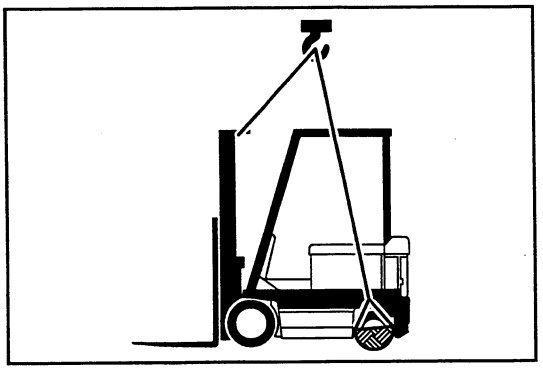
FOREWORD

This Manual contains specifications, maintenance, repair, diagnostic and service procedures for the chassis, body, electrical controller, and material handling system of the TOYOTA ELECTRIC POWERED FORKLIFT 7FBCU15 to 55 series.

Please use this manual for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of July 2001. Please understand that disagreement can take place between the descriptions in the manual and actual vehicles due to change in design and specifications. Any change or modifications thereafter will be informed by Toyota Industrial Equipment Parts & Service News.

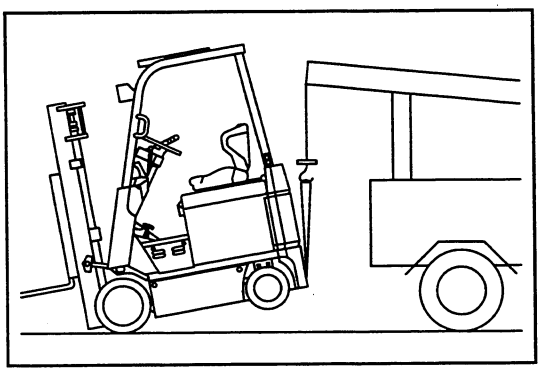
TOYOTA Material Handling Company
A Division of TOYOTA INDUSTRIES CORPORATION



HOISTING THE VEHICLE

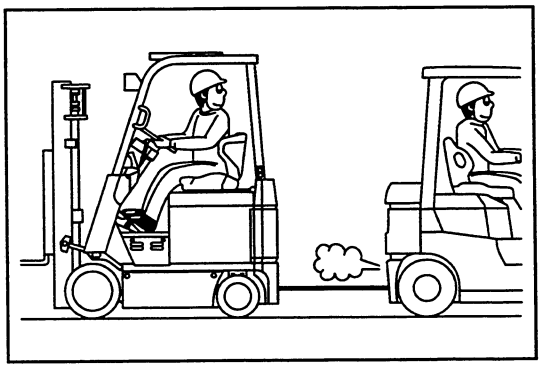
When hoisting the vehicle, use the mast hook on the front of the vehicle and a wire net on the rear wheel.

Caution:
- **Use wire ropes having sufficient strength.**
- **Never hoist the forklift by the weight hook holes or head guard.**

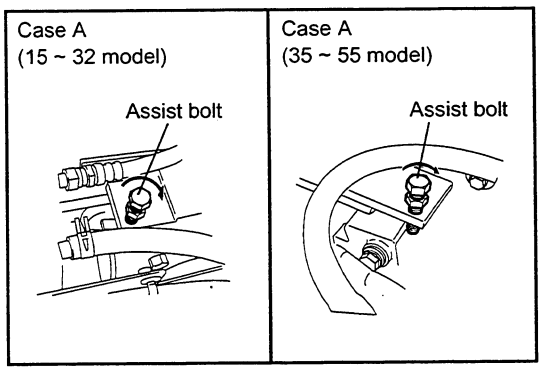


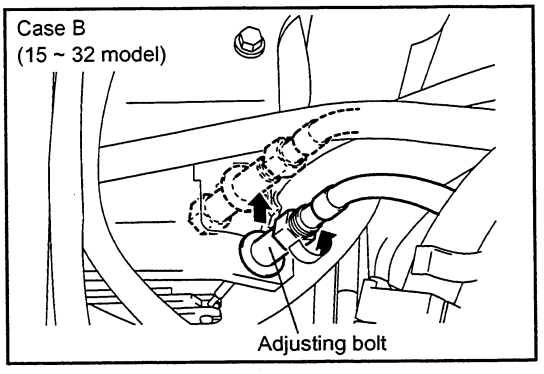
CAUTION FOR TOWING

1. When towing the forklift, always lift the rear wheels away from the ground.
2. The traveling speed in towing must not exceed the maximum traveling speed of the forklift.



3. Always set the key switch to OFF and the direction switch to the neutral position before starting towing.
   In case of towing by connection with a wire rope with the operator on the forklift, however, set the key switch to ON (PS operation) and always set the direction switch to the neutral position.
4. Before towing, either remove the fork or take an action to prevent fork contact with the ground due to bounding.





Cautions for Deadman Brake Spec. Model

The brake exclusive to the deadman brake must be released before towing.
The deadman brake can be released in the two following ways. Select according to the situation.

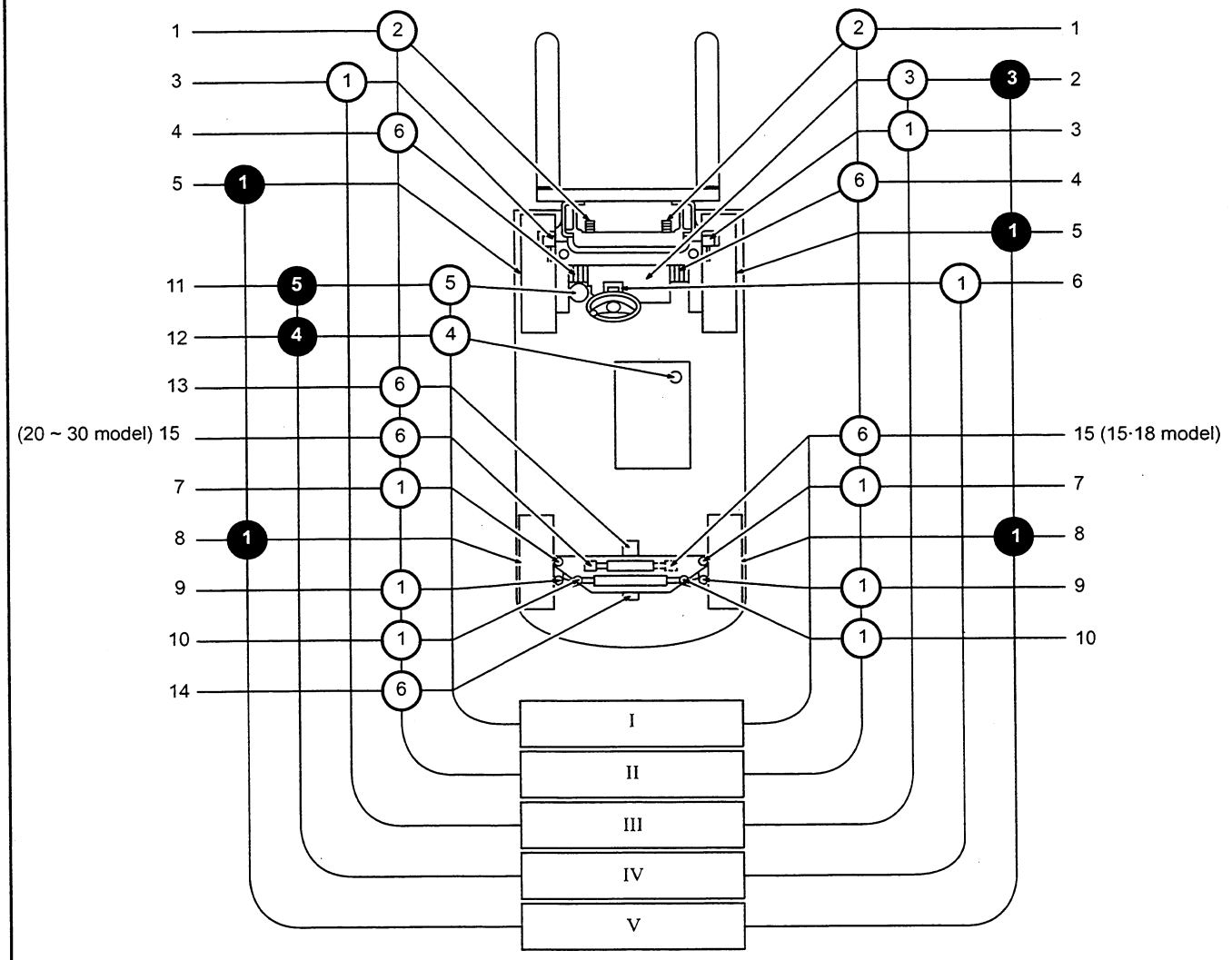
A. Releasing after battery removal
B. Releasing with the battery installed

Case A:
1. Remove the battery.
2. Loosen the lock nut for the assist bolt for forced releasing of the brake, and tighten the assist bolt fully to release the brake.
3. Be sure to adjust after towing. (See Page 10-57, 58.)

Case B:
1. Remove the toe board.
2. Loosen the deadman brake cable adjusting bolt and free the cable from the cable clamp.
   15 ~ 32 model:
   Remove the PS controller first for easier operation.

LUBRICATION CHART

15 ~ 32 Model



- O Inspection
- ● Replacement
- ① MP Grease
- ② Engine Oil
- ③ Hypoid gear Oil
- ④ Hydraulic Oil
- ⑤ Brake Fluid
- ⑥ Molybdenum disulfide greass

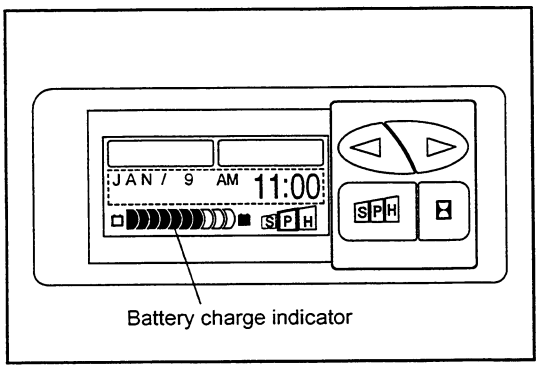
I. Inspect every 8 hours (daily)
II. Inspect every 40 hours (weekly)
III. Inspect every 170 hours (monthly)
IV. Inspect every 1000 hours (6 monthly)
V. Inspect every 2000 hours (annual)

1 Chain
2 Drive unit
3 Tilt cylinder front pin
4 Mast support bush
5 Front wheel bearing
6 Tilt steering lock mechanism
7 Steering knuckle king pin
8 Rear wheel bearing
9 Tie rod end pin
10 Rear axle cylinder end pin
11 Brake master cylinder
12 Oil tank
13 Rear axle beam front pin
14 Rear axle beam rear pin
15 Swing lock cylinder crank and rod pin

SERVICE STANDARD

Specific gravity upon full charge		1.280 [20°C (68°F)]
Specific gravity upon end of discharge		1.150 [20°C (68°F)]
Discharge end voltage	36 V	32.0 V
	48 V	42.5 V
Electrolyte		Refined dilute sulfuric acid
Fluid to be added		Distilled (deionized) water
Insulation resistance		1MΩ or more

DISPLAY



Battery discharged state %	LCD									
	10 F	9	8	7	6	5	4	3	2	1 E
0 to 10 (exclusive)	O	O	O	O	O	O	O	O	O	O
10 to 20 (exclusive)	—	O	O	O	O	O	O	O	O	O
20 to 30 (exclusive)	—	—	O	O	O	O	O	O	O	O
30 to 40 (exclusive)	—	—	—	O	O	O	O	O	O	O
40 to 50 (exclusive)	—	—	—	—	O	O	O	O	O	O
50 to 60 (exclusive)	—	—	—	—	—	O	O	O	O	O
60 to 70 (exclusive)	—	—	—	—	—	—	O	O	O	O
70 to 80 (exclusive)	—	—	—	—	—	—	—	O	O	O
80 to 90 (exclusive)	—	—	—	—	—	—	—	—	O	O
90 to 100 (exclusive)	—	—	—	—	—	—	—	—	—	O
100 or more	—	—	—	—	—	—	—	—	—	—

Battery Charge Indicator

The battery charge indicator indicates 10 levels of battery charge on the LCD.

Low Remaining Battery Charge Warning

When the remaining battery charge drops below the set level, the charge display blinks.

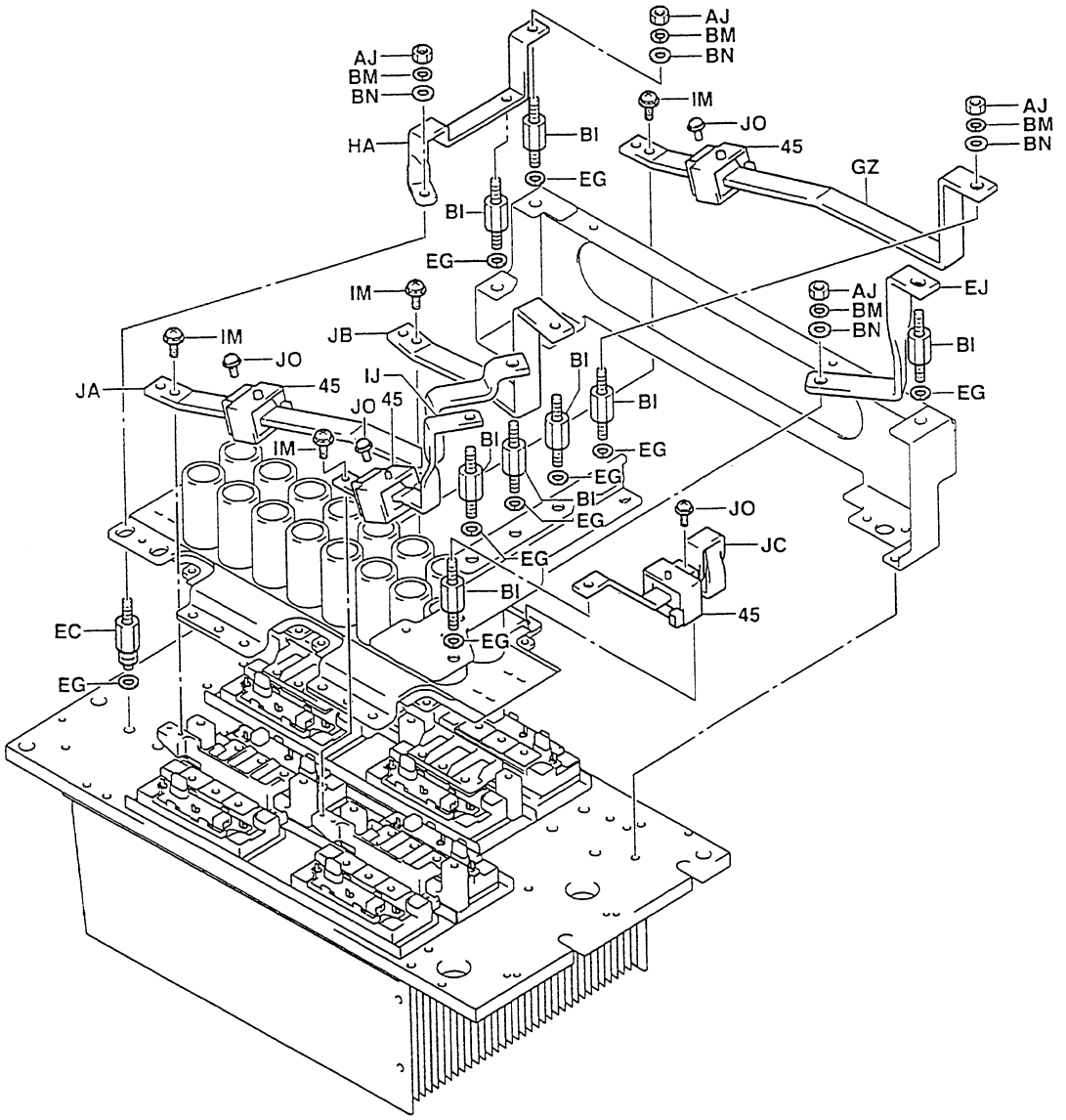
When the key switch is turned to OFF and ON again in this state, the buzzer sounds for 5 seconds to warn the operator.

Battery Overdischarge Warning Function

When the battery charge decreases further below the set level after the remaining battery charge warning, any attempt at traveling or material handling operation will cause all charge indicator segments to blink and the alarm to sound to warn the operator.

Chopper

2401

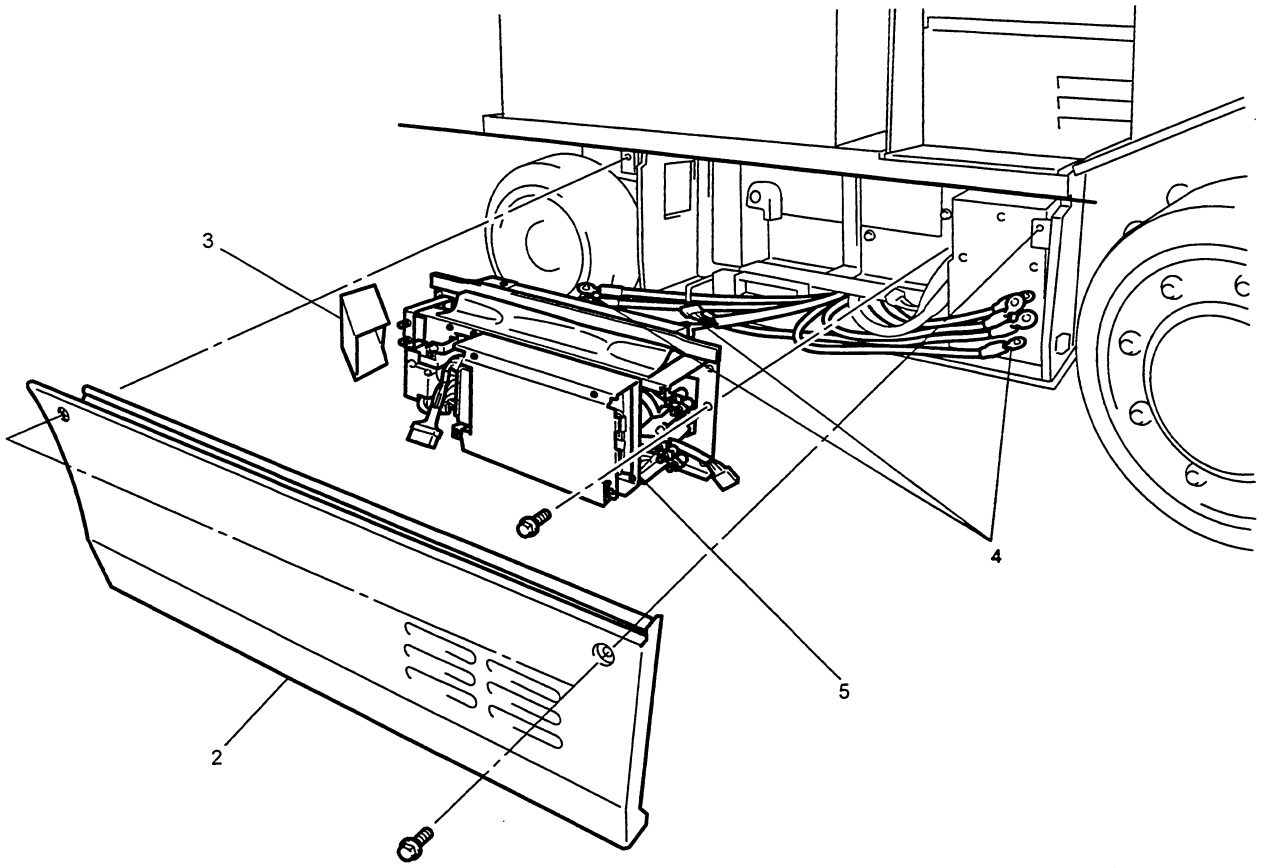


2401-253

TRAVELING CONTROLLER ASSY REMOVAL·INSTALLATION (35 ~ 55 MODEL)

Caution:
Before starting the job, measure the voltage between P4 and N1; if there is any voltage, insert a resistor at approx. 100 Ω between P4 and N1 to discharge the capacitor.

T = N·m (kgf-cm) [ft-lbf]



Nut connecting controller to cable	M8	T = 11 ~ 15 (112 ~ 153) [8.1 ~ 11.1]
	M10	T = 15 ~ 19 (153 ~ 194) [11.1 ~ 14.0]

Removal Procedure

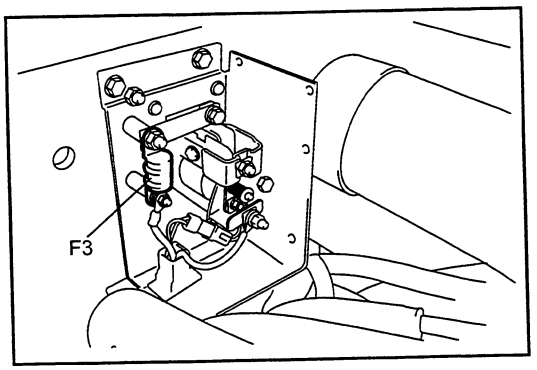
1 Disconnect the battery plug.
2 Remove the side cover RH.
3 Remove the duct.
4 Disconnect the connectors and terminals from the traveling controller ASSY.
5 Remove the controller ASSY.

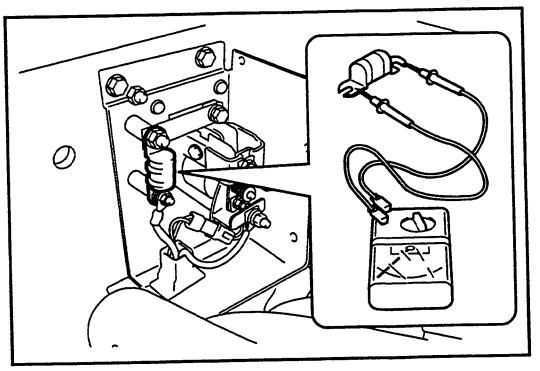
Installation Procedure

The installation procedure is the reverse of the removal procedure.

3. F3 (PS circuit fuse) inspection
   Battery plug disconnected, F3 removal

Measurement terminals	Both terminals of F3
Circuit tester range	Ω × 1
Standard	0 Ω





DC/MD board

CN111 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN111-1 (41, B48V)	CN112-18 (N2, N2)		Approx. 36 V/48 V	
CN111-2 (10, MPS+)	CN111-8 (9, MPS-)	Measurement with (-) probe in contact with CN111-8	Approx. 11 V	PS controller STD model
CN111-3 (338, H15V+)	CN111-9 (315, H15V)		Approx. 15 V	
CN111-4 (11, S20V+)	CN111-12 (12, S20V-)		Approx. 20 V	
CN111-5 (16, D15V)	CN111-13 (14, GNDD)		14 ~ 15 V	
CN111-6 (43, VBKY)	CN112-18 (N2, N2)		Approx. 36 V/48 V	
CN111-7		Unused	—	
CN111-8 (9, MPS-)	CN111-2	Battery plug disconnected Resistance measurement	Approx. 20 Ω	PS controller STD model
CN111-9 (315, H15V-)		Immeasurable	—	
CN111-10 (338, B20V+)		Unused	—	
CN111-11 (44, VBMB)	CN112-18 (N2, N2)		Approx. 36 V/48 V	
CN111-12 (12, S20V-)		Immeasurable	—	
CN111-13 (14, GNDD)		Immeasurable	—	
CN111-14		Unused	—	

CN112 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN112-1 (162, TMPD2+)	CN112-2 (N2, TMPD-SD)		13 ~ 15 V	
CN112-2 (N2, TMPD-SD)		Immeasurable	—	
CN112-3 (153, TMPD-G)	CN112-2 (N2, TMPD-SD)		13 ~ 15 V	
CN112-4 (162, TMPD1+)	CN112-2 (N2, TMPD-SD)		13 ~ 15 V	
CN112-5 (15, C15V)	CN112-18 (N2, N2)		14 ~ 15 V	
CN112-6 (41, B48V)	CN112-18 (N2, N2)		Approx. 36 V/48 V	
CN112-7 (43, VBKY)	CN112-18 (N2, N2)		Approx. 36 V/48 V	

CN102 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN102-1 (64, SWAC)	CN102-22 (51, POT-)	Key switch OFF, SWAC ON Key switch OFF, SWAC OFF	Approx. 0 V Approx. 5 V	
CN102-2 (52, POTA)	CN102-22 (51, POT-)	Key switch OFF, accelerator pedal depressed	0.5 ~ 3 V	Varies with the degree of operation
CN102-3		Unused	—	
CN102-4		Unused	—	
CN102-5		Unused	—	
CN102-6 (81, SSD1)	CN102-22 (51, POT-)		1 ~ 3 V	
CN102-7 (82, SSD2)	CN102-22 (51, POT-)		1 ~ 3 V	
CN102-8		Unused	—	
CN102-9		Unused	—	
CN102-10 (86, TD+)	CN102-22 (51, POT-)		Approx. 5 V	
CN102-11 (87, TD-)	CN102-22 (51, POT-)		1 ~ 4 V	
CN102-12 (88, TD2+)	CN102-22 (51, POT-)		Approx. 5 V	
C102-13 (89, TD2-)	CN102-22 (51, POT-)		1 ~ 4 V	
CN102-14 (53, POTA+)	CN102-22 (51, POT-)		Approx. 4.6 V	
CN102-15		Unused	—	
CN102-16		Unused	—	
CN102-17		Unused	—	
CN102-18 (80, SSD+)	CN102-22 (51, POT-)		Approx. 15 V	
CN102-19		Unused	—	
CN102-20		Unused	—	
CN102-21		Unused	—	
CN102-22 (51, POT-)		Immeasurable	—	

CN138 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN138-1 (6, MP2-)	CN138-2 (5, MP2+)	Battery plug disconnected Resistance measurement	Approx. 20 Ω	
CN138-2 (5, MP2+)	CN138-1 (6, MP2-)	LSL1 ON	Approx. 11 V	

CN139 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN139-1 (4, MP1-)	CN139-2 (3, MP1+)	Battery plug disconnected Resistance measurement	Approx. 20 Ω	
CN139-2 (3, MP1+)	CN139-1 (4, MP1-)		Approx. 11 V	

CN157 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN157-1 (49, CD-)	CN157-2 (47, CD+)	Battery plug disconnected Resistance measurement	Approx. 20 Ω	
CN157-2 (47, CD+)	CN157-1 (49, CD-)		Approx. 11 V	

CN158 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

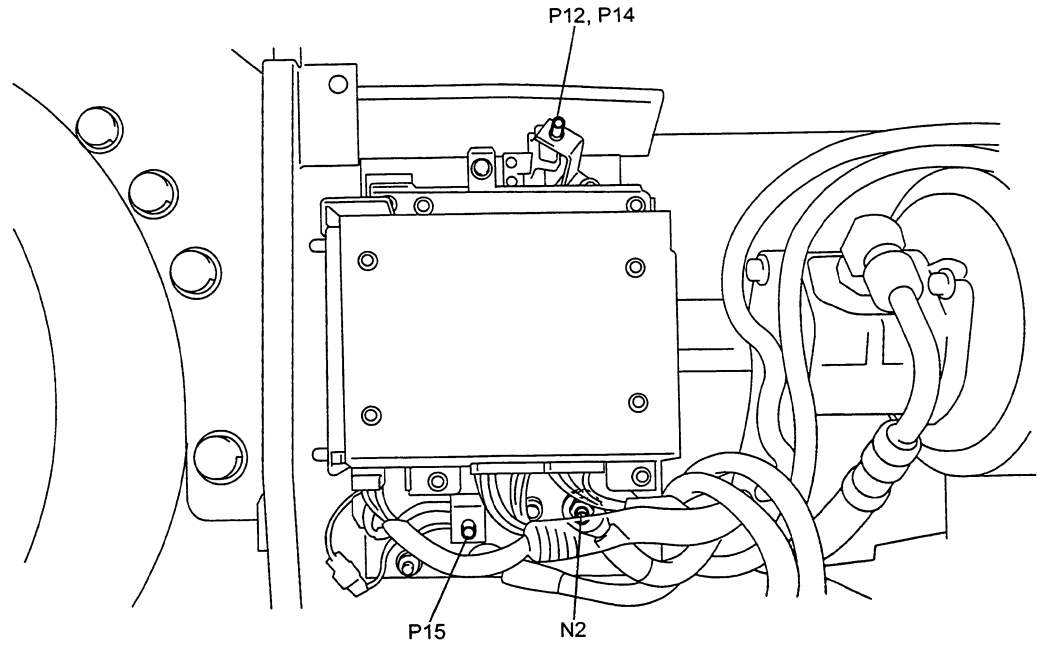
Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN158-1 (44, VBMB)	CN158-4 (N2, N2)		36/48 V	
CN158-2 (47, CD+)	CN158-3 (49, CD-)		Approx. 11 V	
CN158-3 (49, CD-)	CN158-2 (47, CD+)	Battery plug disconnected Resistance measurement	Approx. 20 Ω	
CN158-4 (N2, N2)		Immeasurable	—	
CN158-5 (77, CHOPCD+)		Immeasurable	—	
CN158-6 (19, CHOPCD-)		Immeasurable	—	

CN155 basic conditions
(battery plug connected, key switch ON, direction lever at N, and motor cable disconnected)

Connector No.⇔Connector No.		Conditions	Standard	Remarks
CN155-1 (193, BMP)	CN154-8 (N1, N1)		Approx. 0 V	Vehicle with motor brush wear warning
CN155-2 (354, PLST)	CN155-10 (350, PLS-)	PLST ON, key switch OFF PLST OFF, key switch OFF	Approx. 0 V Approx. 13 V	
CN155-3 (351, PLSL1)	CN155-10 (350, PLS-)	PLSL1 ON, key switch OFF PLSL1 OFF, key switch OFF	Approx. 0 V Approx. 13 V	
CN155-4 (—, PLSAT2)	CN155-10 (350, PLS-)	Immeasurable	—	
CN155-5 (—, CKT-G)		Immeasurable	—	
CN155-6 (194, BMP2)	CN154-8 (N1, N1)		Approx. 0 V	Vehicle with motor brush wear warning
CN155-7 (11, S20V+)	CN155-8 (12, S20V-)		Approx. 19.5 V	
CN155-8 (12, S20V-)		Immeasurable	—	
CN155-9 (355, PLSAT1)	CN155-10 (350, PLS-)	PLSAT1 ON, key switch OFF PLSAT1 OFF, key switch OFF	Approx. 0 V Approx. 13 V	
CN155-10 (350, PLS-)	CN154-8 (N1, N1)		Approx. 0 V	

Material Handling Controller (35 ~ 55 Model)

(1) Inspection method
Always disconnect the pump motor cables.
Tester range:Ω × 10



(a) Motor cable terminal inspection

Motor cable terminal		N2		P12	
		(-)	(+)	(-)	(+)
P14	(-)	—	Capacitor characteristic		
	(+)	Approx. 50 Ω	—		
P15	(-)	—	Capacitor characteristic	—	Approx. 50 Ω
	(+)	Approx. 50 Ω	—	Capacitor characteristic	—

(b) P12 - N2 inspection

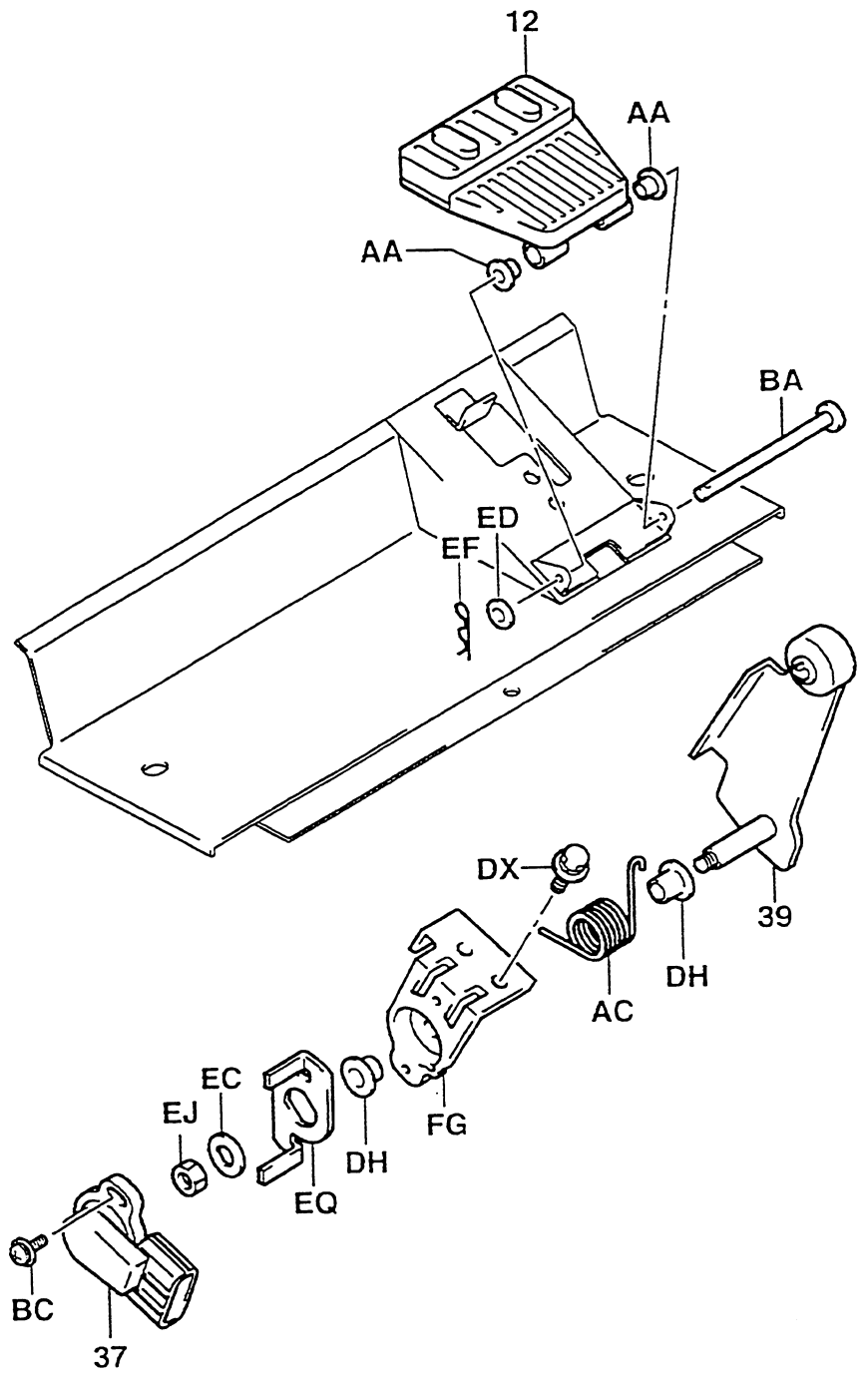
P12 (-) — N2 (+)	Capacitor characteristic
P12 (+) — N2 (-)	Approx. 50 Ω

Capacitor characteristic:The pointer deflects to the 0 Ω position once, then it gradually returns to ∞ Ω.
Finally it indicates ∞ Ω.

