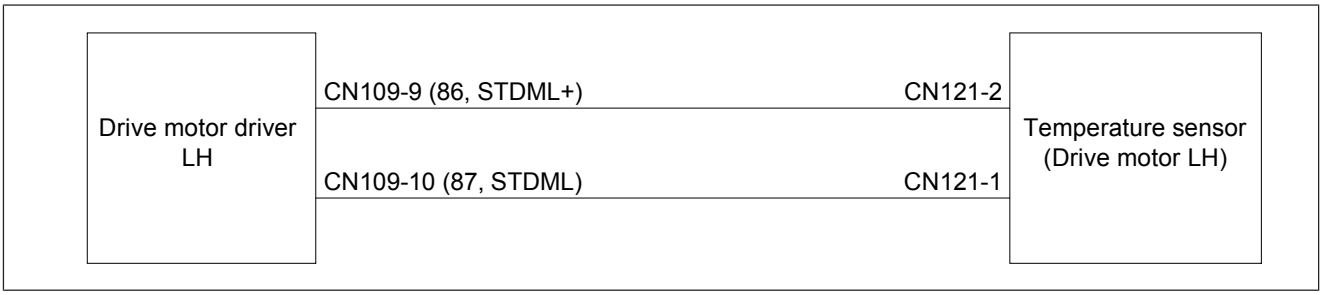
Error Code: C202

Failure mode: Drive motor LH temperature sensor (open/short) abnormality

Probable cause

- Connector contact defect
- Drive motor LH temperature sensor defect
- Drive motor LH temperature sensor harness defect
- Drive motor driver LH defect

Related portion



STEP1

Disconnect the battery plug and visually check inside the CN121 connector and the crimped portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm the error.

Judgment

Result	Procedure
C202 error occurs.	Go to step 2
C202 error does not occur.	**Connector contact defect**

STEP2

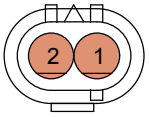
Inspection :

Temperature sensor individual inspection.

Turn off the key switch and disconnect the battery plug.

Disconnect the CN121 connector, and perform the temperature sensor individual inspection.

CN121



[Inspection procedure and standard]

Carry out temperature sensor individual inspection.

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Error Code: C405

Failure mode: Accelerator potentiometer offset abnormality

⚠ CAUTION

- **Make sure to perform Matching after removal and inspection of the accelerator potentiometer.**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN26 connector, check the inside of the connector and the crimped portion of wire whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
C405 error does not occur.	**Connector contact defect**
C405 error occurs.	Go to step 2

STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Error Code: C506

Failure mode: Brake potentiometer matching value abnormality

⚠ CAUTION

- **If C501, C502, C503, C504, C505 occurs, give priority to troubleshooting for C501, C502, C503, C504, C505.**
- **Make sure to perform Matching after removal and inspection of the brake potentiometer.**

Probable cause

- Main controller defect
- Brake potentiometer matching value defect
- Brake potentiometer assembly defect

Related portion

Main controller	CN101-34 (72, VRB1+)	CN6-5	Brake potentiometer
	CN102-33 (71, VRB1)	CN6-4	
	CN101-22 (50, VRA-)	CN6-6	
	CN101-33 (74, VRB2+)	CN6-1	
	CN102-25 (73, VRB2)	CN6-3	
	CN101-32 (51, POT-)	CN6-2	

STEP1

Perform matching of the brake potentiometer.

(Refer to page MATCHING [page 143].)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Check the brake potentiometer voltage.

Brake sensor 1/2 voltage

[ANL] I/O TRAVELING 1/5 VRB

[Inspection procedure and standard]

Error Code: C803

Failure mode: Drive motor RH rotation sensor open abnormality

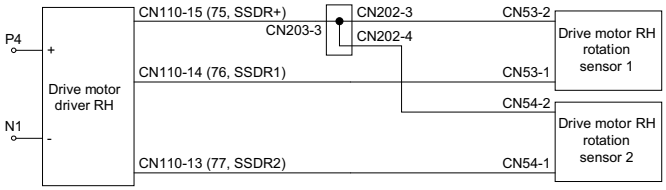
⚠ CAUTION

- **Jack up the lift truck until the drive wheels leave the ground and support the frame with wooden blocks before you start troubleshooting.**

Probable cause

- Connector contact defect
- Drive motor RH rotation sensor 1/2 harness defect
- Drive motor RH rotation sensor 1 defect
- Drive motor RH rotation sensor 2 defect
- Drive motor RH rotation sensor 1/2 defect
- Drive motor driver RH defect

Related portion



STEP1

Disconnect the battery plug. Visually check inside the connector between CN110, CN53, CN54 and CN202 and the crimped portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connectors, connect the battery plug and turn on the key switch to confirm the error.

Judgment

Result	Procedure
C803 error does not occur.	**Connector contact defect**
C803 error occurs.	Go to step 2

STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110, CN53 and CN54 connectors and check the harnesses.

Inspection : Fuse box

Connect the F6 fuse, and disconnect the connector of fuse box.

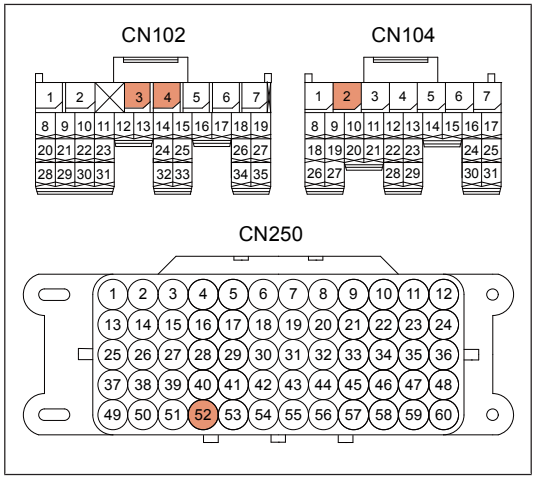
Measure the resistance for both ends of F6 fuse box.

Judgment

Result	Procedure
0 Ω	Go to step 6
∞ Ω	**F6 fuse box defect**

STEP6

Inspection : Harness



Disconnect the CN102 and CN104 connectors and F6 fuse and check the harnesses for continuity.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug, the CN102 and CN104 connectors, and F6 fuse disconnected. Visually check inside the connectors and the crimped portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-3(19) to P3	Continuity
CN102-4(19) to P3	Continuity
CN250-52(44) to CN104-2(44)	Continuity
CN250-52 (fuse side) to P3	Continuity
CN102-3(19) to N1	No continuity
CN102-4(19) to N1	No continuity
CN250-52 (fuse side) to N1	No continuity
CN250-52(44) to N1	No continuity

Judgment

Result	Procedure
OK	Go to step 7
NG	**Harness defect**

STEP7

Voltage inspection

After connecting the connectors, connect the battery plug, and turn on the key switch.

Measure both ends of the contactor for voltage (contact side).

[Inspection procedure and standard]

Refer to the following figure, and measure both ends of the contactor for voltage (contact side).

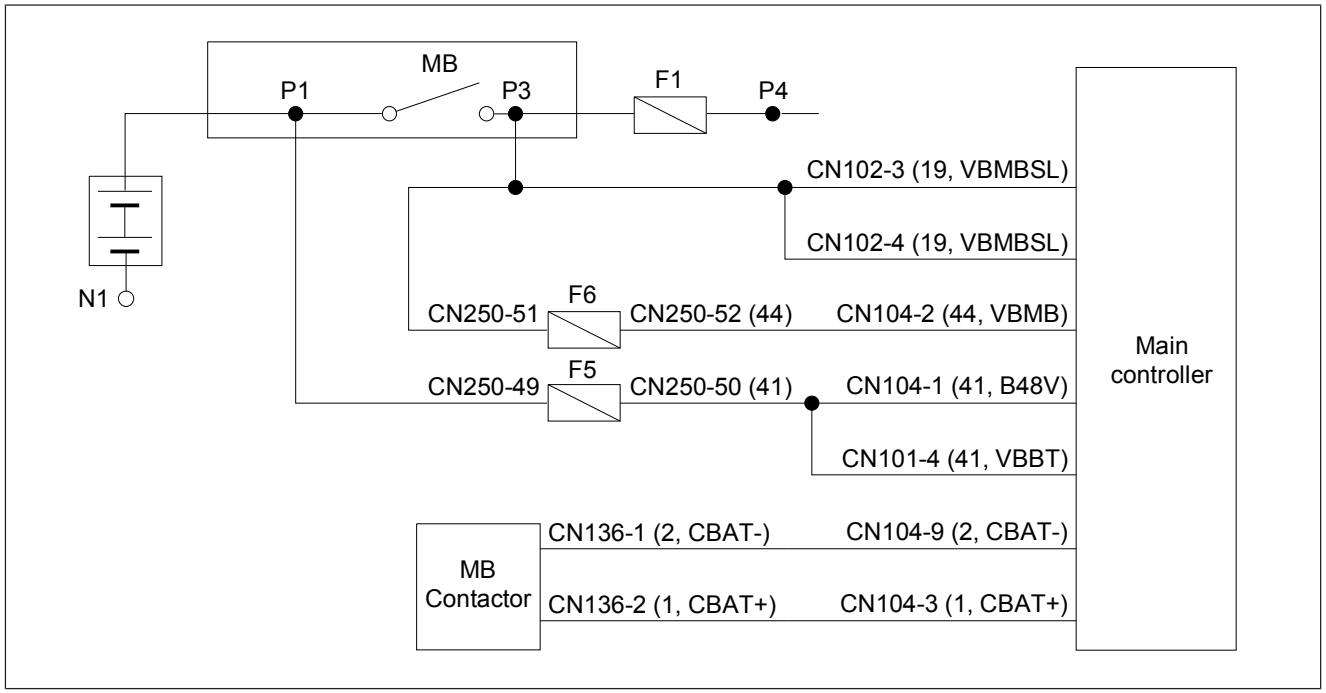
Error Code: CB05

Failure mode: MB contactor (coil side) short abnormality

Probable cause

- Connector contact defect
- MB contactor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN136 connector, check the inside of connector and the crimped portion of the wire to see whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN136 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
CB05 error occurs.	Go to step 2

Error Code: CD03

Failure mode: Drive motor driver RH CPU abnormality

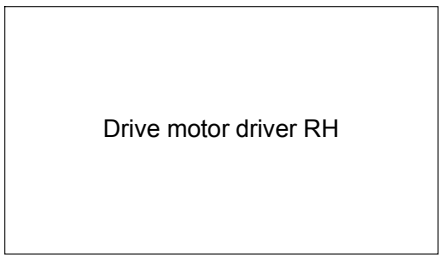
⚠ CAUTION

- **If CD03 occurs, the drive motor driver RH is defective. Replace it.**

Probable cause

- Drive motor driver RH defect

Related portion



Error Code: E201

Failure mode: Pump motor overheating abnormality

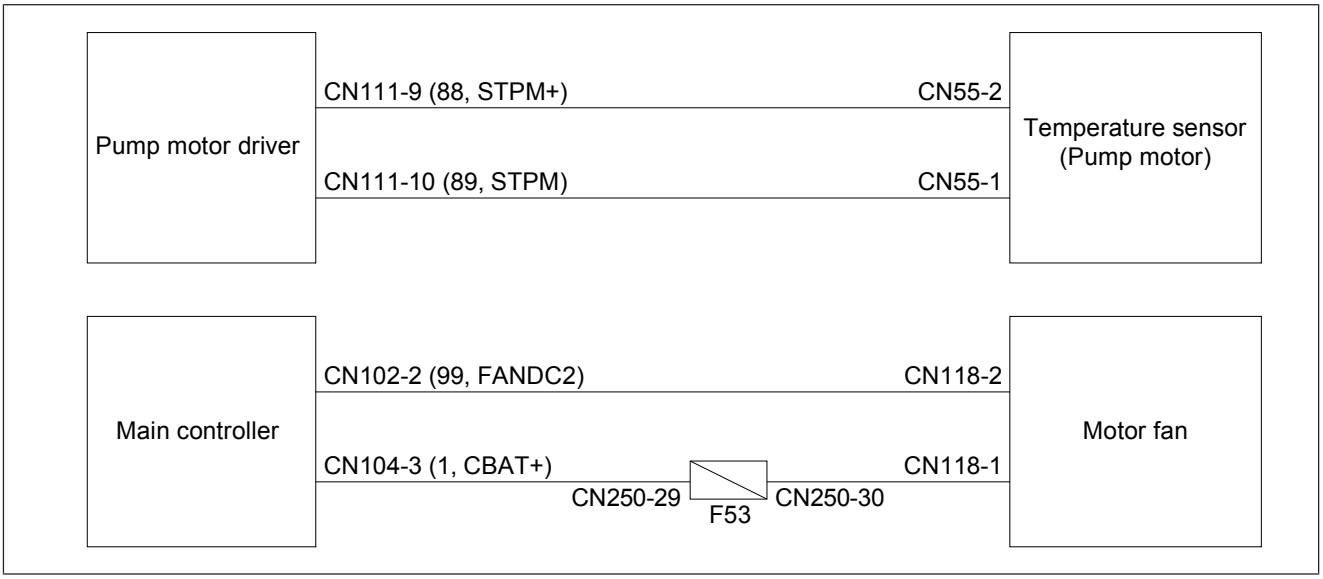
⚠ CAUTION

- **Do not leave the lift truck standing in a hot place.**

Probable cause

- Overheating (continuous overload operation)
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

[ANL] ACTIVE TEST 2/3

FAN2 : OFF → ON

* If the cooling fan is not working correctly, start troubleshooting from STEP2.

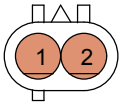
Judgment

Result	Procedure
Not running	Go to step 5

Connect SST2 between CN56-1 and CN56-2 on the CN111 side with CN56 connector disconnected.

Connect the battery plug and turn on the key switch to confirm that the error occurs.

CN56



Judgment

Result	Procedure
E802 error occurs.	Go to step 5
E801 error occurs, or error does not occur.	**Pump motor driver defect**

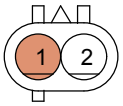
STEP5

Inspection: Pump motor driver

Turn off the key switch and disconnect the battery plug.

Disconnect SST2, and measure the resistance between CN56-1 (CN111 side) and N2 with CN56 connector disconnected.

CN56



Judgment

Result	Procedure
Approx. 100 Ω	**Pump motor rotation sensor defect**
Outside Approx. 100 Ω	**Pump motor driver defect**

Error Code: EE02

Failure mode: Communication line abnormality: Display to main controller

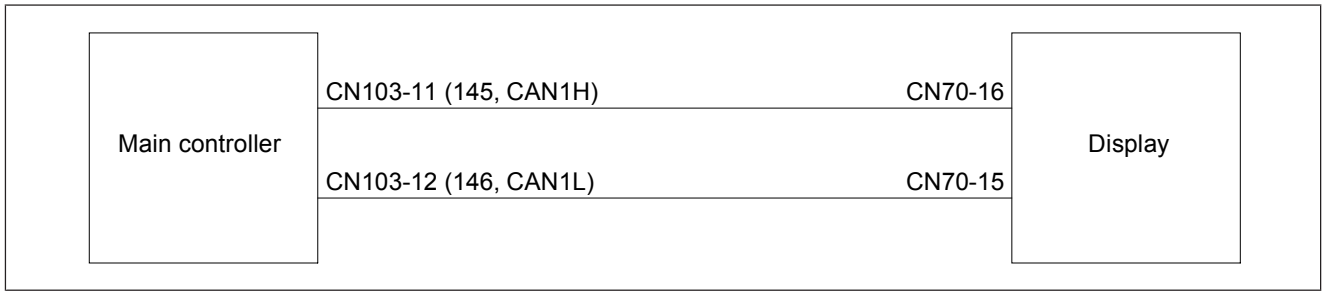
⚠ CAUTION

- **The display was not communicating with the main controller. Communication to the display has recovered. Use it as is.**

Probable cause

- Display defect
- Main controller defect

Related portion



STEP1

Confirming error occurrence:

Check if error F101 or F102 is occurring at display.

Judgment

Result	Procedure
F101 or F102 occur	**Troubleshooting for F101, F102**
No occurrence	**Display or main controller defect**

Error Code: F406

Failure mode: Display CPU defect

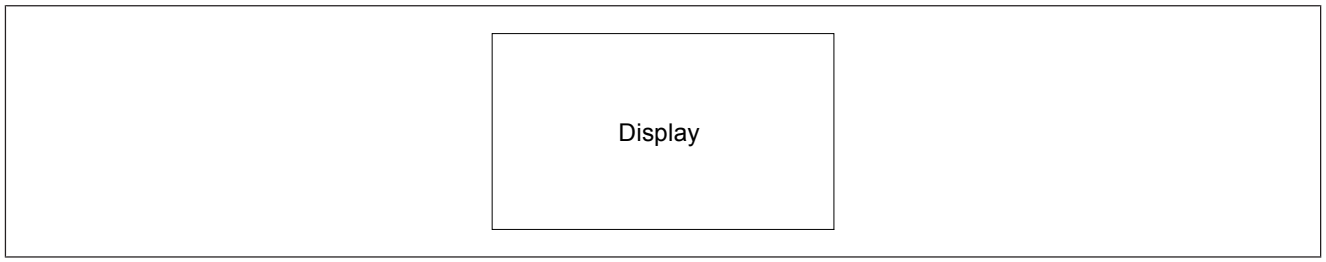
⚠ CAUTION

- **If F406 occurs, the display is defective. Replace it.**

Probable cause

- Display defect

Related portion



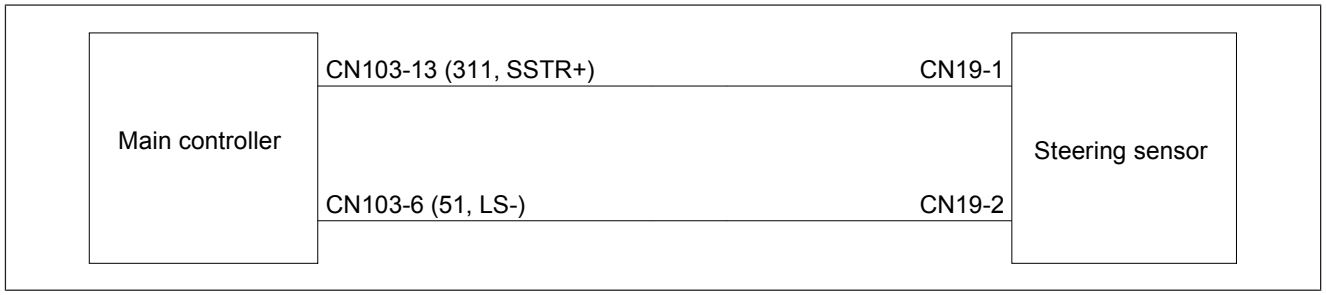
Error Code: FF02

Failure mode: Steering sensor power-supply circuit over current

Probable cause

- Connector contact defect
- Steering sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Disconnect the battery plug. Visually check inside connector CN19 and the crimped portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm the display.