EZ PEDAL (OPT)

COMPONENTS

2611



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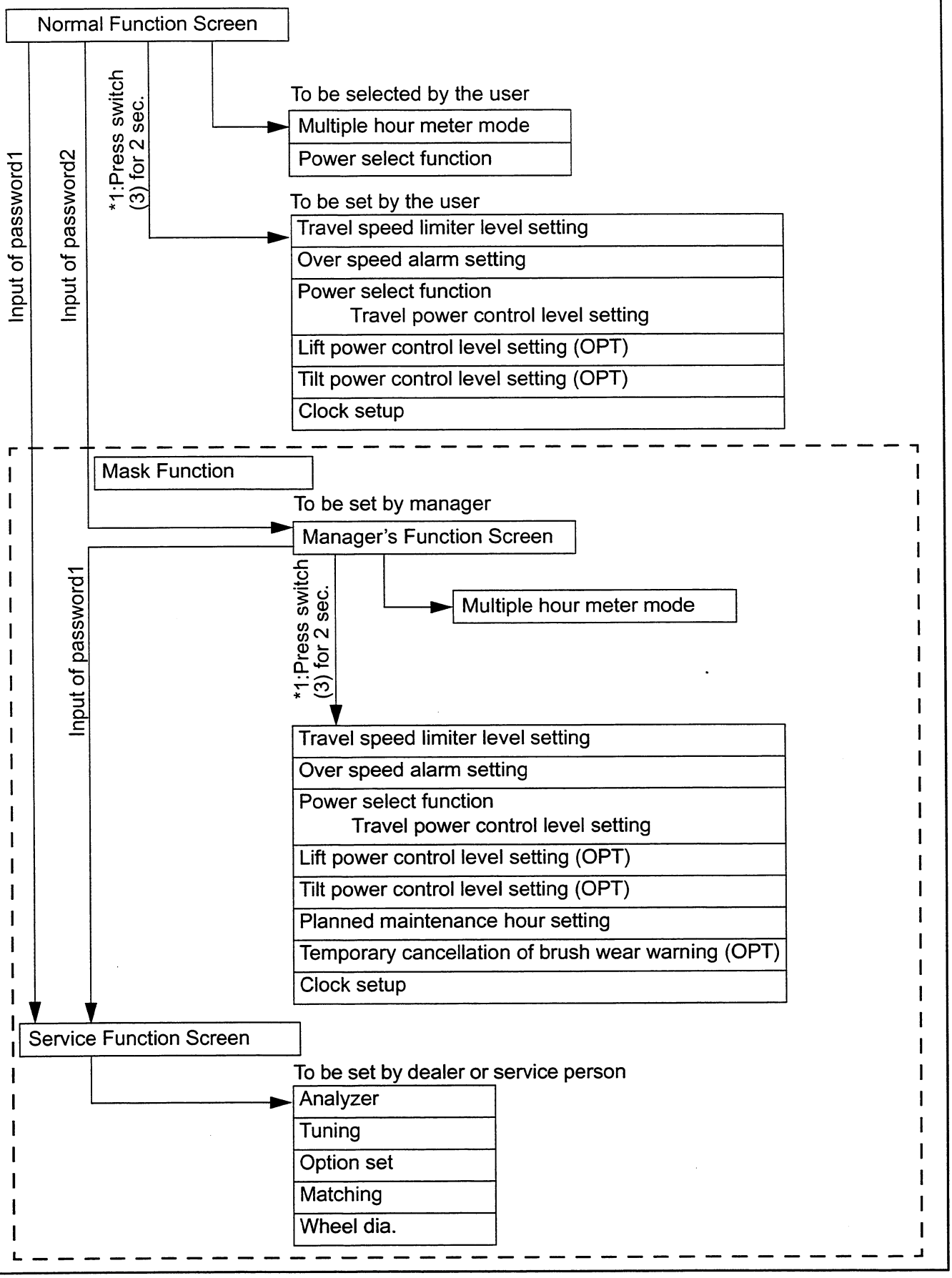
Export Model

*1: See page 3-12 for the switch No.

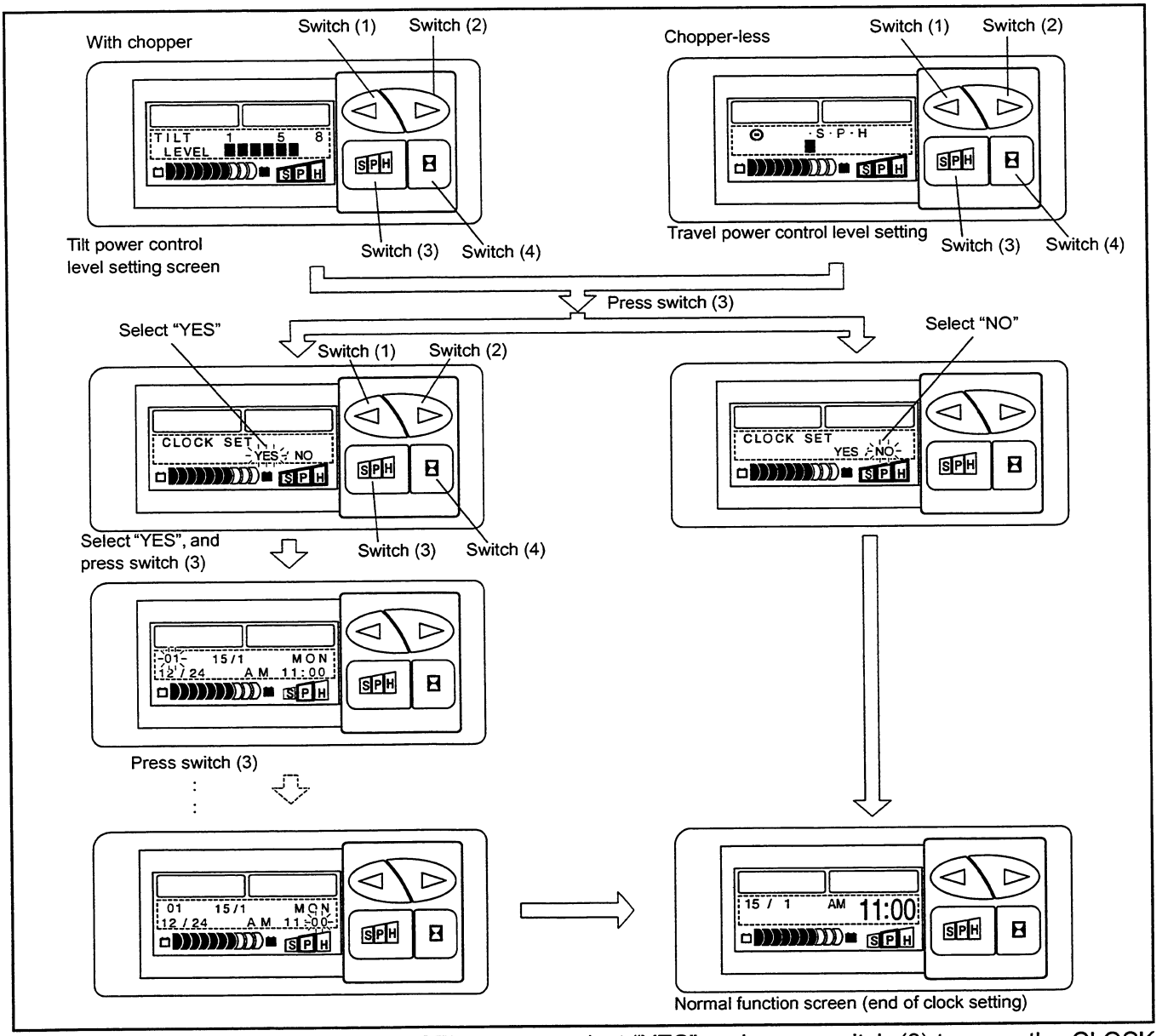


CLOCK SET UP SELECTION SCREEN

The year, month, day, day of week, time and 12/24-hour system can be set independently.

With chopper: Press switch (3) on the TILT POWER CONTROL LEVEL SETTING screen to go to the CLOCK SET UP SELECTION screen.

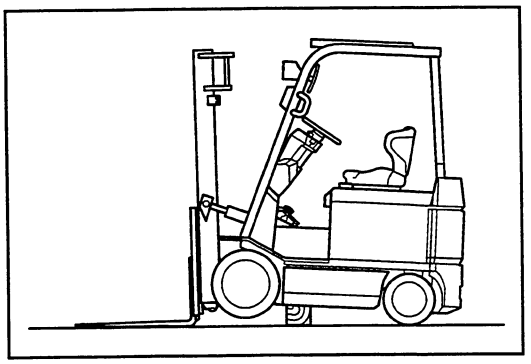
Chopper-less: Press switch (3) on the TRAVEL POWER CONTROL LEVEL SETTING screen to go to the CLOCK SET UP SELECTION screen.



1. Press switch (1) on the CLOCK SET screen, select "YES" and press switch (3) to open the CLOCK SET screen.

   (1) CLOCK SET screen
   - Press switch (1) to decrease the set value (blinking).
   - Press switch (2) to increase the set value (blinking).
   - Press switch (3) to set the currently selected item (blinking) and go to the next item.
   - Press switch (3) when Minute is selected on the CLOCK SET screen to return to the normal function screen.

2. Press switch (2) on the CLOCK SET screen, select "NO" and press switch (2) to return to the normal function screen.



SERVICE FUNCTION

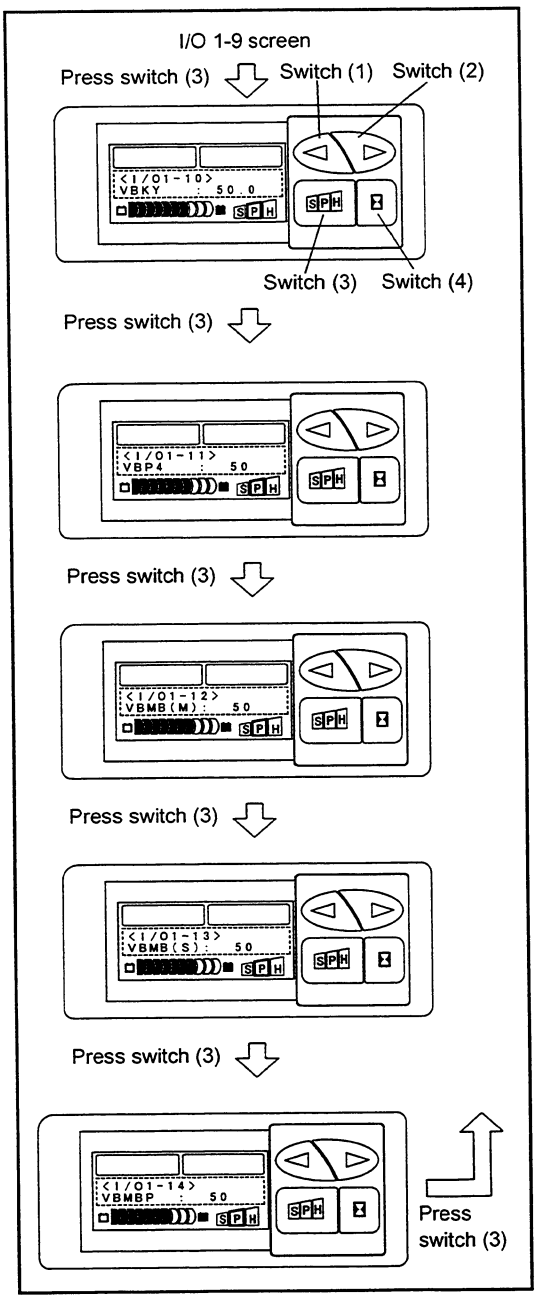
HOW TO USE THE SERVICE FUNCTION SCREEN

Preparation

Caution:
Always jack up the frame until the drive wheels (front tires) leave the ground and support the vehicle with wooden block under both side frames in the front. Fully lower the fork.

1. See that the battery plug is connected securely and turn the key switch to ON.

2. Operate the SERVICE FUNCTION according to the password input procedure explained on page 3-30.



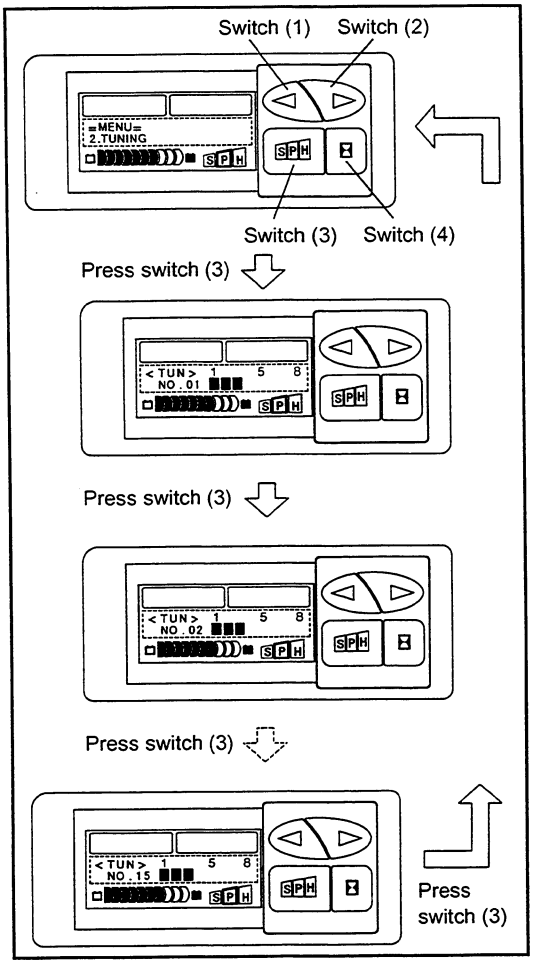
(10) I/O1-10 screen
VBKY:Battery voltage (V)
Voltage after key switch.

(11) I/O1-11 screen
VBP4:Voltage at P4 terminal (V)
Voltage measured at terminal P4.

(12) I/O1-12 screen
VBMB(M):Voltage (V) after (main input) MB contactor
Input voltage to the main controller after the MB contactor.

(13) I/O1-13 screen
VBMB(S):Voltage (V) after (SAS input) MB contactor
Input voltage to the SAS controller after the MB contactor.

(14) I/O1-14 screen
VBMBP:Voltage (V) after MP1 contactor
Input voltage after the MP1 contactor.



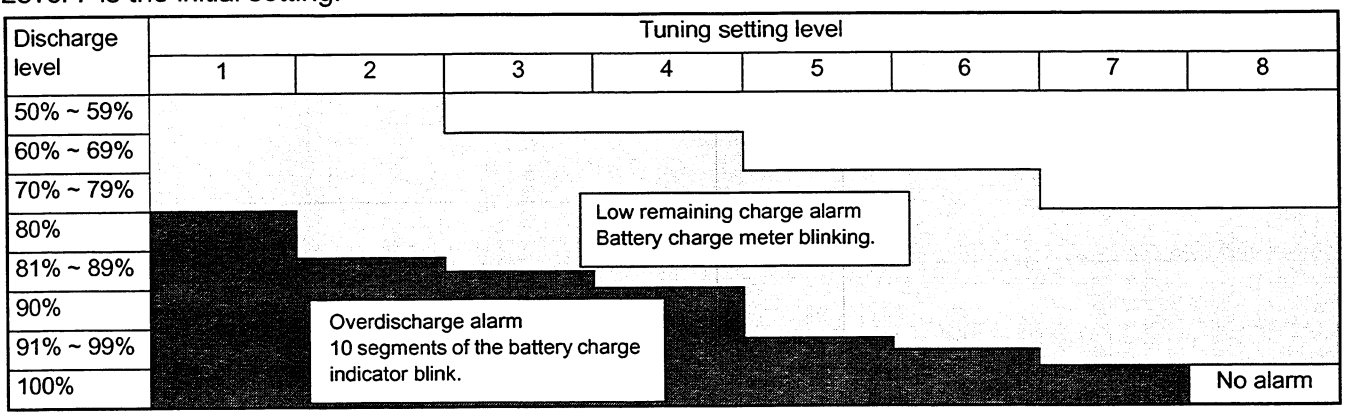
TUNING Screen Operation Procedure

1. Input the password on the normal function screen (see page 3-30) to display the SERVICE FUNCTION screen.
2. Press switch (2) to display 2. TUNING. Press switch (3) (enter) to display the TUNING screen.
3. Select the desired tuning item using switches (3) and (2).
4. Functions of switches on the TUNING screen are as follows:
   - Switch (1):Decreases the tuning level.
   - Switch (2):Increases the tuning level.
   - Switch (3):Enters (and switches to the next screen)

Note:
Press switch (3) on the Tuning No.15 (spare) screen to return to the SERVICE FUNCTION screen.

Low Remaining Battery Charge Alarm and Overdischarge Alarm Setting Levels (Tuning No. 3)

Level 7 is the initial setting.



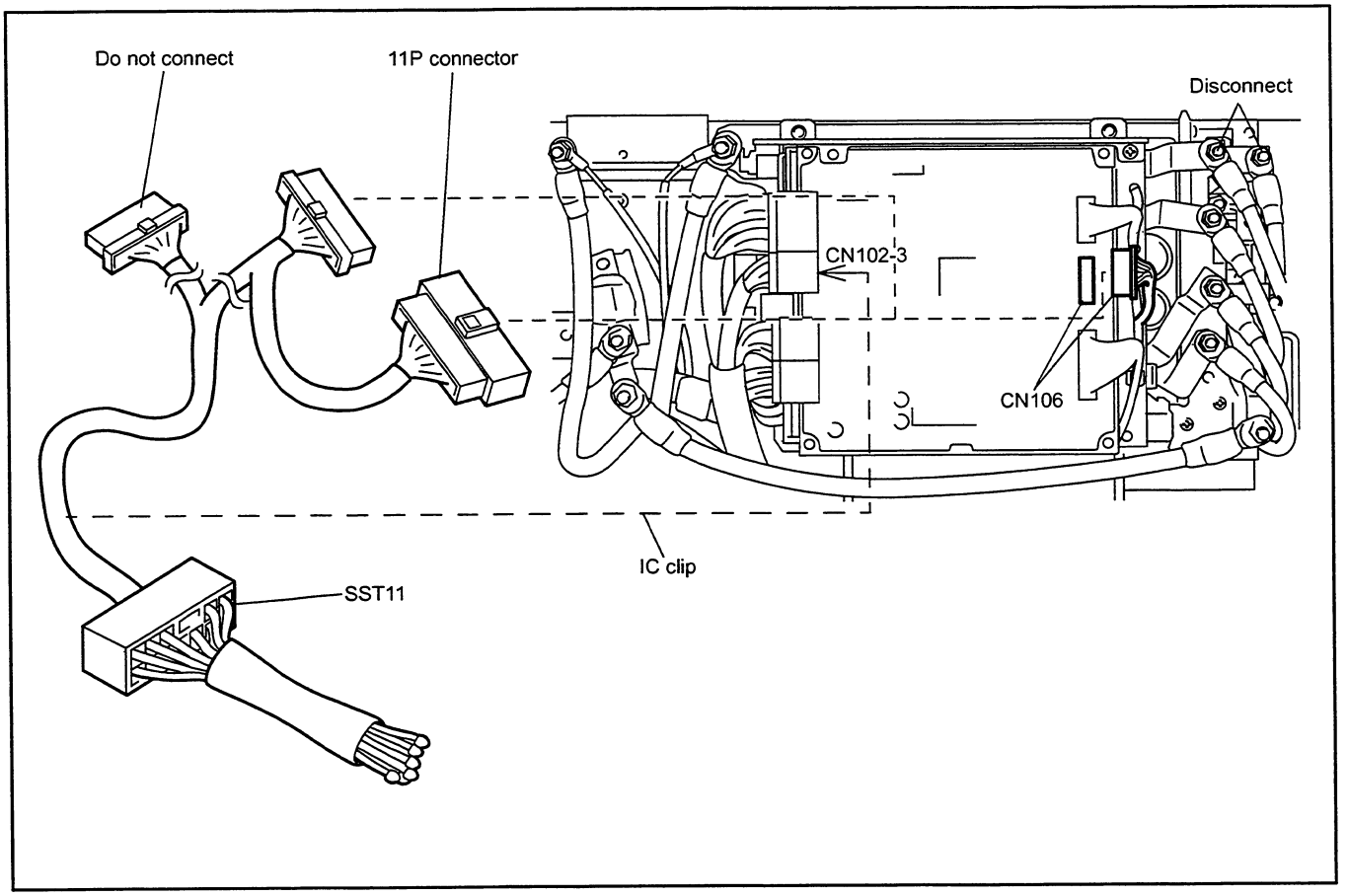
How to read the figure:
Example: When set to level 5
The battery charge indicator (10 segments) on the normal function screen is activated when the battery discharge is up to 69%. The low remaining battery charge alarm is activated when the battery discharge level is between 70% and 90% to blink the battery charge indicator. All 10 segments blink in case of overdischarge alarm, which is activated when the degree of battery discharge exceeds 90%.

Caution:
When level 8 is set, the overdischarge alarm (including lift interrupt) does not function. Carefully avoid overdischarge of battery also in view of the battery life.

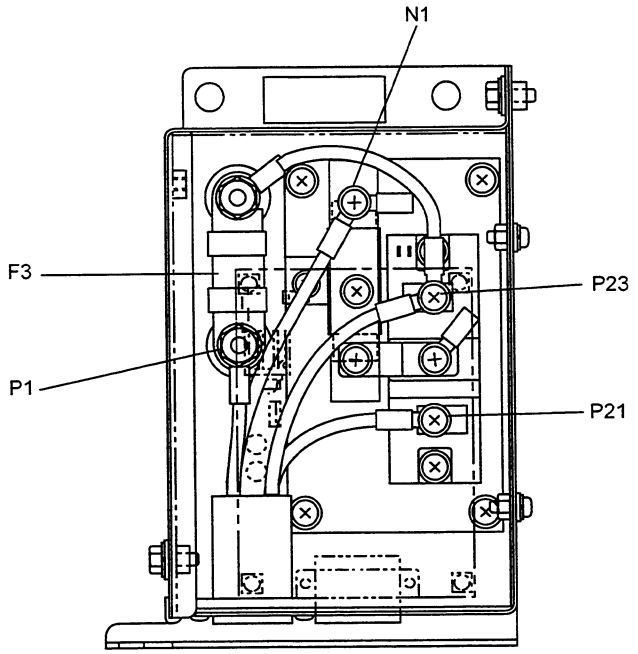
Display indication	Diag memory	Faulty portion	Defect mode	Phenomenon on vehicle
67-1	67-1	Lifting height switch	Switch abnormality	Low lifting height control No forward tilt restriction No automatic leveling control
 C/R	A0-1	Main drive circuit temperature	Overheat	Restricted drive output
	A0-2	Main pump circuit temperature	Overheat	Stop of material handling operations
A0-4	A0-4	Traveling system fan	FAN abnormality	Limited drive output
A1	A1	Controller	High voltage	Traveling and material handling are halted after abnormality indication.
 C/R	A2	CPU board temperature	Overheat	Restricted drive output
A3	A3	Incorrect battery connection	Charger-related incorrect connection	Stopped traveling and material handling MB does not turn ON.
A4	A4	Acceleration switch	Switch abnormality	Traveling disabled after abnormality indication
A6-1	A6-1	Lift No.1 switch	Lift No.1 switch abnormality	Traveling disabled after abnormality indication
A6-2	A6-2	Lift No.2 switch	Lift No.2 switch abnormality	Stop of material handling operations
A6-3	A6-3	Tilt switch	Tilt switch abnormality	Stop of material handling operations
A6-5	A6-5	Attachment No.1 switch	Attachment No.1 switch abnormality	Stop of material handling operations
A8	A8	Traveling/material handling system	Open fuse F1	Indication only
AA	AA	CPU board thermo-sensor	Thermo-sensor abnormality	Indication only
AF-1	AF-1	Main CPU	CPU board abnormality (1)	Traveling and Material handling outputs are stopped after abnormality detection. Reset
AF-2	AF-2	Main CPU	CPU board abnormality (2)	
AF-3	AF-3	Main CPU	CPU board abnormality (3)	
AF-4	AF-4	Main CPU	CPU board abnormality (4)	Traveling and material handling outputs are stopped after abnormality detection.
AF-5	AF-5	ST board CPU	CPU abnormality (1)	Swing control·Tilt control disabled
AF-6	AF-6	ST board CPU	CPU abnormality (2)	Swing control·Tilt control disabled
AF-7	AF-7	ST board CPU	CPU abnormality (3)	Swing control·Tilt control disabled
AF-8	AF-8	ST board CPU	CPU abnormality (4)	Swing control·Tilt control disabled

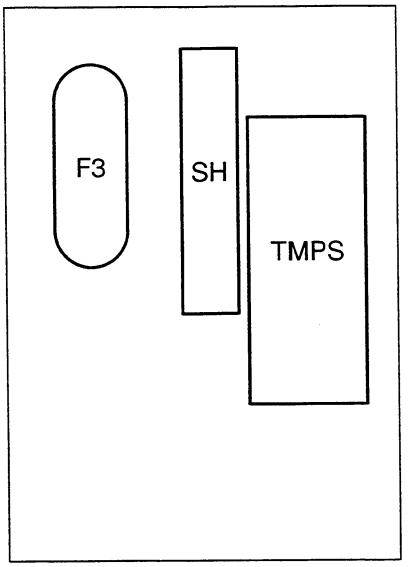
4

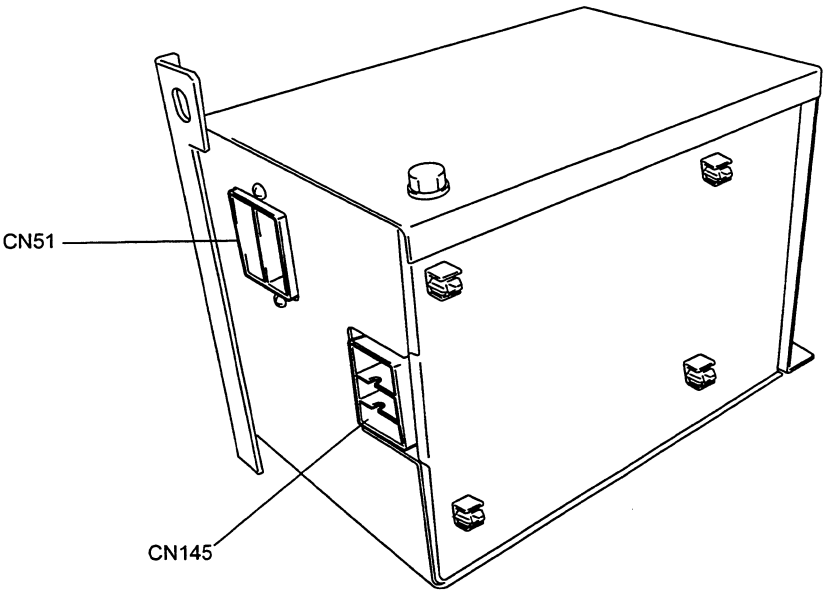
7. SST11 setting method for troubleshooting for "Failure of material handling only"
   (1) Disconnect the battery plug.
   (2) Disconnect the pump motor cables (P14 and P15).
   (3) Disconnect CN106 on the CPU board and connect SST11.
   (4) Connect the battery plug.
   (5) Turn key switch ON and make sure that LED No. 6 lights up when the material handling lever is operated.



EHPS CONTROLLER CONNECTOR·COMPONENT

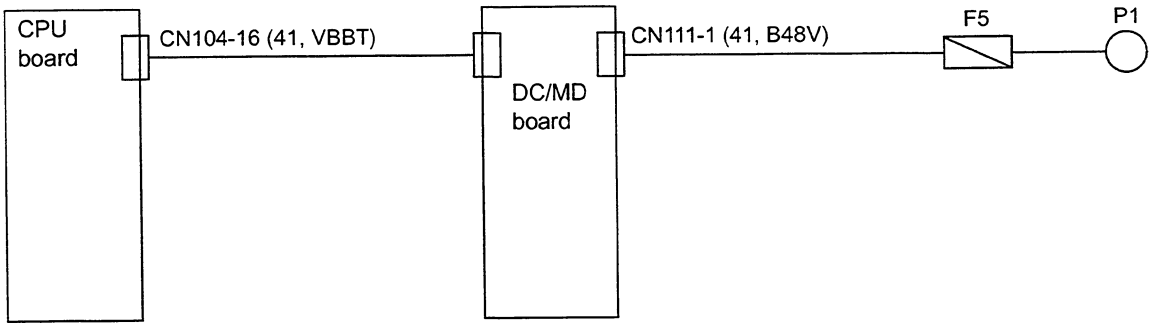






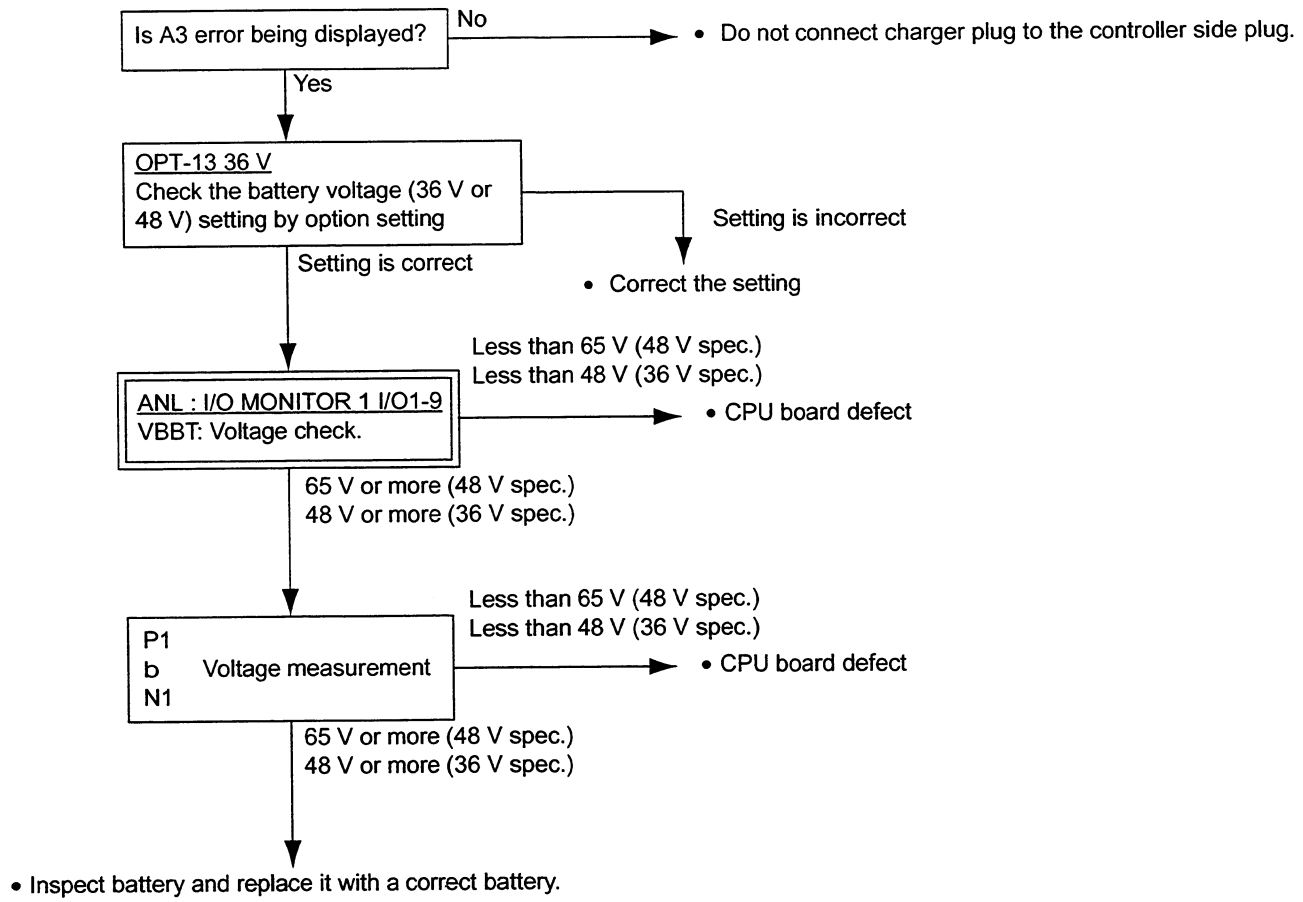
A3	Incorrect charging plug connection

Related portion



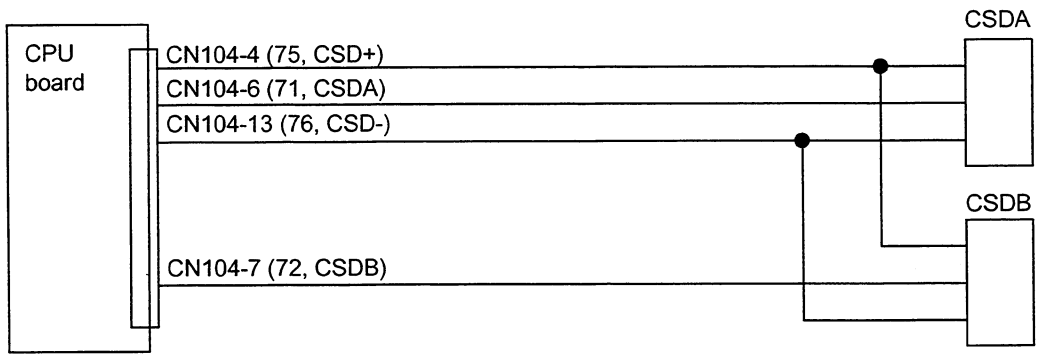
Condition for error detection

Output when the voltage of the VBBT line after F5 fuse exceeds the specified level.



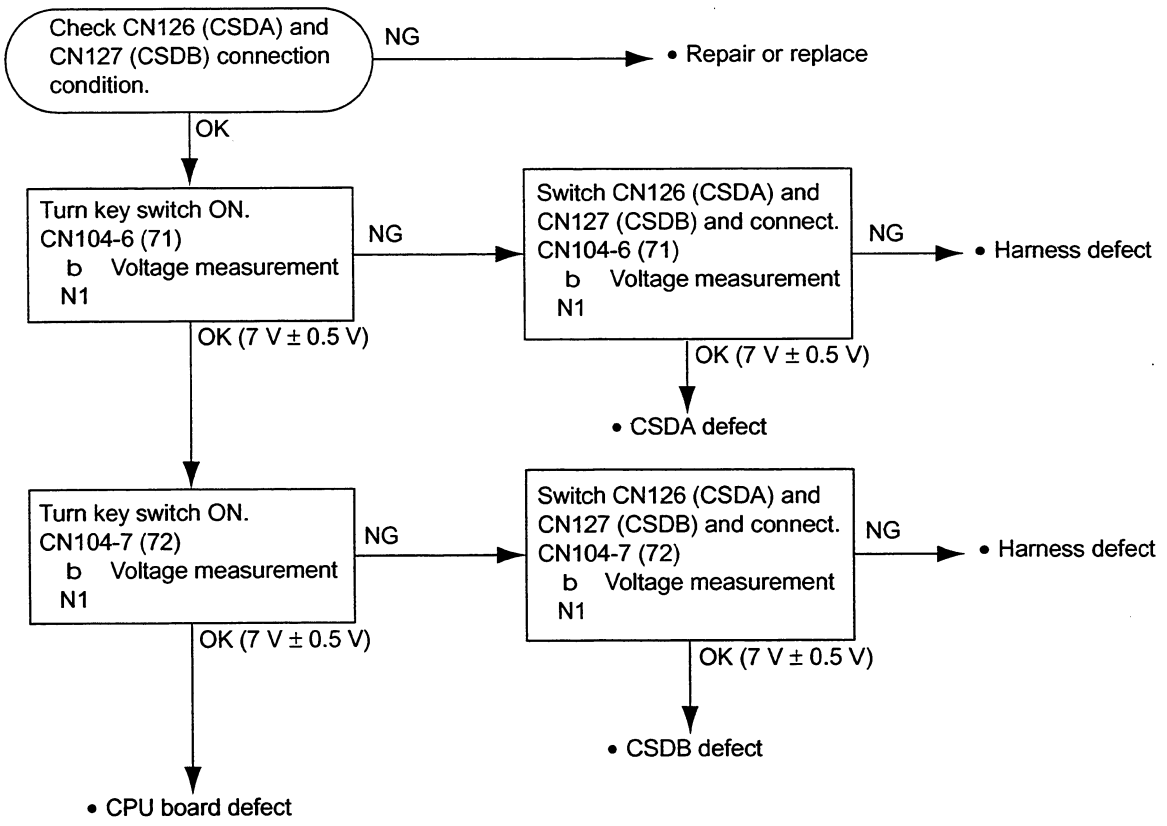
C1	Drive current sensor abnormality

Related portion



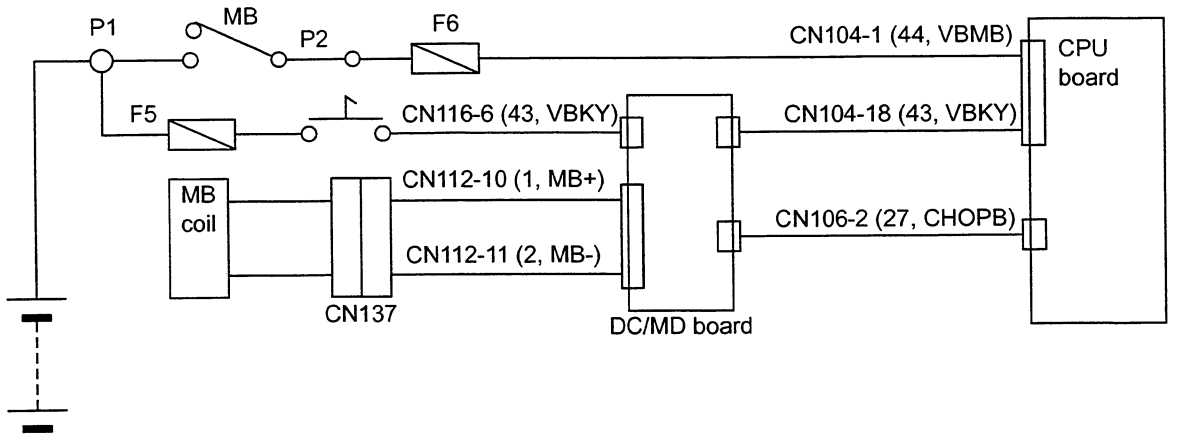
Condition for error detection

Output when the CSDA or CSDB output is outside the specified range.



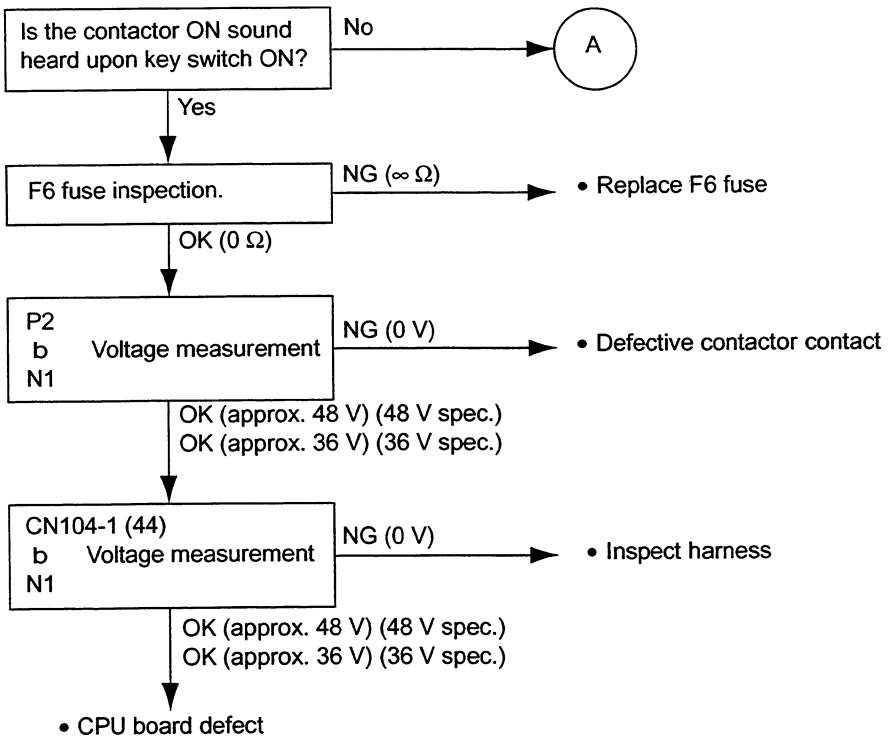
CB-1	Battery contactor (MB) open

Related portion



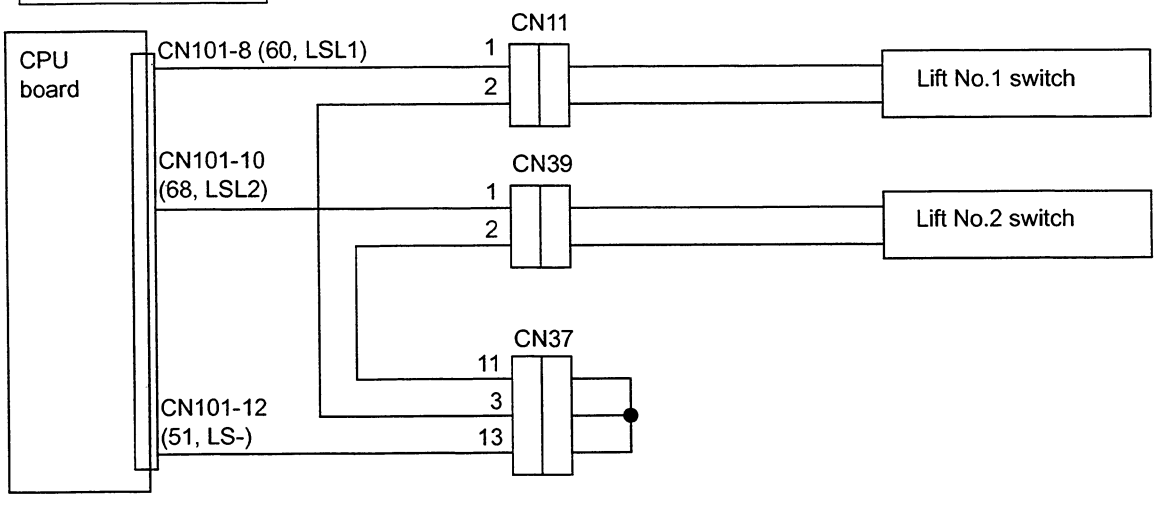
Condition for error detection

Output when the voltage difference between VBKY and VBMB lines exceeds the specified level.



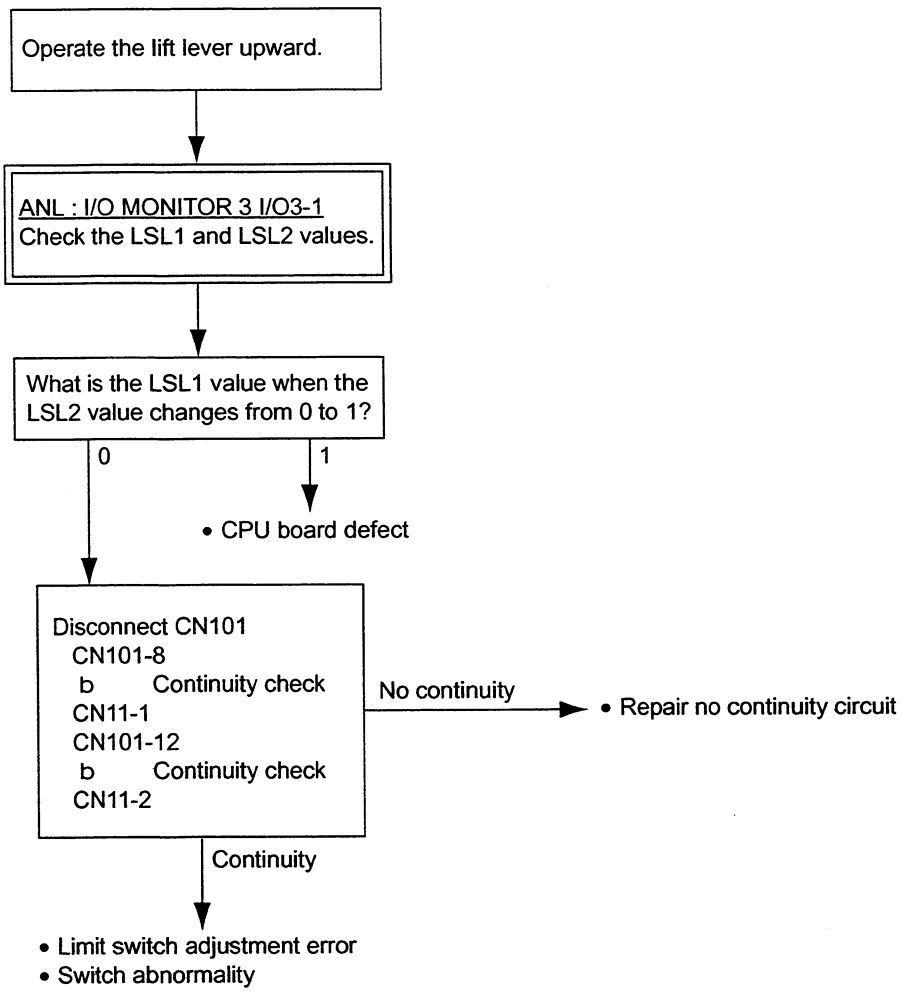
E6	Lift switch abnormality

Related portion



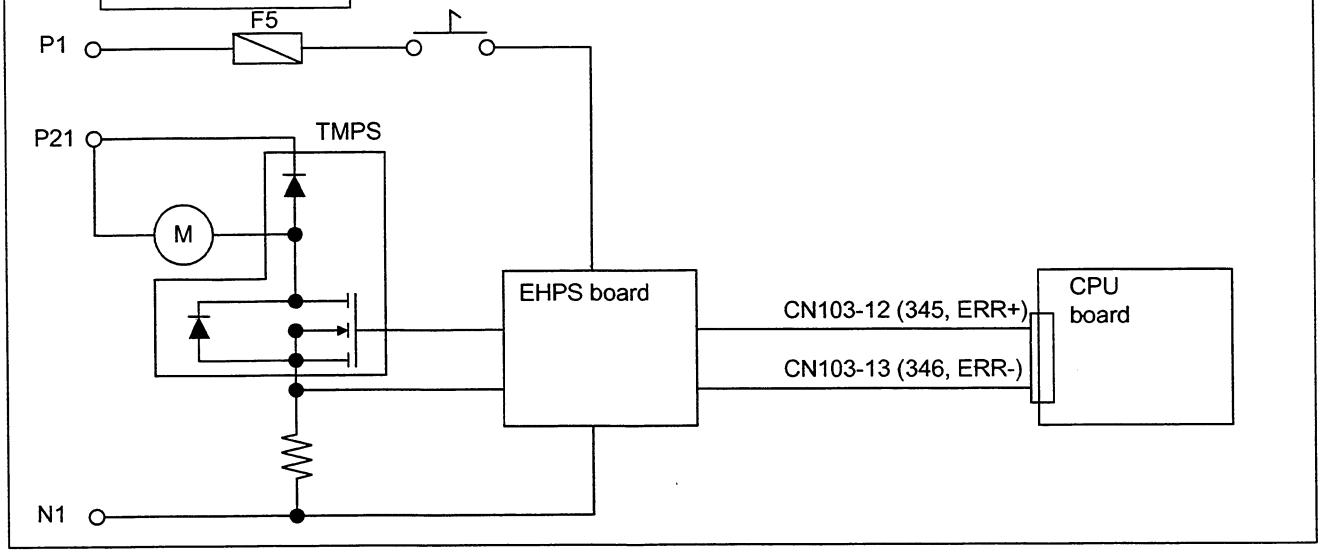
Condition for error detection

Output if lift No. 1 switch is OFF when lift No. 2 switch is turned ON.



F0-2	EHPS abnormality

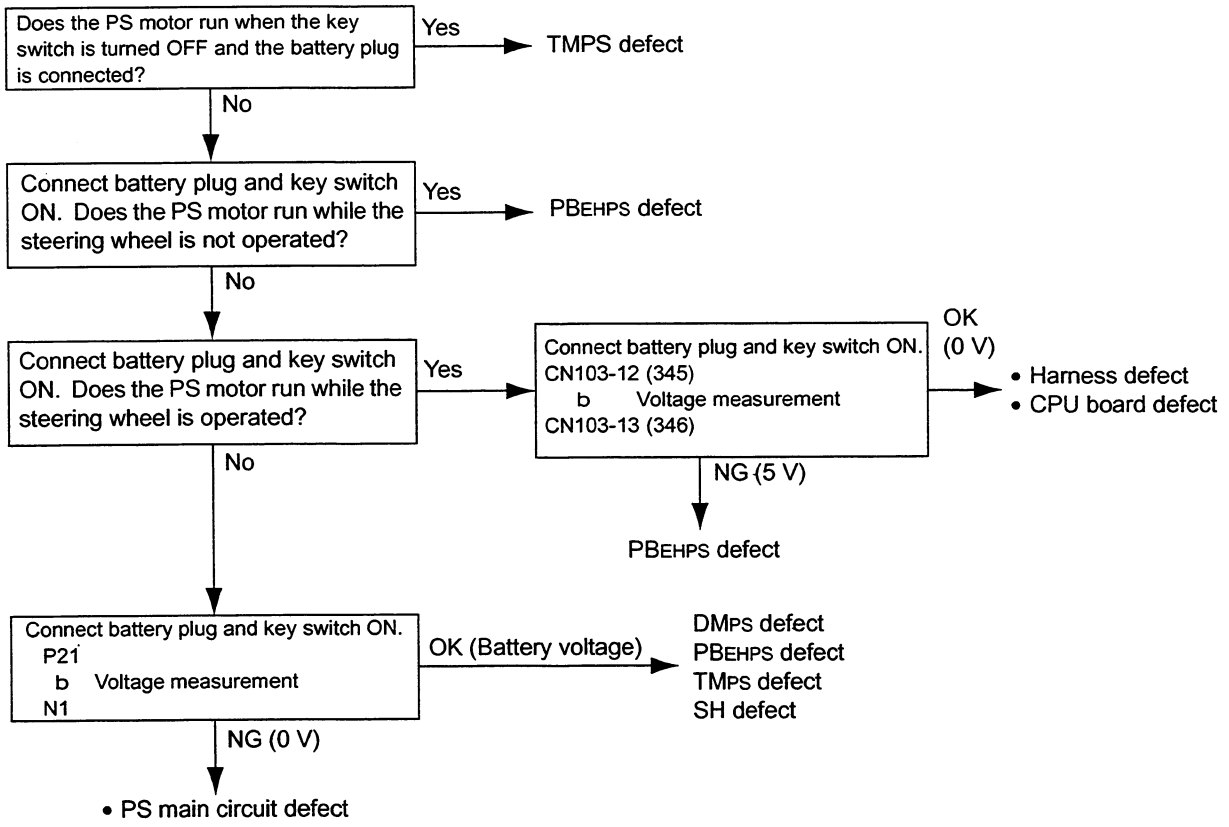
Related portion



Condition for error detection

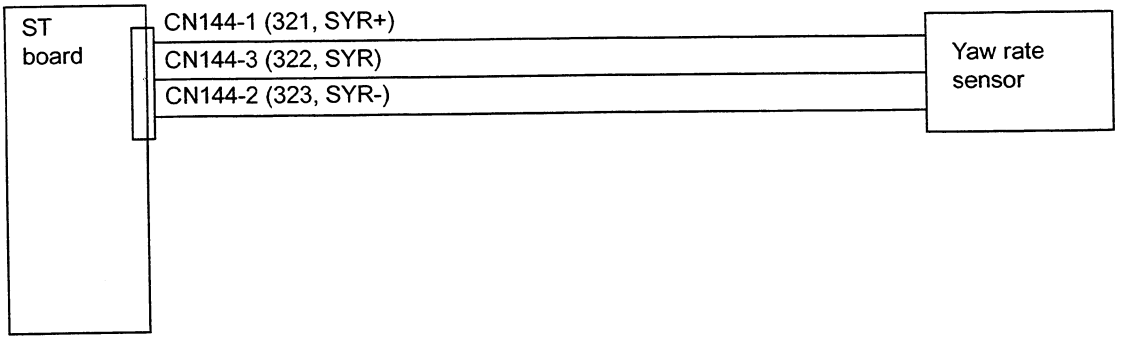
Current flows in the motor althugh TMPS is not ON

Check if EHPS is set to YES by option setting on the display.



52-1, 2, 3	Yaw rate sensor abnormality

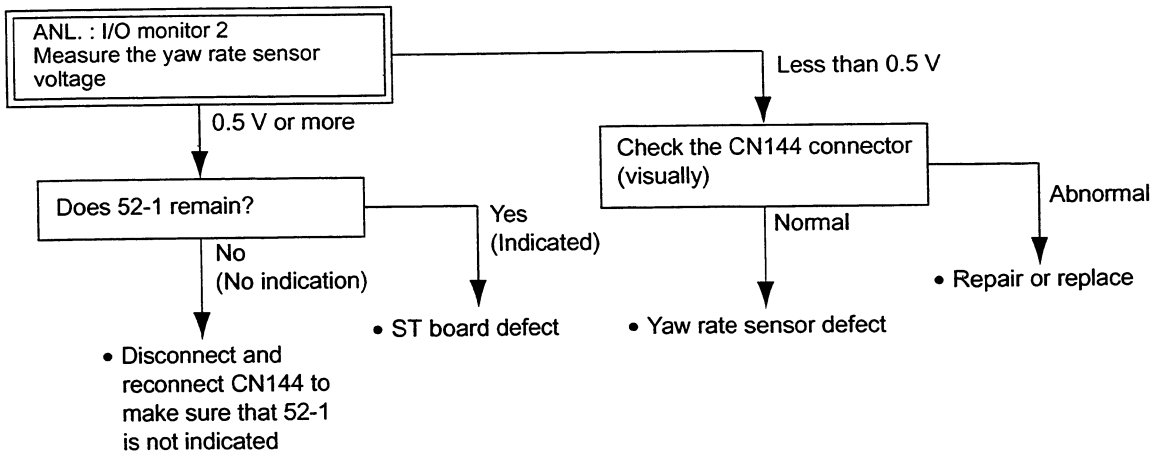
Related portion



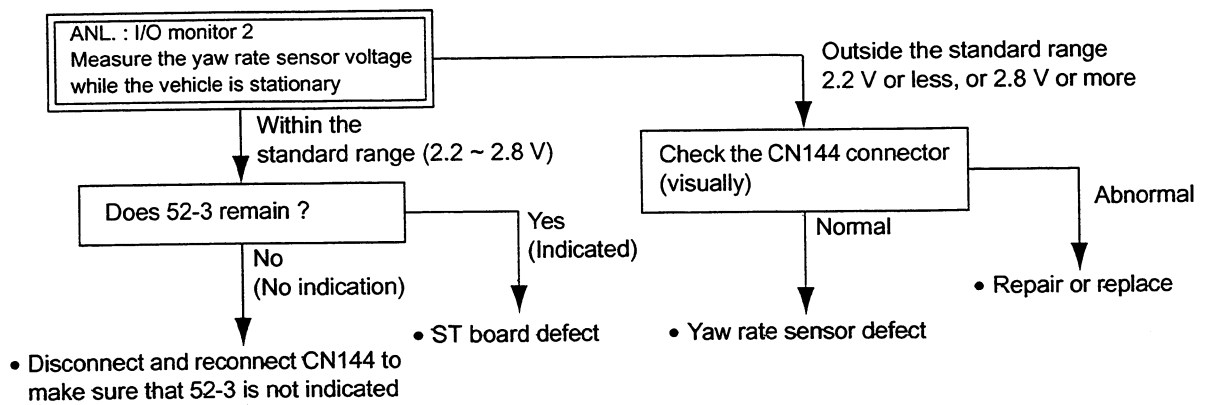
Condition for error detection

Output if the yaw rate sensor output voltage is outside the standard range (open or short circuit), or if the yaw rate sensor output voltage while the vehicle is stationary is outside the standard range (neutral voltage).
52-1 Yaw rate sensor open-circuit defect
52-2 Yaw rate sensor short-circuit defect
52-3 Yaw rate sensor neutral voltage defect

- **52-1, 2**

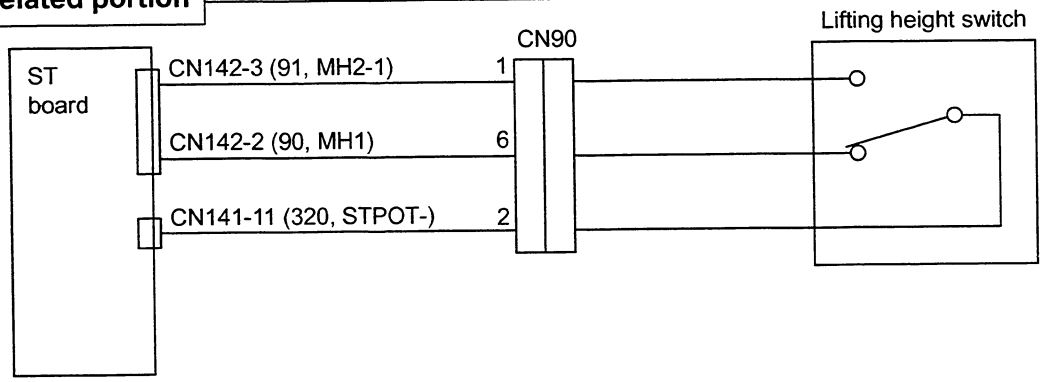


- **52-3**



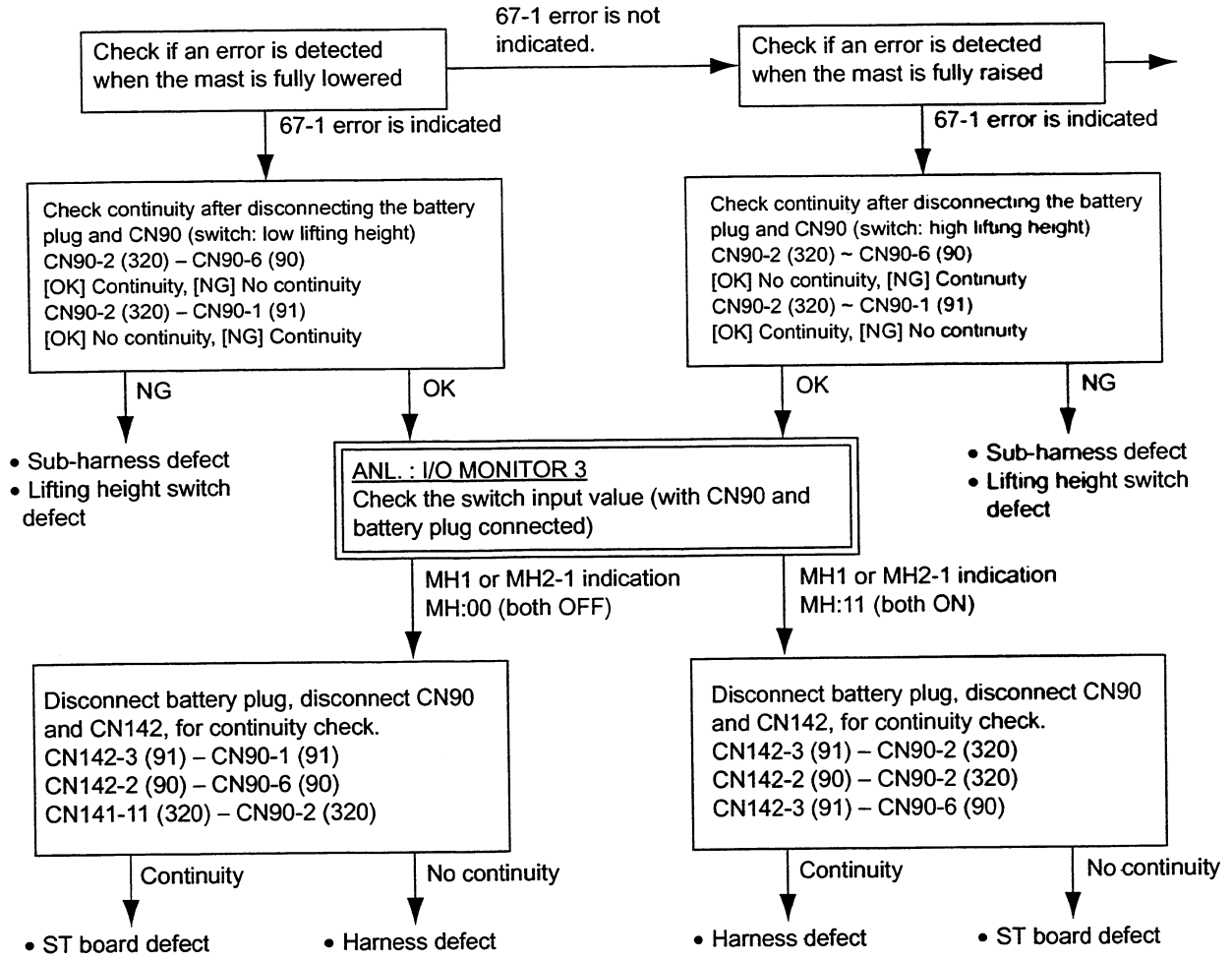
67-1	Lifting height switch abnormality

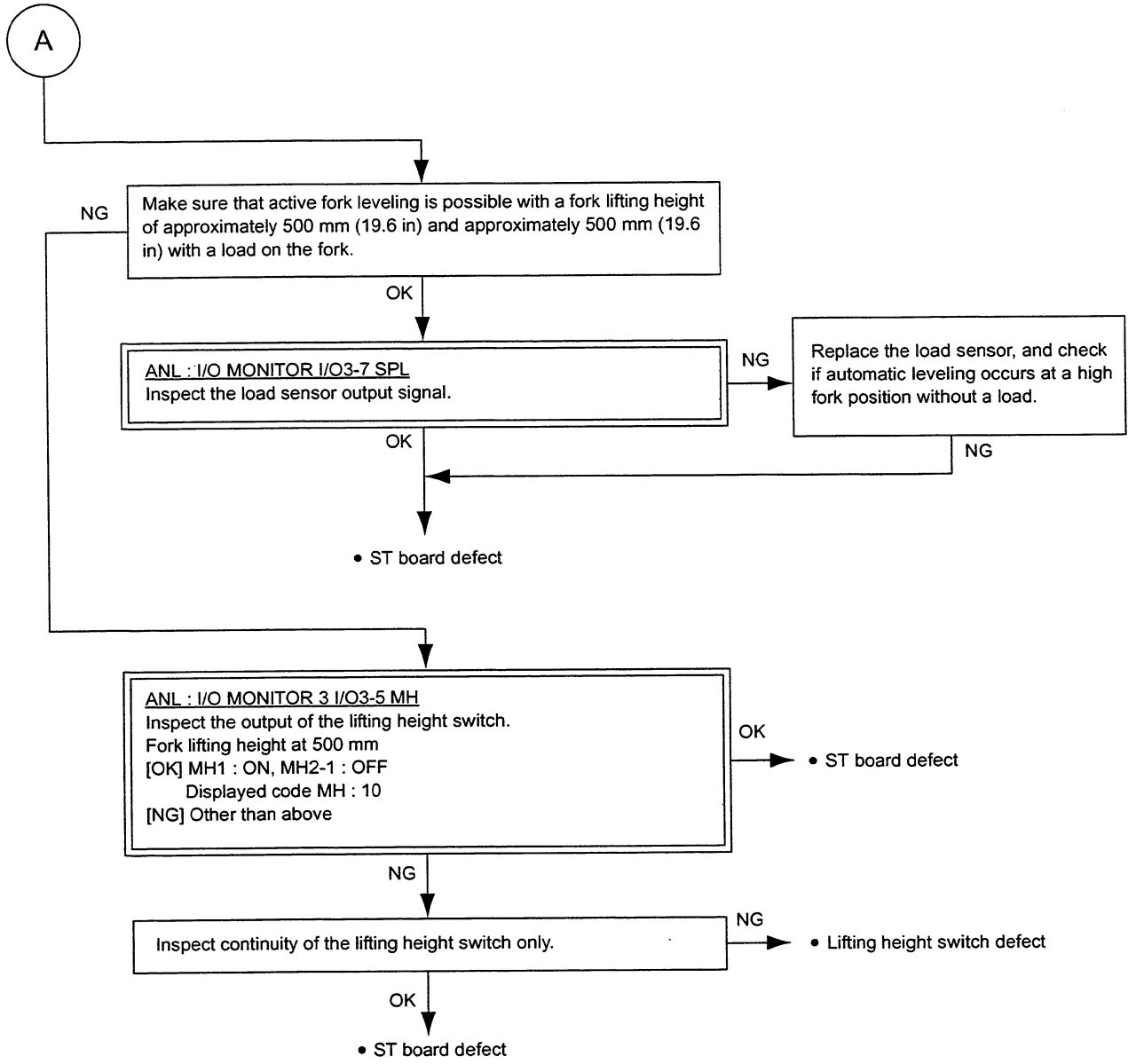
Related portion



Condition for error detection

Output if the lifting height switch line from the ST board to the lifting height switch is open or shorted.




A
NG
Make sure that active fork leveling is possible with a fork lifting height of approximately 500 mm (19.6 in) and approximately 500 mm (19.6 in) with a load on the fork.
OK
ANL : I/O MONITOR I/O3-7 SPL
Inspect the load sensor output signal.
NG
Replace the load sensor, and check if automatic leveling occurs at a high fork position without a load.
NG
OK
• ST board defect
ANL : I/O MONITOR 3 I/O3-5 MH
Inspect the output of the lifting height switch.
Fork lifting height at 500 mm
[OK] MH1 : ON, MH2-1 : OFF
Displayed code MH : 10
[NG] Other than above
OK
• ST board defect
NG
Inspect continuity of the lifting height switch only.
NG
• Lifting height switch defect
OK
• ST board defect

4. SST4·SST9 setting method for troubleshooting for "Error code C0-1, failure of traveling only or the traveling speed does not rise"

   SST4 and SST9 are used for judging the quality of the instruction signal from the CPU board to the DC/MD board and the drive signal from the DC/MD board to the MOS when any abnormality is found in the check using SST3.

   Pay special attention to the operation because SST4 and SST9 are set while SST3 is set. (Especially pay attention to battery plug connect/disconnect and motor cable disconnection.)

To check the traveling 1 circuit (Parenthesized portions apply to checking the traveling 2 circuit.)

(1) Disconnect the CN106 and 107 connectors on the CPU board and the CN110 (CN109) connector on the DC/MD board.

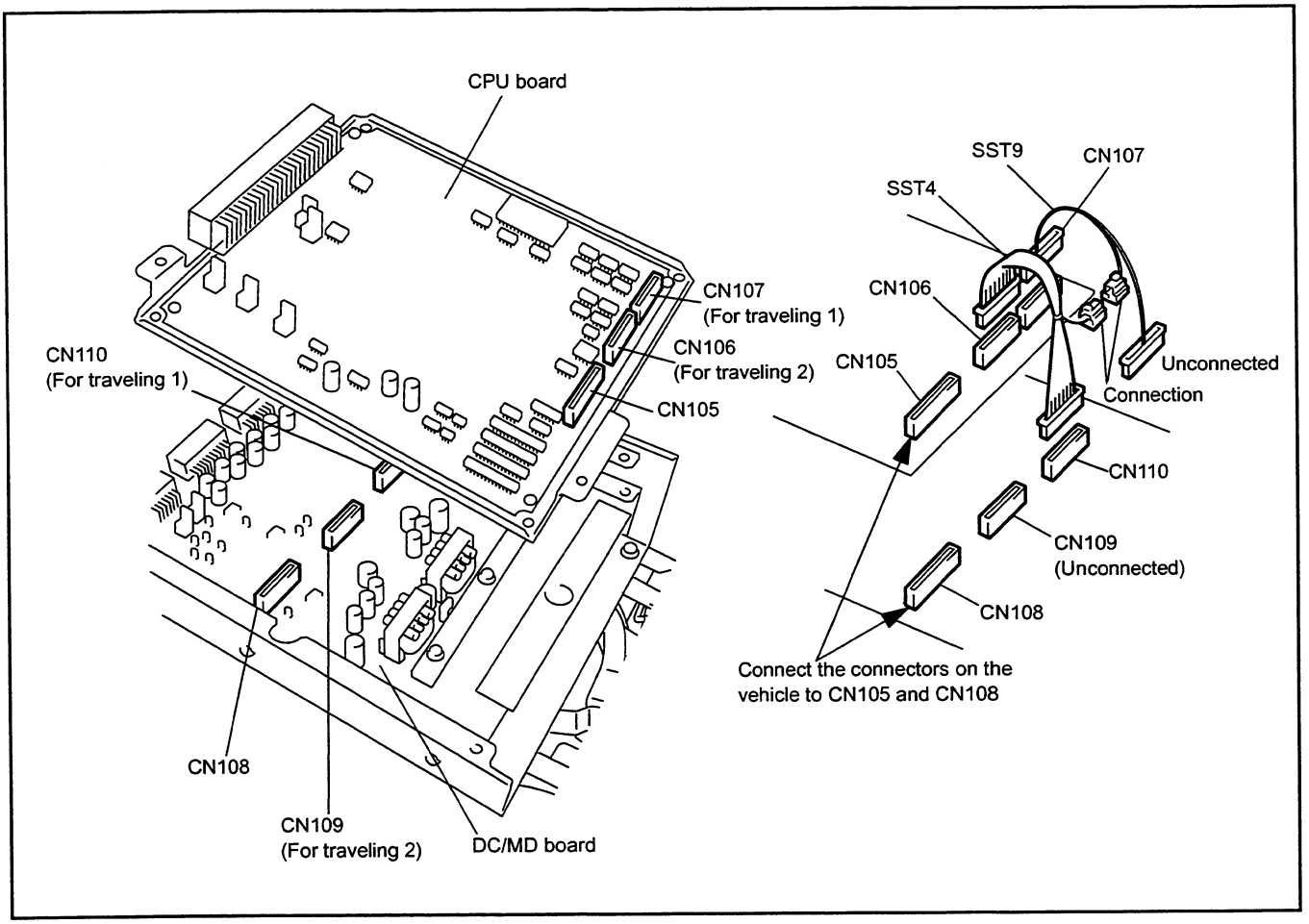
(2) Connect the 11-pin (10-pin) connector of SST4 to the CN106 (CN107) connector on the CPU board, and connect the 10-pin (11-pin) connector of SST4 to the CN110 (CN109) connector on the DC/MD board.