Judgment

Result	Procedure
FF02 error occurs.	Go to step 2
FF02 error does not occur.	**Connector contact defect**

STEP2

Inspection:

Steering sensor power supply inspection.

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector, connect the battery plug, and turn on the key switch.

Measure the voltage between the CN19-1 and CN19-2 connectors on the harness side.

Inspection: Motor driver

Replace the drive motor driver LH with the pump motor driver.

Connect the battery plug and turn on the key switch to confirm that the error occurs.

(Ignore the error codes 3201 and 3203.)

Judgment

Result	Procedure
3303 error occurs.	**Drive motor driver (LH) defect** **The motor driver that is drive motor driver (LH) before replacement is defective.**
3301 error occurs.	**Main controller defect**

Judgment

Result	Procedure
6101 error occurs.	**Load sensor defect**
6101 error does not occur.	Go to step 3

STEP3

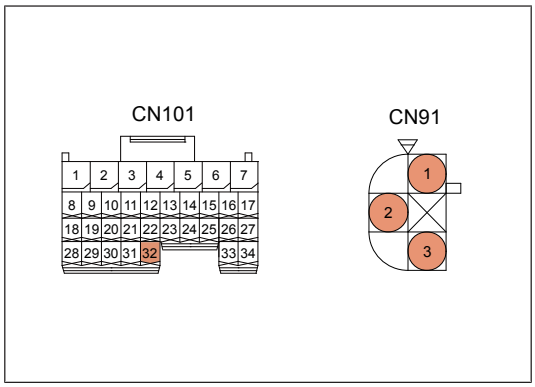
Inspection: Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN91, CN101, CN103 and CN104 connectors and check the harnesses for continuity.

[Inspection procedure and standard]

Inspect for continuity of the harnesses.



Perform this check with the battery plug and the CN91, CN101, CN103, CN104 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN91-1(58) to CN91-2(59)	No continuity
CN101-32(51) to CN91-3(51)	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Judgment

Result	Procedure
“0” occurs after the operation is repeated several times.	**Detect the error for operating in a backward direction for over 2 minutes. Use as it is.**
“1” occurs after the operation is repeated several times.	**Tilt lever switch installation defect.** **Tilt lever switch defect**

Judgment

Result	Procedure
6404 error occurs.	Go to step 2
6404 error does not occur.	**Connector contact defect.**

STEP2

Inspection : Check the mounting state of F73 fuse

Turn off the key switch and disconnect the battery plug.

Visually confirm if the F73 fuse has no defect.

After connecting the fuse, connect the battery plug and turn on the key switch to confirm the error.

Judgment

Result	Procedure
6404 error does not occur.	**F73 fuse installation defect**
6404 error occurs.	Go to step 3

STEP3

Inspection : F73 fuse individual inspection

Turn off the key switch and disconnect the battery plug.

After removing F73 fuse, measure the resistance for both ends of F73 fuse.

Judgment

Result	Procedure
∞ Ω	**F73 fuse defect**. **After replacing F73 fuse, go to STEP5.**
0 Ω	Go to step 4

STEP4

Inspection: F73 fuse box

Turn off the key switch and disconnect the battery plug.

Connect the F73 fuse, and disconnect the connector of F73 fuse box.

Measure the resistance for both ends of F73 fuse box.

Judgment

Result	Procedure
∞ Ω	**F73 fuse box defect**
0 Ω	Go to step 5

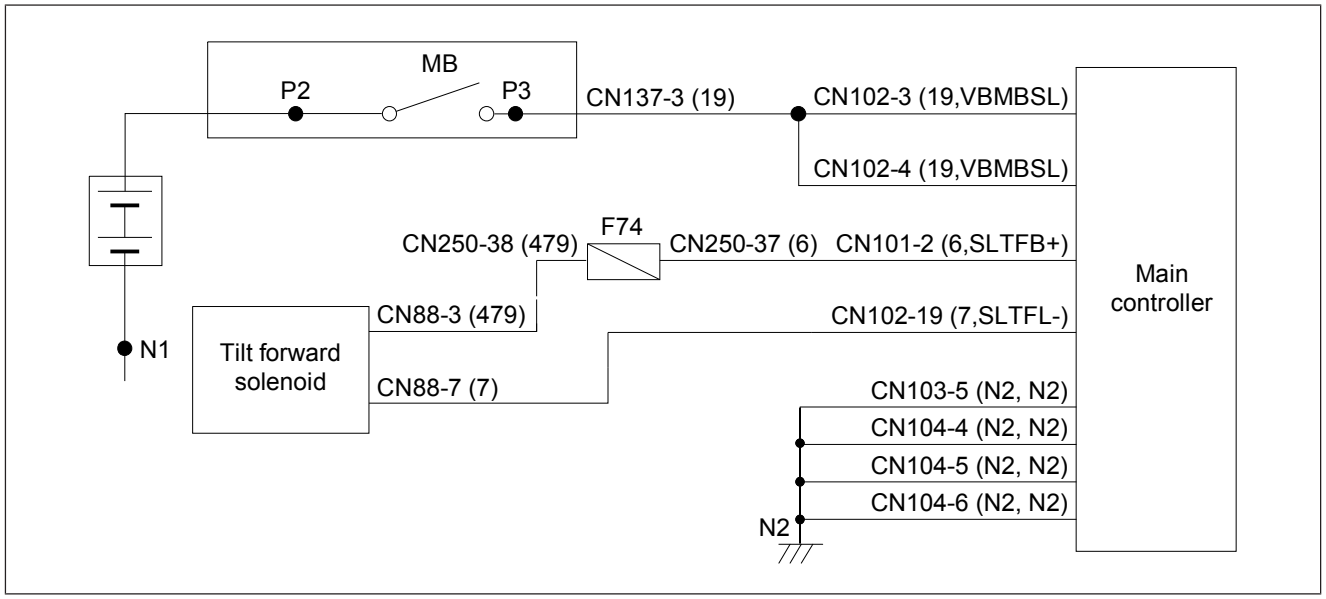
Error Code: 6503

Failure mode: Tilt solenoid drive circuit abnormality

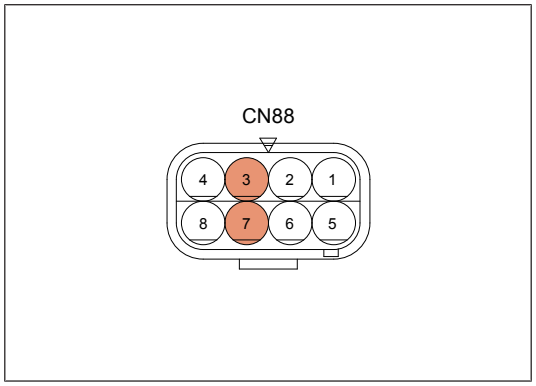
Probable cause

- Tilt solenoid defect
- Harness defect
- Main controller defect
- F74 fuse defect

Related portion



STEP1



Inspection: Tilt solenoid

Turn off the key switch and disconnect the battery plug.

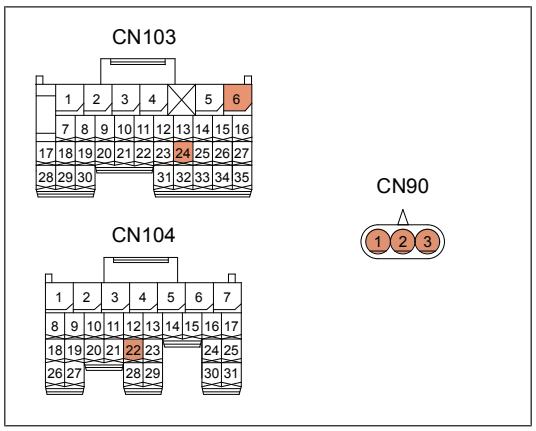
Disconnect the CN88 connector, and check the resistance of tilt solenoid.

[Inspection procedure and standard]

Check the resistance of tilt solenoid.

Turn off the key switch and disconnect the battery plug. Disconnect the CN88 connector. Visually check inside the connector and the crimped portion of its wires for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-3(479) to CN88-7(7)	Approx. 10 Ω



Disconnect the CN90, CN103 and CN104 connectors and check the harnesses for continuity.

[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN90, CN102, CN103 and CN104 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard
CN104-22(90) to CN90-2(90)	Continuity
CN103-24(91) to CN90-3(91)	Continuity
CN103-6(51) to CN90-1(51)	Continuity
CN90-1(51) to CN90-2(90)	No continuity
CN90-1(51) to CN90-3(91)	No continuity
CN90-2(90) to CN90-3(91)	No continuity

Judgment

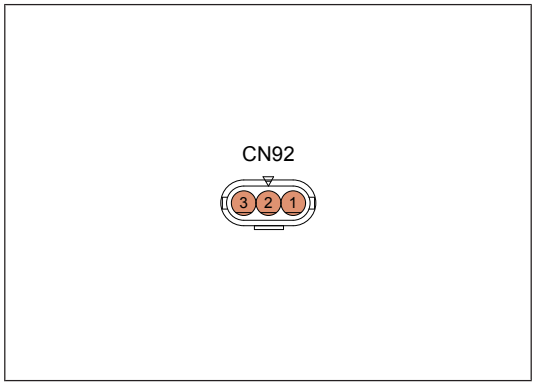
Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP4

Inspection: Lifting height switch

Turn off the key switch and disconnect the battery plug while keeping the condition (height) under the occurred error.

Disconnect the CN92 connector and check the height switch for continuity.



[Inspection procedure and standard]

Check the switch for continuity.

Perform this check with the battery plug and the CN92 connector disconnected. Visually check inside the connector and the crimped portion of its wires for defects.

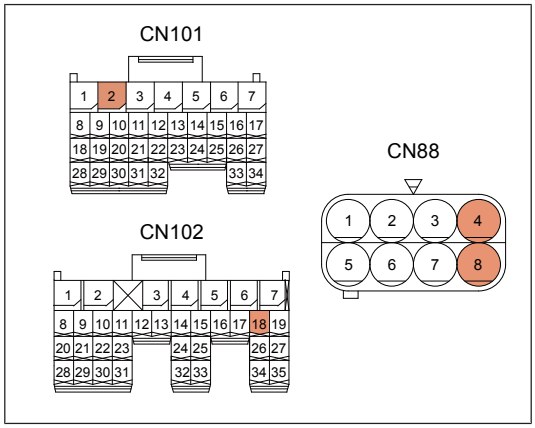
Refer to BEFORE TROUBLESHOOTING

Give attention to the inspection contents. These are different standards for the condition of the height switch lever.

Judgment

Result	Procedure
NG	Go to step 2 **Backward lock solenoid defect**
OK	Go to step 2

STEP2



Inspection: Harness

Disconnect the CN101, CN102 and CN88 connectors, then check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN102, CN88 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-8(480) to CN88-4(8)	No continuity
CN101-2(6) to CN102-18(8)	No continuity
CN102-18(8) to P2	No continuity
CN102-18(8) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect. Go to step 3**
OK	**Main controller defect. Go to step 3**

STEP3

Inspection : F75 fuse

Turn off the key switch and disconnect the battery plug.

After removing F75 fuse, measure the resistance for both ends of F75 fuse.

Judgment

Result	Procedure
∞ Ω	**F75 fuse defect** **Replace the F75 fuse with the defective portion in the former step.**
0 Ω	**Replace the defective portion in the former step.**

Error Code: 7201

Failure mode: Steering-wheel angle sensor SS1 open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion

Main controller	CN103-13 (311, SSTR+)	CN19-1	Steering angle sensor
	CN104-30 (312, SSTR1)	CN19-3	
	CN104-31 (313, SSTR2)	CN19-4	
	CN104-24 (314, SSTRC)	CN19-5	
	CN102-10 (51, LS-)	CN19-2	

STEP1

Connector contact inspection:

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN19 connector, visually confirm whether the inside of the connector and the crimped portion of the wire has a defect or not. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and check if an error occurs with turning the steering wheel.

Judgment

Result	Procedure
7201 error occurs.	Go to step 2
7201 error does not occur.	**Connector contact defect**

STEP2

Inspection: Steering angle sensor

Check the condition of the sensor when operating the steering wheel.

[ANL] I/O STEERING 1/1 SSTR

Error Code: 7203

Failure mode: Steering-wheel angle sensor SSC open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion

Main controller	CN103-13 (311, SSTR+)	CN19-1	Steering angle sensor
	CN104-30 (312, SSTR1)	CN19-3	
	CN104-31 (313, SSTR2)	CN19-4	
	CN104-24 (314, SSTRC)	CN19-5	
	CN102-10 (51, LS-)	CN19-2	

STEP1

Connector contact inspection:

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN19 connector, visually check inside the connector and the crimped portion of its wires for defects. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and check if an error occurs while turning the steering wheel (over one revolution).

Judgment

Result	Procedure
7202 error occurs.	Go to step 2
7202 error does not occur.	**Connector contact defect**

STEP2

Inspection: Steering angle sensor

Check the condition of the sensor while operating the steering wheel.

[ANL] I/O STEERING 1/1 SSTR

Error Code: 7302

Failure mode: Steering knob position synchronizer solenoid short abnormality

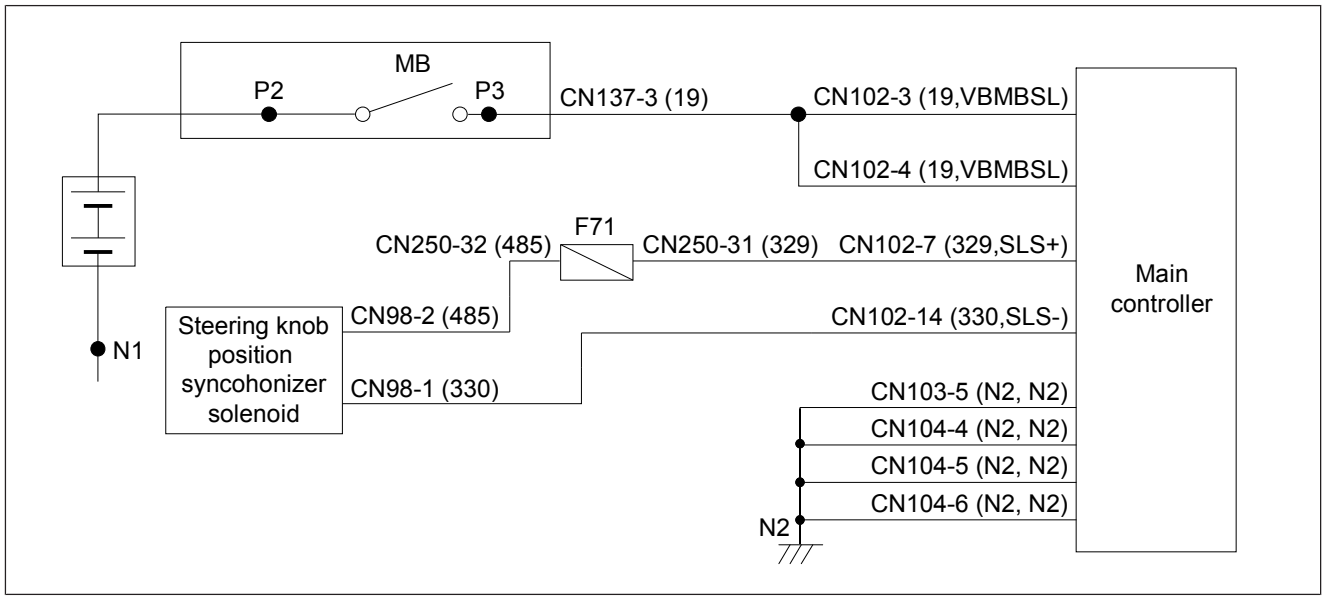
⚠ CAUTION

- **If 7303 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 7303.**

Probable cause

- Connector contact defect
- Harness defect
- Steering knob position synchronizer solenoid defect
- Main controller defect

Related portion



STEP1

Connector contact inspection:

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN98 connector, visually confirm whether the inside of the connector and the crimped portion of the wire has a defect or not. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN98 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

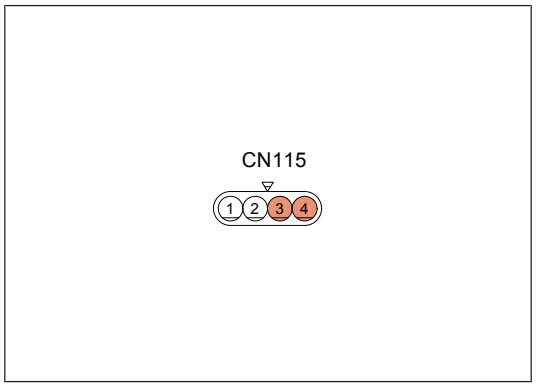
Portion to be inspected	Standard:
CN102-7(329) to CN98-2(329) *	Continuity
CN102-14(330) to CN98-1(330) *	Continuity
CN102-7(329) to CN102-14(330) *	No continuity
CN98-2(329) to N2	No continuity
CN98-1(330) to N2	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Connect between CN115-4 and CN115-3 on the harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm that the error occurs.



Judgment

Result	Procedure
H102 error occurs.	Go to step 5
H102 error does not occur.	Go to step 3

STEP5

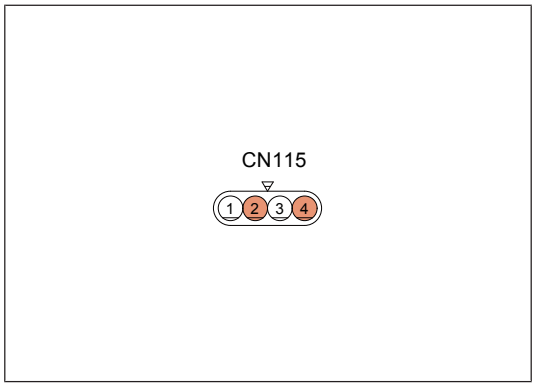
Inspection: Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect between CN115-4 and CN115-2 on the harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm that the error occurs.



Judgment

Result	Procedure
H102 error occurs.	**Lift lever potentiometer defect**
H102 error does not occur.	Go to step 3

Connect the battery plug and turn on the key switch to confirm that the error occurs.

Judgment

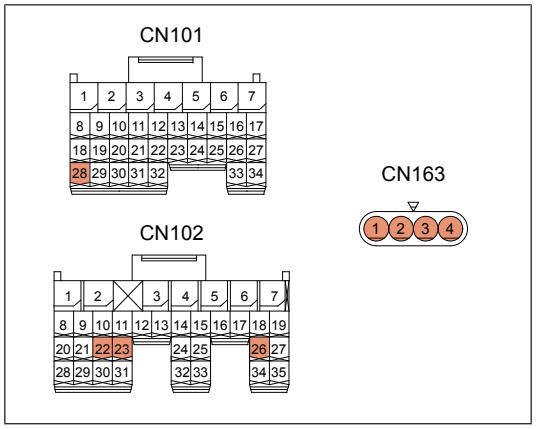
Result	Procedure
H201 error does not occur.	Go to step 3
H201 error occurs.	Go to step 4

STEP3

Inspection: Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102 and CN163 connectors and check the harnesses for continuity.