(3) Connect the 10-pin (11-pin) connector of SST9 to the CN107 (CN106) connector on the CPU board.

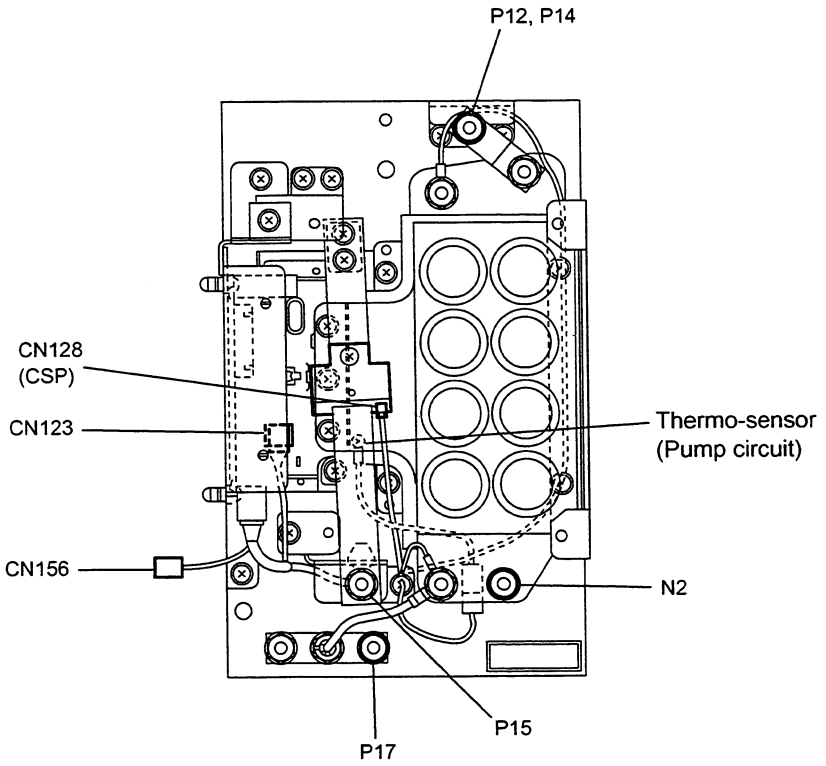
   The 11-pin (10-pin) connector of SST9 is left unconnected.

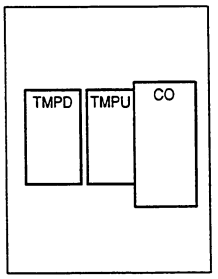
(4) Connect the 3-pin connector of SST4 to the 3-pin connector of SST9.

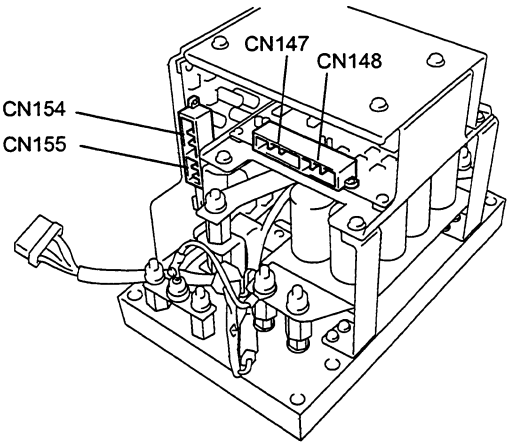
(5) Operate the direction lever with the battery plug connected and key switch ON and depress the accelerator pedal to check the LED blinking state.



MATERIAL HANDLING CONTROLLER CONNECTOR·COMPONENT

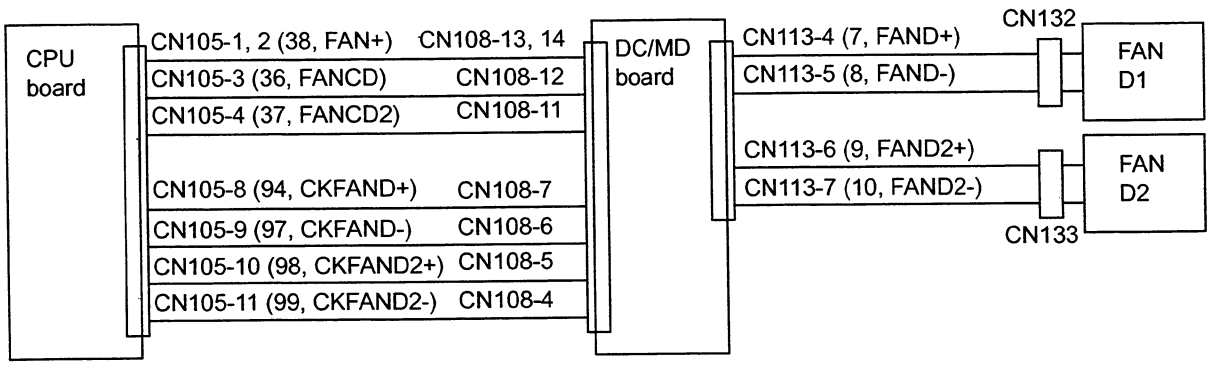






A0-5	Fan 2 abnormality

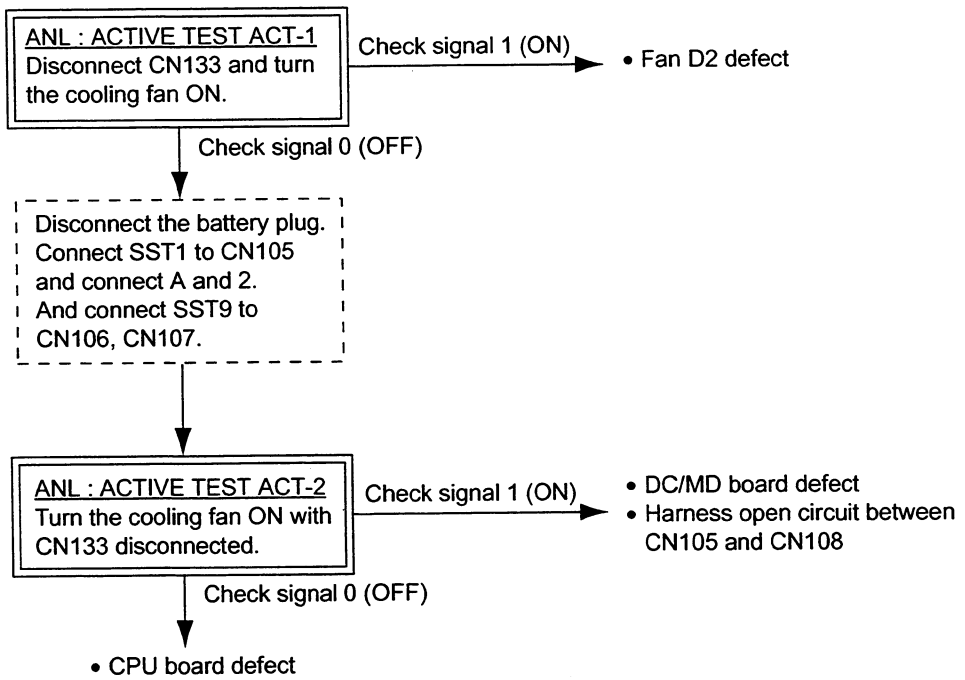
Related portion



Condition for error detection

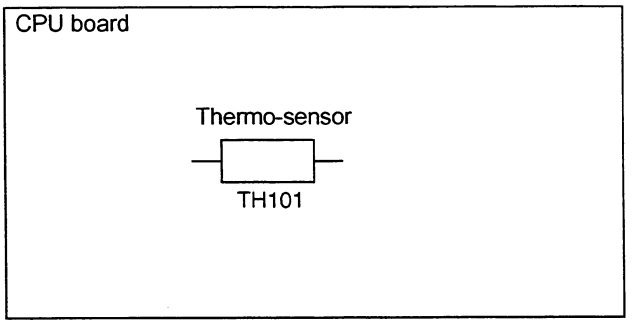
Output upon detection of FAN D2 abnormality.

If C0 occurs at the same time, perform troubleshooting for C0 first



AA	CPU board thermo-sensor abnormality

Related portion



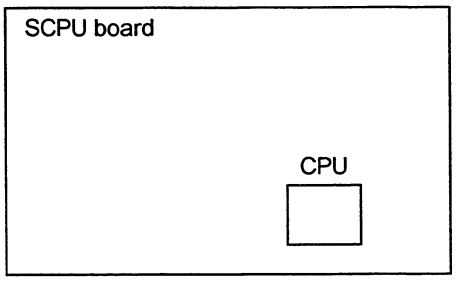
Condition for error detection

Output when CPU board thermo-sensor abnormality is detected.

- To correct, replace the CPU board.

AE-1, 2, 3, 4	SCPU board CPU abnormality

Related portion



Condition for error detection

Output if any abnormality is detected as a result of CPU inspection on the ST board or if sensor input processing does not come to an end.

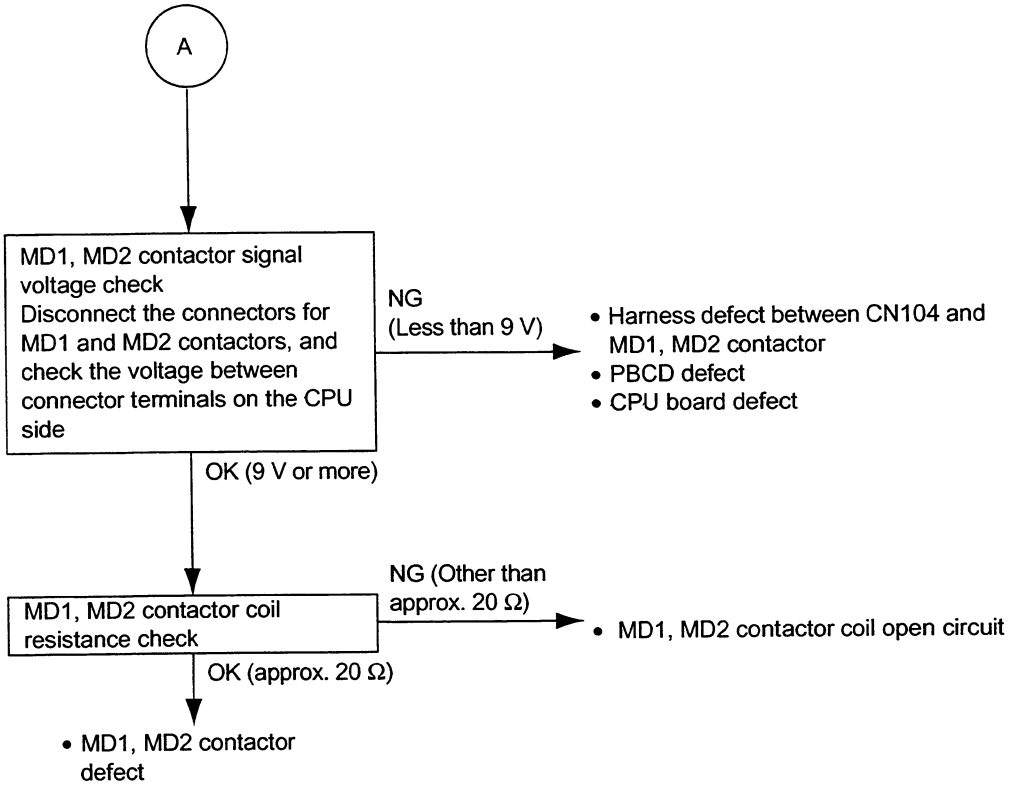
- SCPU board defect

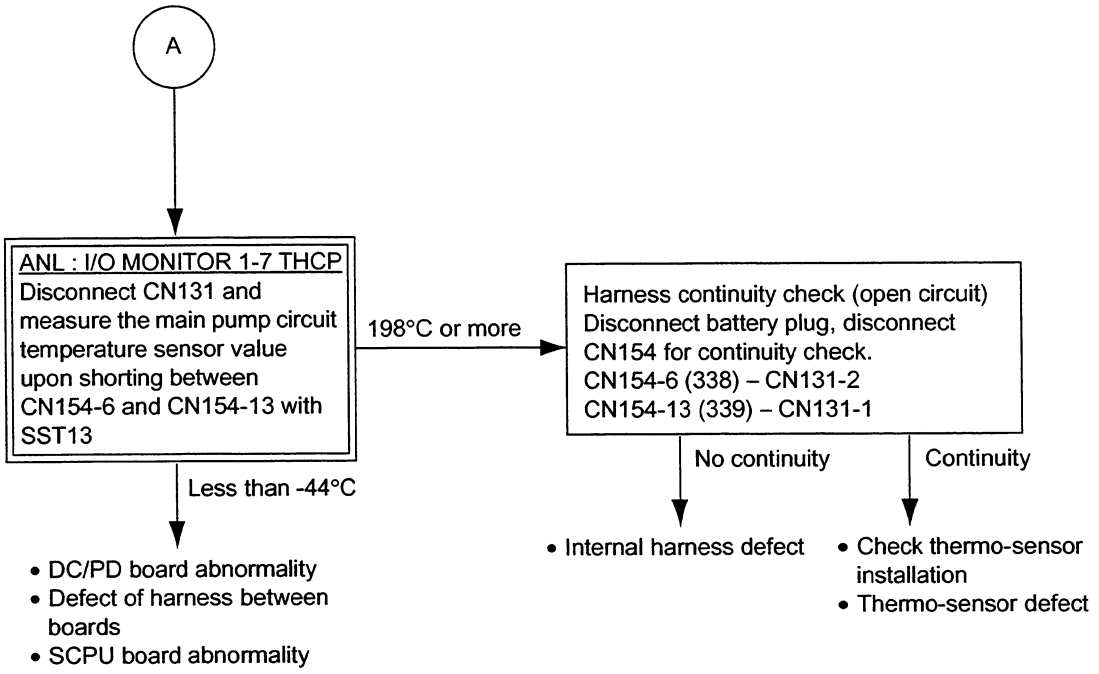
C2-1	Drive motor overheat

Condition for error detection

Output when the drive motor thermo-sensor output value exceeds the specified level.

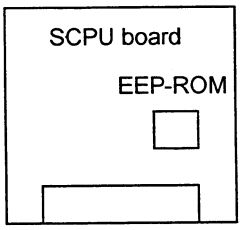
- To correct, allow the vehicle to stand for a while (about 30 minutes) .


A
MD1, MD2 contactor signal voltage check
Disconnect the connectors for MD1 and MD2 contactors, and check the voltage between connector terminals on the CPU side
NG
(Less than 9 V)
• Harness defect between CN104 and MD1, MD2 contactor
• PBCD defect
• CPU board defect
OK (9 V or more)
MD1, MD2 contactor coil resistance check
NG (Other than approx. 20 Ω)
• MD1, MD2 contactor coil open circuit
OK (approx. 20 Ω)
• MD1, MD2 contactor defect


A
ANL : I/O MONITOR 1-7 THCP
Disconnect CN131 and measure the main pump circuit temperature sensor value upon shorting between CN154-6 and CN154-13 with SST13
198°C or more
Harness continuity check (open circuit)
Disconnect battery plug, disconnect CN154 for continuity check.
CN154-6 (338) – CN131-2
CN154-13 (339) – CN131-1
No continuity
Continuity
Less than -44°C
• Internal harness defect
• Check thermo-sensor installation
• Thermo-sensor defect
• DC/PD board abnormality
• Defect of harness between boards
• SCPU board abnormality

EF-7, 8	SCPU board EEP-ROM abnormality

Related portion



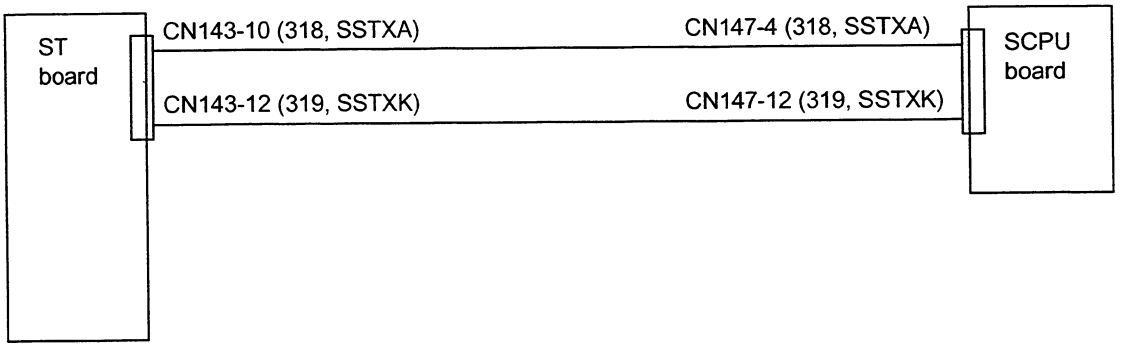
Condition for error detection

Output if access to the EEP-ROM on the SCPU board fails.

- SCPU board defect

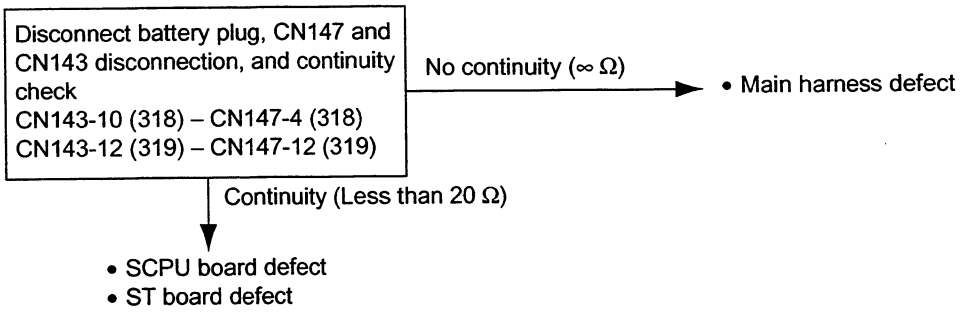
FD-1, 2	Abnormal communication between ST board and SCPU board

Related portion



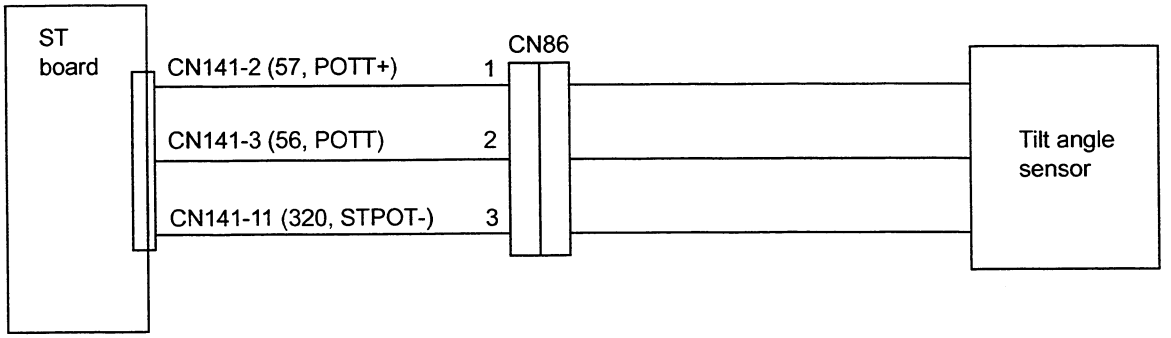
Condition for error detection

Output if communication fails for a certain period or if abnormal data is received frequently



62-1, 2	Tilt angle sensor abnormality

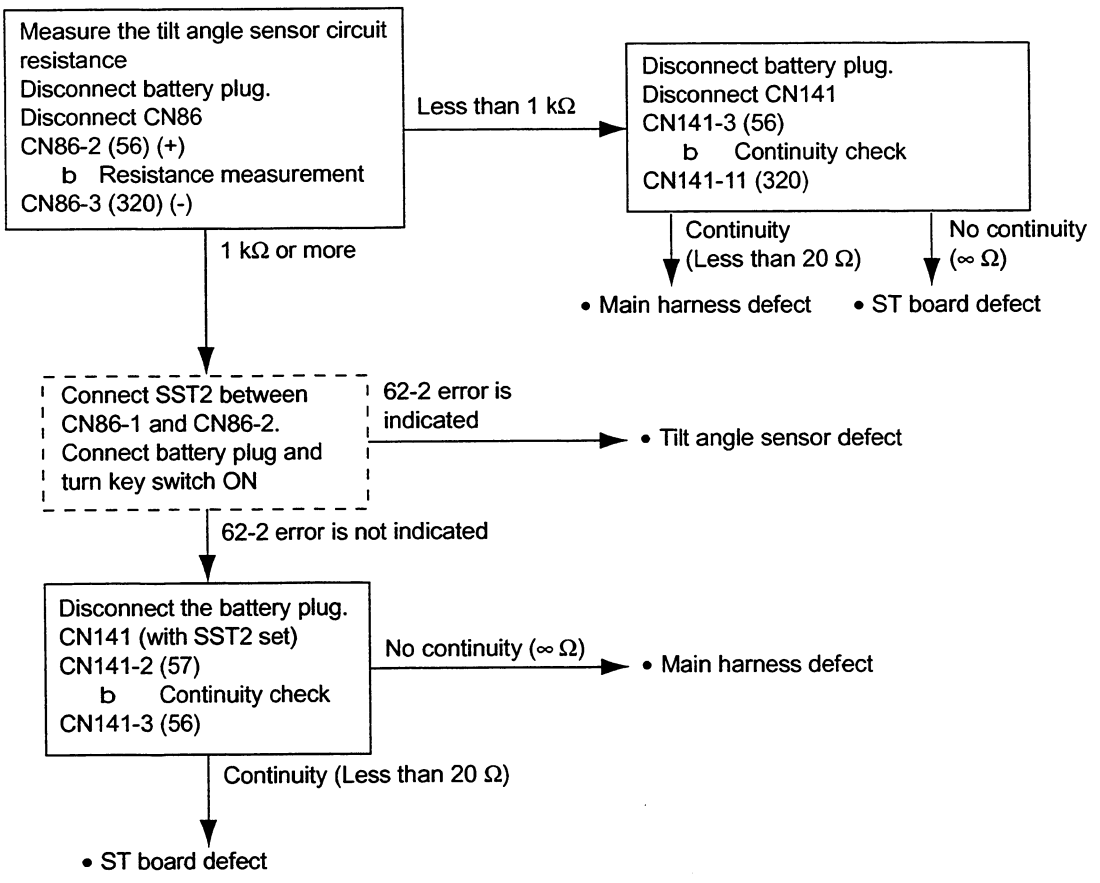
Related portion



Condition for error detection

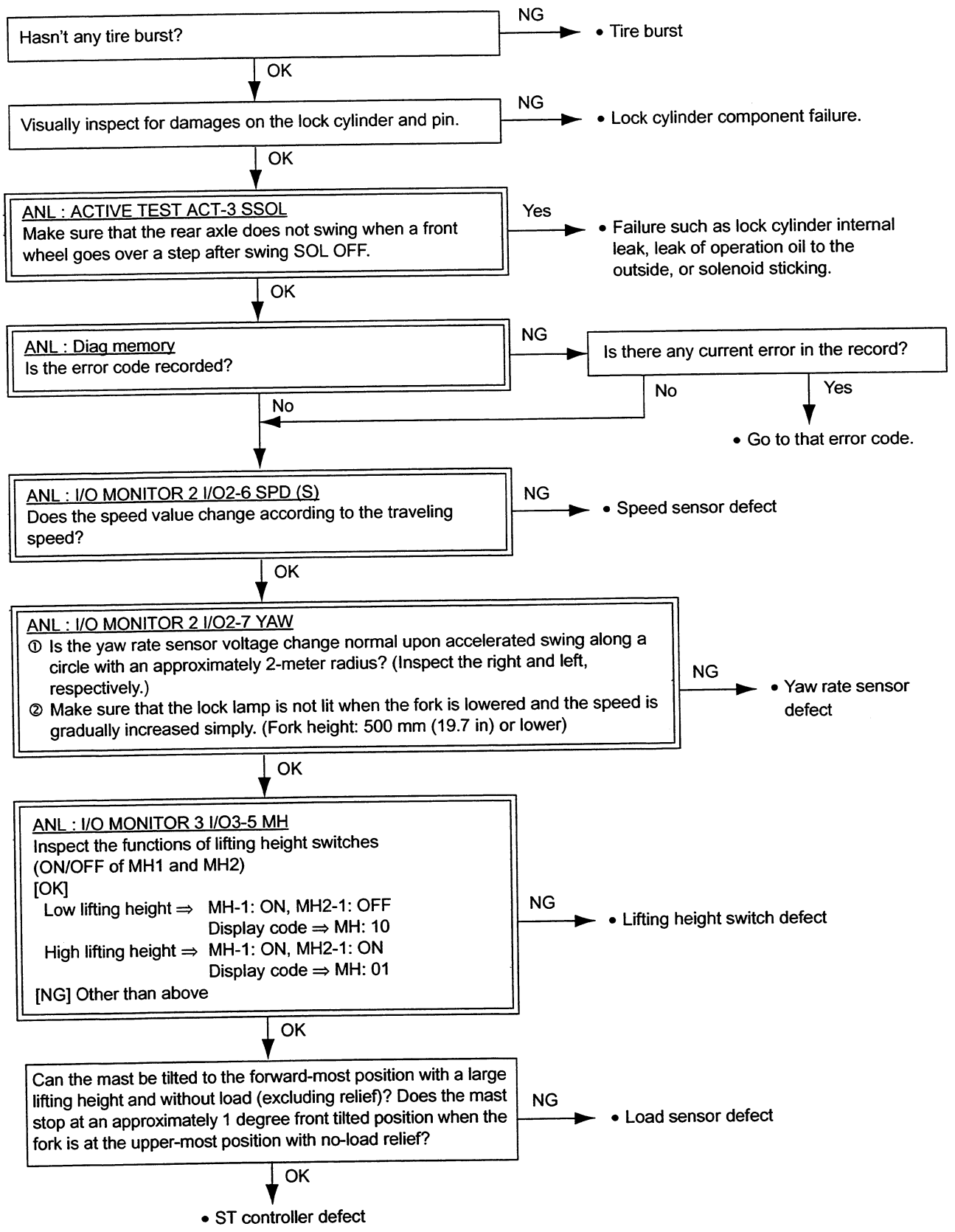
Output if the tilt angle sensor output voltage is outside the standard range.
62-1 Tilt angle sensor defect (open circuit)
62-2 Tilt angle sensor defect (short circuit)

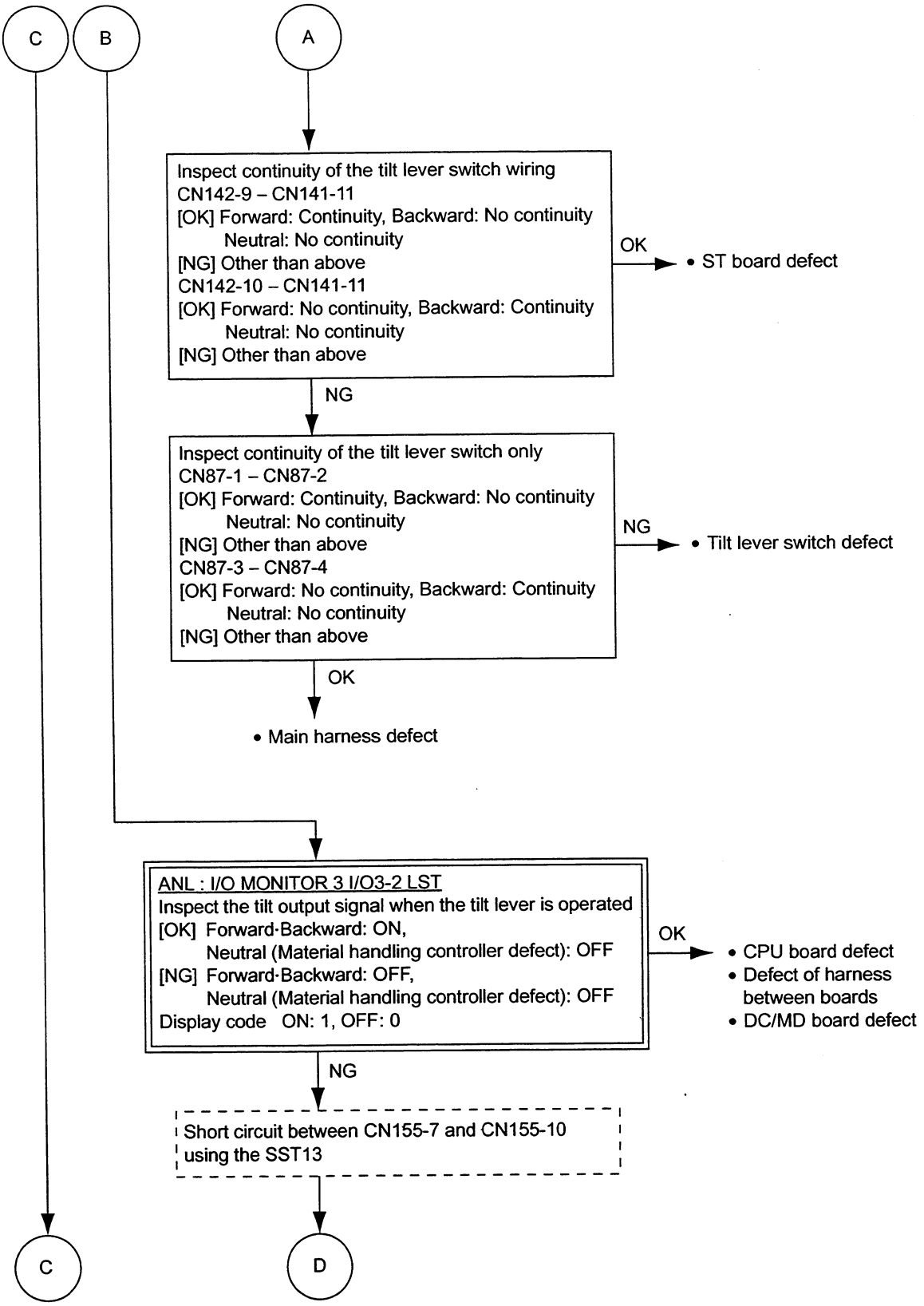
- **62-1**



WHEN NO ERROR CODE IS DISPLAYED

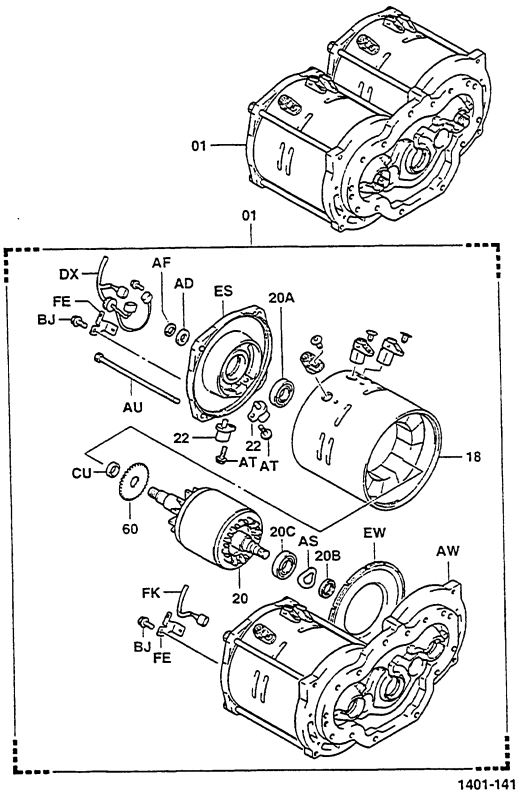
Stability not provided during traveling (-Locking hardly or not provided during traveling)



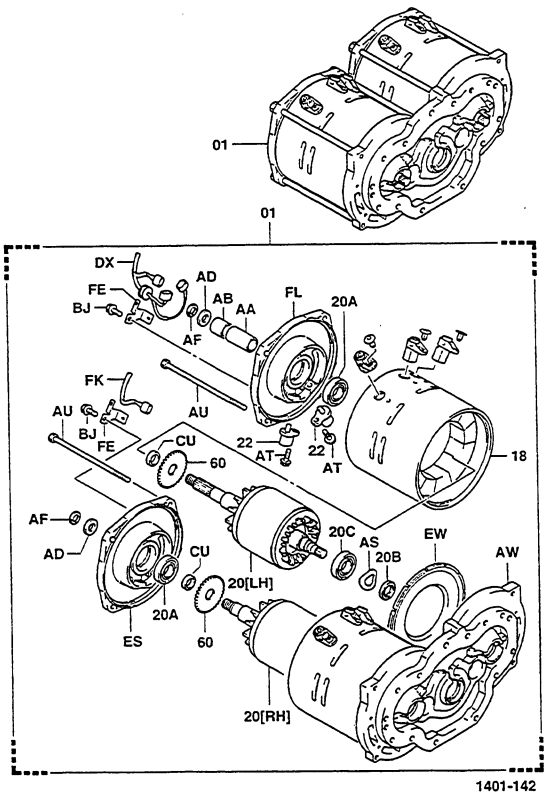

C
B
A
Inspect continuity of the tilt lever switch wiring
CN142-9 – CN141-11
[OK] Forward: Continuity, Backward: No continuity
Neutral: No continuity
[NG] Other than above
CN142-10 – CN141-11
[OK] Forward: No continuity, Backward: Continuity
Neutral: No continuity
[NG] Other than above
OK
• ST board defect
NG
Inspect continuity of the tilt lever switch only
CN87-1 – CN87-2
[OK] Forward: Continuity, Backward: No continuity
Neutral: No continuity
[NG] Other than above
CN87-3 – CN87-4
[OK] Forward: No continuity, Backward: Continuity
Neutral: No continuity
[NG] Other than above
NG
• Tilt lever switch defect
OK
• Main harness defect
ANL : I/O MONITOR 3 I/O3-2 LST
Inspect the tilt output signal when the tilt lever is operated
[OK] Forward·Backward: ON,
Neutral (Material handling controller defect): OFF
[NG] Forward·Backward: OFF,
Neutral (Material handling controller defect): OFF
Display code ON: 1, OFF: 0
OK
• CPU board defect
• Defect of harness between boards
• DC/MD board defect
NG
Short circuit between CN155-7 and CN155-10 using the SST13
C
D

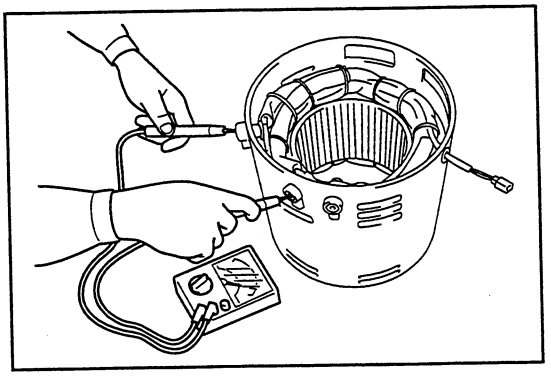
7FBCU35·45

1401



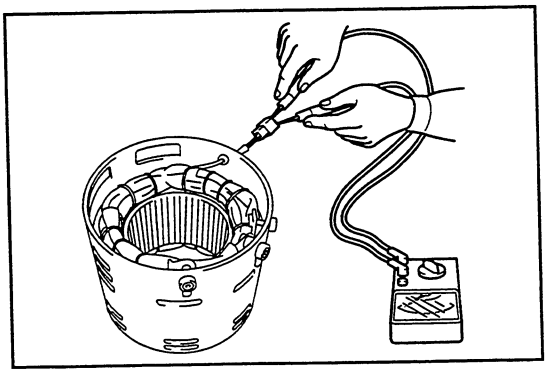
7FBCU35·45 (dead-man brake)





(2) Check continuity between terminals.