[Inspection procedure and standard]

Inspect for continuity of the harnesses.

Perform this check with the battery plug and the CN101, CN102 and CN163 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects.

Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard:
CN101-28(29) to CN163-4(29)	Continuity
CN102-23(22) to CN163-3(22)	Continuity
CN102-22(23) to CN163-2(23)	Continuity
CN102-26(51) to CN163-1(51)	Continuity
CN163-3(22) to CN163-4(29)	No continuity
CN163-2(23) to CN163-4(29)	No continuity
CN163-3(22) to CN163-1(51)	No continuity
CN163-2(23) to CN163-1(51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

STEP4

Inspection: Tilt lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN163 connector.

Connect between CN163-4 and CN163-3 on the harness side with SST2 connected.

Error Code: H303

Failure mode: Attachment 1 lever potentiometer: sensor output declination abnormality

⚠ CAUTION

- **Make sure to perform matching if the lever was removed and inspected.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 1 lever potentiometer defect
- Main controller defect

Related portion

Main controller	CN101-29 (30, VRAT1+)	CN119-4 (30)	Attachment 1 lever potentiometer
	CN102-21 (24, VRA11)	CN119-3 (24)	
	CN102-20 (25, VRA12)	CN119-2 (25)	
	CN102-26 (51, POT-)	CN119-1 (51)	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnecting the CN119 connector, visually confirm whether the inside of the connector and the crimped portion of the wire has a defect or not. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN119 connector. Connect the battery plug.

Turn on the key switch to check that the error occurs.

Judgment

Result	Procedure
H303 error does not occur.	**Connector contact defect**
H303 error occurs.	Go to step 2

STEP2

Inspection: Attachment 1 potentiometer

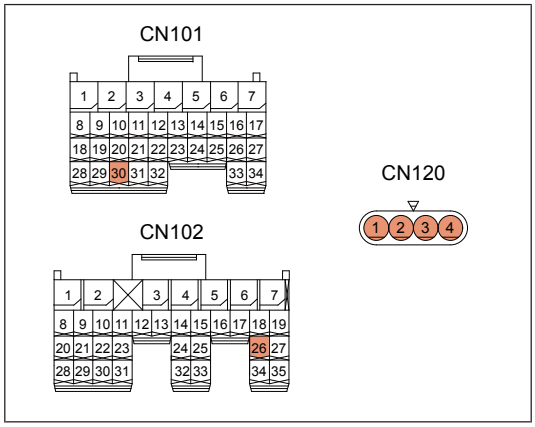
Turn off the key switch and disconnect the battery plug.

Disconnect the CN119 connector.

Judgment

Result	Procedure
H402 error occurs.	Go to step 3
H102 error occurs.	**Attachment 2 lever potentiometer defect**

STEP3



Inspection: Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102 and CN120 connectors, then check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

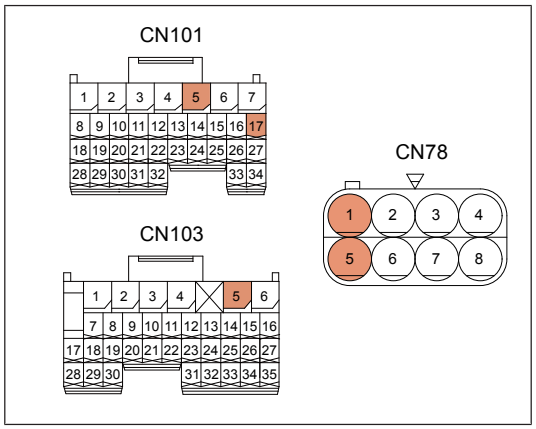
Perform this check with the battery plug and the CN102, CN120 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*: It is OK to connect CN120-1 to CN120-4 through SST2 (979-001/161) and check if there is continuity between CN102-26 and CN101-30.

Portions to be checked	Standard:
CN102-26(51) to CN120-1(51)	Continuity *
CN120-2(27) to CN120-4(31)	No continuity
CN120-3(26) to CN120-4(31)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*1: Connect the CN78 connector and measure the resistance between CN101-5(9) and CN101-17(10). It is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5(9) to CN78-5(481)	Continuously *1
CN101-17(10) to CN78-1	Continuously *1
CN101-5(9) to CN103-5(N2)	No continuity
CN101-17(10) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

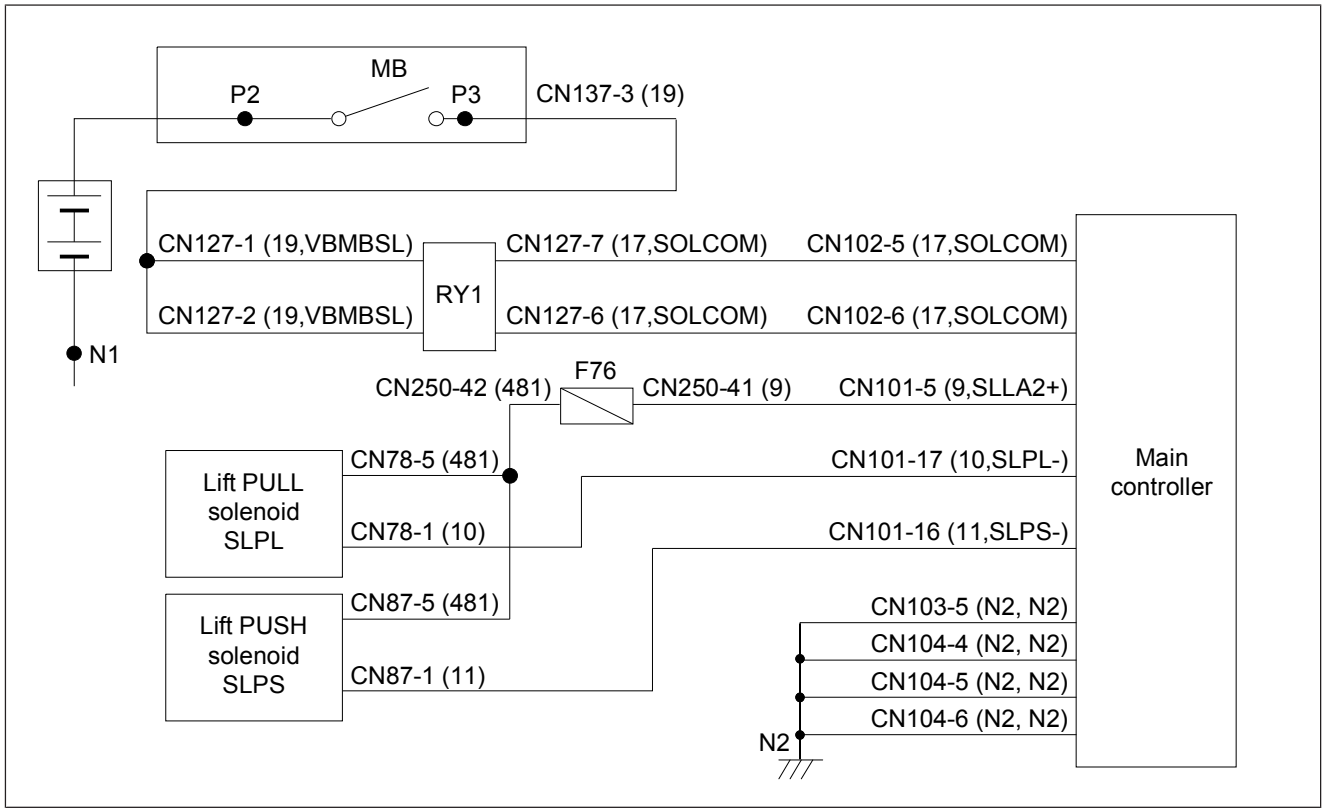
Error Code: H505

Failure mode: Lift proportional valve solenoid drive circuit abnormality

Probable cause

- Lift proportional valve solenoid defect
- Harness defect
- Main controller defect
- F76 fuse defect

Related portion

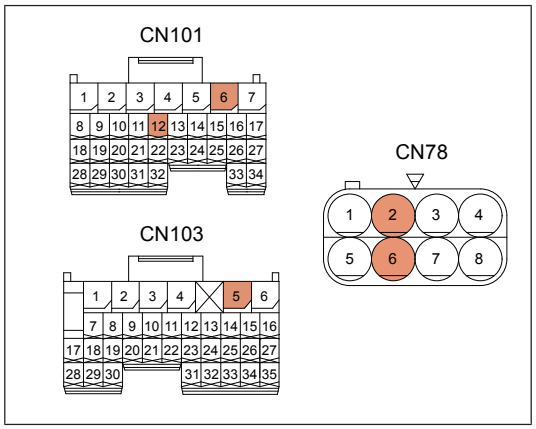


STEP1

Inspection: Lift proportional valve solenoid individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the CN78 and CN87 connectors, and check the resistance of the lift proportional valve solenoid.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*: Connect the CN78 connector and measure the resistance between CN101-6 and CN101-12. It is OK if this resistance is approx. 8 Ω.

Portion to be inspected	Standard:
CN101-6(32) to CN78-6(482)	Continuously *1
CN101-12(33) to CN78-2(33)	Continuously *1
CN101-6(32) to CN103-5(N2)	No continuity
CN101-12(33) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

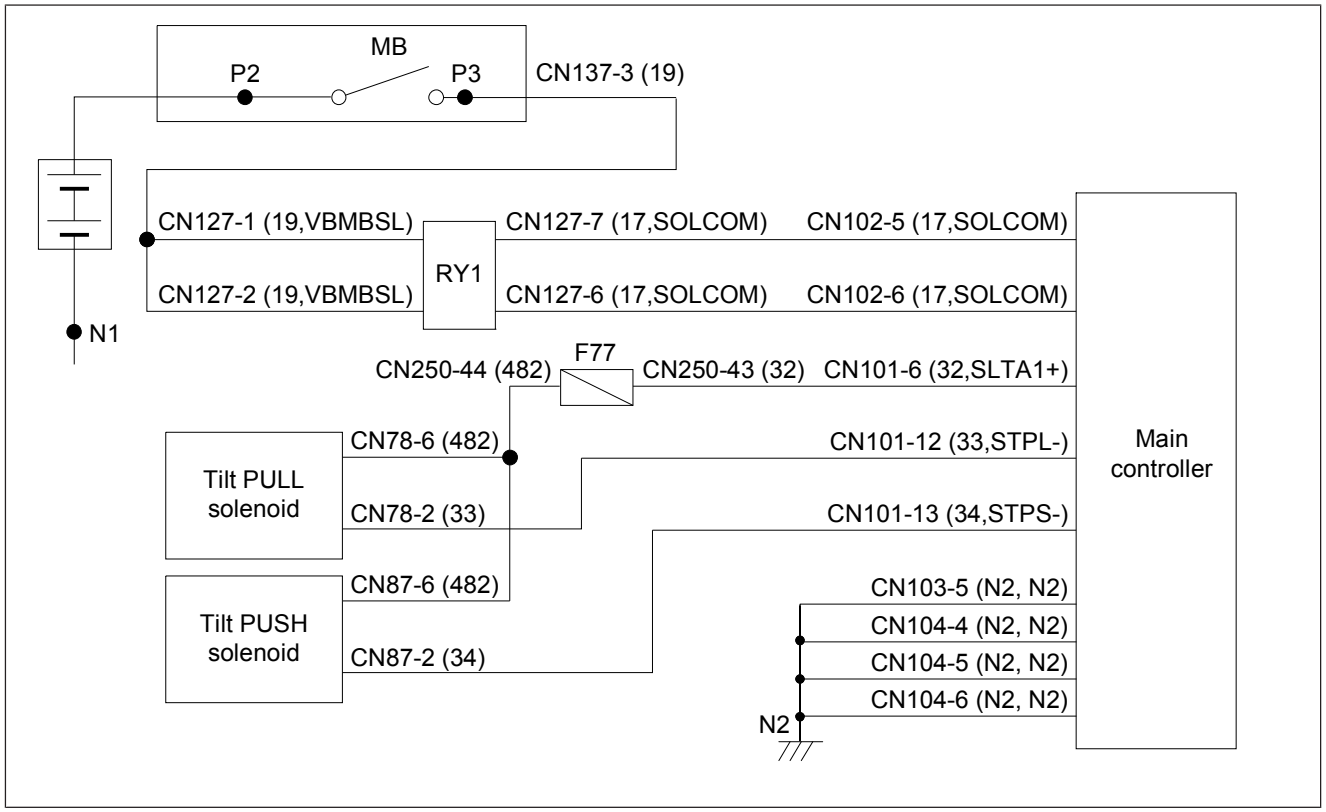
Error Code: H605

Failure mode: Tilt proportional valve solenoid drive circuit abnormality

Probable cause

- Tilt proportional valve solenoid defect
- Harness defect
- Main controller defect
- F77 fuse defect

Related portion



STEP1

Inspection: Tilt proportional valve solenoid individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the CN78 and CN87 connectors, and check the resistance of the tilt proportional valve solenoid.

Error Code: H702

Failure mode: Attachment 1 proportional valve solenoid short abnormality (lever pull side)

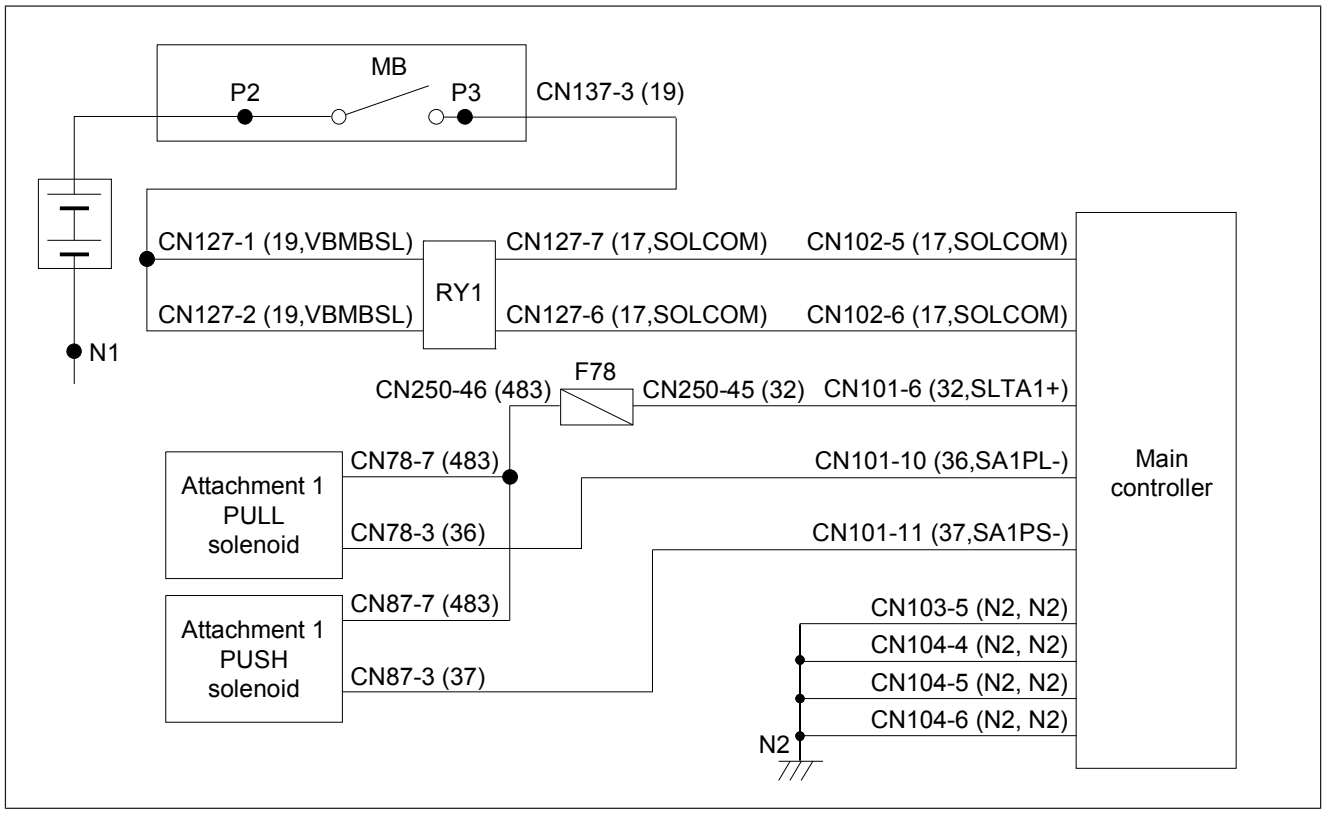
⚠ CAUTION

- **If H705 also occurs, disconnect the battery plug at once. Perform troubleshooting with priority given to H705.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

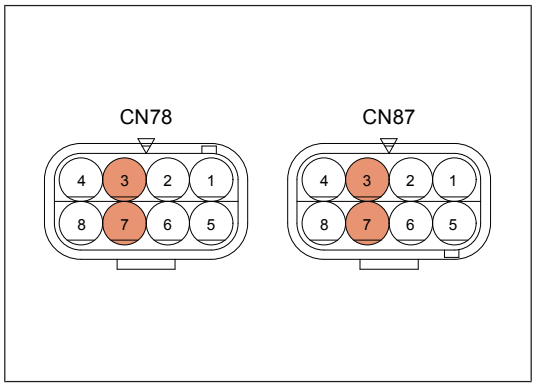
Related portion



STEP1

Turn off the key switch and disconnect the battery plug and disconnect the CN78 connector. Check the inside of connector CN78 and the crimped portion of the wire to see whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

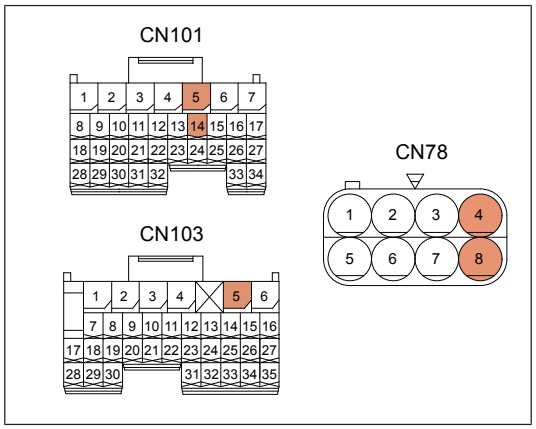
After connecting CN78, connect the battery plug and turn on the key switch to confirm the error.



[Inspection procedure and standard]

Check the resistance of the attachment 1 proportional valve solenoid.

Turn off the key switch and disconnect the battery plug. Disconnect the CN78 and CN87 connectors. Visually check each terminal and the crimped portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*: Connect the CN78 connector and measure the resistance between CN101-5 and CN101-14. It is OK if this resistance is approx. 8 Ω.

Portion to be inspected	Standard:
CN101-5(9) to CN78-8(484)	Continuity *
CN101-14(39) to CN78-4(39)	Continuity *
CN101-5(9) to CN103-5(N2)	No continuity
CN101-14(39) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

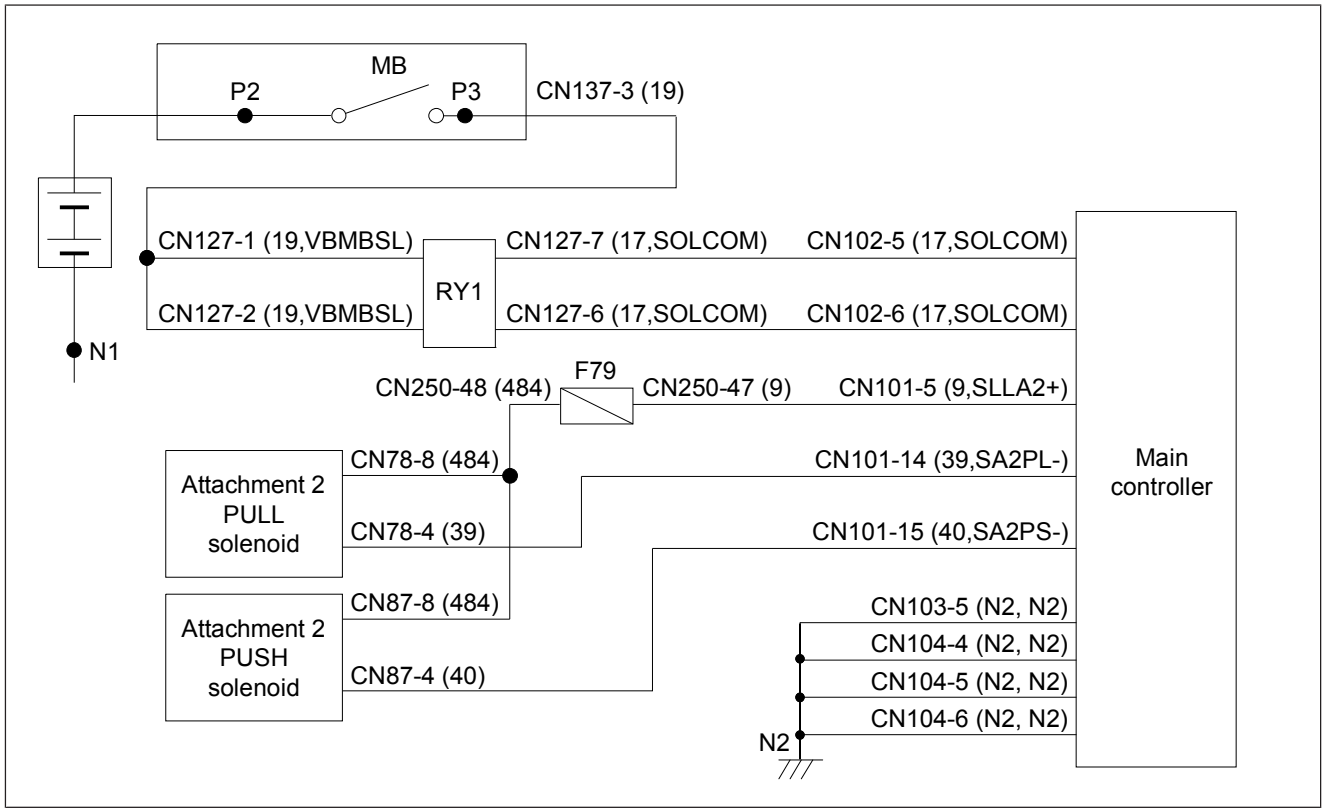
Error Code: H805

Failure mode: Attachment 2 proportional valve solenoid drive circuit abnormality

Probable cause

- Attachment 2 proportional valve solenoid defect
- Harness defect
- Main controller defect
- F79 fuse defect

Related portion



STEP1

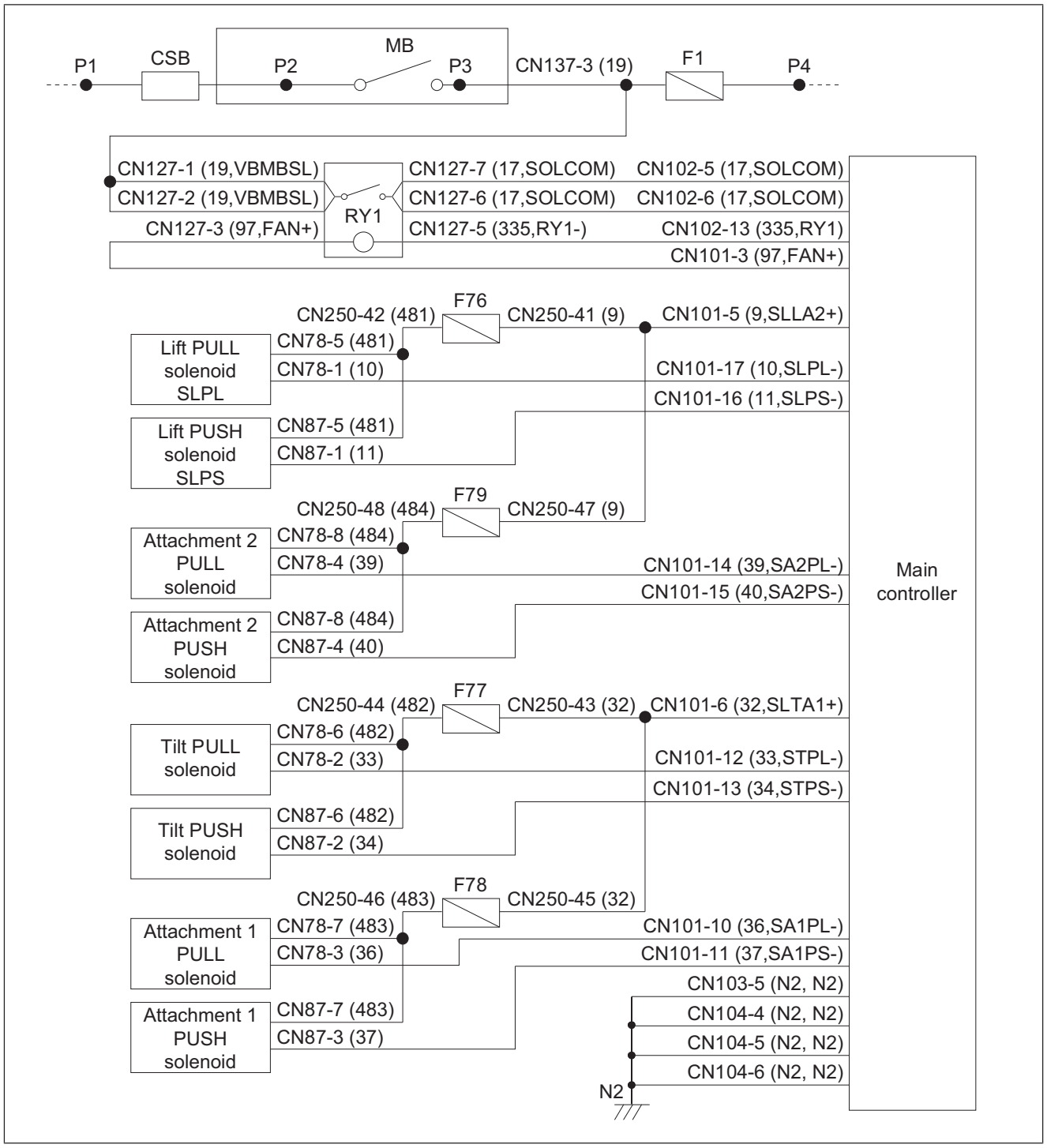
Inspection: Attachment 2 proportional valve solenoid individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the CN78 and CN87 connectors, and check the resistance of attachment 2 proportional valve solenoid.

5

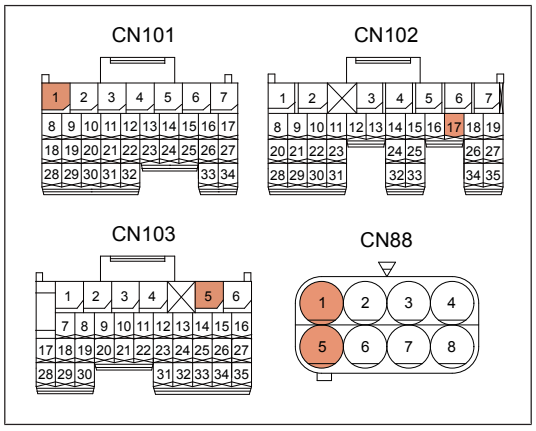
Related portion



STEP1

Turn off the key switch and disconnect the battery plug and CN127 connector. Check the inside of connector CN127 and the crimped portion of the wire to see whether it has a defect or not by visual confirmation. (Refer to BEFORE TROUBLESHOOTING)

After connecting CN127, connect the battery plug and turn on the key switch to confirm the error.



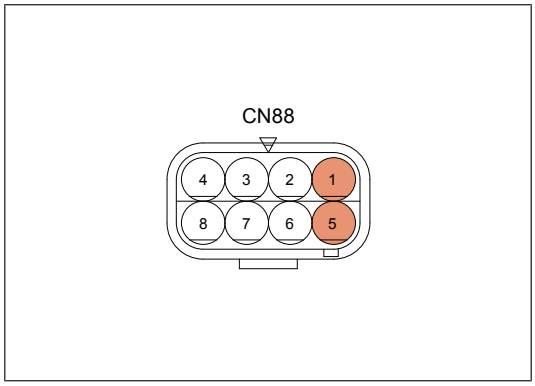
[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN102, CN103, and CN88 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*: Connect the CN88 connector and measure the resistance between CN101-1 and CN102-17. It is OK if this resistance is approx.10 Ω.

STEP5



Inspection: Unload solenoid individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the CN88 connector, and check the resistance of unload solenoid.

[Inspection procedure and standard]

Check the resistance of unload solenoid.

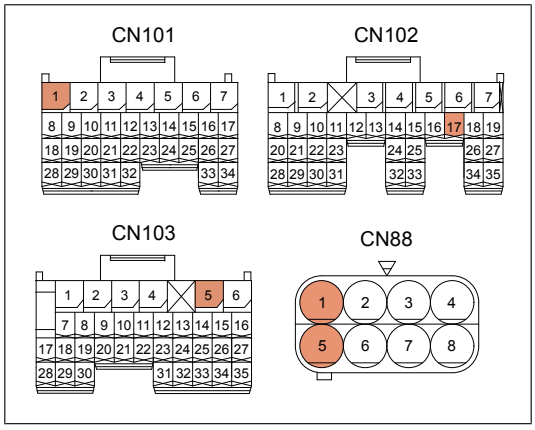
Turn off the key switch and disconnect the battery plug. Disconnect the CN88 connector. Visually check each terminal and the crimped portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-1(478) to CN88-5(5)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Unload solenoid defect** **If replacing the F72 fuse in the former step, perform STEP 6.**
OK	Go to step 6

STEP6



Inspection: Harness

Disconnect the CN101, CN102, CN103, and CN88 connectors, then check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harnesses.

Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected. Visually check inside the connectors and the crimped portion of their wires for defects. (Refer to BEFORE TROUBLESHOOTING)

*: If the former step is OK, connect the CN88 connector and measure the resistance between CN101-1 and CN102-17. It is OK if this resistance is approx. 10 Ω.

Portion to be inspected	Standard:
CN101-1(3) to CN88-1(478)	Continuity *
CN102-17(5) to CN88-5(5)	Continuity *
CN88-1(478) to CN88-5(5)	No continuity *
CN101-1(3) to CN103-5(N2)	No continuity
CN102-17(5) to CN103-5(N2)	No continuity

Judgment

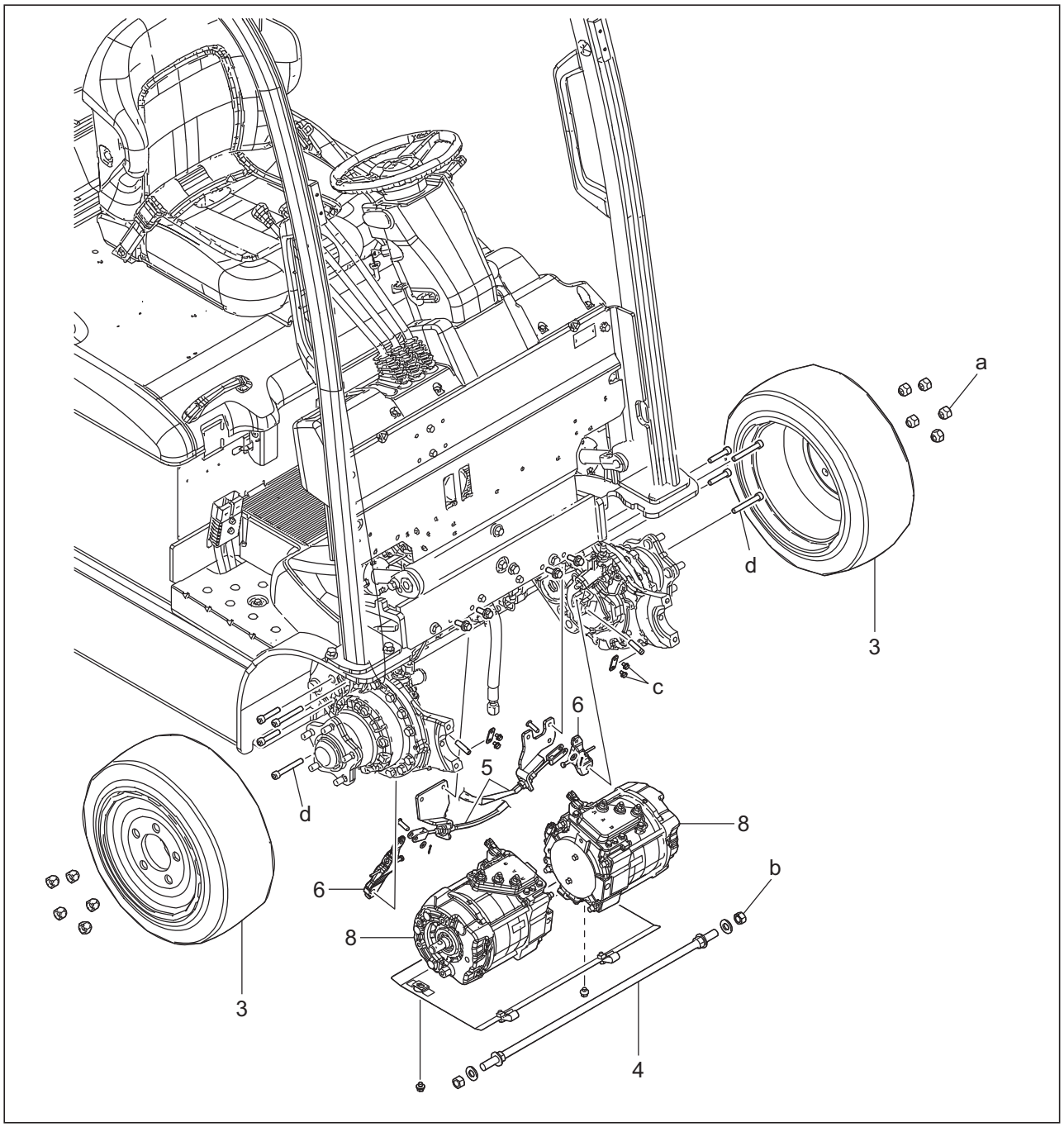
Result	Procedure
NG	**Harness defect**

Control systems	Symptom	Failed portions and failure modes	How to check	Action and remedies
Load handling and power steering	Only load handling cannot be performed. (The pump motor operates normally during steering operation and direction switch operation.)	Main body of load handling lever potentiometer : Internal failure Installation of load handling lever potentiometer : Installation portion is broken or damaged. Load handling lever potentiometer harness : Wire breakage, short circuit, leakage (harness or connector)	Measure the voltage of the load handling lever potentiometer using Analyzer. : Leave the seat Tilt the load handling lever forward and backward to check the change in voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main body of tilt forward/backward switch : Internal failure Installation of tilt forward/backward switch : Installation portion is broken or damaged. Tilt forward/backward switch harness : Wire breakage, short circuit, leakage (harness or connector)	Check the tilt forward/backward switch using Analyzer. : Leave the seat Operate the tilt lever forward to backward position to check the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Seat switch main body : Open failure Seat switch harness : Wire breakage, (harness or connector)	Check the seat switch using Analyzer. : Load handling lever in neutral Check if the switch turns on and off normally, sitting in the seat or standing beside it.	▪ Check the seat adjustment and seat switch replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

Control systems	Symptom	Failed portions and failure modes	How to check	Action and remedies
Multifunction display	[Diagnostic mode indicator] Although no error code is displayed, the spanner indicator is left on.	One of the following matching operations is not performed. ▪ Tire straight running angle matching ▪ Forward tilt limit angle matching ▪ Tilt horizontal angle matching ▪ Tilt no-load matching ▪ Mast type data matching ▪ Accelerator pedal fully open matching ▪ Accelerator pedal fully closed matching ▪ Brake pedal fully open matching ▪ Brake pedal fully closed matching ▪ Each load handling lever: neutral voltage matching ▪ Tire diameter data	Check the matching value on the Matching screen.	▪ Setting screen * If accelerator pedal fully closed and fully open matching is finished by simply performing fully closed matching and fully open matching in this order, the setting will not be saved. * If brake pedal fully closed and operating point matching is finished by simply performing fully closed matching and operating point matching in this order, the setting will not be saved.

Control systems	Symptom	Failed portions and failure modes	How to check	Action and remedies
Tilt control	Although the load is lifted high, the mast forward tilting speed is not limited.	Lifting height switch main body : High lifting height is always detected. Lifting switch harness : Wire breakage, short circuit (harness or connector)	Check the lifting height switch using Analyzer. : In ANL, Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
		Display setting : Forward tilting speed setting (T F-SPD LIM)	Check the set value on the Option Set screen.	▪ Setting screen
		Lifting height switch main body : Low lifting height is always detected. Lifting switch harness : Wire breakage, short circuit (harness or connector)	Check the lifting height switch using Analyzer. : In ANL, Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

6.1.3 REMOVAL AND INSTALLATION



a: T = 86.8 to 145 ft·lbf. [117.6 to 196.0 N·m]

b: T = 46 to 108 ft·lbf. [63 to 147 N·m]

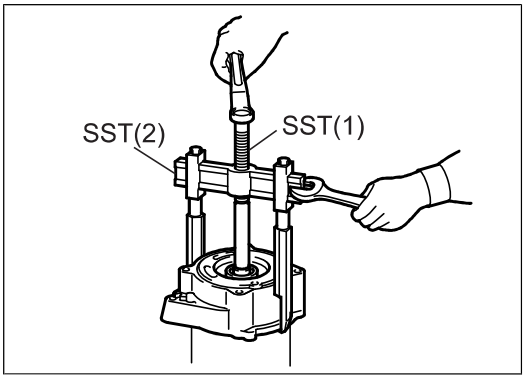
c: T = 6.5 to 12.0 ft·lbf. [8.8 to 16.3 N·m]

d: T = 27.1 to 40.7 ft·lbf. [36.8 to 55.2 N·m]

⚠ CAUTION

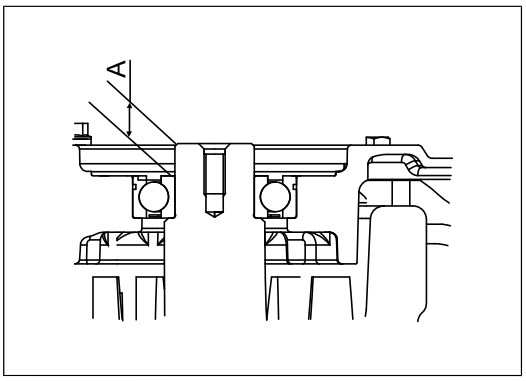
Make sure not to apply impact to the rpm sensor bearing.