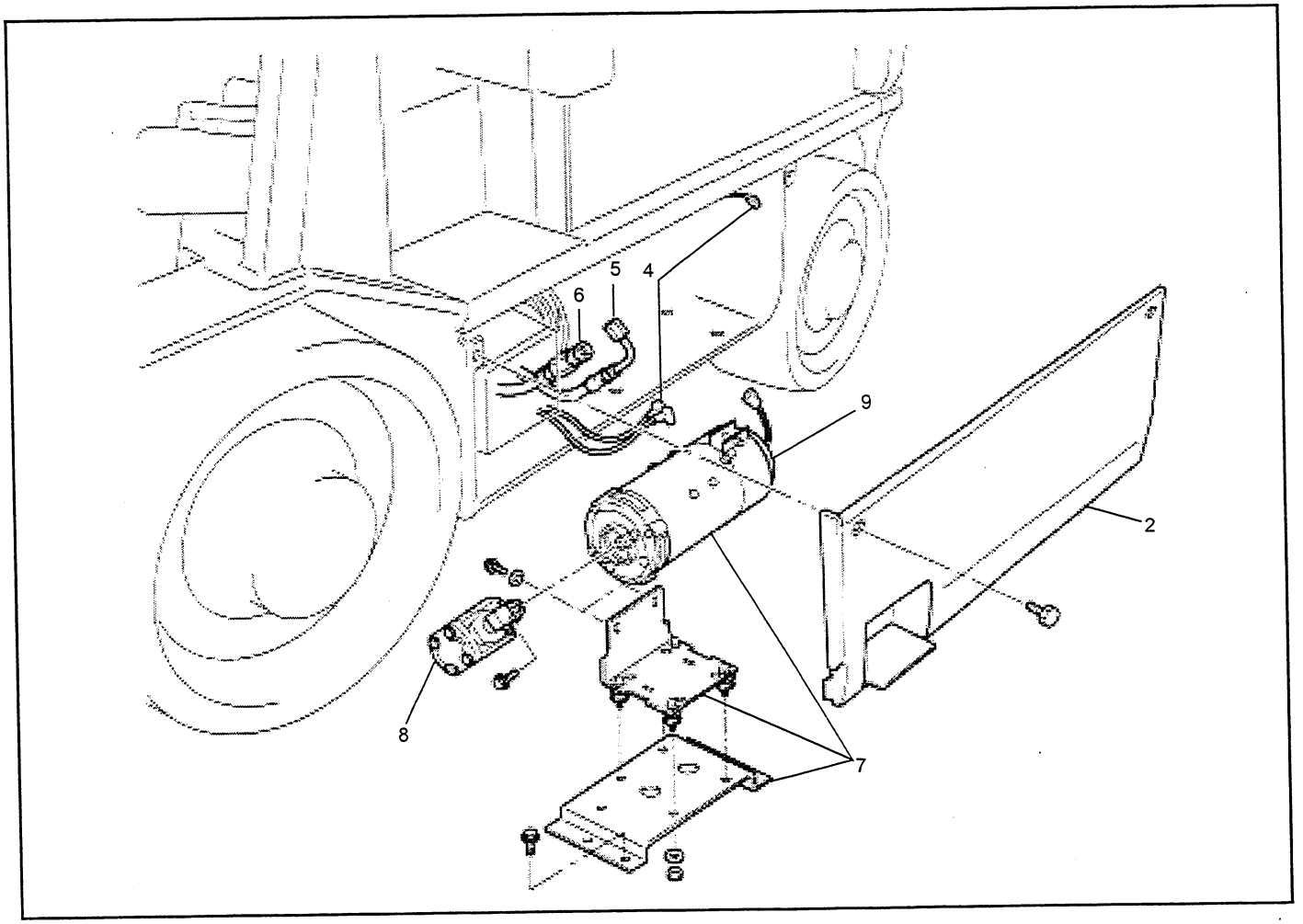
Measurement terminals: U-V, V-W, W-U
Standard: 0 Ω



(3) Measure the resistance of the thermo-sensor.

Measurement terminals:
Both terminals of temperature sensor connector
Standard: Approx. 11 ~ 15 kΩ
(at 20°C [68°F])

REMOVAL·INSTALLATION (35 ~ 55 MODEL, NO.2)



Removal Procedure

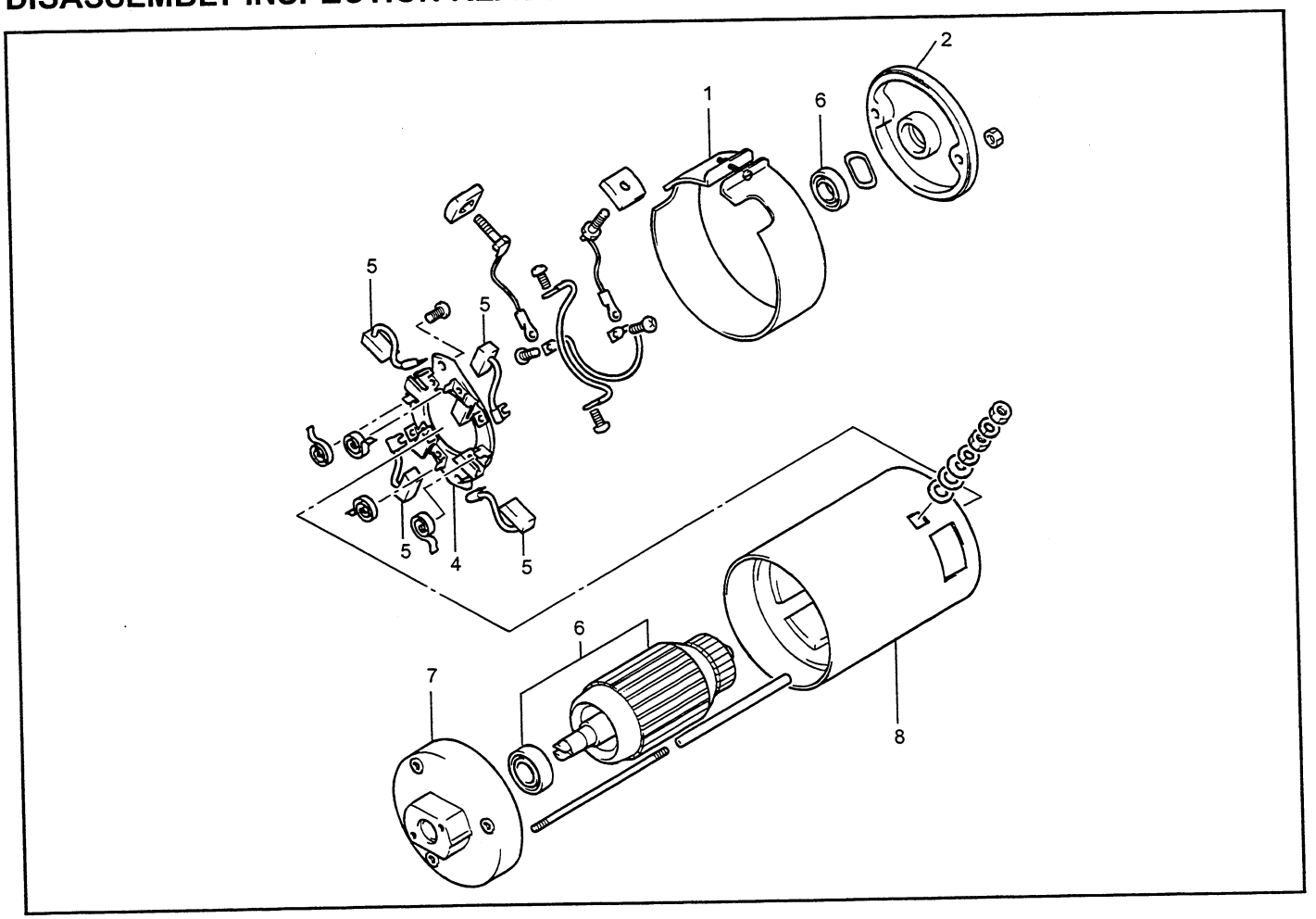
1 Disconnect the battery plug.
2 Remove the side cover LH.
3 Drain hydraulic oil.
4 Disconnect the wiring.
5 Disconnect the outlet hose.
6 Disconnect the inlet hose.
7 Remove the pump motor ASSY & oil pump ASSY W/pump motor set plate.
8 Remove the oil pump ASSY from the pump motor ASSY.
9 Remove the pump motor ASSY from the pump motor set plate.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

Note:
Apply grease (molybdenum disulfide grease) on the pump shaft spline portion before installation.

DISASSEMBLY·INSPECTION·REASSEMBLY



Disassembly Procedure

1 Remove the brush cover. **[Point 1]**
2 Remove the bracket No.1.
3 Free the brushes.
4 Remove the brush holder from the yoke ASSY. **[Point 2]**
5 Remove the brush from the brush holder. **[Point 3]**
6 Remove the armature coil from the yoke ASSY. **[Point 4]**
7 Remove the bracket No.2 from the yoke ASSY.
8 Remove the yoke ASSY. **[Point 5]**

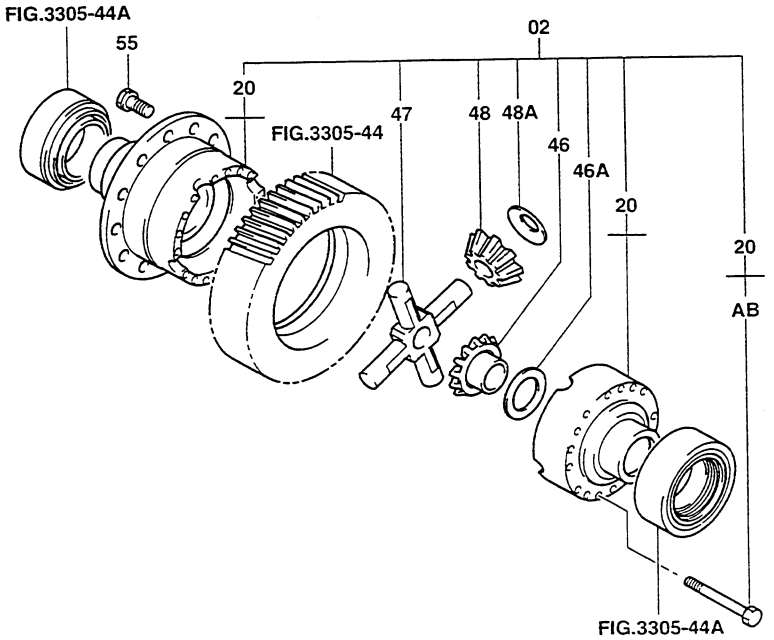
Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.

Note:
After reassembly, perform motor brush and overheat warning inspection (brush warning spec.) (See page 5-42).

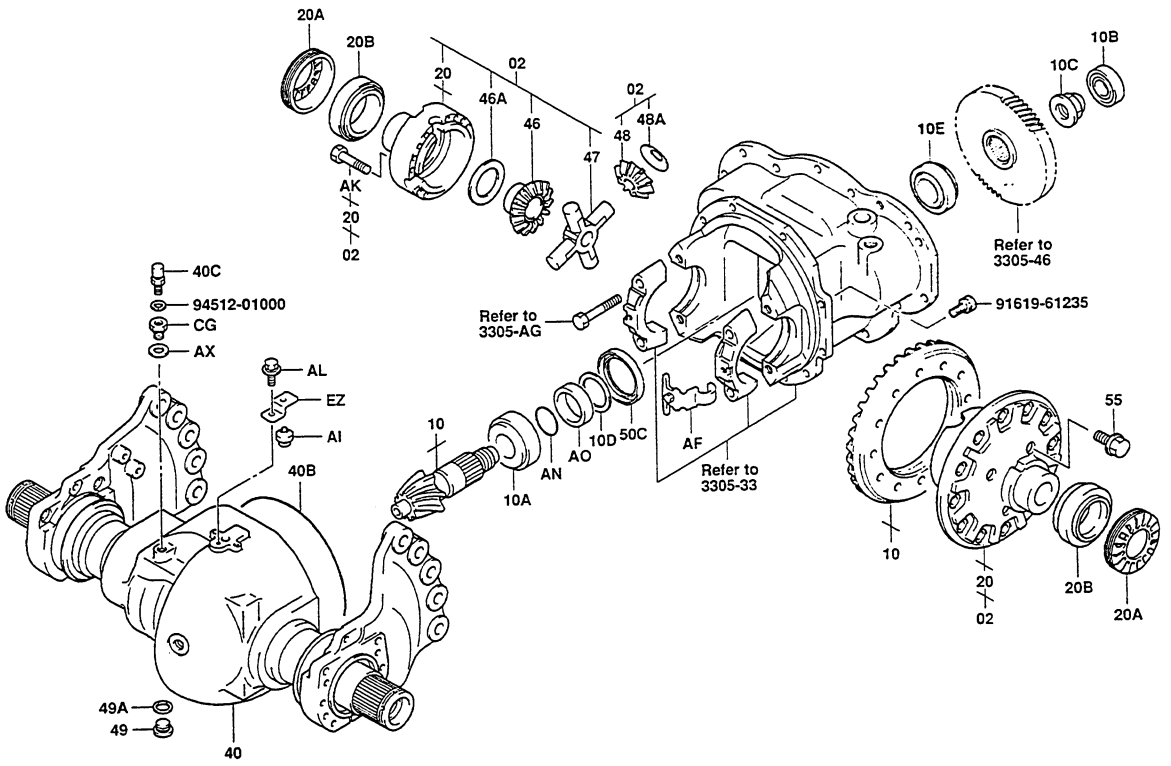
15·18 model (dead-man), 20 ~ 32 model

4101



4101-180

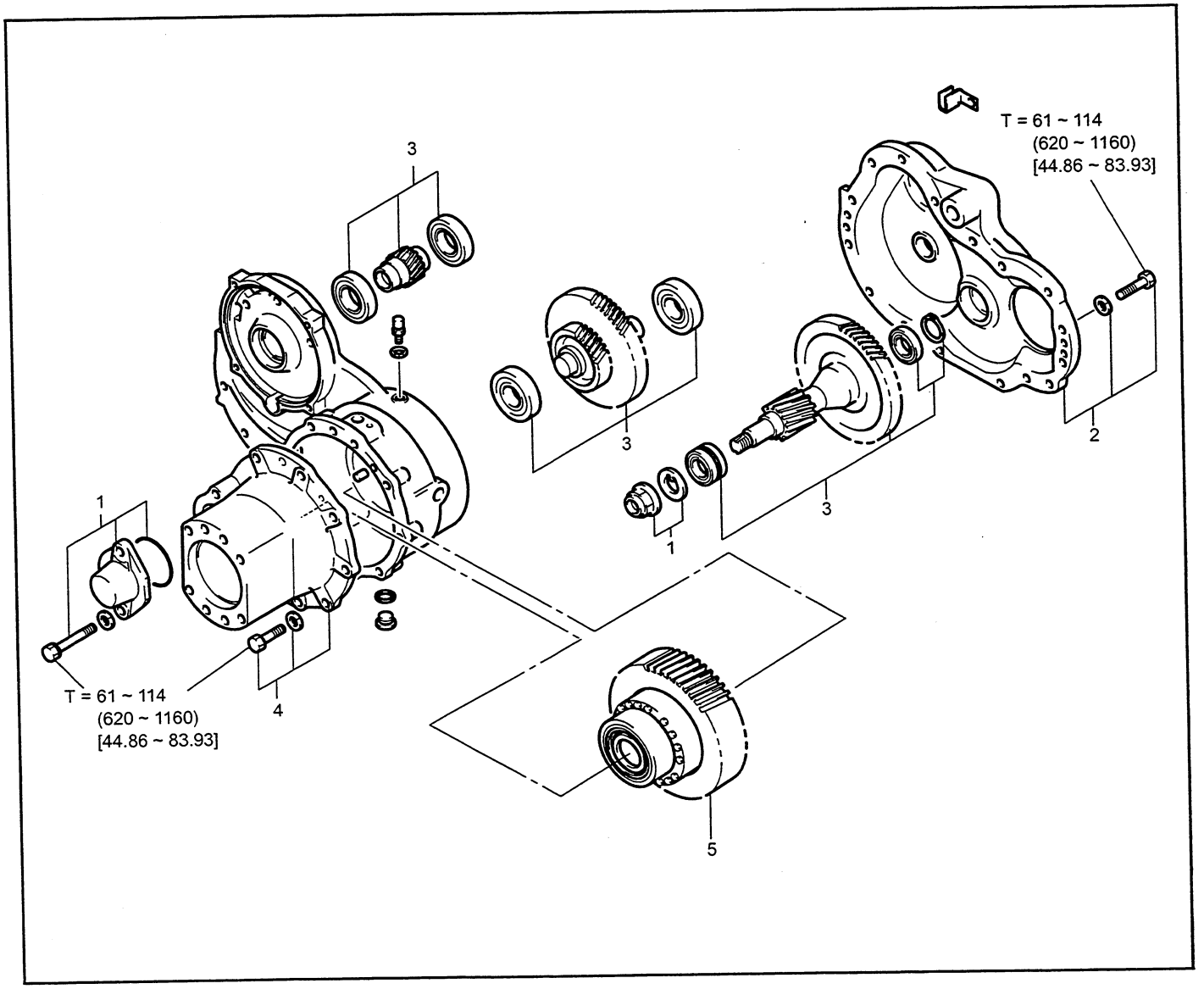
35 ~ 55 model



4101-177

DISASSEMBLY·INSPECTION·REASSEMBLY (15·18 MODEL (DEAD-MAN BRAKE), 20 ~ 32 MODEL)

T = N·m (kgf-cm) [ft-lbf]

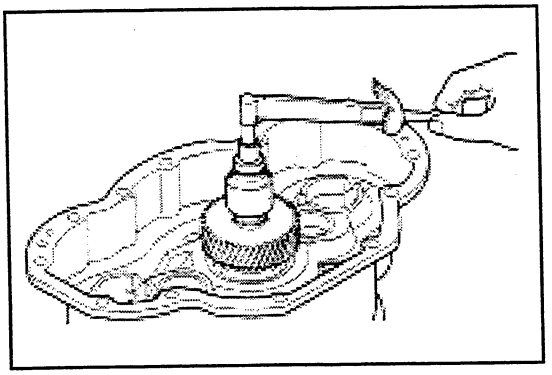


Disassembly Procedure

1 Remove the drive unit cap and lock nut. **[Point 1]**
2 Erect the housing with the gear case cover LH on the upper side, remove the gear case cover LH. **[Point 2]**
3 Remove the reduction gears No.1, 2 and 3. **[Point 3]**
4 Face the drive unit gear case cover RH upward, and remove the gear case cover RH. **[Point 4]**
5 Remove differential ASSY W/reduction gear shaft No. 1.

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.

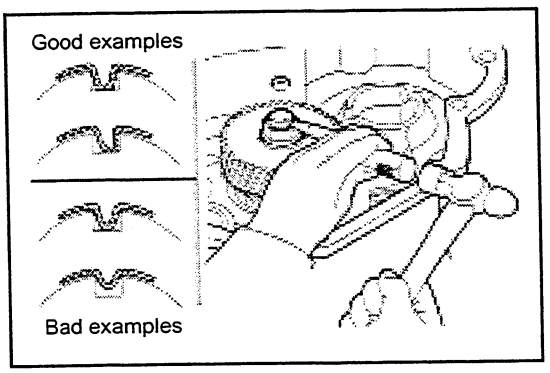


2. Apply a wooden block to prevent the gear from rotating.
3. Tighten the lock nut to the specified torque.
4. Remove the wooden block.
5. Measure the drive pinion starting torque.

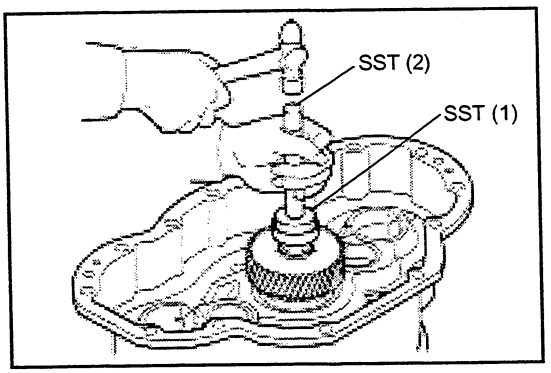
   Standard: 4.90 ~ 8.82 N·m (50 ~ 90 kgf·cm)

   If the standard is not satisfied, make adjustment by increasing or decreasing the shim thickness:

   Shim thickness:
   0.13, 0.10, 0.15, 0.35 and 0.40 mm
   (0.0051, 0.0039, 0.0059, 0.018 and 0.016 in)

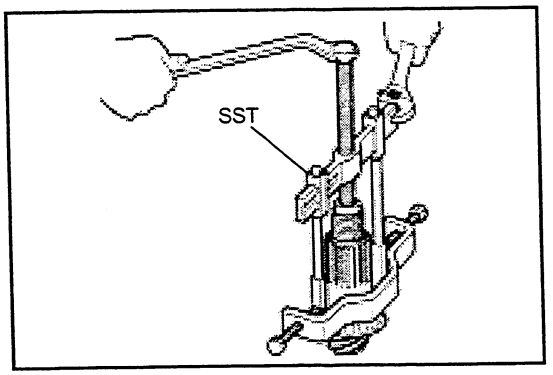


6. Securely caulk the lock nut.



7. Install the drive pinion pilot bearing.

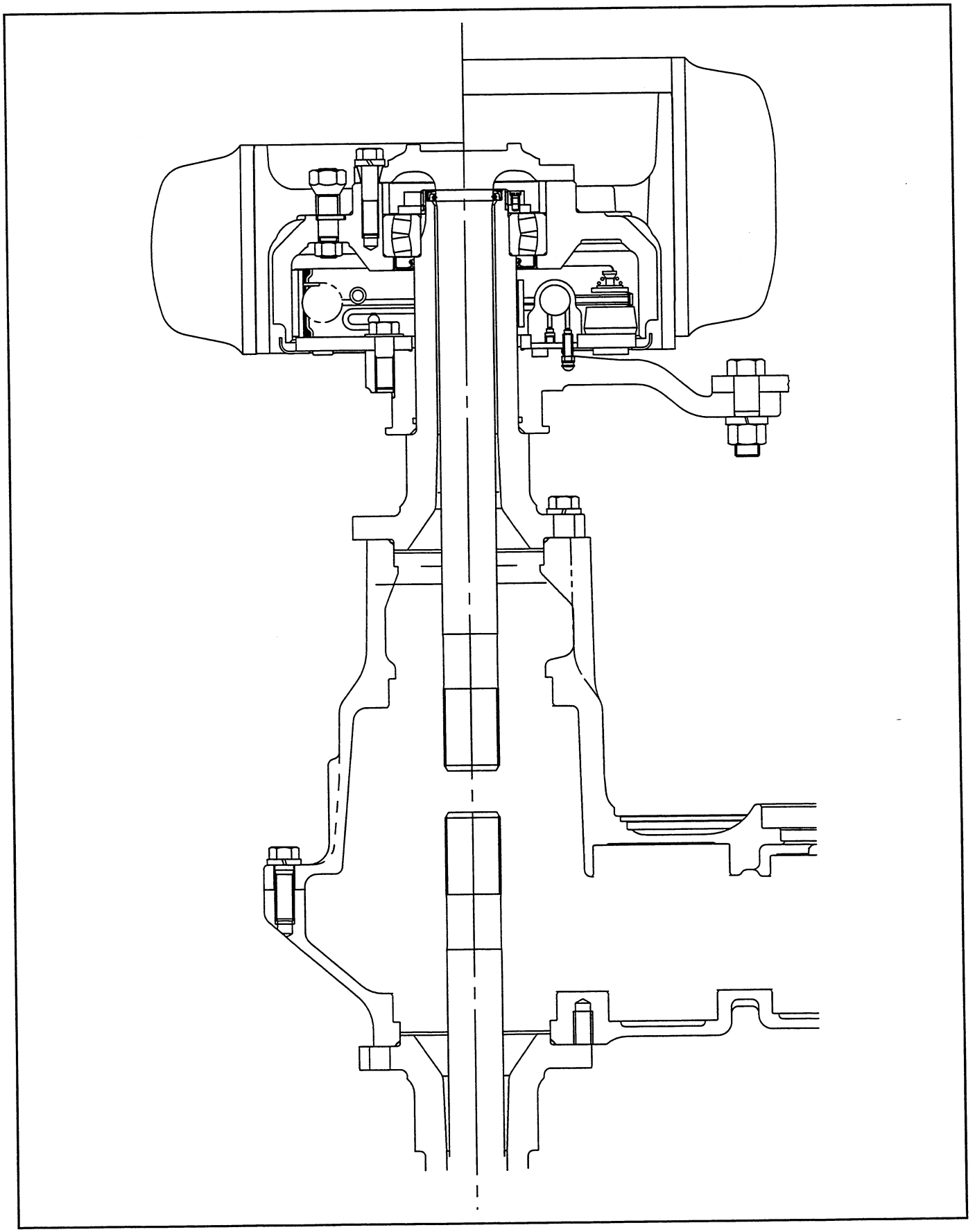
   SST 09950-76018-71..... (1)
   (SST 09950-60010)
   SST 09950-76020-71..... (2)
   (SST 09950-70010)



Disassembly:
Remove the front drive pinion bearing.
SST 09950-76014-71
(SST 09950-40011)

GENERAL

15·18 Model

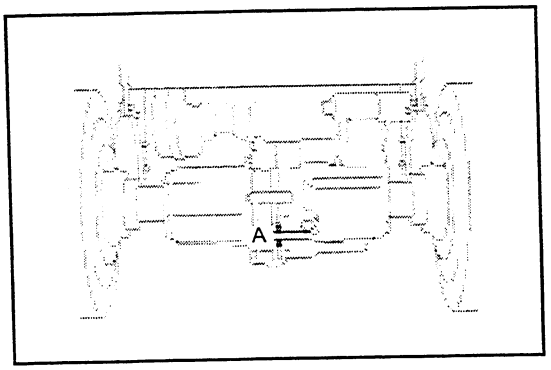


Removal Procedure

1 Drain drive unit oil. **[Point 1]**
2 Jack up the vehicle and remove front wheel.
3 Remove the front axle shaft. **[Point 2]**
4 Remove the axle shaft oil seal. **[Point 3]**
5 Remove the bearing lock nut and plate. **[Point 4]**
6 15·18 model: Remove the spacer.
7 15·18 model: Remove the front axle hub W/bearing. **[Point 5]**
20 ~ 32 model: Remove the outer bearing roller and front axle hub. **[Point 5]**
8 15·18 model: Remove the oil seal. **[Point 6]**
20 ~ 32 model: Remove the oil seal and inner bearing roller. **[Point 6]**
9 15·18 model: Remove the bearing. **[Point 6]**
20 ~ 32 model: Remove the bearing outer race. **[Point 6]**
10 Remove the hub bolt.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

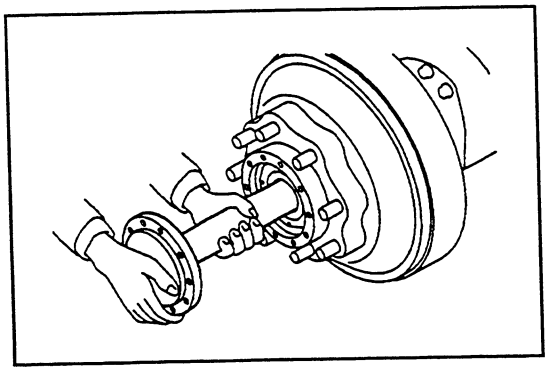


Point Operations

[Point 1]

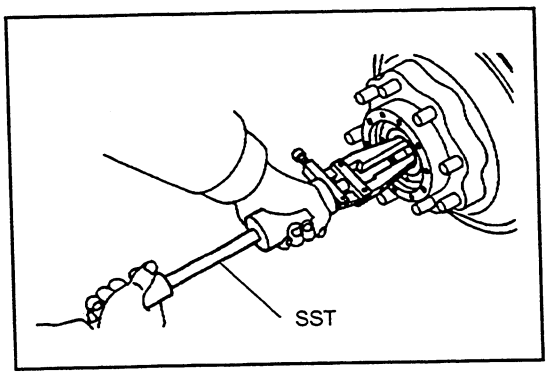
Installation:
Fill Hypoid gear oil to the specified level after installation.

A = within 15 mm (0.059 in)



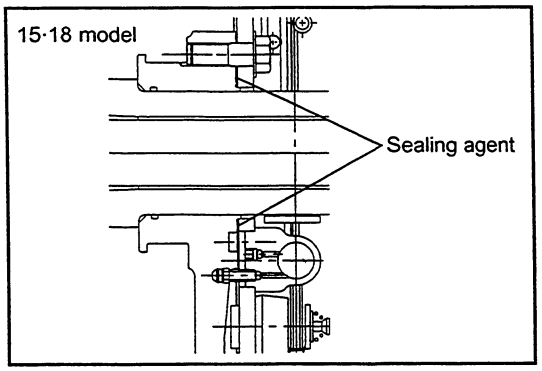
[Point 2]

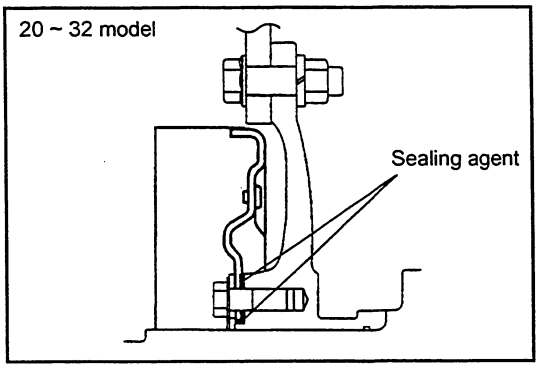
Removal·Installation:
Carefully operate so as not to damage the oil seal by contact with the axle shaft.



[Point 3]

Removal:
SST 09320-23000-71





Point Operation

[Point 1]

Installation:

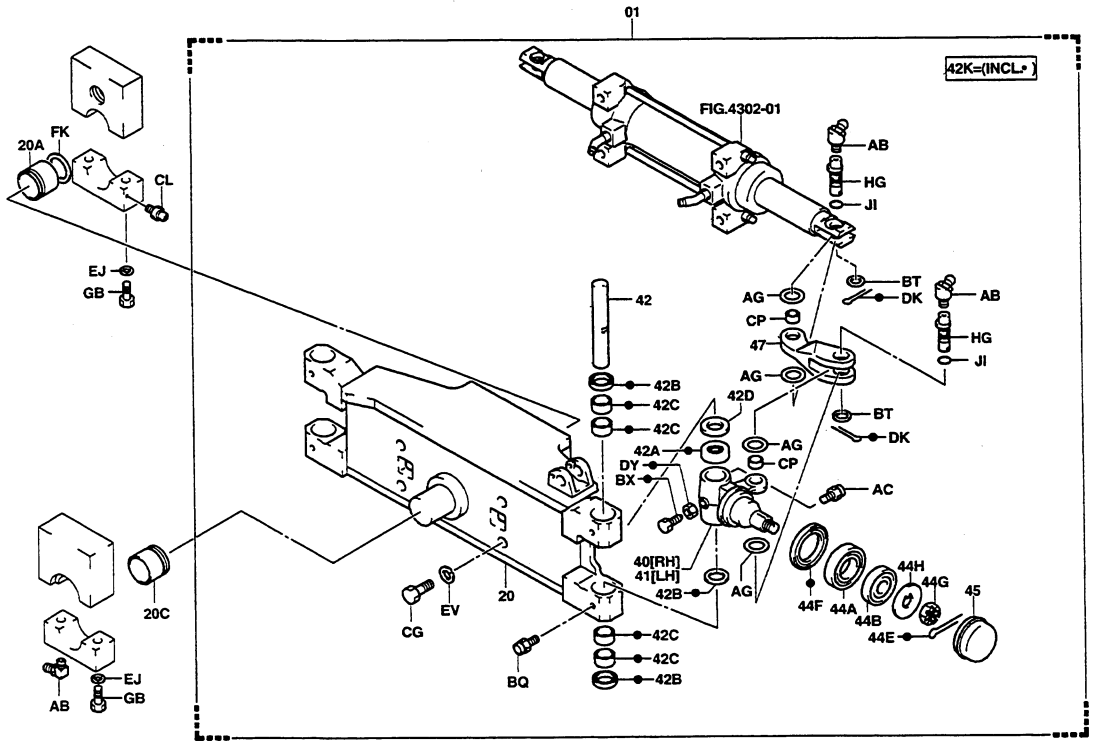
Apply sealing agent (08826-76001-71 (08826-00080)) on the mating surfaces of the brake backing plate and front axle bracket before installation.

Installation:

Apply locking agent (08833-76001-71 (08833-00070)) on the set bolts before tightening.

35 ~ 55 model

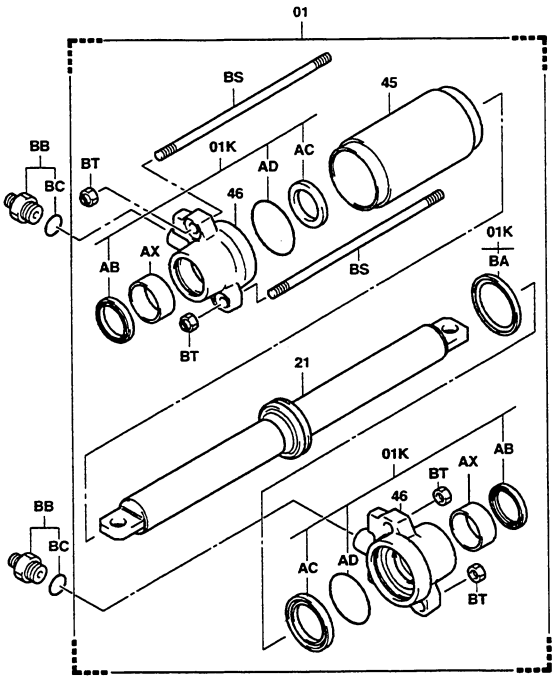
4301



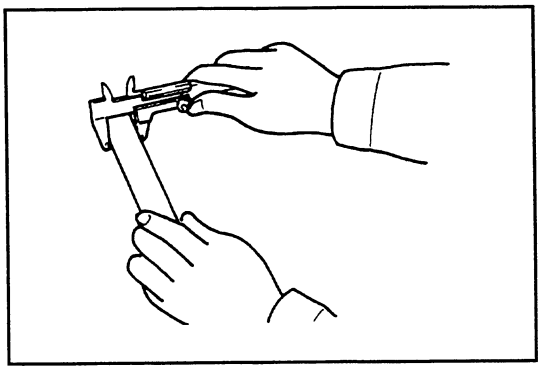
4301-140B

15·18 model

4302



4302-028

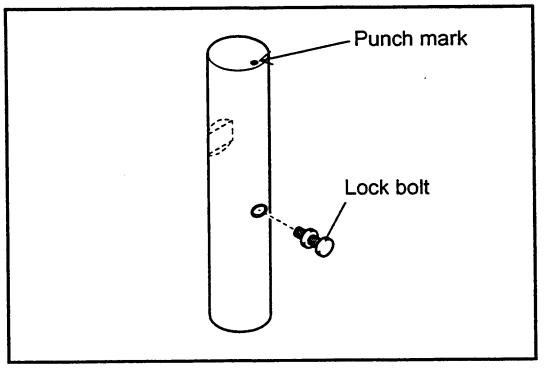


[Point 7]

Inspection:

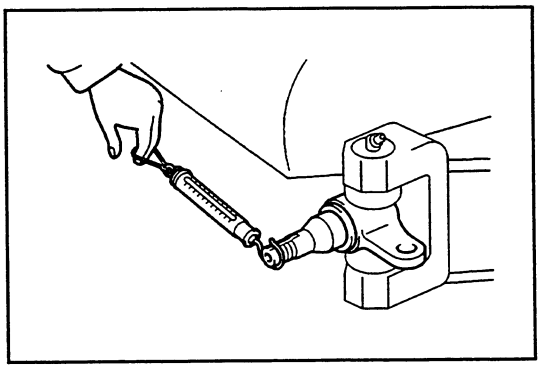
Measure the king pin outside diameter.

Limit: 27.8 mm (1.094 in)



Installation:

Before installation, check the positional relationships between the punch mark on top of the king pin and the king pin lock bolt.

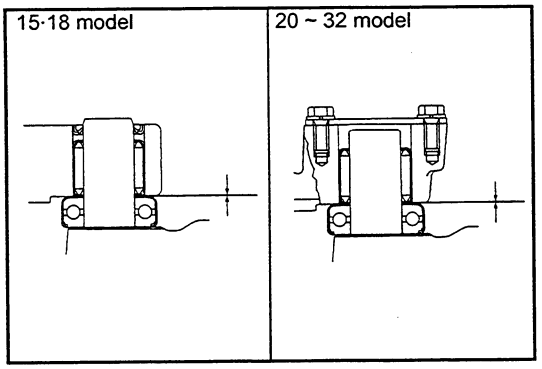


Installation:

Measure the steering knuckle starting force.

1. Temporarily install the king pin and king pin lock bolt. Select the spacer so as to minimize vertical looseness of the knuckle, and install it on top of the thrust bearing.
2. Set a spring scale at the tip end of the knuckle spindle, and measure the starting force.

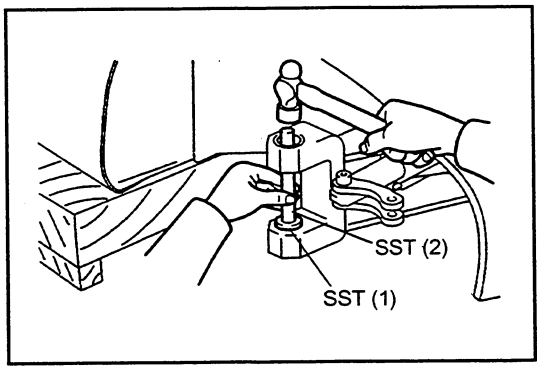
   Standard: 19.3 N (2.0 kgf) [4.4 lbf] or less



3. If the standard is exceeded, check the king pin for bend, the needle bearing for damage and axle beam for deformation.

   Spacer thickness: 3.0, 3.5, 4.0 and 4.5 mm (0.118, 0.138, 0.157 and 0.177 in)

4. Tighten the lock nut for the king pin lock bolt.



[Point 8]

Removal:

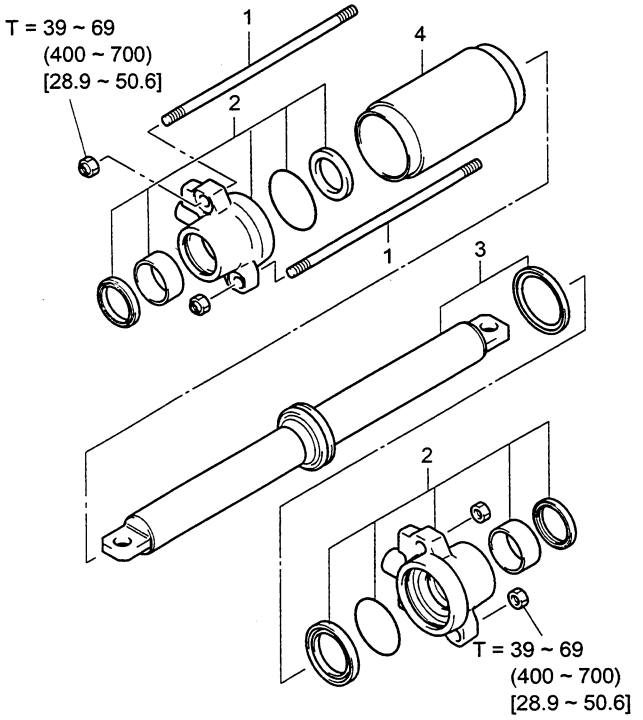
Remove the king pin oil seal and needle roller bearing.

1. Use a straight-edge screwdriver to remove the dust seal and oil seal.
2. Use the SST and remove the needle roller bearing.
   SST 09950-76018-71 ..... (1)
   (SST 09950-60010)
   SST 09950-76020-71 ..... (2)
   (SST 09950-70010)

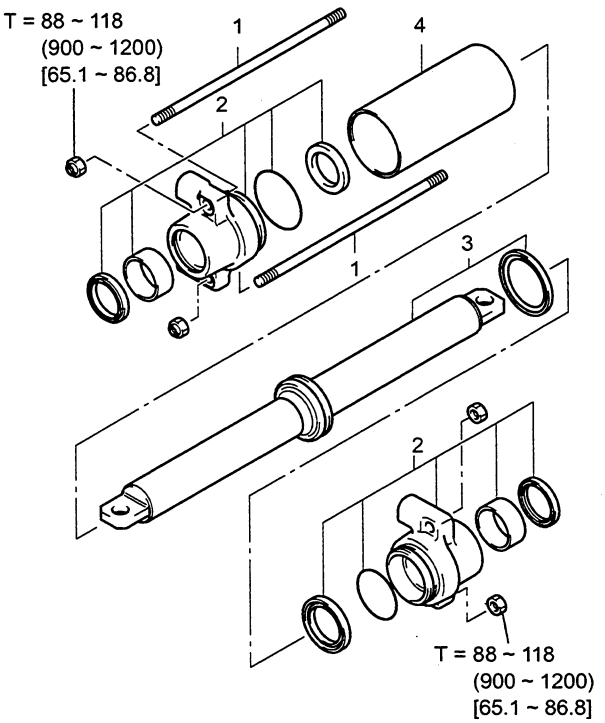
DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf-cm) [ft-lbf]

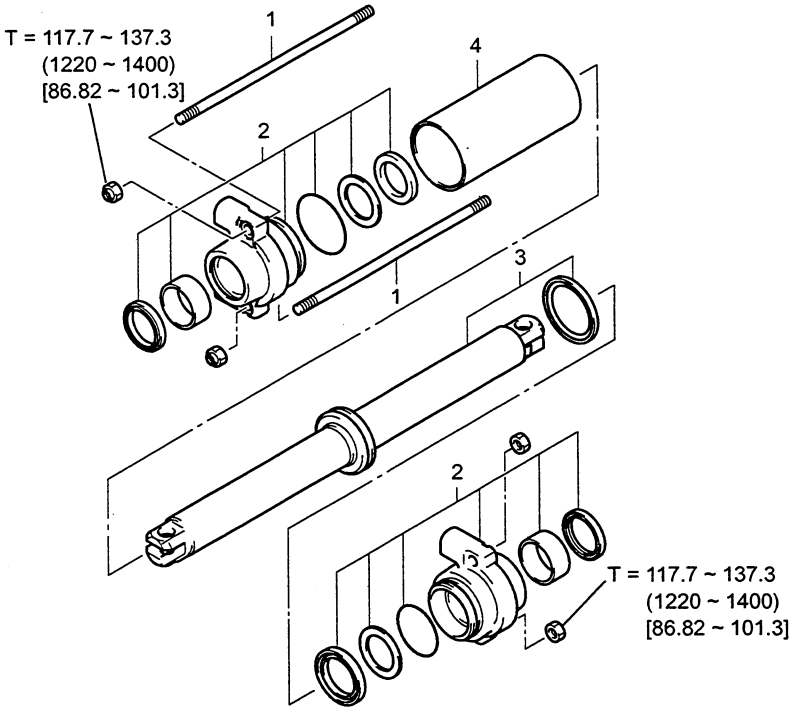
15·18 model



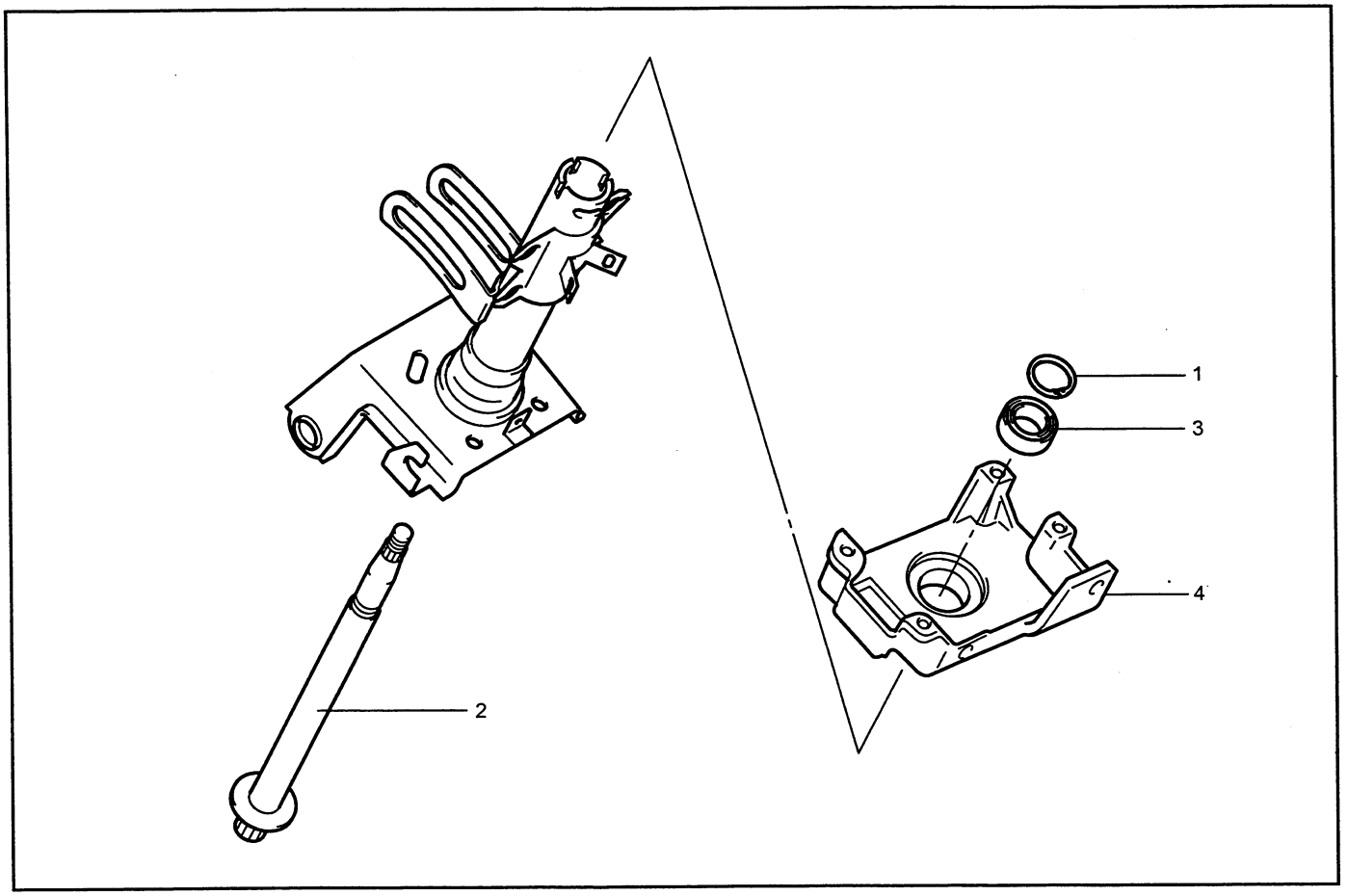
20 ~ 32 model



35 ~ 55 model



DISASSEMBLY·INSPECTION·REASSEMBLY

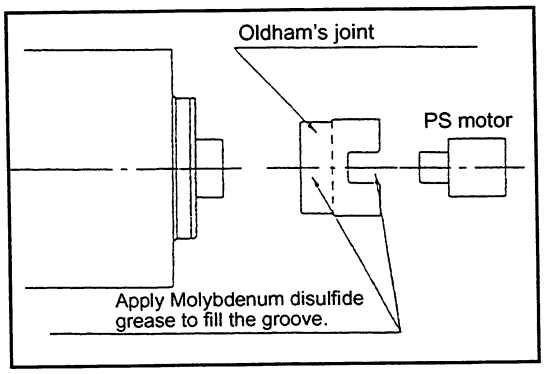


Disassembly Procedure

1 Remove the snap ring.
2 Remove the steering shaft.
3 Remove the bearing.
4 Remove the turn signal switch bracket.

Installation Procedure

The installation procedure is the reverse of the removal procedure.



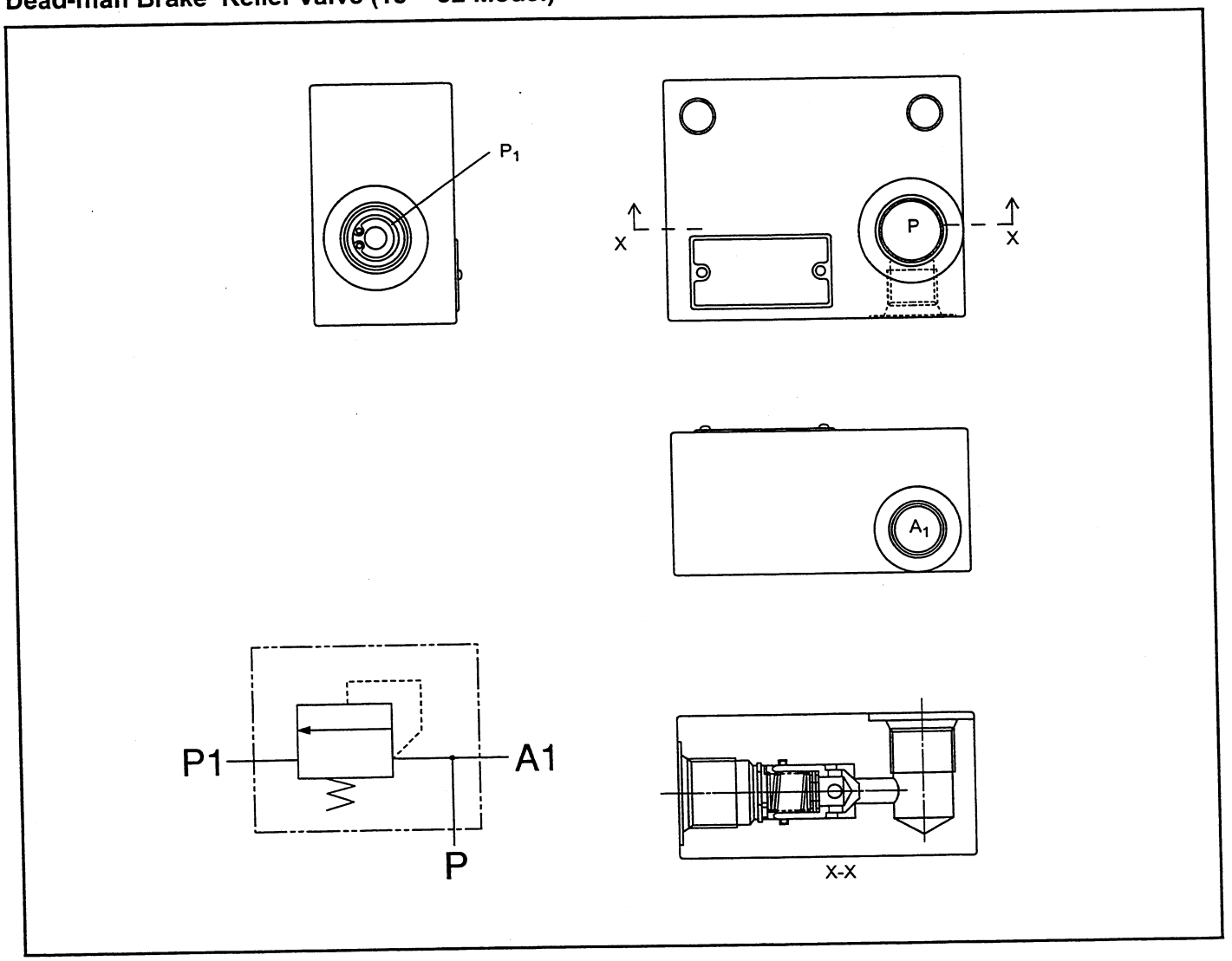
Point Operation

[Point 1]

Installation:

When assembling the PS motor and pump, fill molybdenum disulfide grease in the groove on the oldham's joint.

Dead-man Brake Relief Valve (15 ~ 32 Model)



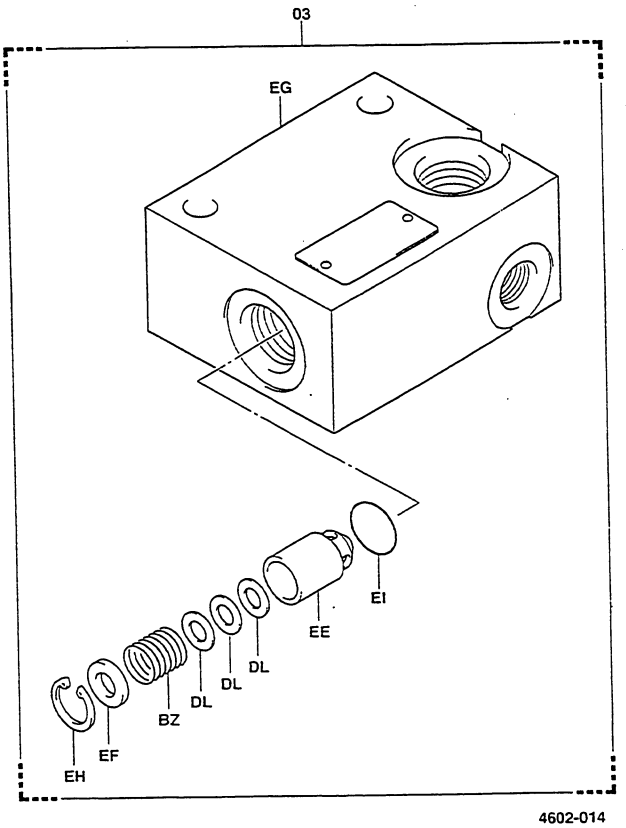
SPECIFICATIONS

15 ~ 32 Model

Item \ Model			15·18	20 ~ 32
Foot brake type			Hydraulic internal expanding duo servo brake	
Parking brake type			Internal expanding mechanical brake	
Brake drum inside diameter		mm (in)	254 (10.0)	310 (12.2)
Brake lining material			Resin mold (asbestos-free)	
Brake lining dimensions Thickness × width × length		mm (in)	4.9 × 48.5 × 271 (0.19 × 1.91 × 108)	5.7 × 60 × 343 (0.22 × 2.36 × 13.5)
Wheel cylinder bore		mm (in)	22.2 (0.87)	28.5 (1.12)
Brake master cylinder	Bore	mm (in)	19.05 (0.75)	
	Stroke	mm (in)	30 (1.18)	
Applicable oil			SAE J-1703-DOT-3	

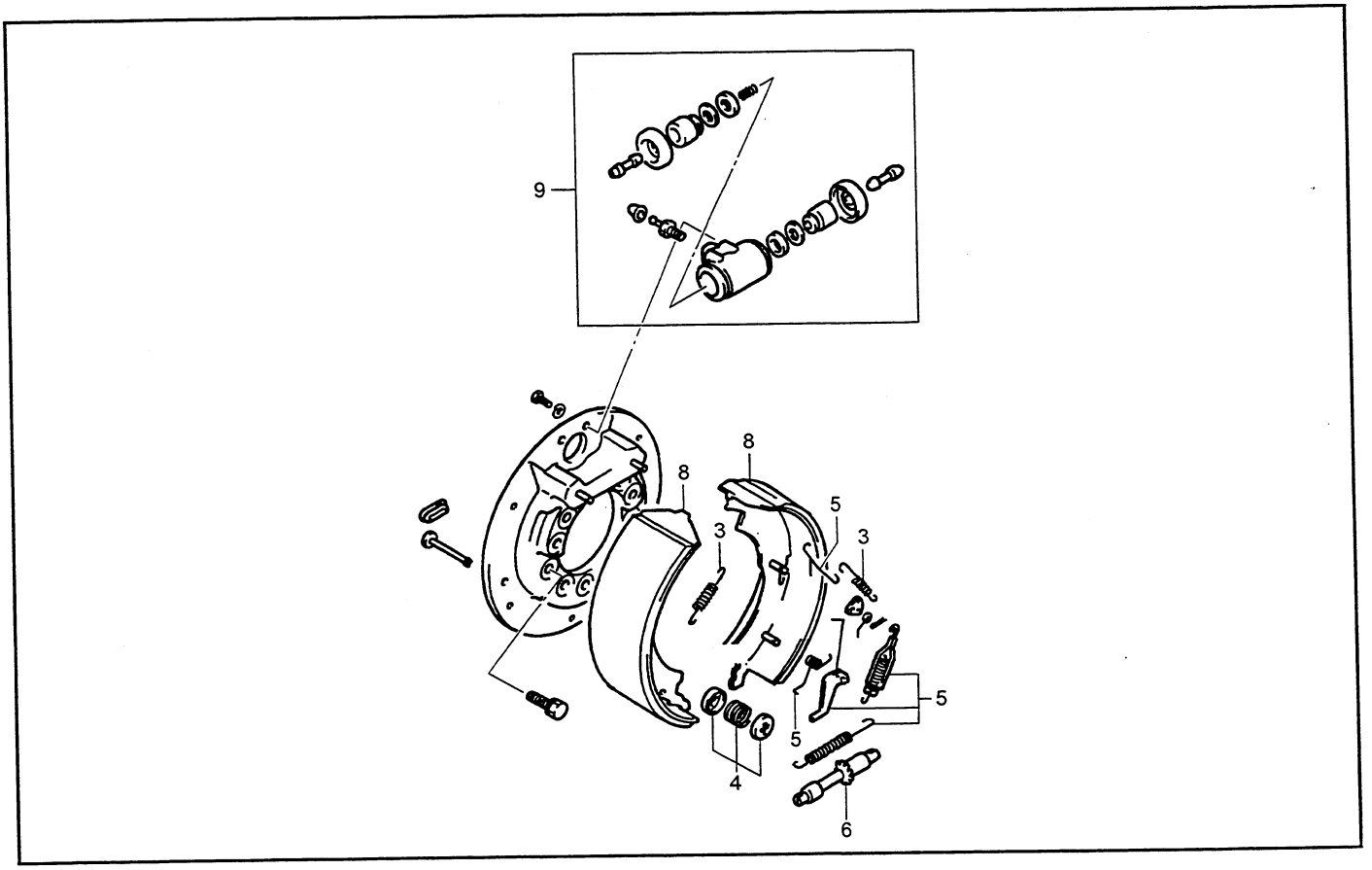
Dead-man Brake Relief Valve (15 ~ 32 model)

4602



DISASSEMBLY·INSPECTION·REASSEMBLY (55 MODEL)

T = N·m (kgf-cm) [ft-lbf]

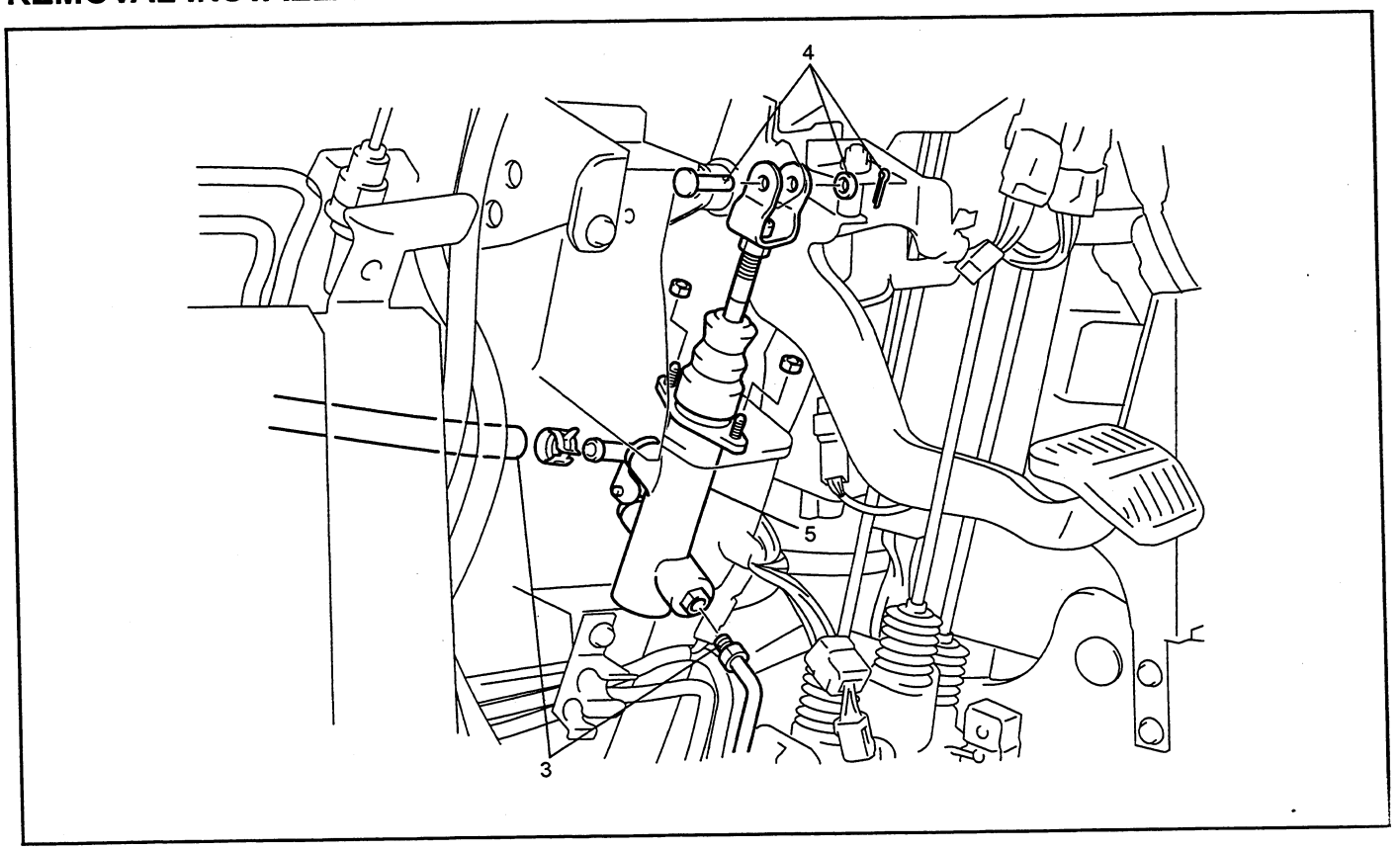


Disassembly Procedure

1 Remove the front wheel.
2 Remove the front axle hub W/brake drum. (See page 7-15.) **[Point 1]**
3 Remove the shoe return spring. **[Point 2]**
4 Remove the shoe hold down spring. **[Point 3]**
5 Remove the adjuster lever, link and spring.
6 Remove the brake shoe adjuster. **[Point 4]**
7 Disconnect the parking brake cable.
8 Remove the brake shoe. **[Point 5]**
9 Remove the wheel cylinder.
10 Disassemble the wheel cylinder.

BRAKE MASTER CYLINDER (15 ~ 32 MODEL)

REMOVAL·INSTALLATION



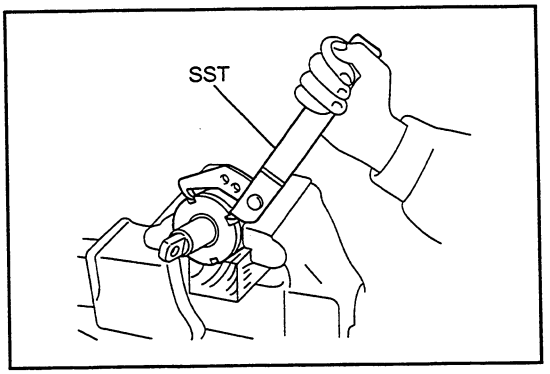
Removal Procedure

1 Remove the toe board (front and rear) and lower panel.
2 Disconnect the brake side hose from the reservoir tank and drain brake fluid.
3 Disconnect the piping.
4 Remove the push rod clevis pin.
5 Remove the brake master cylinder.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

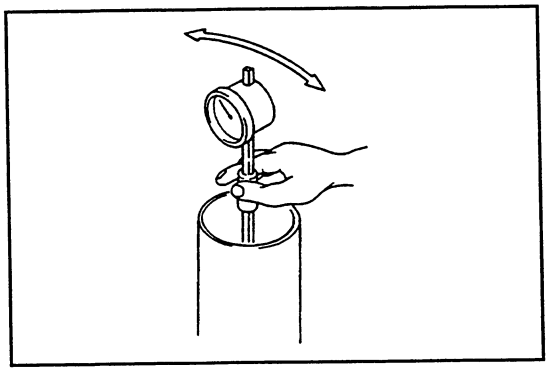
Note:
After installation, perform brake pedal adjustment (See page 10-59 (15 ~ 32 model), 10-60 (35 ~ 55 model)) and air bleeding (page 10-38).



Point Operations

[Point 1]

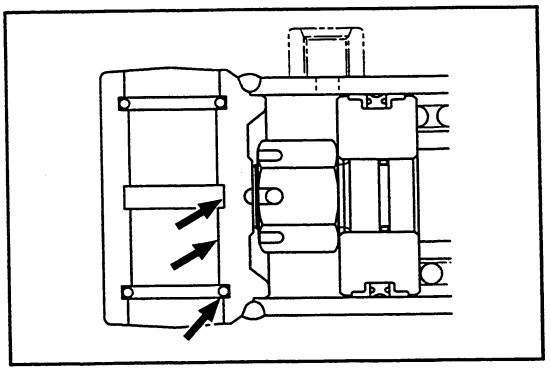
Disassembly·Reassembly:
SST 09620-10100-71



[Point 2]

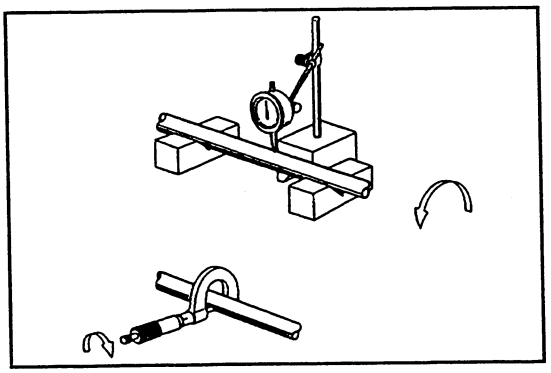
Inspection:
Measure the cylinder bore.

Standard: 70.0 mm (2.756 in)
Limit: 70.35 mm (2.7697 in)



[Point 3]

Reassembly:
Apply MP grease on the illustrated portion.



[Point 4]

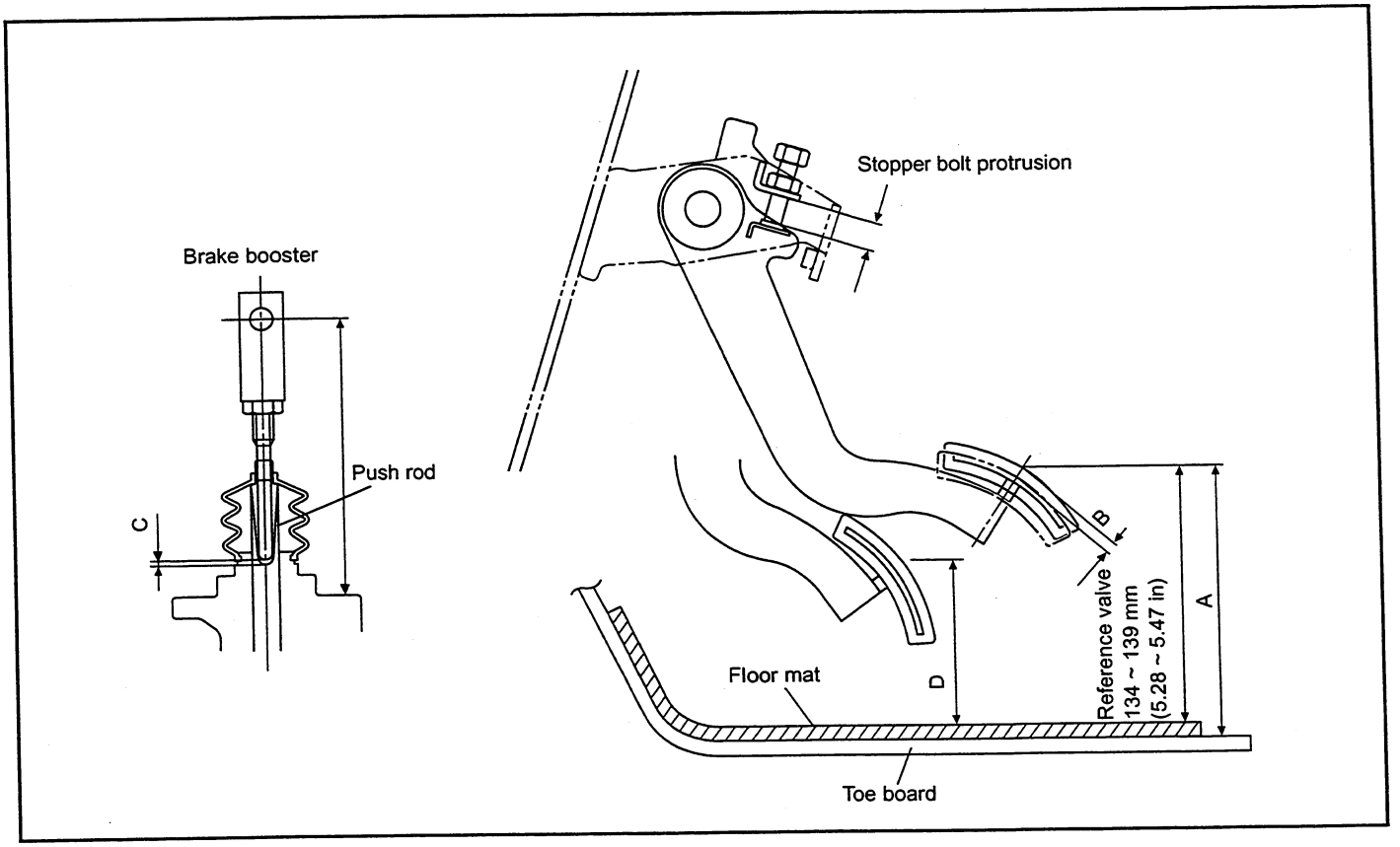
Inspection:
Measure the piston rod outside diameter.