Point Operations

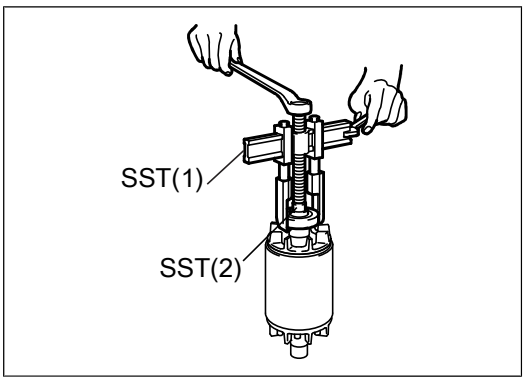


[POINT 1]

Disassembly:
SST(1) 979-001/181
SST(2) 979-001/157

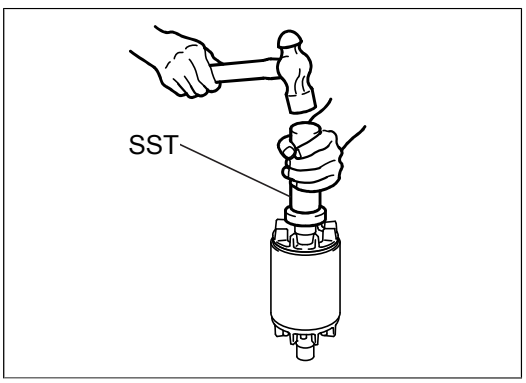


Reassembly:
Install the end frame and rpm sensor to the position with the dimension A.
Dimension A 0.43 to 0.50 in. (10.8 to 12.8 mm)



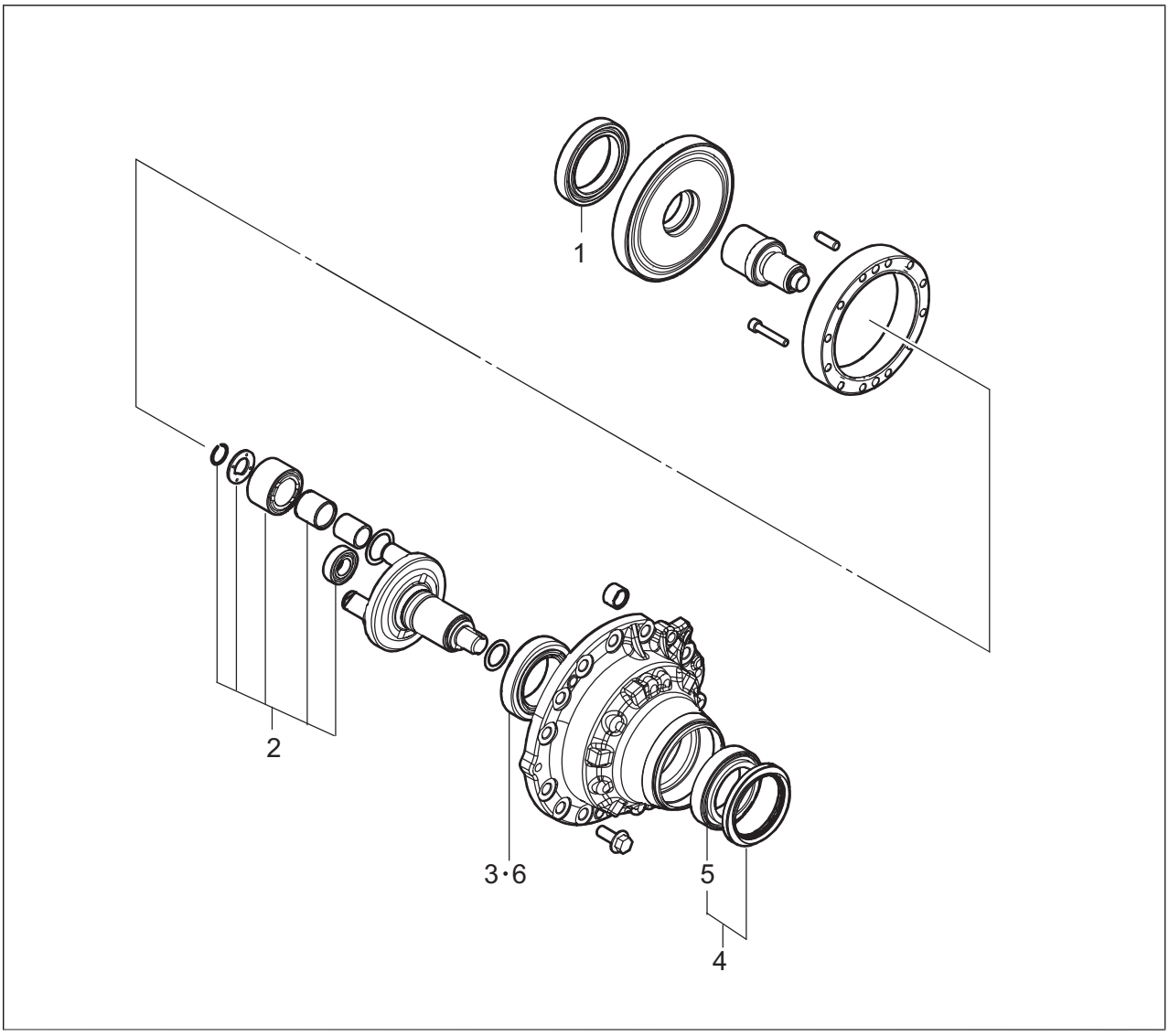
[POINT 2]

Inspection:
Inspect the bearing of the rotor ASSY and replace it if an abnormal noise or damage is observed.
Disassembly:
SST(1) 979-001/182
SST(2) 979-001/183



Reassembly:
SST 979-005/492

7.3.2 DISASSEMBLY, INSPECTION AND REASSEMBLY



Disassembly Procedure

1. Remove the idle gear bearing. **[Point 1]**
2. Remove the planetary gear. **[Point 2]**
3. Remove the axle shaft bearing and inner bearing.
4. Remove the oil seal and outer bearing. **[Point 3]**
5. Remove the bearing outer race. **[Point 4]**
6. Remove the inner bearing outer race. **[Point 5]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.

NOTICE

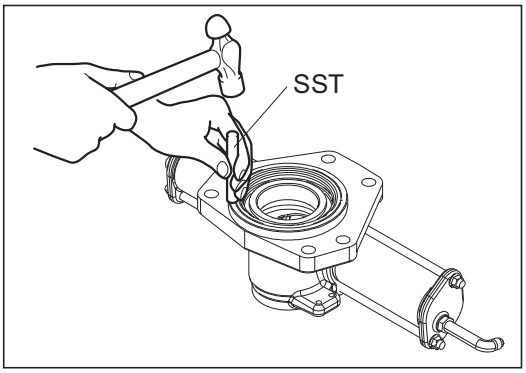
Apply gear oil to the planetary gear and bearing and install them.

7. Remove the lower bearing. **[Point 4]**
8. Remove the oil seal and inner bearing. **[Point 5]**

Reassembly Procedure

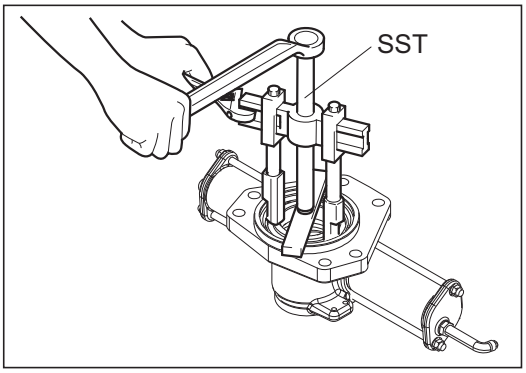
The reassembly procedure is the reverse of the disassembly procedure.

Point Operations



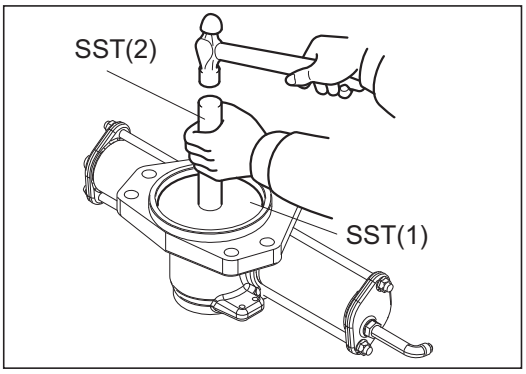
[POINT 1]

Reassembly:
Use the SST to install the oil seal.
SST 979-001/177

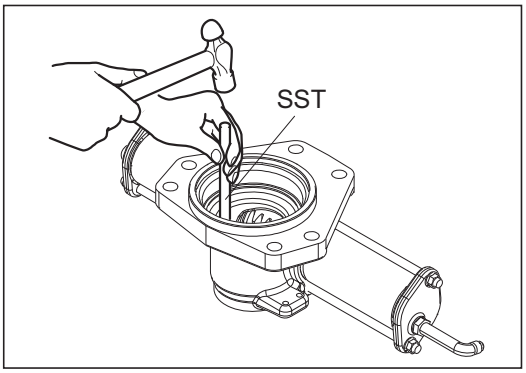


[POINT 2]

Disassembly:
Use the SST to remove the lower bearing outer race.
SST 979-001/182



Reassembly:
Use the SST to install the lower bearing outer race.
SST(1) 979-005/491
SST(2) 979-001/185

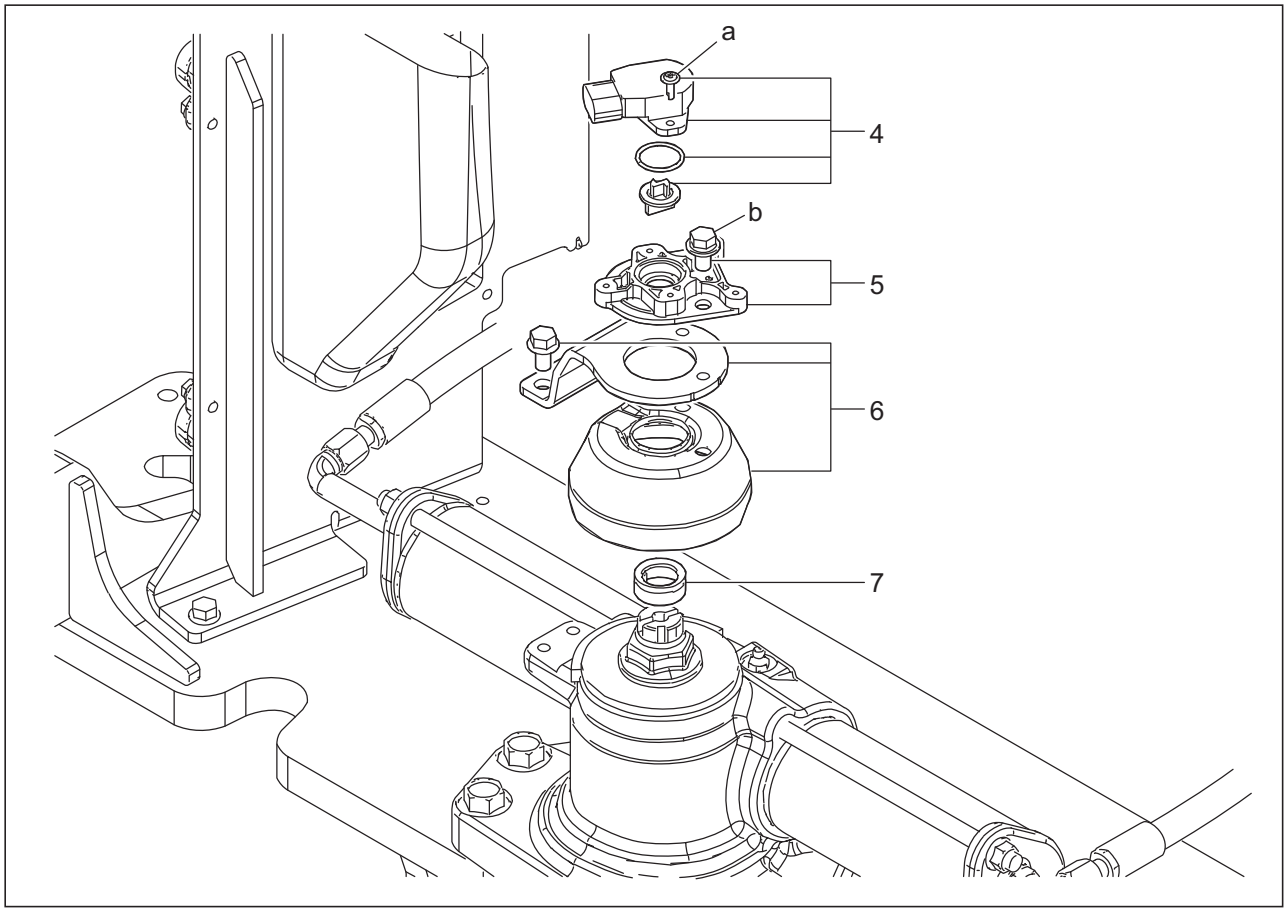


[POINT 3]

Disassembly:
Use the SST to remove the upper bearing outer race.
SST 979-001/177

8.4 TIRE ANGLE SENSOR

8.4.1 REMOVAL AND INSTALLATION



a: T = 1.0 to 1.2 ft·lbf. [1.4 to 1.6 N·m]

b: T = 7.4 to 11.8 ft·lbf. [10 to 16 N·m]

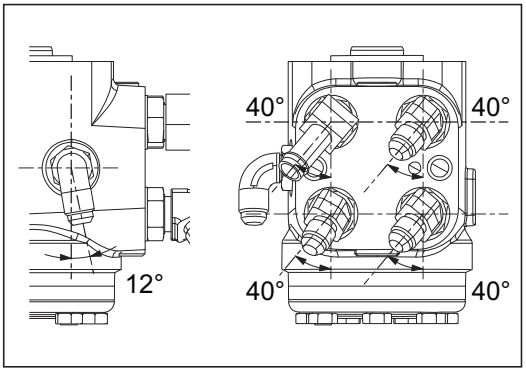
Removal Procedure

1. Disconnect the battery plug.
2. Remove the rear cover.
3. Disconnect the wiring connector.
4. Remove the tire angle sensor and joint. **[Point 1]**
5. Remove the tire angle sensor plate. **[Point 2]**
6. Remove the bracket.
7. Remove the joint cover.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

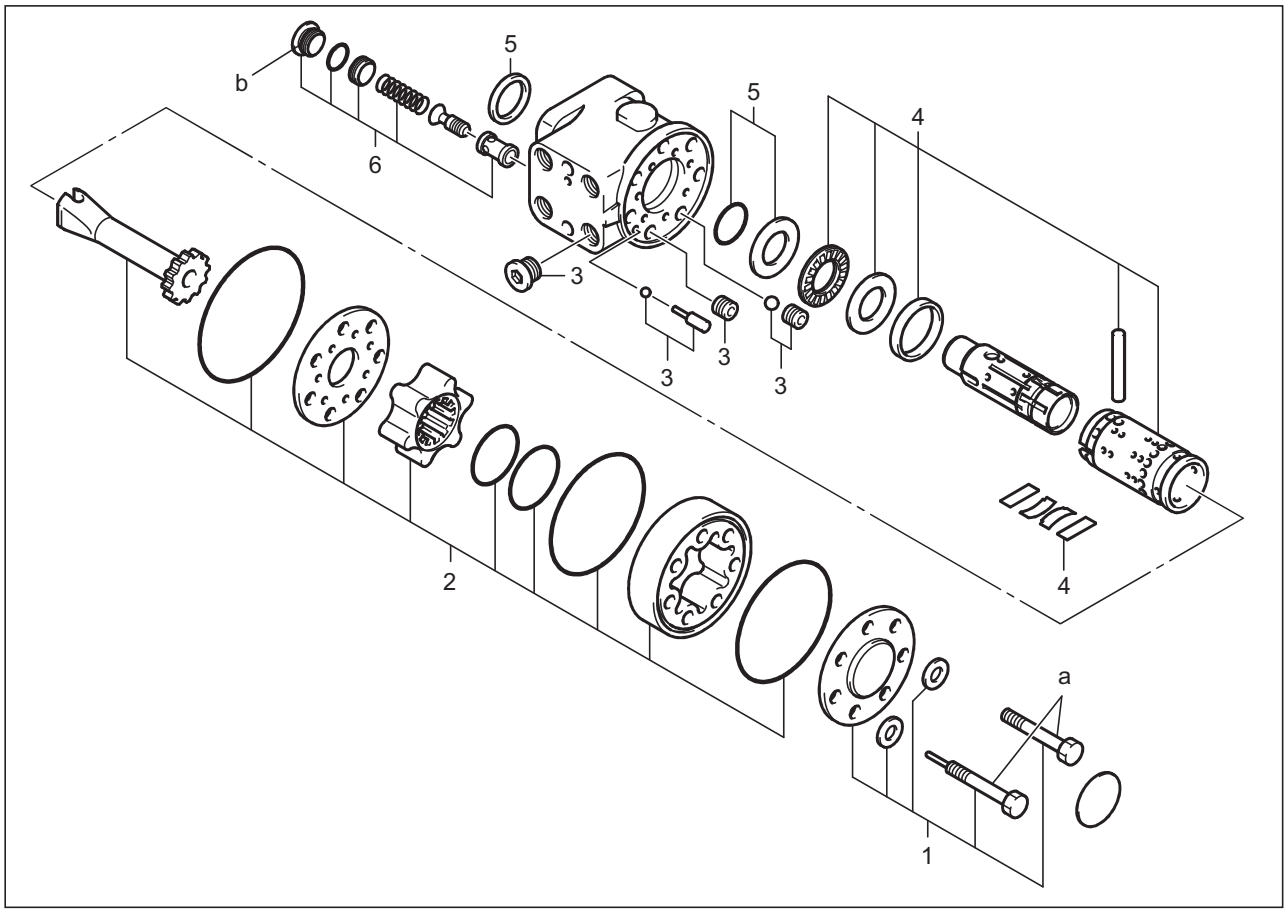
Point Operations



[Point 1]

Reassembly:
Install the fitting with the angle shown in the illustration to the left.

9.4.3 DISASSEMBLY, INSPECTION AND REASSEMBLY



a: T = 17.7 to 26.6 ft-lbf. [24 to 36 N·m]

b: T = 44.3 to 51.7 ft-lbf. [60 to 70 N·m]

NOTICE

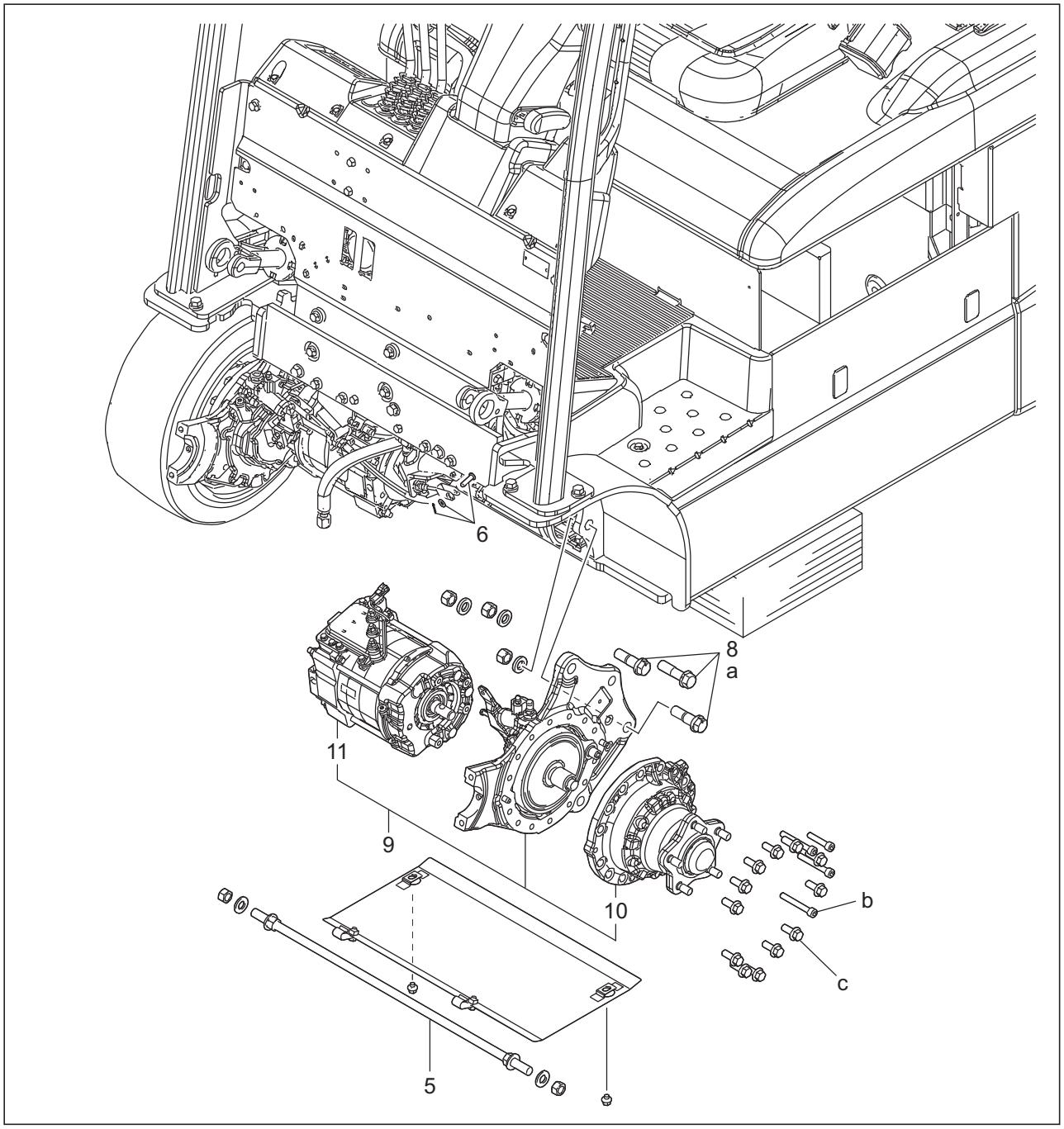
Clean dirt off from ports and joints before disassembly and operate in a clean place.

Disassembly Procedure

1. Remove the end cover. **[Point 1]**
2. Remove the gear wheel set, cardan shaft and distributor plate. **[Point 2]**

10.3 DISC BRAKE

10.3.1 REMOVAL AND INSTALLATION (Outside of brake)



a: T = 151 to 225 ft·lbf. [205 to 305 N·m]

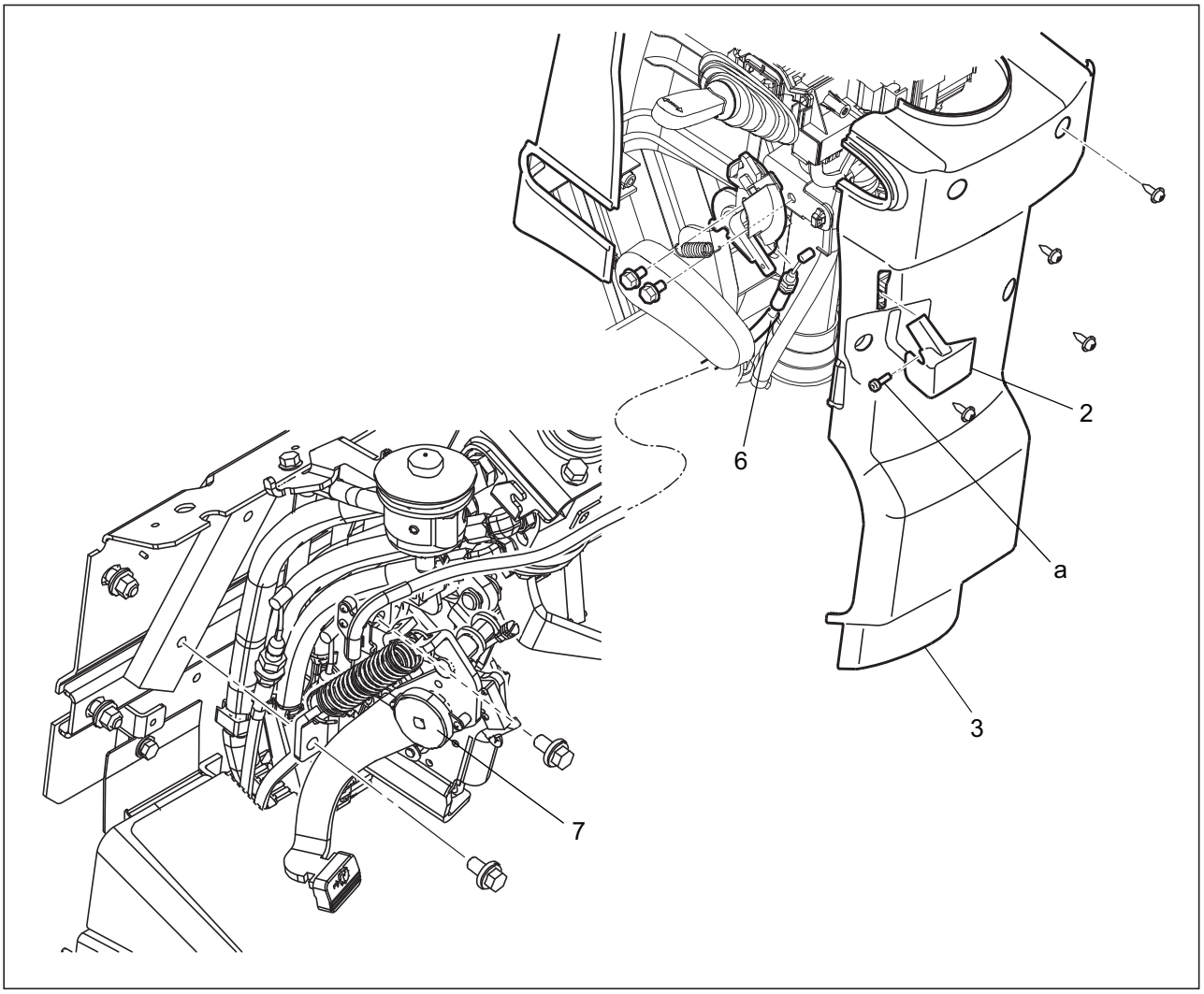
b: T = 27.1 to 40.7 ft·lbf. [36.8 to 55.2 N·m]

c: T = 73.8 to 108 ft·lbf. [100 to 146 N·m]

Removal Procedure

1. Disconnect the battery plug.
2. Remove mast ASSY. (Refer to mast section)
3. Jack up the lift truck and remove the front wheel.

10.7 PARKING BRAKE



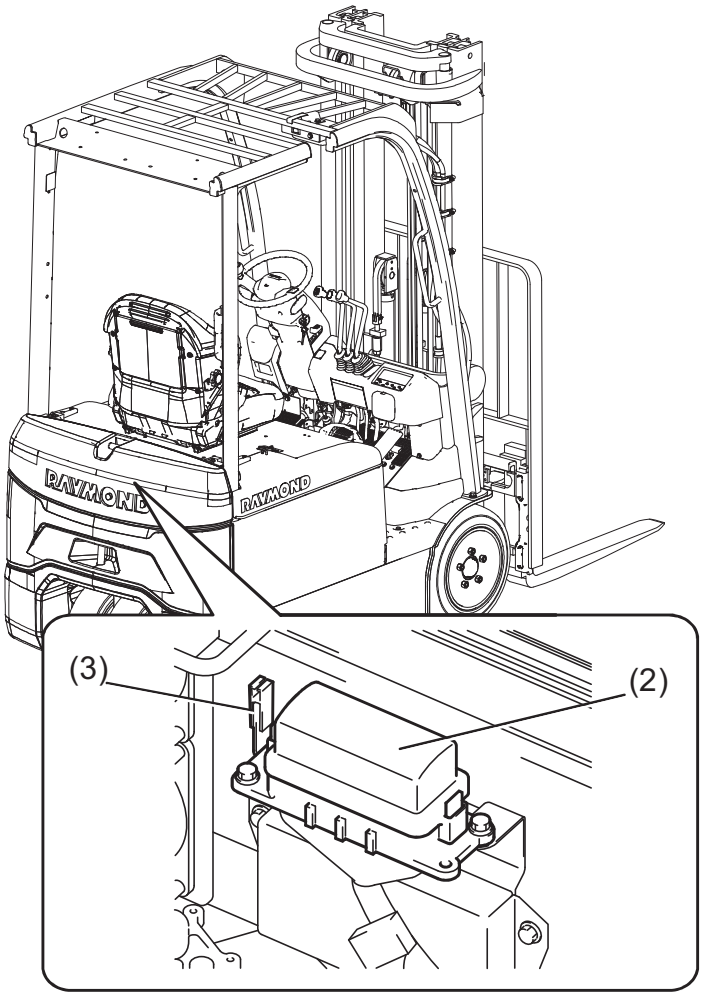
a : T = 6.7 to 12.5 ft·lbf. [9.1 to 16.9 N·m]

Removal Procedure

1. Disconnect the battery plug.
2. Remove the tilt steering lock release lever.
3. Remove the column cover.
4. Remove the instrument panel LH.
5. Remove the lower panel.
6. Remove the parking brake release cable from the mast jacket.
7. Remove the parking brake ASSY.

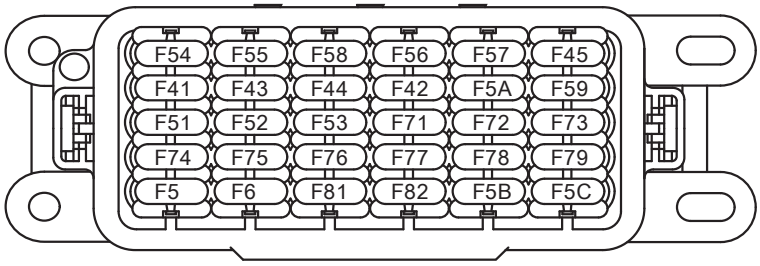
Installation Procedure

The installation procedure is the reverse of the removal procedure.



(2) Fuse box cover

(3) Fuse clip



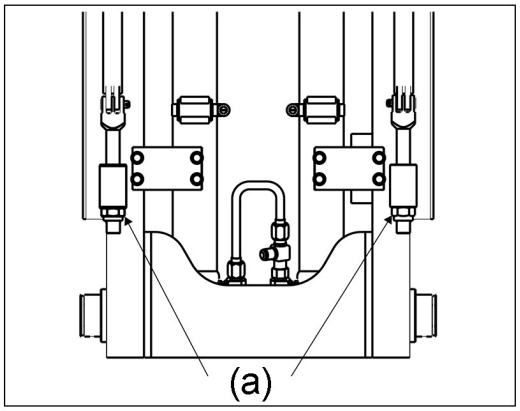
See the fuse assignment table below for the device corresponding to each fuse.

Fuse assignment

Fuse name	Capacity	Corresponding device
F1	700A (36V spec.) 600A (48V spec.)	Drive and pump circuit
F54	2A	Horn relay
F55	2A	Horn surge absorber
F58	2A	Direction control switch
F56	2A	Strobe light, blue light, key off head light off relay
F57	2A	Flasher relay
F45	2A	Stop lights

13.1.4 MAIN LIFT CHAIN ADJUSTMENT (TT)

1. Raise the inner upright 3 ft. (90 cm). Place a 3 ft. (90 cm) block under the free lift cylinder support blocks. The main lift chain anchors are now accessible.
2. Adjust one chain to achieve the correct upright position when fully lowered.
3. Adjust the other chain to achieve equal chain tension.
4. Raise and lower the mast several times to confirm the adjustments.



(a) Chain adjusting nut

13.1.5 MAIN LIFT CHAIN SERVICE (TT)

⚠ WARNING

Block the intermediate upright.

1. Raise the inner upright 3 ft. (90 cm). Place a 3 ft. (90 cm) block under the free lift cylinder support casting, then lower the cylinder support onto the block. The main lift chains should be slack.
2. Remove the cotter pins and pins (a) from the chain anchors (b). Remove the chains.
3. Inspect the chain anchors for cracks. Replace as required.
4. For reassembly, reverse the disassembly procedure. Adjust the chains.

1. Turn the key switch OFF and disconnect the battery connector.
2. Remove the console and front covers.
3. Remove the forks.
4. Verify that the mast is in a vertical position.
5. Position the lift truck beneath the hoist or lift truck.
6. Wrap a chain or lifting strap around the top of the mast. Attach the chains or straps to a hoist or lift truck.
7. Lift the hoist just enough to take the slack out of the chain or strap.
8. Remove the support cap and retaining bolts from the support pins.
9. Remove the tilt pin assembly retaining hardware and mast support cap. Carefully remove the pivot blocks from each tilt cylinder clevis, allowing the tilt cylinder to rest on the brake assemblies

13.4.1.3 INSTALLATION AFTER PARTIAL REMOVAL

NOTE: For this procedure, you will need a hoist or lift truck of suitable capacity.

1. With the mast securely held by a strap or chain, carefully raise the mast until it is vertical.
2. Reconnect the battery connector and turn the key switch ON.
3. Apply chassis grease on the tilt pin before the mast is installed on the lift truck.
4. Slowly extend the tilt cylinders until you are able to install the cylinder front pin, stopper plate, and lock bolt into each tilt plate.
5. Perform MAST FORWARD/BACKWARD TILT ANGLE ADJUSTMENT in the Cylinder section.
6. Apply chassis grease to the grease nipple after the mast is mounted to the lift truck.
7. Remove the lifting device and any chains/straps used to lift the mast.
8. Bleed the hydraulic system.

NOTICE

- **Without a load, repeat full-stroke raising and lowering of the cylinder to bleed air and check normal functioning.**
- **Check the hydraulic oil level and add if insufficient.**
- **Inspect lift cylinders for uneven lifting, and make any necessary adjustment. (Refer to "MAST FORWARD BACKWARD TILT ANGLE ADJUSTMENT"**

9. Install the forks.

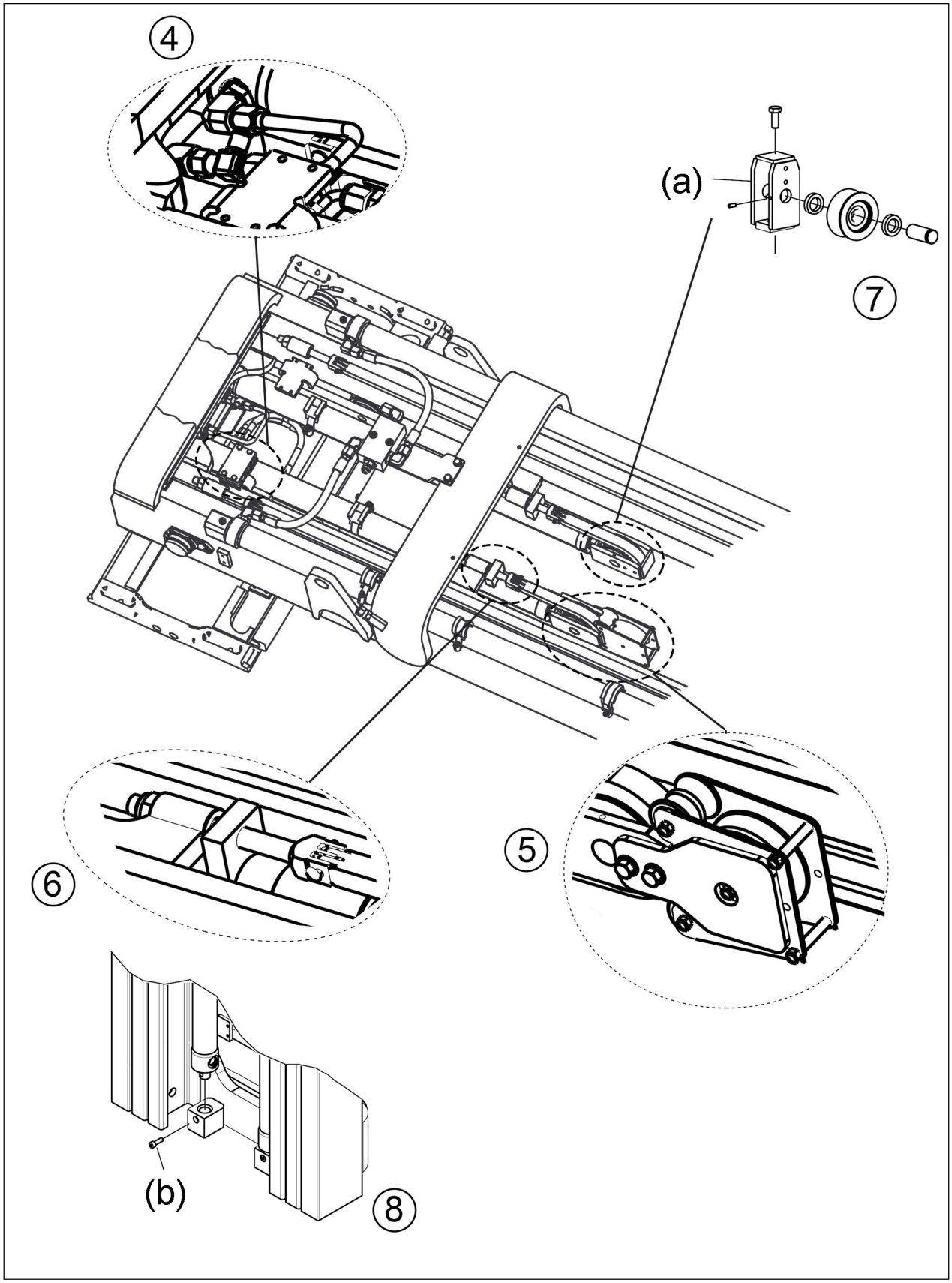
13.4.1.4 COMPLETE MAST REMOVAL

NOTE: See also “Partial Removal” procedure which precedes for an alternative means of gaining access to motors and pumps.