Standard: 30.0 mm (1.181 in)
Limit: 29.92 mm (1.1780 in)

Inspection:
Measure the bend of the piston rod.

Limit: 1.0 mm (0.039 in)

BRAKE PEDAL INSPECTION·ADJUSTMENT (35 ~ 55 MODEL)



1. Inspect brake pedal height A. (From toe board to top of pedal)

   Standard: A = 144 ~ 149 mm (5.67 ~ 5.87 in) (with pedal pad)

   If the standard is not satisfied, make adjustment by changing the stopper bolt protrusion.

2. Inspect brake pedal play B.

   Standard: B = 5 ~ 9 mm (0.2 ~ 0.35 in)

   If the standard is not satisfied, make adjustment by changing the master cylinder push rod length.

3. Check master cylinder push rod play C with the brake pedal in the above state.

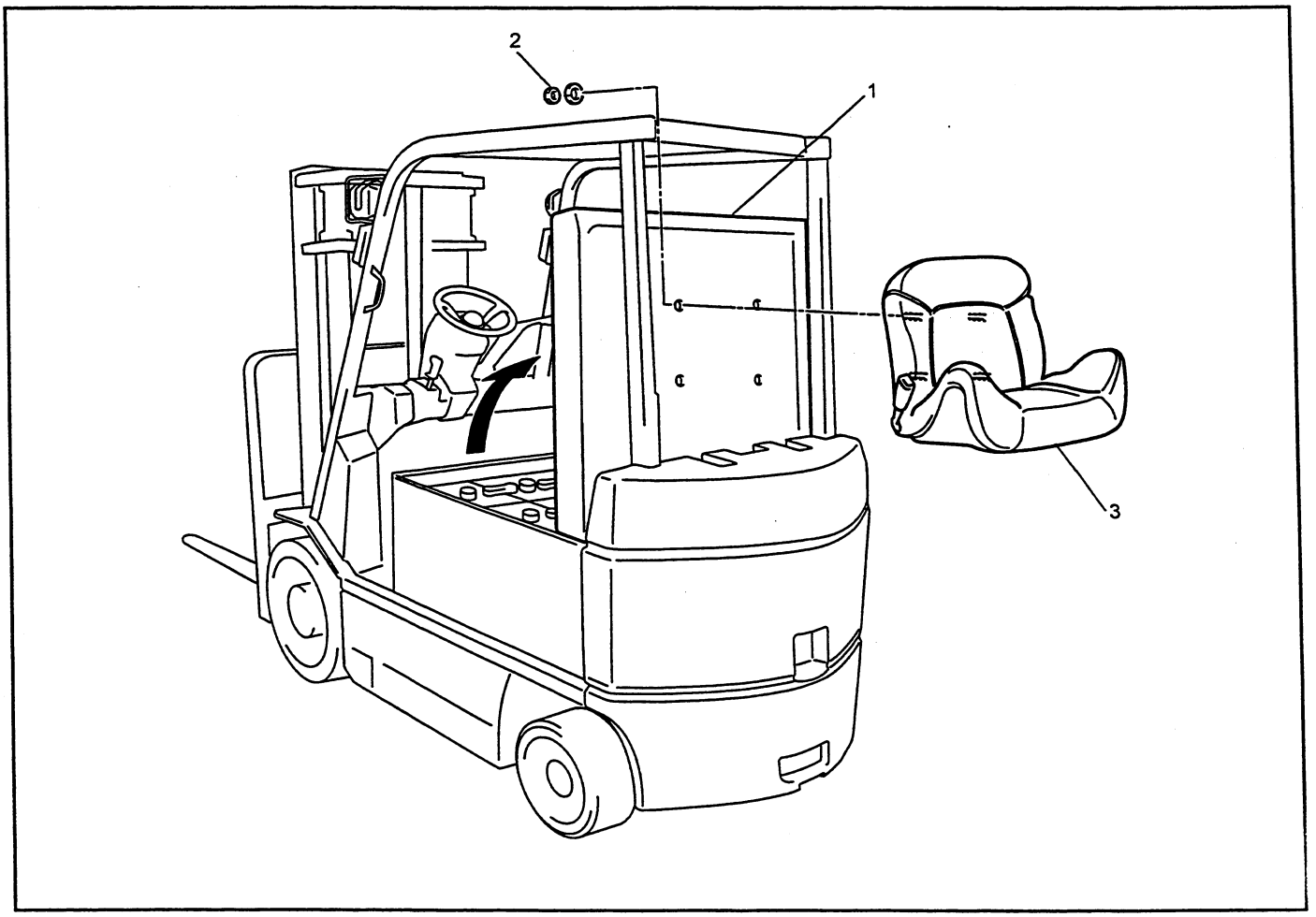
   Standard: C = 1 mm (0.04 in)

4. After the adjustment, fully depress the brake pedal D and inspect the pedal height in that state.

   Standard: D = 84 mm (3.31 in) or more

DRIVER'S SEAT

REMOVAL·INSTALLATION

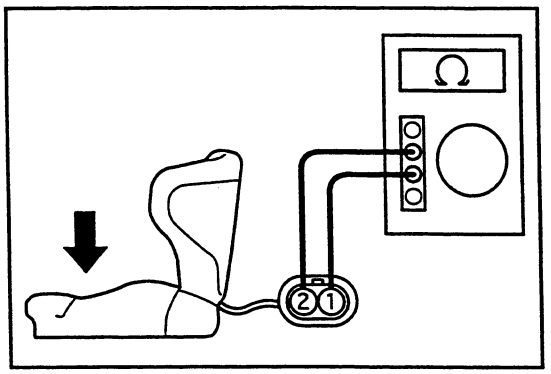


Removal Procedure

1 Open the seat stand.
2 Disconnect the seat switch connector. (Dead-man brake spec.)
3 Remove the driver's seat set nuts.
4 Remove the driver's seat. **[Point 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.



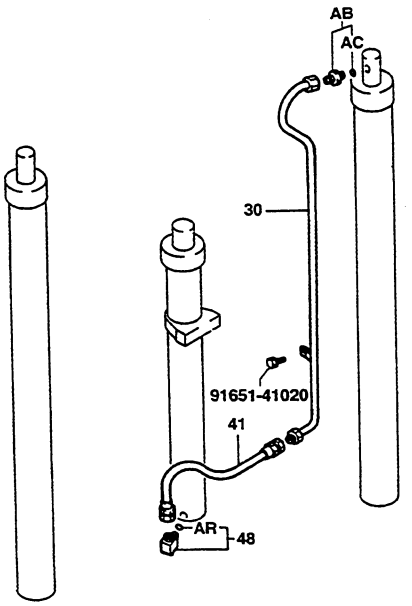
Point Operation

[Point 1]

Inspection:
Dead-man brake spec:
Push on the seat cushion and cheak continnity of the seat switch.
Standard seat switch: Between CN22-1 and CN22-2
Free : OFF (∞Ω)
Push : ON (0Ω)

35 ~ 55 model

6802

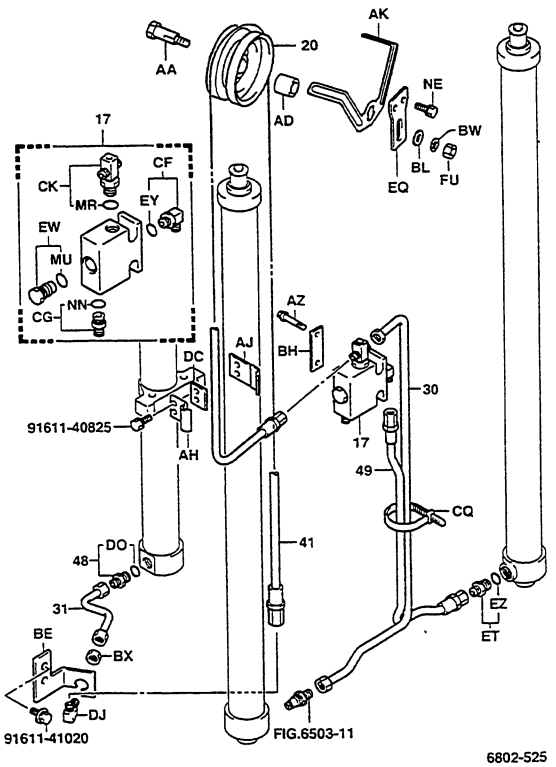


6802-477

FSV Mast

15·18 model

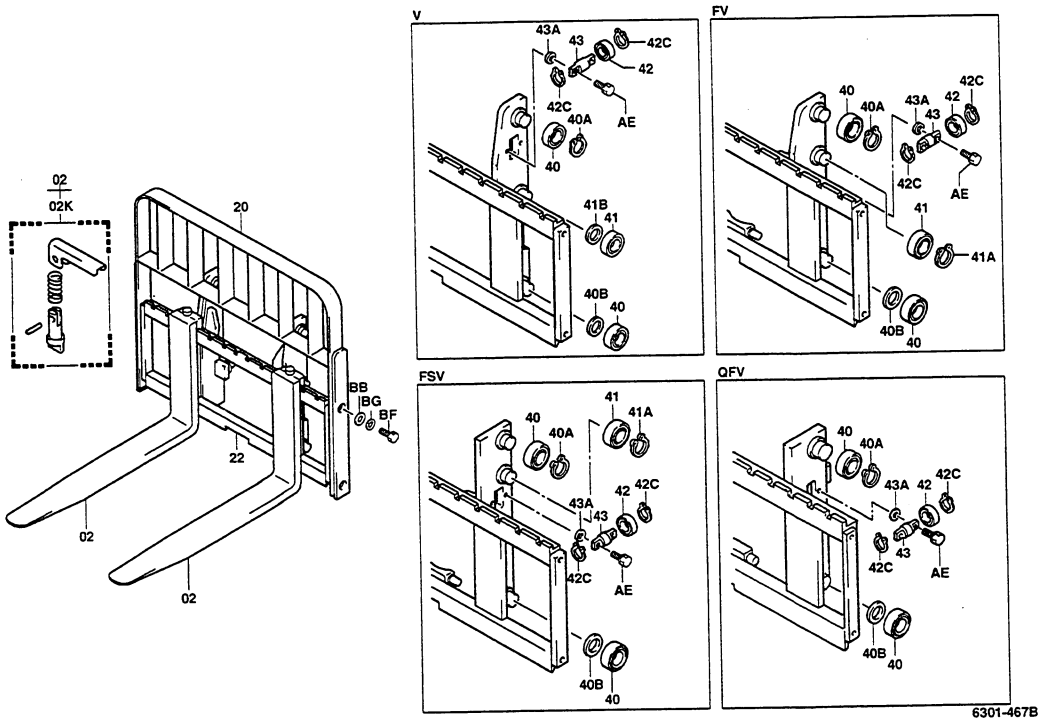
6802



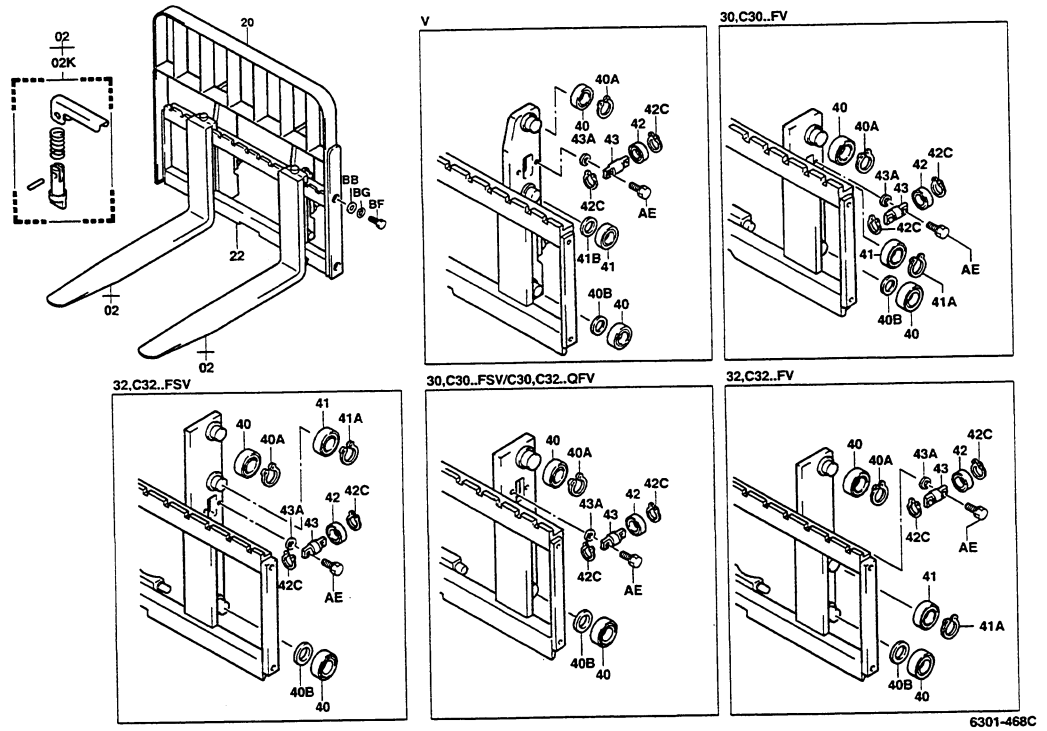
6802-525

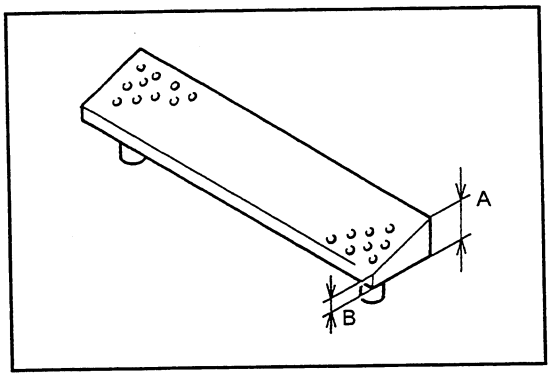
6301

20·25 model



30·32 model





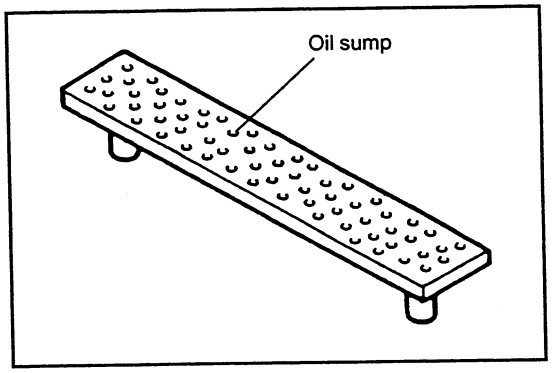
[Point 3]

Inspection:

15 ~ 32 model

Measure the mast strip thickness.

Thickness limit: A = 2.7 mm (0.106 in)
B = 1.3 mm (0.051 in)



35 ~ 55 model

Inspect the mast strip for wear.

Limit: Worn to leave no oil sump

3. Roller selection

(1) In 35·45 models, use oversize No. 2 as a rule for the inner mast roller. Use No. 1 only when the mast inside width (rolling contact surface) is narrow. The roller size may be different between the right and left sides.

Inner mast roller

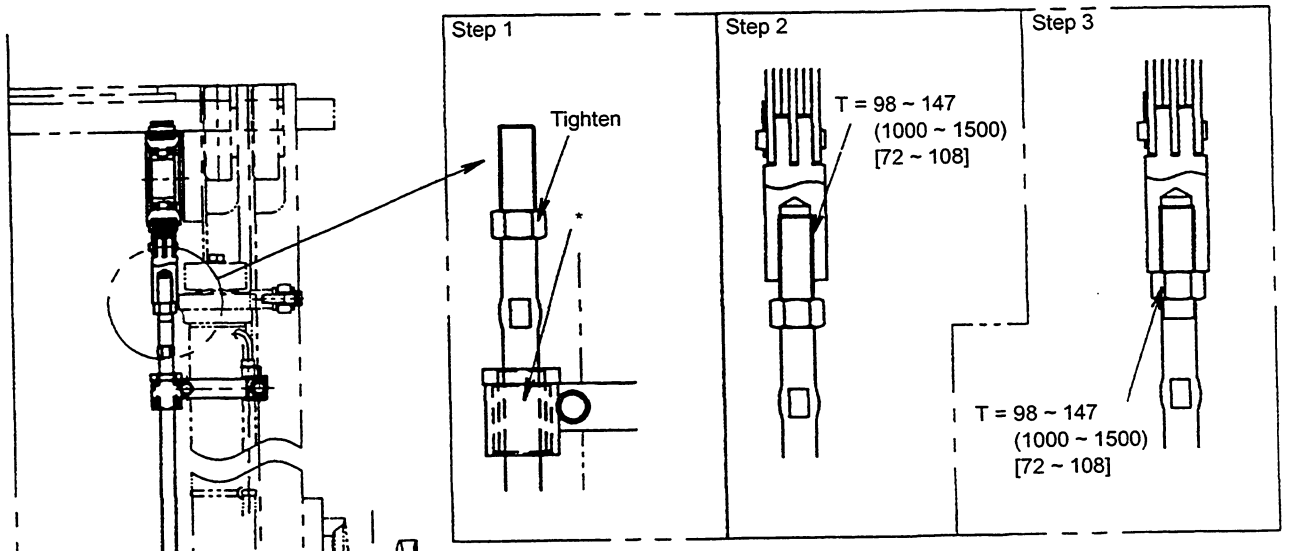
Model	No.	Outside diameter mm (in)	Outer mast inside width mm (in)	Remarks
35·45 model	No. 1	124.5 (4.902)	125.0 (4.921)	—
	No. 2	125.2 (4.929)		Oversize
55 model	No. 1	164.5 (6.476)	165.0 (6.496)	—

Outer mast roller

Model	Outside diameter mm (in)
35·45 model	124.5 (4.902)
55 model	164.5 (6.476)

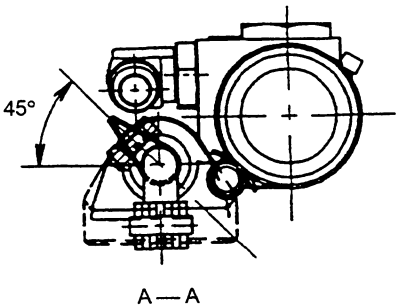
3. 35 model FSV H3700 ~ H5500 mm (145 ~ 216.5 in)

T = N·m (kgf-cm) [ft-lbf]



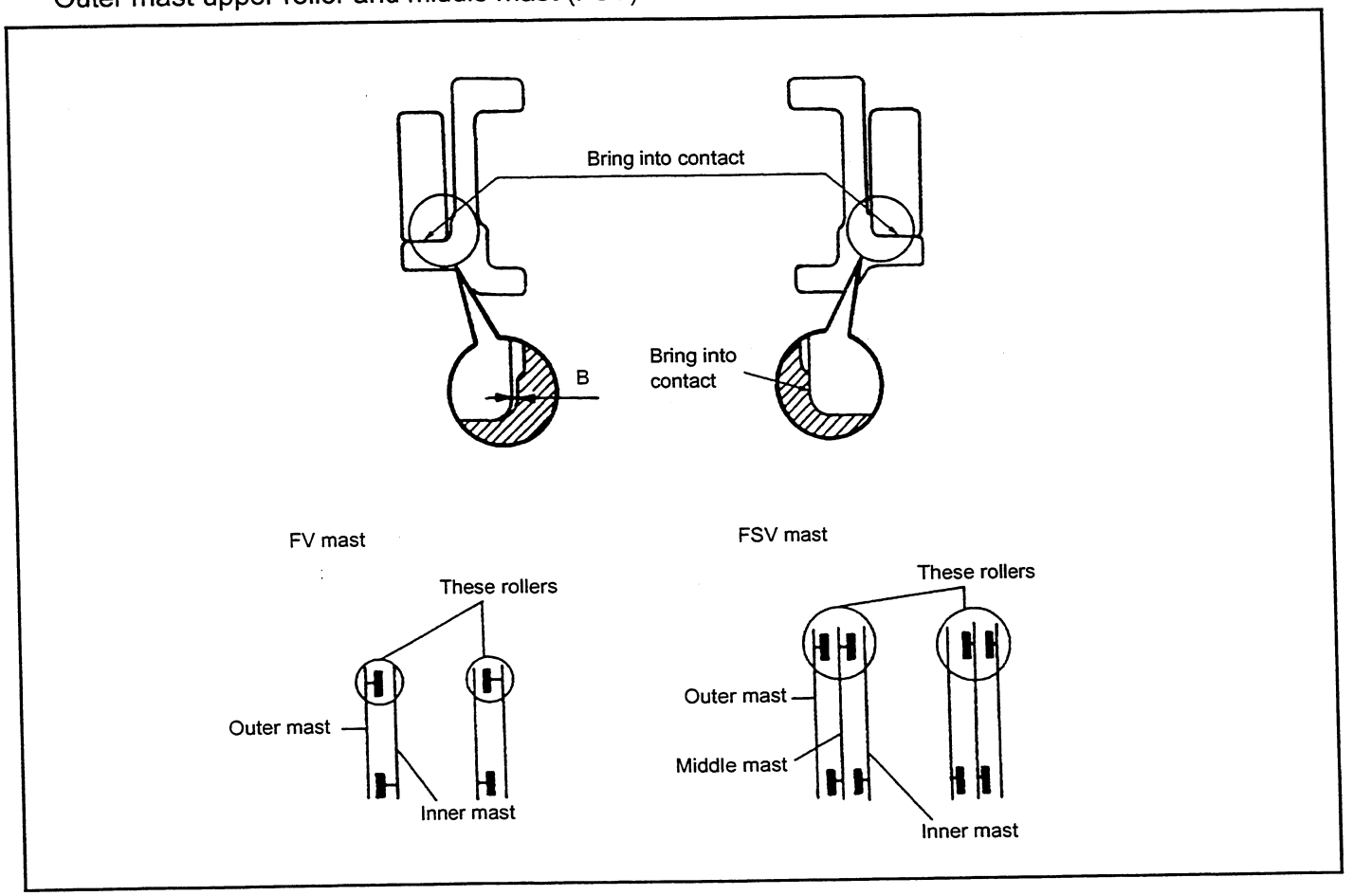
*: Before assemble a piece to the chain, put it through the rod.

The clamp installed angle:



A—A

2. Clearance between:
   Outer mast roller and inner mast (FV).
   Middle mast upper roller and inner mast (FSV).
   Outer mast upper roller and middle mast (FSV).



(1) Adjust the mast overlap to approx. 450 mm (17.72 in).

(2) Shift the inner mast to one side to bring the roller into contact with the inner mast, and measure on the opposite side the clearance between the roller side face and mast where they are the closest.

Standard: B = 0 ~ 0.5 mm (0 ~ 0.020 in)

If the standard is not satisfied, make adjustment by changing the outer mast roller shim thickness.

Shim thickness: 0.5 and 1.0 mm (0.020 and 0.039 in)

(3) Distribute shims equally to the rollers on the left and right sides.

(4) After the adjustment, see that mutual mast movement is smooth.

3. Roller selection
   Inner mast rollers and middle mast lower rollers
   - In the case of 35·45 models, use oversize No. 2 rollers as a rule, and use No. 1 only when the mast inside width (rolling contact surface) is narrow. The roller size may be different between the left and right sides.

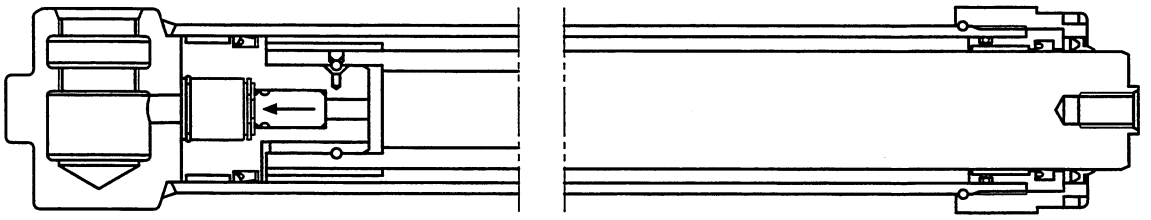
Model	No.	Outside diameter mm (in)	Mast inside width mm (in)	Remarks
35·45 model	No. 1	124.5 (4.902)	125.0 (4.921)	—
	No. 2	125.2 (4.929)		Oversize
55 model	No. 1	164.5 (6.476)	165.0 (6.496)	—

Outer mast rollers and middle mast upper rollers

Model	Outside diameter mm (in)
35·45 model	124.5 (4.902)
55 model	164.5 (6.476)

Lift Cylinder (V/35·45 Model)

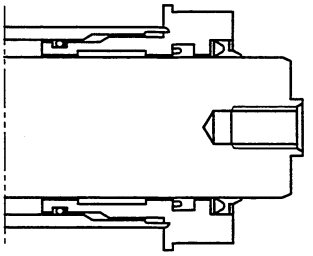
RH

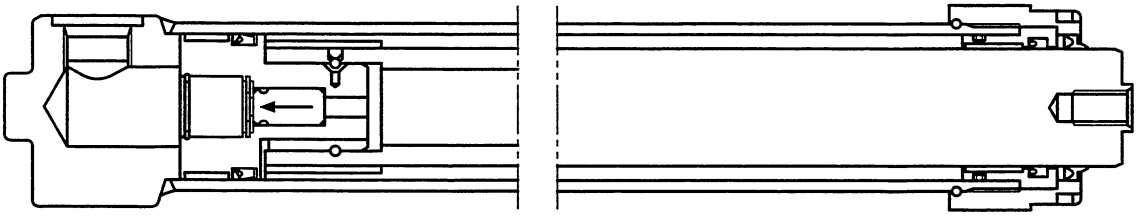


35 model: ~ H3700, 45 model: ~ H3500

LH

RH·LH
35 model: H4000 ~
45 model: H3700 ~

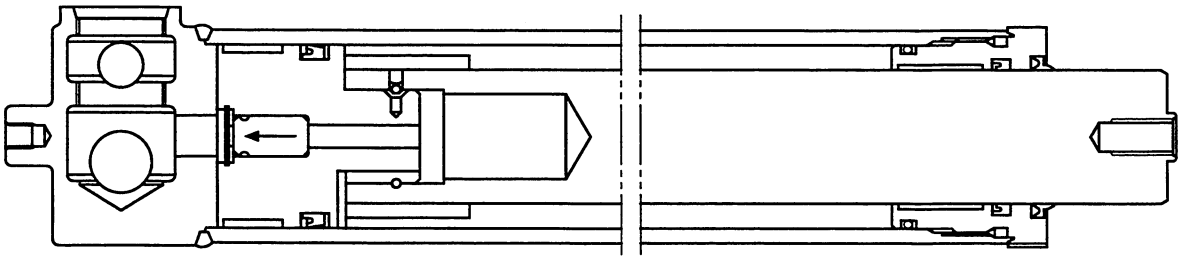




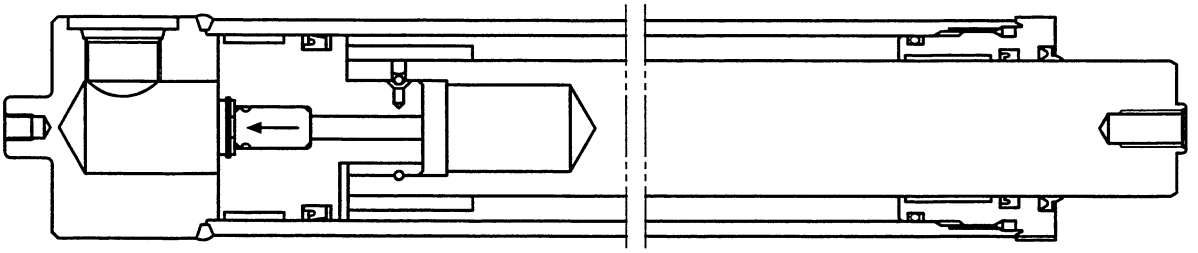
35 model: ~ H3700, 45 model: ~ H3500

Lift Cylinder (V/55 Model)

RH



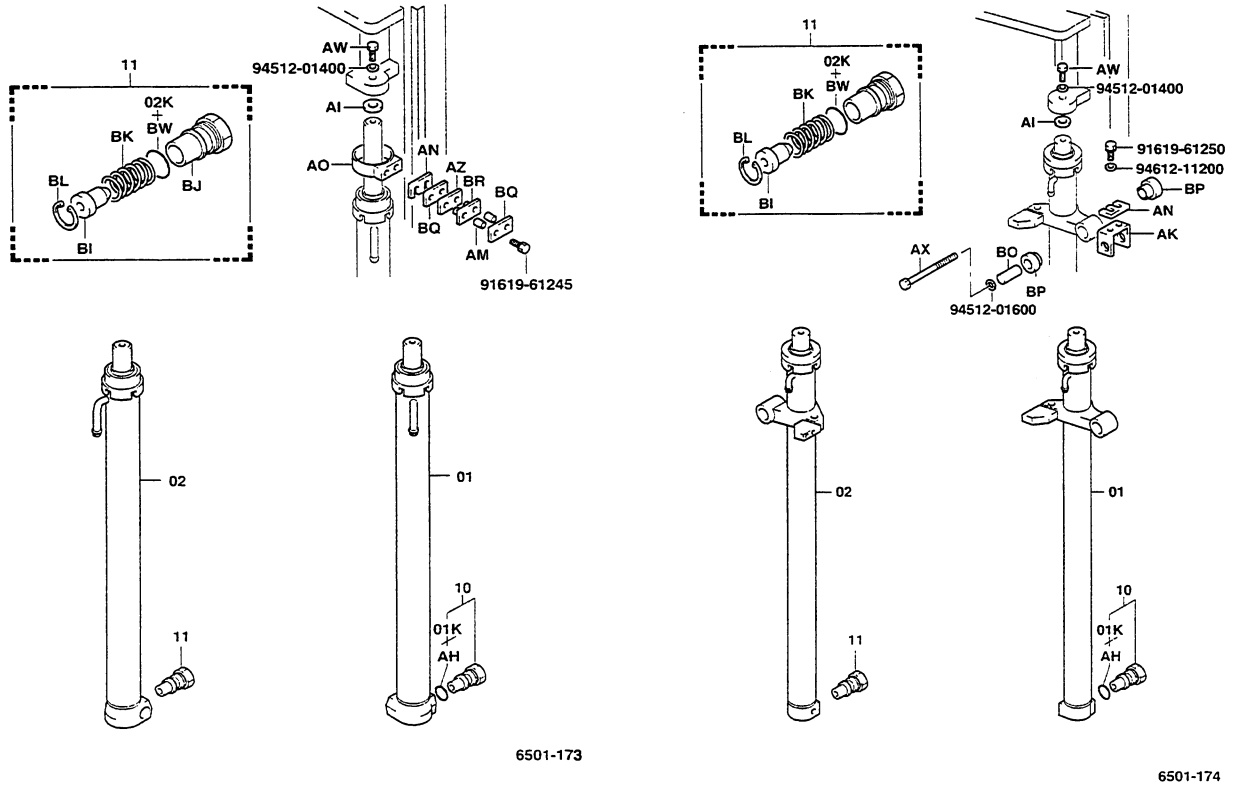
LH



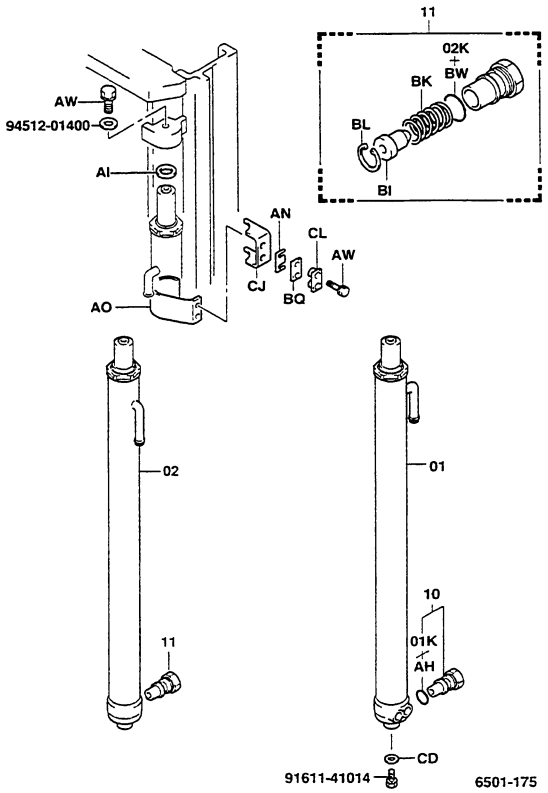
35 model

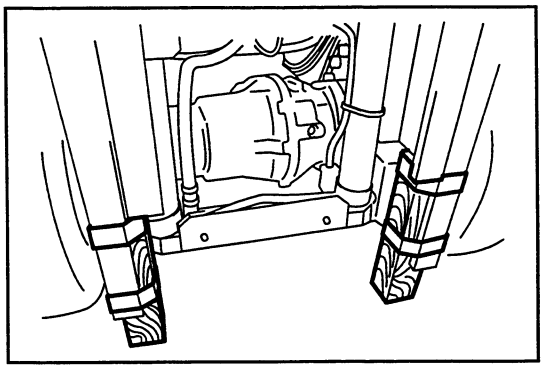
45 model

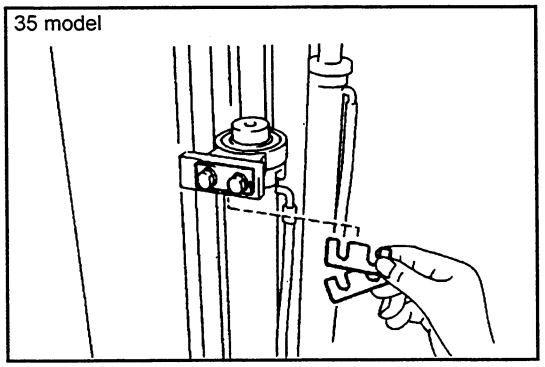
6501

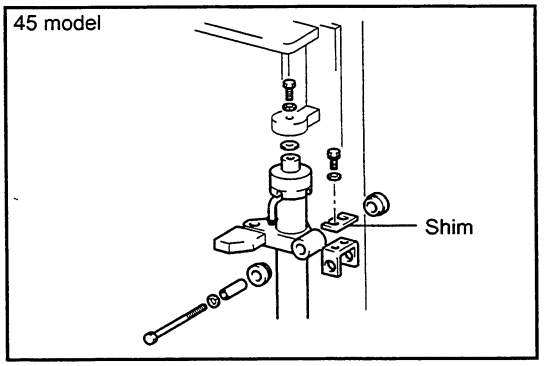


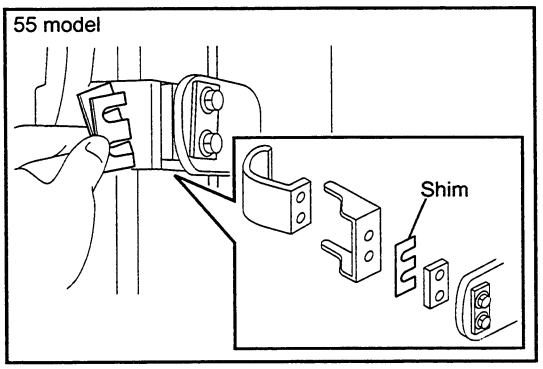
55 model











Point Operations

[Point 1]

Removal:

Hoist the inner mast.