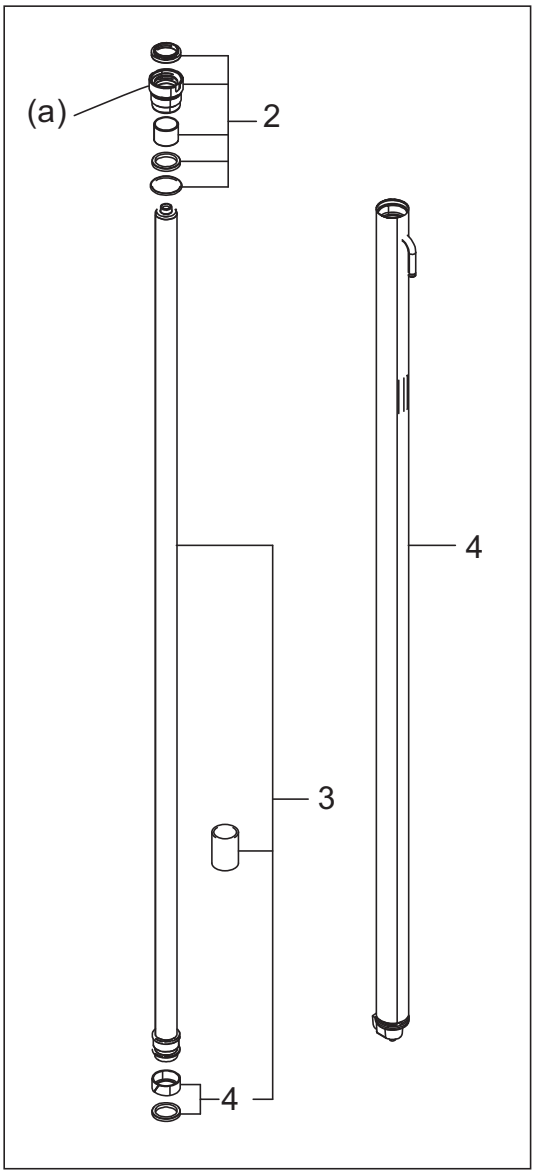
For this procedure, you will need a hoist or lift truck of suitable capacity.

1. Before starting complete removal, perform partial removal steps.
2. Verify that the mast is in a vertical position.
3. Wrap a chain or lifting strap around the top of the mast. Attach the chains or straps to a hoist.
4. Turn the key switch OFF and disconnect the battery connector.
5. Remove the forks.
6. Lift the hoist just enough to take the slack out the chain or strap.
7. Remove the support cap and retaining hardware from the support pins.
8. Disconnect the main lift and auxiliary hoses. Be careful not to spill hydraulic fluid. Plug/cap each fitting to prevent contamination from entering the hydraulic system.
9. Use the hoist or other lift truck to lift the mast just enough to allow it to be moved away from the tractor.

13.4.5.3 FREE LIFT CYLINDER REMOVAL - MAST ON FLOOR



14.1.4 DISASSEMBLY, INSPECTION AND REASSEMBLY



a (TT): T = 180 to 200 ft·lbf. [244 to 271 N·m]

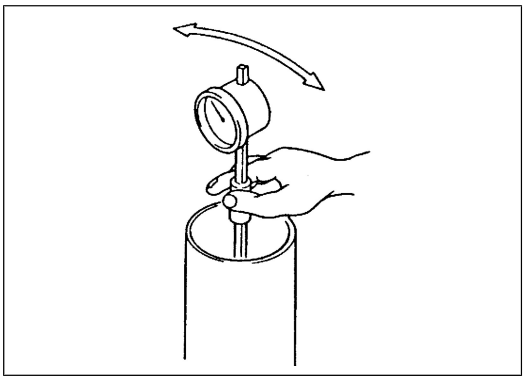
a (QM): T = 200 to 220 ft·lbf. [271 to 298 N·m]

Disassembly Procedure

1. Remove the valve (LH).
2. Remove the cylinder cover. **[Point 1]**
3. Remove the piston rod. **[Point 2]**
4. Remove seals on the piston side. **[Point 3]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.



[POINT 3]

Installation:
Measure the lift cylinder bore.

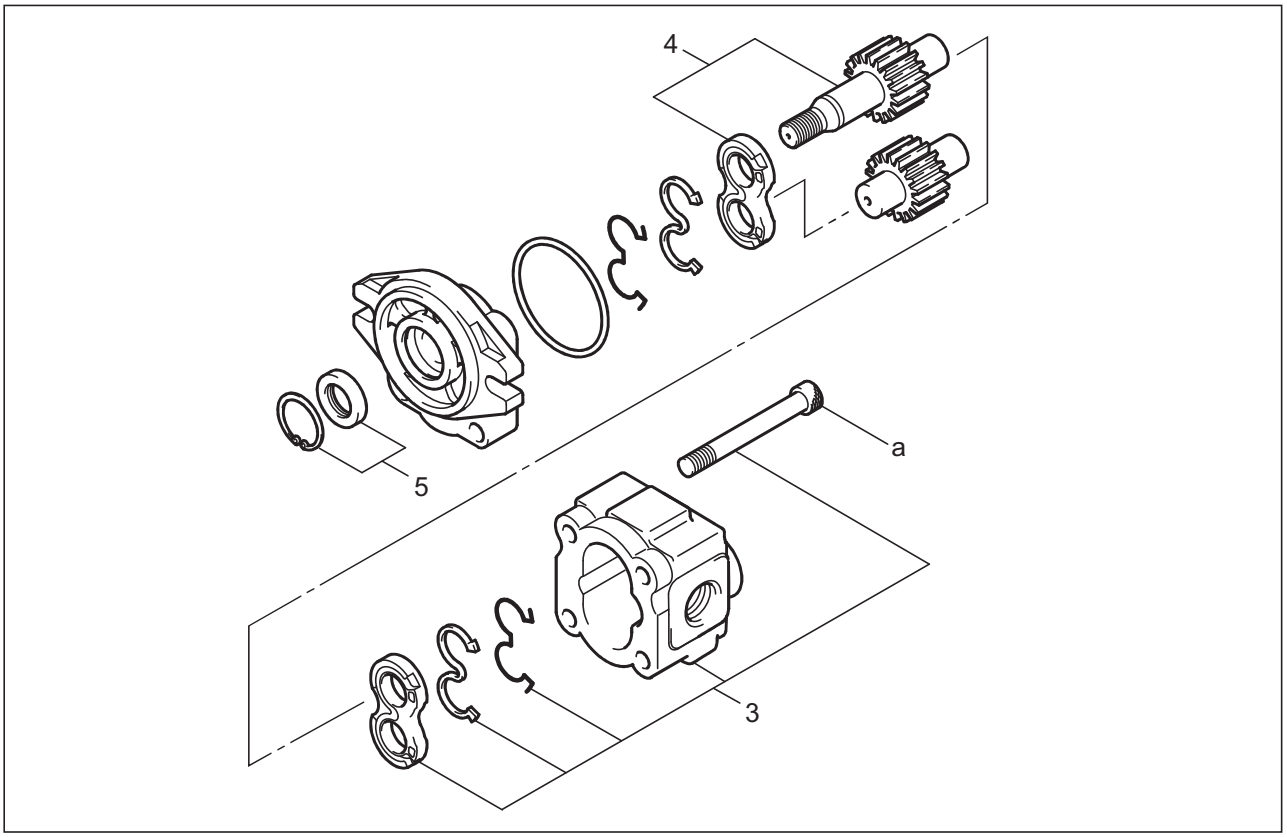
Standard:

TT: 1.968 in. (50 mm)
QM: 2.76 in. (70 mm)

Limit:

TT: 1.980 in. (50.3 mm)
QM: 2.7697 in. (70.35 mm)

15.3 DISASSEMBLY, INSPECTION AND REASSEMBLY



a: T = 35.5 to 42.7 ft·lbf. [48.1 to 57.9 N·m]

Disassembly Procedure

1. Make match marks between the front cover and body.
2. Fix the mounting parts of front cover with body side up to the vice.
3. Remove the four bolts, body, back-up, figure 3 gasket and side plate. **[Point 1]**
4. Remove the drive gear, driven gear and side plate. **[Point 2]**
5. Remove the oil seal. **[Point 3]**

Reassembly Procedure

1. Put the body on the worktable with its hole for the gear up.
2. Reassemble the parts in order as the upper illustration. **[Point 4]**
3. Invert the assembled pump so the front cover is down and fix the mounting parts to the vice.
4. Tighten 4 bolts evenly by 35.5 to 42.7ft·bf. [48.1 to 57.9 N·m] torque.
5. Invert the assembled pump again so the front cover is up. Fix the body to the vice.
6. Remove the oil seal. **[Point 5]**

NOTICE

- **Wash each part, blow dry with compressed air, and apply hydraulic oil before installation.**
- **Always use new seals for reassembly.**

16.1.2 SPECIFICATIONS

Model		All model
Type		Add-on type
Relief pressure psi [MPa]	Lift	2494 [17.2]
	Tilt ATT	1987 [13.7]
Flow regulator flow rate L / min		50

ATT flow rate list

Tuning level	Flow rate (L / min)
8	63
7	54
6	45
5	37
4	28
3 *	**20**
2	16
1	13

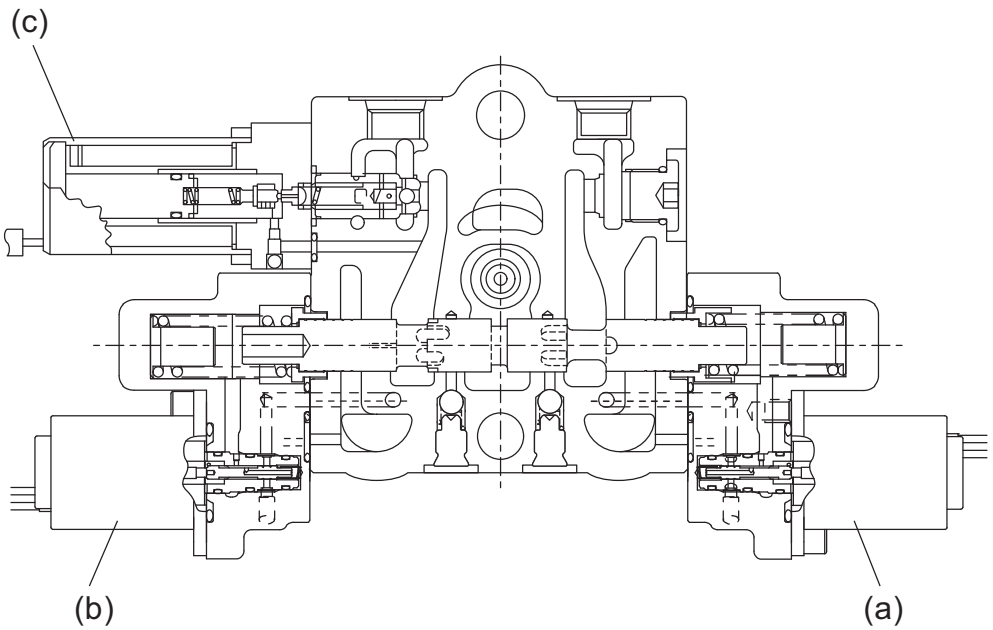
* : Factory preset is level "3"

Lowering speed specification (36V / 48V)

mm / sec (fpm)

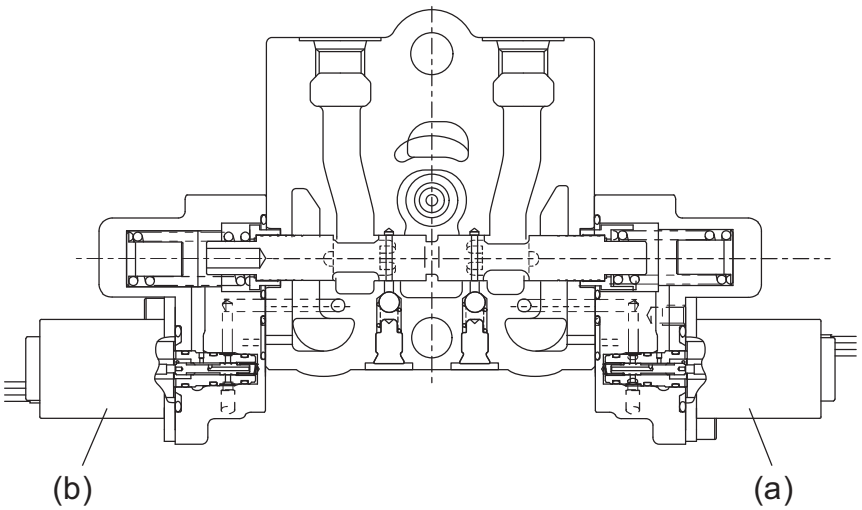
Model		All model	
Mast	**Mode**	**No load**	**Load**
TT	All	480 (94)	490 (96)
QM	All	485 (95)	500 (98)

Tilt section (X3-X3)

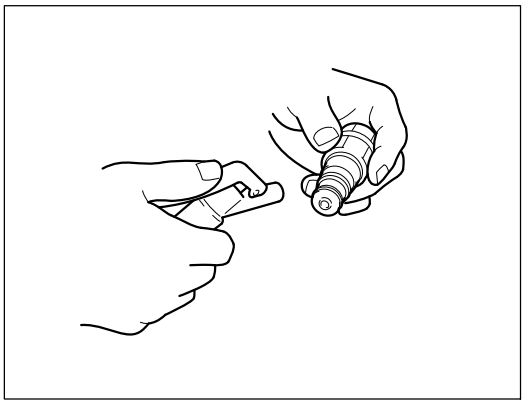


(a) Proportional SOL	(b) Proportional SOL	(c) Tilt control valve (Tilt control SOL)

Attachment section (X4-X4)



(a) Proportional SOL	(b) Proportional SOL



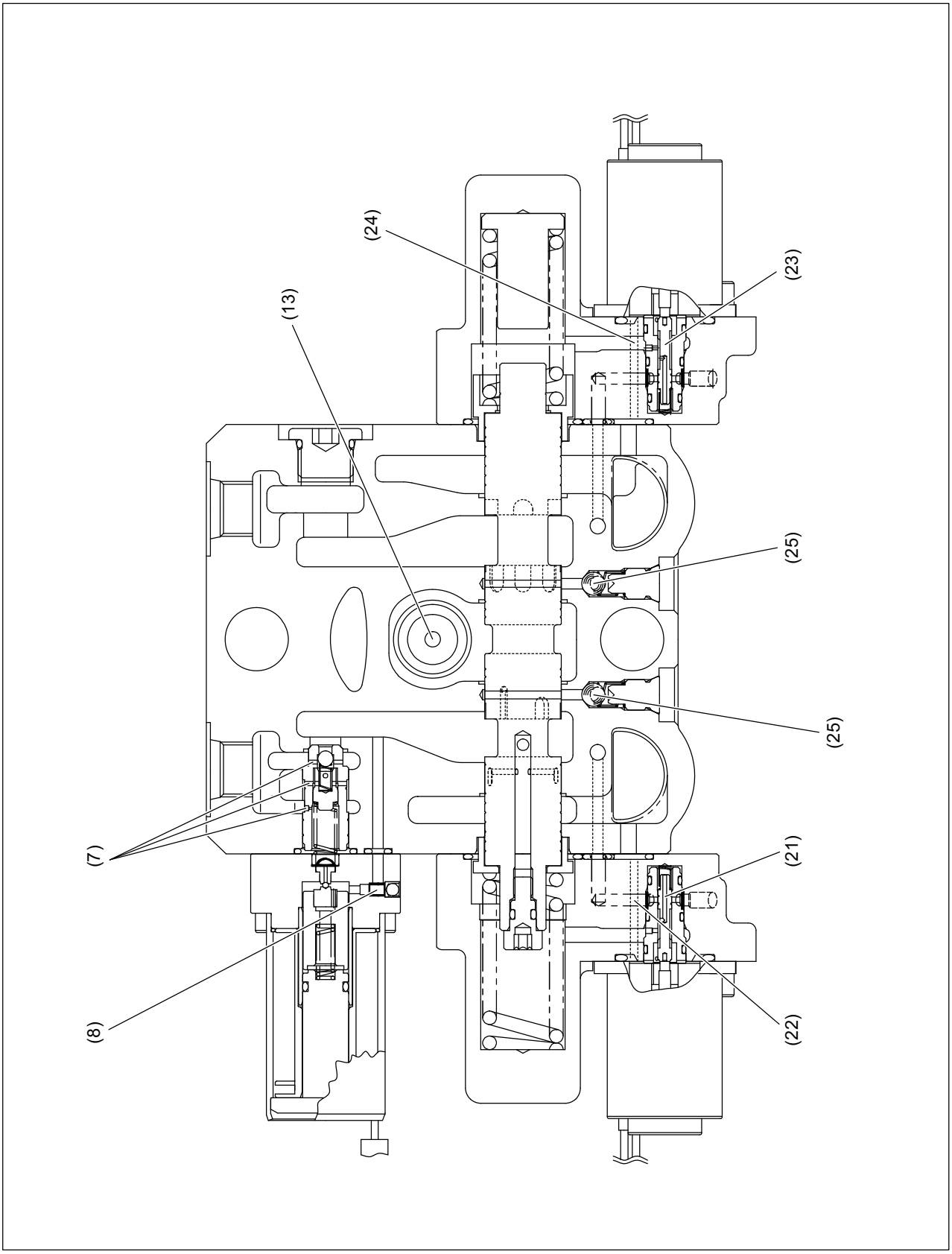
[Point 6]

Installation:

Check for contamination and clean the filter.

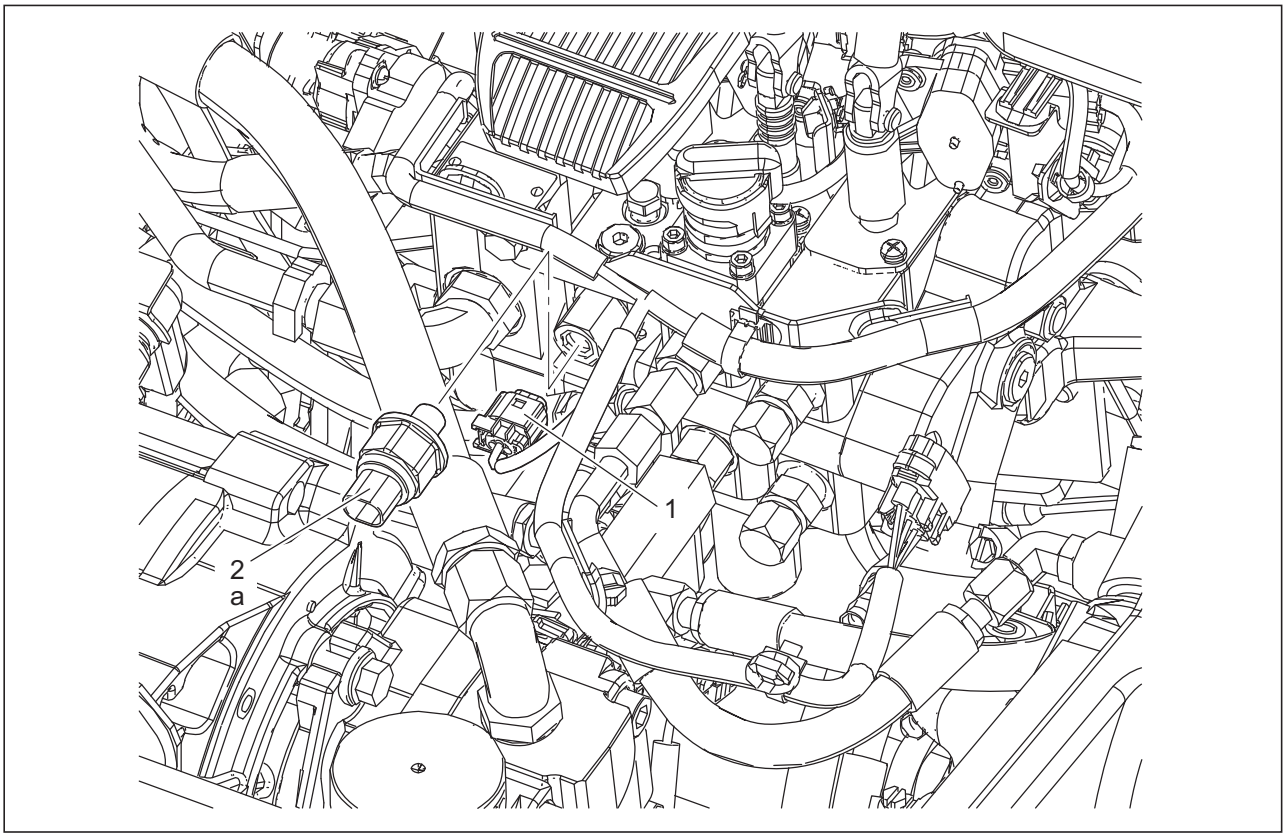
Operation	Symptom	Probable cause	Corrective action
During tilt operation	Cannot tilt forward	Relief valve main plunger is open and stuck.	• Check the relief valve main plunger. This part is removable. • Check the relief valve main plunger is not damaged. • Check the relief valve main plunger is not contaminated.
		The relief valve is set at the wrong setting pressure.	• Check the relief pressure.
		Tilt control valve plunger is closed and stuck.	• Check the tilt control valve plunger. This part is removable. • Check the tilt control valve plunger is not damaged. • Check the tilt control valve plunger is not contaminated.
		Contamination is stuck in the tilt control valve plunger orifice (7).	• Check for contamination in the tilt control valve plunger orifice.
During tilt operation	Cannot tilt forward	Tilt SOL is stuck and closed.	• Check the operational sound of the tilt SOL by moving the lever after the key switch is turned ON. • Check the operation sound of tilt SOL by the following procedure. *MASK MENU > ANALYZER > ACTIVE TEST > TILT SOL > ON - OFF (Tilt SOL forced operation)
		Contamination is stuck in the tilt control valve pilot circuit (8).	• Check for contamination in the tilt control valve pilot circuit.
		Load pressure detection circuit check valve (25) is closed and stuck.	• Not possible to inspect.
		Load check valve (13) is closed and stuck.	• Check the load check valve. This part is removable. • Check the load check valve with no damage. • Check the load check valve without any contaminations.
		Contamination is attached to the lift SOL filter.	• Check for contamination in the tilt SOL filter.

Tilt section (X3-X3)



(7) Orifice	(13) Load check valve	(22) Pilot circuit	(24) Pilot circuit
(8) Pilot circuit	(21) SOL spool	(23) SOL spool	(25) Check valve

17.4 LOAD SENSOR



a (Load sensor) : T = 16.2 to 19.2 ft·lbf. [22 to 26 N·m]

Removal Procedure

1. Disconnect the connector from the load sensor.
2. Remove the load sensor.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

NOTICE

- **When the load sensor is replaced, proceed with the matching procedure. (Refer to Display section)**
- **Do not use open type tool, in fixing pressure sensor to oil control valve. (Use box type wrench)**

4. Return-to-neutral warning

Traveling

- Once the travel Operator Presence Sensor is activated, the buzzer sounds continuously when the seat switch is turned on until the direction lever is returned to the neutral position and the accelerator pedal is released. This sound informs the operator that the lift truck is still in the travel Operator Presence Sensor condition.

Hydraulic function

- On all models, once hydraulic function Operator Presence Sensor is activated, and when the seat switch is turned on without returning all the hydraulic control levers to the neutral position, the sound informs the operator that the hydraulic function Operator Presence Sensor is not released.

5. Parking brake OFF warning

- The buzzer sounds when the operator leaves the seat with the parking brake released.
- The buzzer sounds when the operator turns off the key switch with the parking brake released.

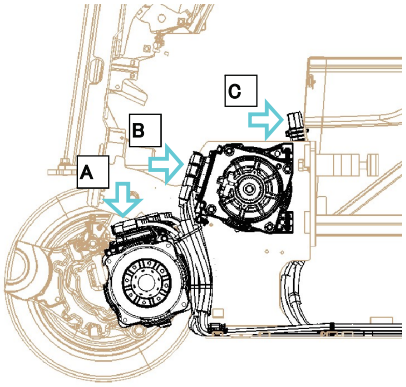
18.3 CONNECTOR LOCATION

- FR STAY and MAST
- CABLES
- INSTRUMENT PANEL
- TOE BOARD No.1
- TOE BOARD No.2
- RR BODY No.1
- RR BODY No.2

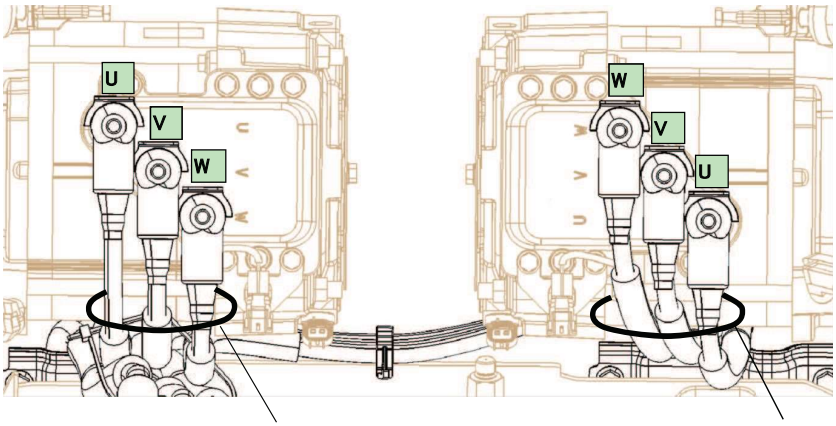
SYMBOLS	WIRE NAME
A	BODY MAIN WIRE
B	FR STAY WIRE
C	TEN KEY WIRE
D	BODY SUB NO.1 WIRE
E	STOP LAMP SWITCH WIRE
F	MAST WIRE
G	C/V WIRE
H	RR UPR WIRE
I	HOOD WIRE (MINI LEVER)
J	HOOD SUB WIRE
K	DC/DC WIRE
L	CLAMP INTERLOCK WIRE

18.3.5 TOE BOARD No.2

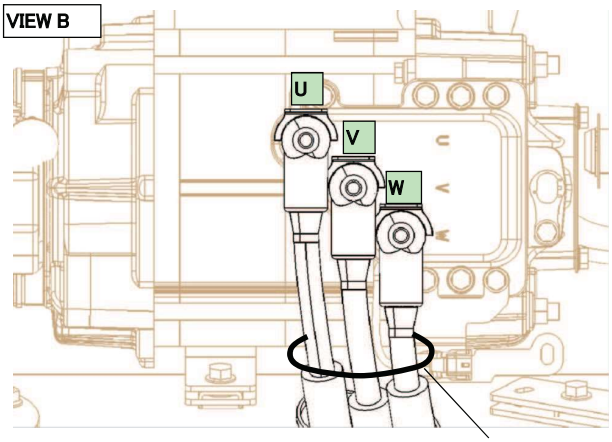
TOE BOARD No.2



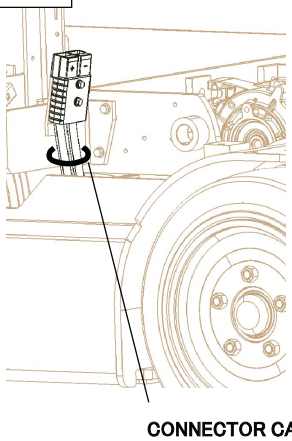
VIEW A



VIEW B



VIEW C



CN58 STROBE LAMP

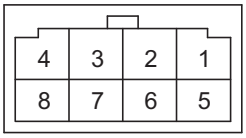
TAB

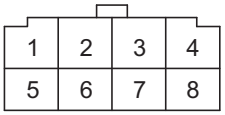
NO	P	C	J
1	493	-	LS+
2	N2	-	LS-

REC

NO	P	C	J
1	493	B-Y	J47,CN37-2
2	N2	W-B	J46

CN62 COMPARTMENT LIGHT SW





TAB

NO	P	C	J
1	112	-	SW+
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	101	-	SW-
8	-	-	-

REC

NO	P	C	J
1	112	G-Y	CN63-1
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	101	L	CN244-2
8	-	-	-

CN63 COMPARTMENT LIGHT

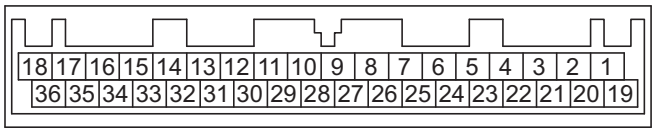
TAB

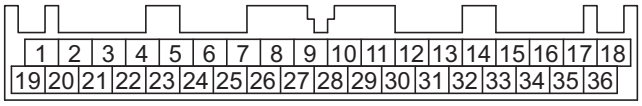
NO	P	C	J
1	112	-	LCM+
2	N2	-	LCM-

REC

NO	P	C	J
1	112	G-Y	CN62-1
2	N2	W-B	CN244-1

CN70 DISPLAY





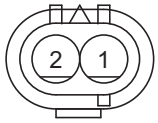
TAB

NO	P	C	J
1	-	-	-
2	-	-	-
3	169	-	TGND
4	14	-	DGND
5	16	-	D7V
6	162	-	ITKY3
7	-	-	-
8	160	-	ITKY1
9	166	-	OTKY3
10	165	-	OTKY2
11	164	-	OTKY1
12	167	-	LEDTKY1
13	-	-	-
14	-	-	-
15	146	-	CAN1L
16	145	-	CAN1H
17	-	-	-
18	486	-	VBKY
19	168	-	LEDTKY2
20	161	-	ITKY2
21	163	-	IPSTKY1
22	-	-	-
23	-	-	-
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-
31	-	-	-
32	-	-	-
33	-	-	-
34	-	-	-
35	-	-	-
36	N2	-	N1

REC

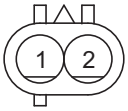
NO	P	C	J
1	-	-	-
2	-	-	-
3	169	GR-R	CN178-9
4	14	W-G	CN103-3
5	16	Y-B	CN103-14
6	162	G	CN178-3
7	-	-	-
8	160	B-Y	CN178-5
9	166	GR-L	CN178-7
10	165	R-Y	CM178-2
11	164	L-O	CN178-8
12	167	G-Y	CN178-1
13	-	-	-
14	-	-	-
15	146	W	CN200-12
16	145	L	CN200-9
17	-	-	-
18	486	B-W	J4
19	168	L-B	CN178-6
20	161	R-B	CN178-4
21	163	W-L	CN178-10
22	-	-	-
23	-	-	-
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-
31	-	-	-
32	-	-	-
33	-	-	-
34	-	-	-
35	-	-	-
36	N2	W-B	J7

CN171 ARMREST HORN SW



TAB

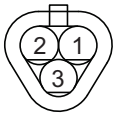
NO	P	C	J
1	N2	W-B	CN76-2
2	118	L-Y	CN76-7



REC

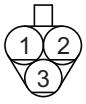
NO	P	C	J
1	N2	-	SW-
2	118	-	SW+

CN172 FR STAY RH1



TAB

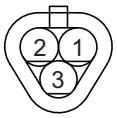
NO	P	C	J
1	106	R-G	CN16-1
2	108	R-Y	CN14-1
3	N2	W-B	CN16-2



REC

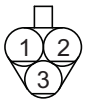
NO	P	C	J
1	106	R-G	CN210-4
2	108	R-Y	J24
3	N2	W-B	J7

CN173 FR STAY RH2



TAB

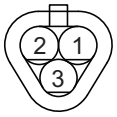
NO	P	C	J
1	104	G-R	J25
2	N2	W-B	J7
3	N2	W-B	J7



REC

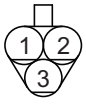
NO	P	C	J
1	104	G-R	CN14-4
2	N2	W-B	CN14-2
3	N2	W-B	CN14-3

CN174 FR STAY LH1



TAB

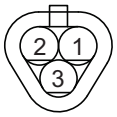
NO	P	C	J
1	102	R-G	CN16-1
2	109	R-Y	CN14-1
3	N2	W-B	CN16-2



REC

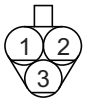
NO	P	C	J
1	102	R-G	CN177-4
2	109	G-Y	CN177-2
3	N2	W-B	J40

CN175 FR STAY LH2



TAB

NO	P	C	J
1	104	G-R	CN177-6
2	N2	W-B	J40
3	N2	W-B	J40



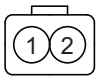
REC

NO	P	C	J
1	104	G-R	CN14-4
2	N2	W-B	CN14-2
3	N2	W-B	CN14-3

CN176 EMERGENCY SW

TAB

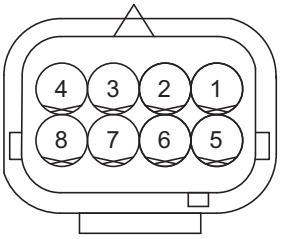
NO	P	C	J
1	41	B	SWE+
2	41	W	SWE-



REC

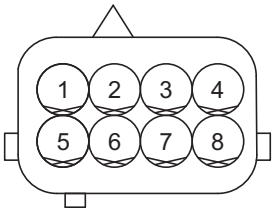
NO	P	C	J
1	41	G-R	J11
2	41	G	J5

CN177 BODY SUB



TAB

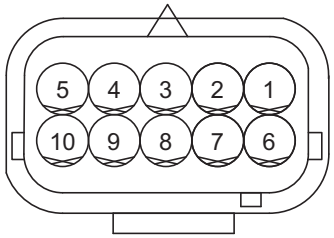
NO	P	C	J
1	66	G-W	CN15-1
2	109	G-Y	CN174-2
3	-	-	-
4	102	R-G	CN174-1
5	51	B	CN15-3
6	104	G-R	CN175-1
7	-	-	-
8	N2	W-B	J40



REC

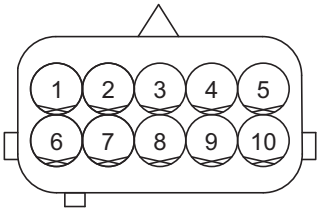
NO	P	C	J
1	66	G-W	CN104-20
2	109	G-Y	J26
3	-	-	-
4	102	R-G	CN211-4
5	51	B	J19
6	104	G-R	J25
7	-	-	-
8	N2	W-B	J7

CN178 TEN KEY



TAB

NO	P	C	J
1	167	G-Y	CN70-12
2	165	R-Y	CN70-10
3	162	G	CN70-6
4	161	R-B	CN70-20
5	160	B-Y	CN70-8
6	168	L-B	CN70-19
7	166	GR-L	CN70-9
8	164	L-O	CN70-11
9	169	GR-R	CN70-3
10	163	W-L	CN70-21



REC

NO	P	C	J
1	167	G-Y	CN33-5
2	165	R-Y	CN33-4
3	162	G	CN33-3
4	161	R-B	CN33-2
5	160	B-Y	CN33-1
6	168	L-B	CN33-10
7	166	GR-L	CN33-9
8	164	L-O	CN33-8
9	169	GR-R	CN33-7
10	163	W-L	CN33-6

DCR	A202	O/H lighting	Drive motor driver (LH) (RH)	Drive motor driver circuit board /the condenser overheating abnormality.	Traveling stops	201
PCR	A203	O/H lighting	Pump motor driver	Pump motor driver circuit board/the condenser overheating abnormality	Load handling stops Steering becomes stiff	206
A301	A301	Spanner blinking	Main controller	Battery connection incorrect	Unable to travel Load handling steering becomes stiff.	211
A501	A501	Spanner blinking	Main controller	Seat switch short abnormality	OPS function invalidity.	212
A603	A603	Spanner blinking	Main controller	Tilt lever switch short abnormality	Tilt stops	214
A801	A801	Spanner blinking	Main controller	F1 fuse open abnormality	Unable to travel Load handling steering becomes stiff	216
A802	A802	Spanner blinking	Main controller	F6 fuse open abnormality	Unable to travel Load handling steering becomes stiff	219
A902	A902	Spanner blinking	Main controller	F7 fuse / solenoid power supply line open abnormality	Material handling disabled	223
AA01	AA01	Spanner blinking	Main controller	Main controller temperature sensor (open/ short) abnormality	Traveling speed becomes slow	225
AA02	AA02	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH board temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up becomes slow	226
AA03	AA03	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH board temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up becomes slow	227
AA04	AA04	Spanner blinking	Pump motor driver	Pump motor driver board temperature sensor (open/short) abnormality	Upward lift speed is limited	228
AB01	AB01	Spanner blinking	Main controller	Cooling fan overcurrent	Traveling speed becomes slow.	229
AC01	AC01	Spanner blinking	Main controller	Motor driver power delivery abnormality	Unable to travel Load handling. steering becomes stiff	233