Support the bottom of the inner mast with wooden blocks and fix the blocks by taping onto the outer mast.

Removal:

Shim adjustment is made at the lift cylinder rod end to prevent uneven movements of the lift cylinders RH and LH. Take a note on which side the adjustment is made and the number of shims used.

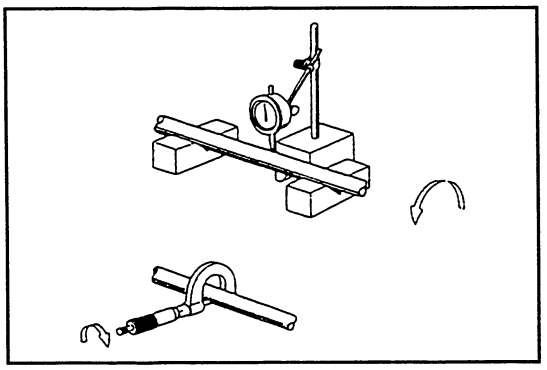
[Point 2]

Installation:

The cylinder support shall be tightened temporarily here and make shim adjustment after rod end connection.

Adjustment:

With the rod end connected, insert shims between the cylinder support and outer mast to eliminate the clearance. The shim thickness shall be slightly on the thicker side.



Point Operations

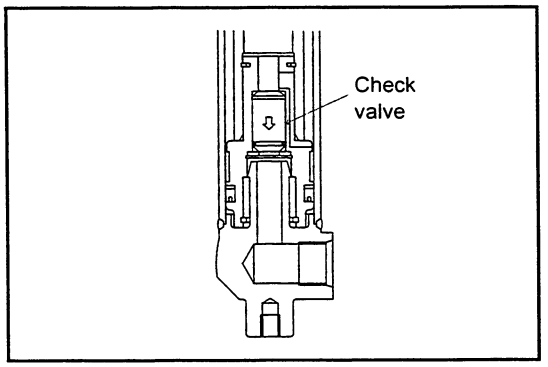
[Point 1]

Inspection:
Measure the piston rod outside diameter.

Standard: 35.0 mm (1.378 in)
Limit: 34.92 mm (1.3748 in)

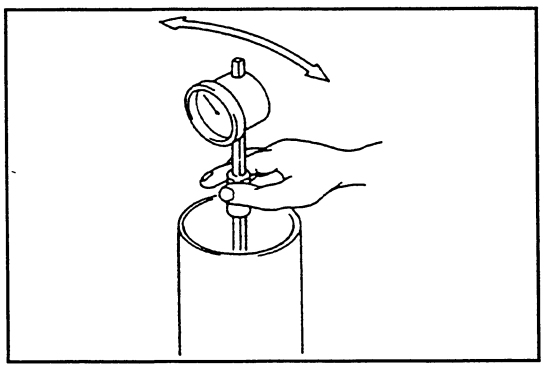
Inspection:
Measure the piston rod bend.

Limit: 2.0 mm (0.079 in)



[Point 2]

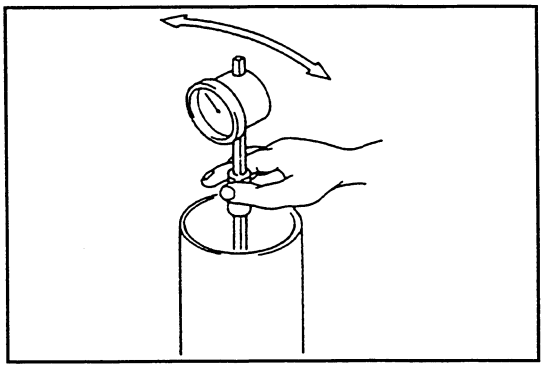
Reassembly:
Install the check valve so that the arrow directs to downward of the lift cylinder.



[Point 3]

Inspection:
Measure the lift cylinder bore.

Standard: 45.0 mm (1.772 in)
Limit: 45.20 mm (1.7795 in)



[Point 4]

Inspection:

Measure the lift cylinder bore.

35 model

Standard: 65 mm (2.56 in)

Limit: 65.35 mm (2.5728 in)

45 model

Standard: 70 mm (2.76 in)

Limit: 70.35 mm (2.7697 in)

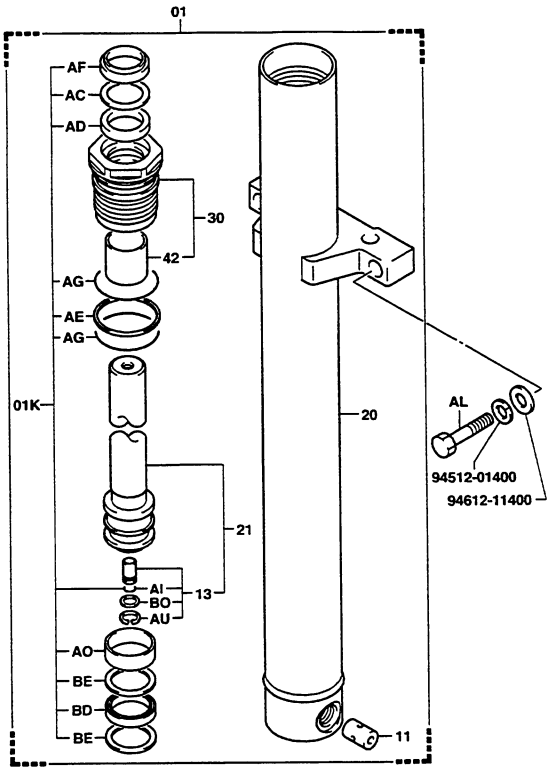
55 model

Standard: 75 mm (2.95 in)

Limit: 75.35 mm (2.9665 in)

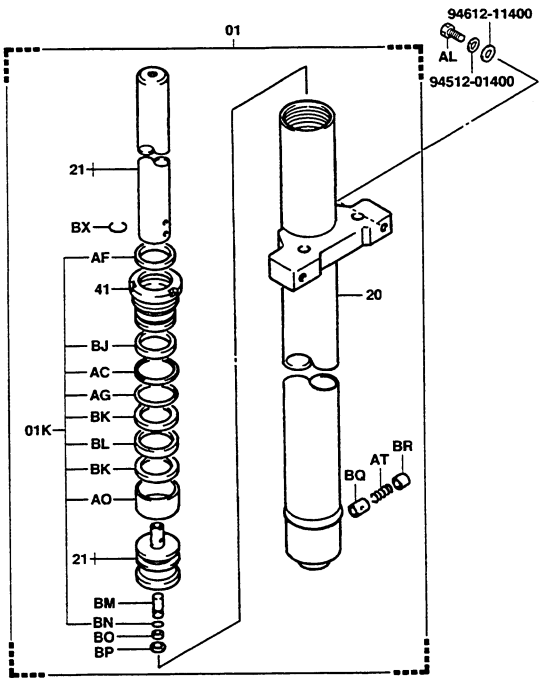
15·18 model (H4800 mm (189 in))

6502



6502-087A

20·25 model

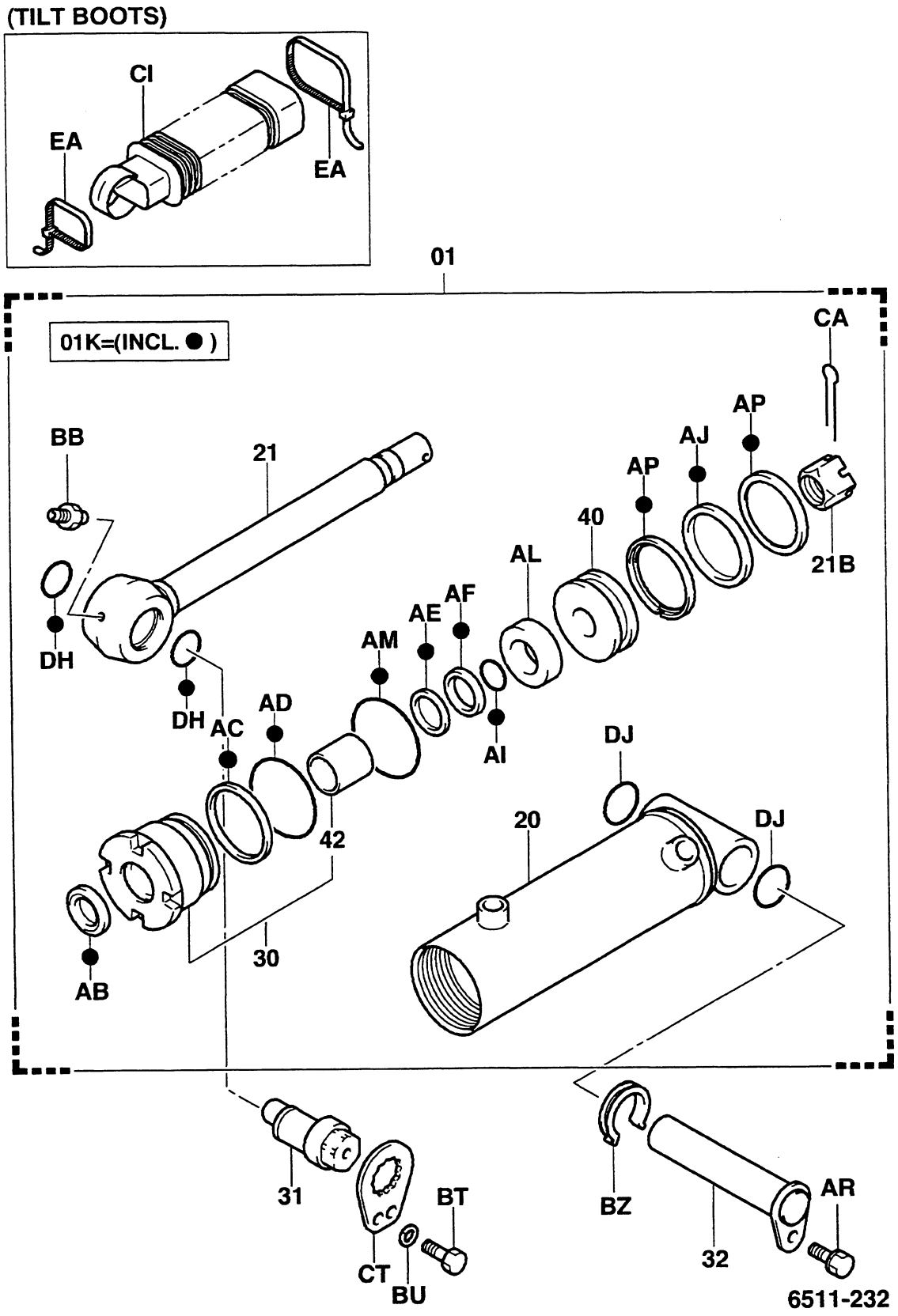


6502-089A

COMPONENTS

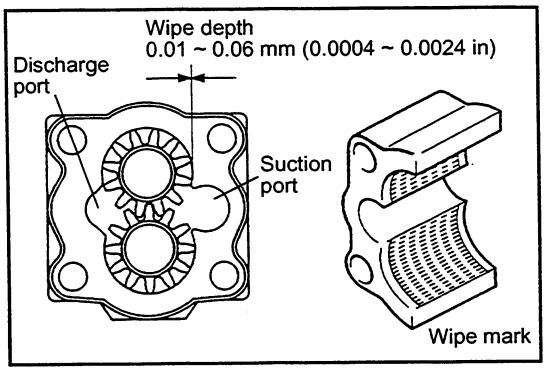
15 ~ 32 model

6511



SPECIFICATIONS

Model		Manufacturer (Model)	Pump type	Displacement cm^3 (in^3)/rev
15·18		KAYABA (KSP4-20C)	Single gear	20.0 (1.220)
20 ~ 32	48 V: Dustproof model	↑	↑	↑
	Other	KAYABA (KSP4-25C)	↑	25.5 (1.556)
35 ~ 55 (No.1 pump)	Dustproof model	SHIMADZU (DDG1A16·9)	Double gear	16.2 (0.989), 9.5 (0.580)
	Other	SHIMADZU (DDG1A18·9)	↑	18.3 (1.117), 9.5 (0.580)
35 ~ 55 (No.2 pump)	Dustproof model	KAYABA (KSP4-20C)	Single gear	20.0 (1.220)
	Other	↑	↑	↑

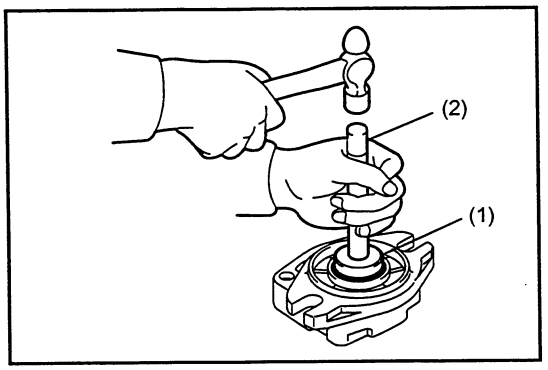


[Point 5]

Inspection:

Inspect the body inner surface for the wipe mark.

Normal wipe depth: 0.01 ~ 0.06 mm (0.0004 ~ 0.0024 in)



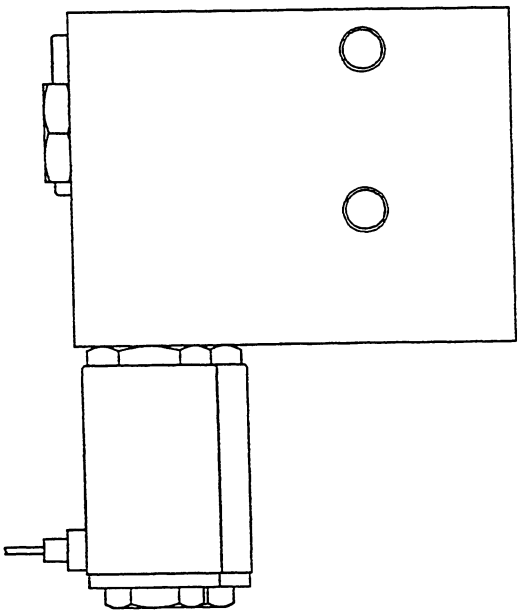
[Point 6]

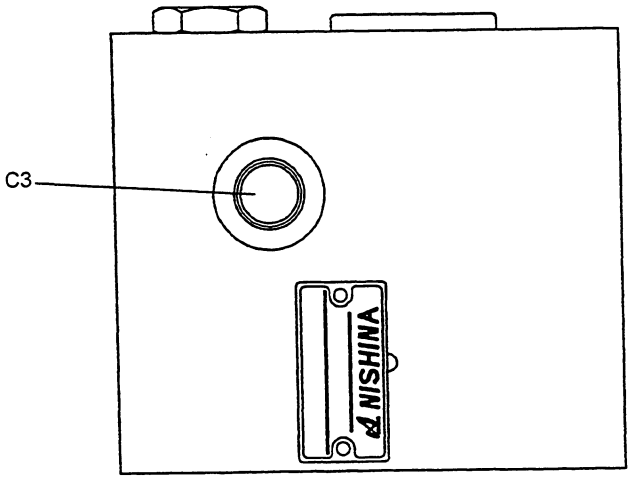
Reassembly:

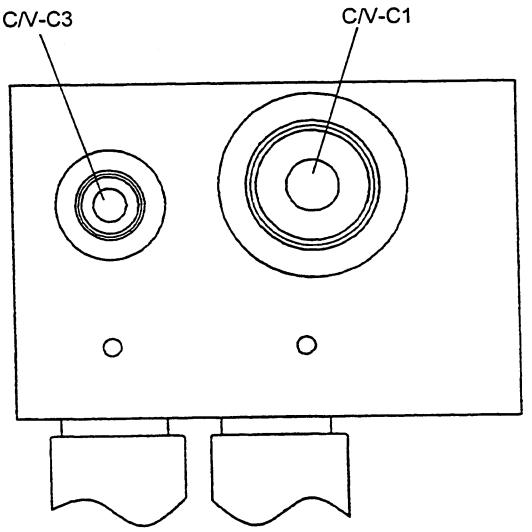
SST 09950-76018-71 .....(1)
(SST 09950-60010)
SST 09950-76020-71 .....(2)
(SST 09950-70010)
After reassembly, apply a thin coat of MP grease on the oil seal lip portion.

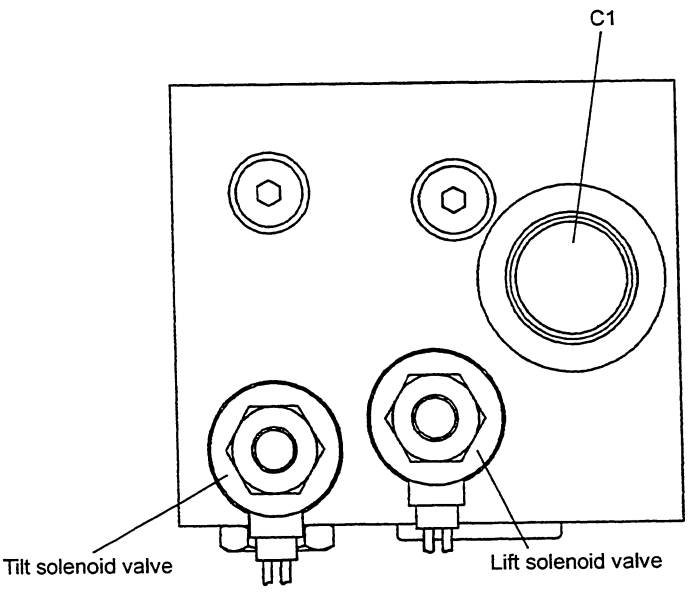
Lift & Tilt Lock Valve ASSY

35 ~ 55 model







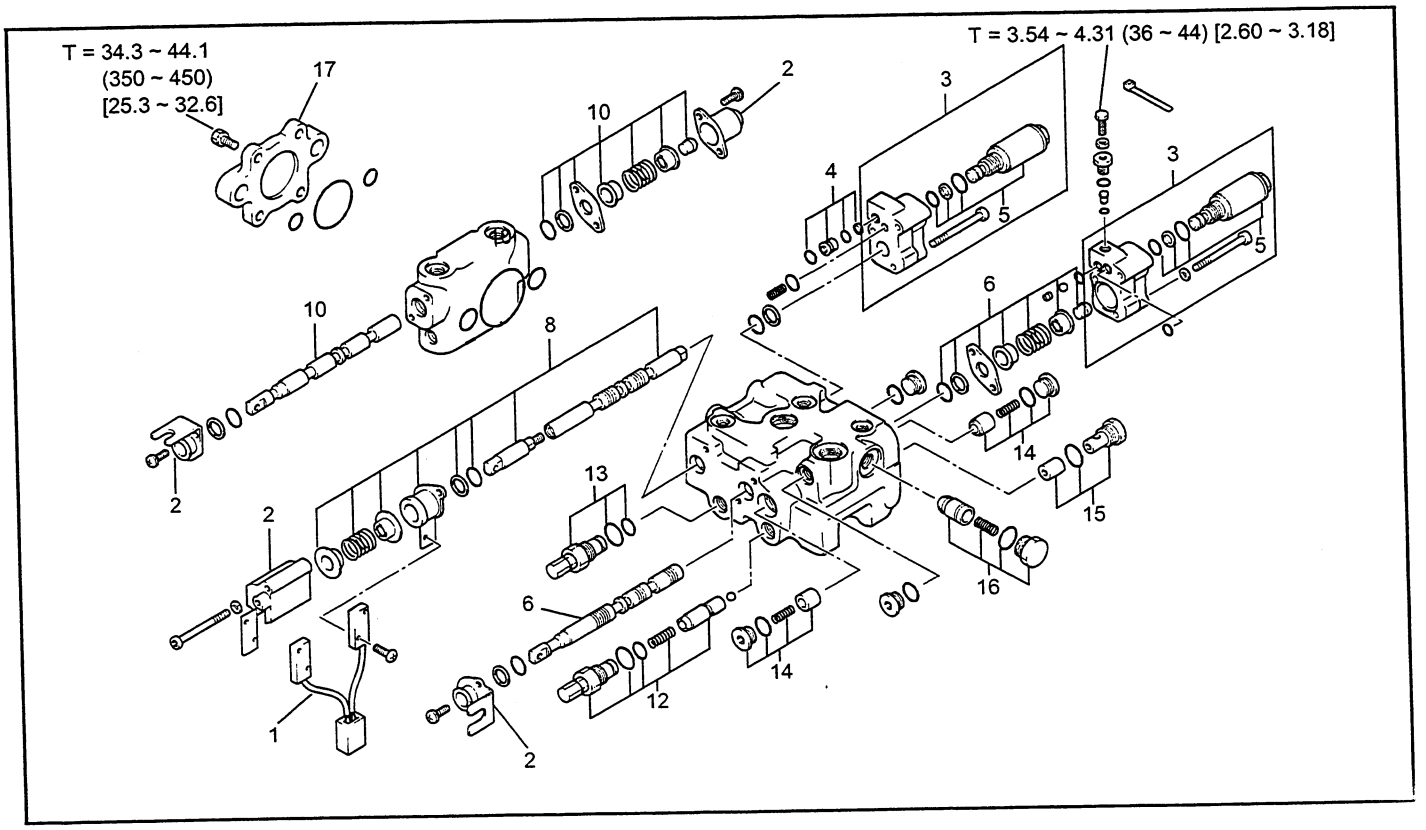


DISASSEMBLY·INSPECTION·REASSEMBLY (15 ~ 32 MODEL)

Note:

- **Since parts are finished with high precision, carefully disassemble and reassemble them to prevent any damage.**
- **Use a clean location for the job.**

T = N·m (kgf-cm) [ft-lbf]

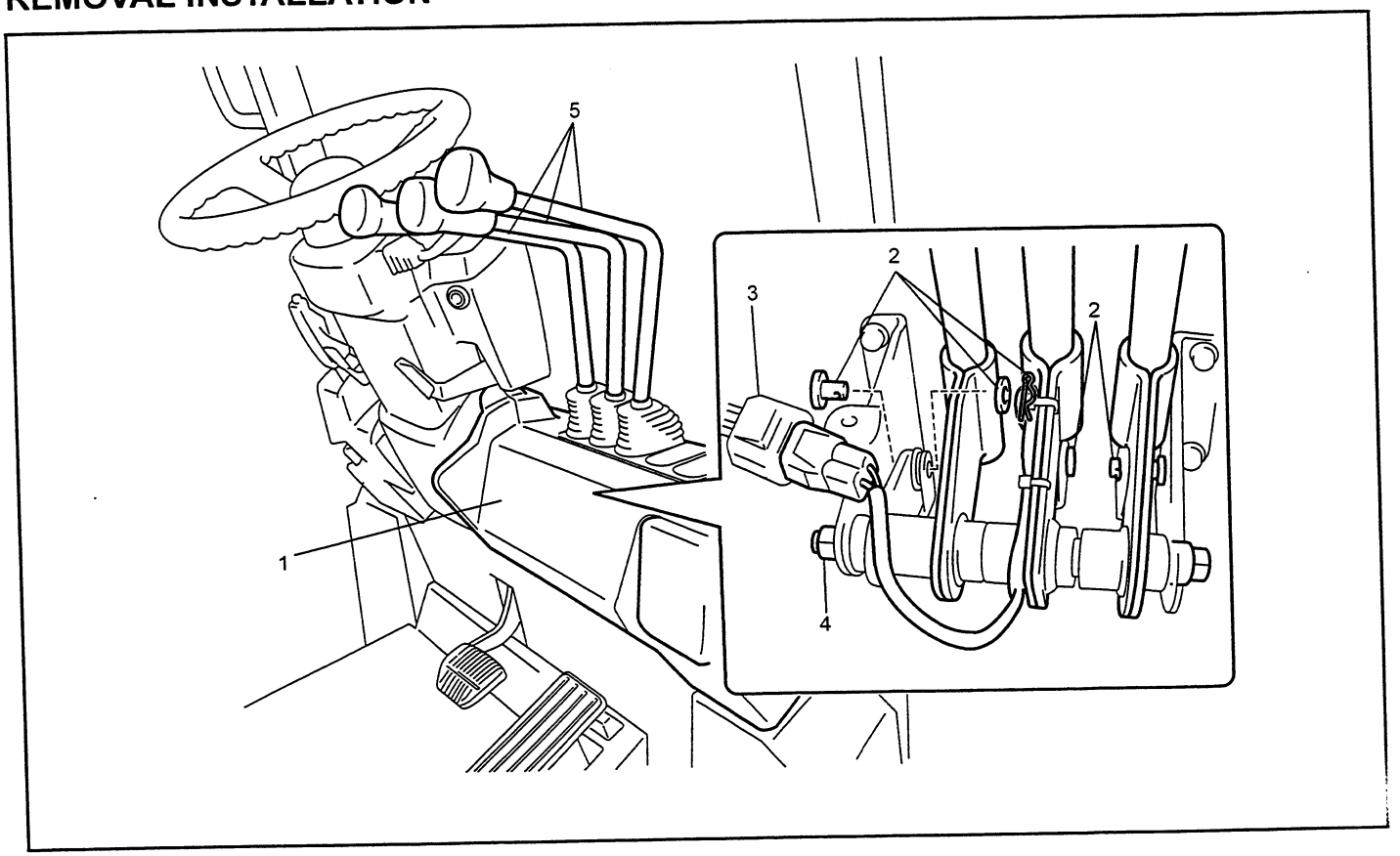


Disassembly Procedure

1 Remove the limit switch. **[Point 1]**
2 Remove the limit switch holder and spring cover.
3 Remove the solenoid ASSY. **[Point 2]**
4 Remove the tilt lock cheak valve.
5 Remove the solenoid valve.
6 Remove the lift spool ASSY.
7 Disassemble the lift spool ASSY. **[Point 3]**
8 Remove the tilt spool ASSY.
9 Disassemble the tilt spool ASSY. **[Point 3]**
10 Remove the additional spool ASSY.
11 Disassemble the additional spool ASSY. **[Point 3]**
12 Remove the lift pilot relief valve set.
13 Remove the tilt pilot relief valve set.
14 Remove the cheak plunger.
15 Remove the valve seat.
16 Remove the lift lock cheak valve.
17 Remove the outlet honsing.

CONTROL VALVE LEVER ASSY

REMOVAL·INSTALLATION



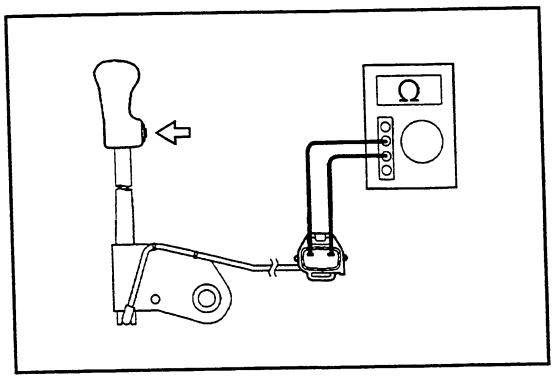
Removal Procedure

1 Remove the instrument panel.
2 Remove the set pin and disconnect the lever rod.
3 Tilt lever: Disconnect the knob switch wiring.
4 Remove the set bolt.
5 Remove the control valve lever. **[Point 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.

Note:
Apply grease at control valve lever link portions.



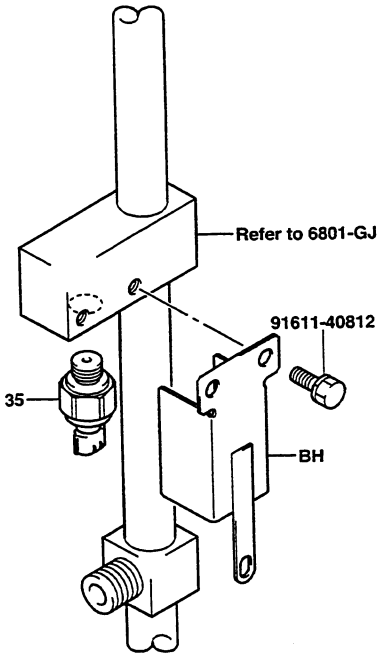
Point Operation

[Point 1]

Inspection:
Inspect the knob switch for continuity.

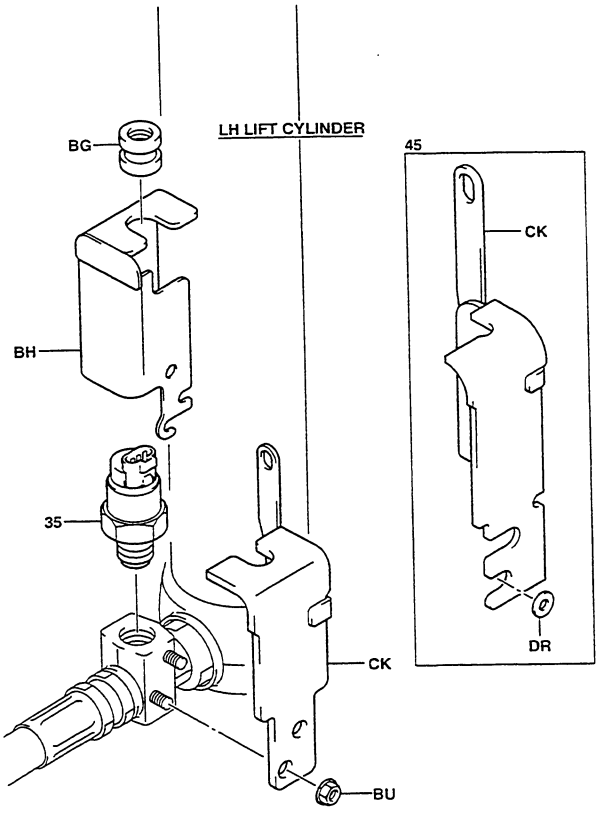
5803

Load sensor (FSV (35 ~ 55 model))



5803-070

Load sensor (V (35 ~ 55 model)·FV (35·45 model))

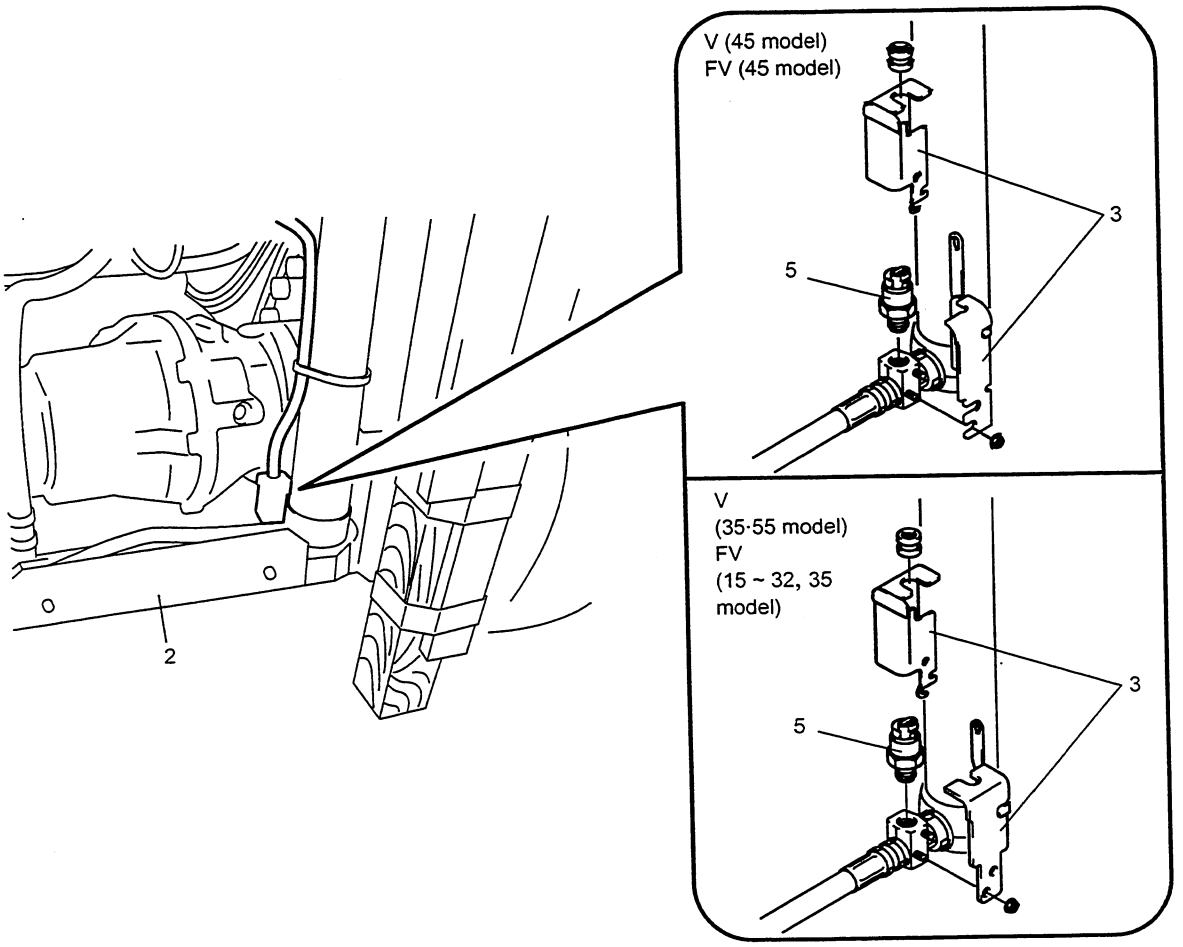


5803-084A

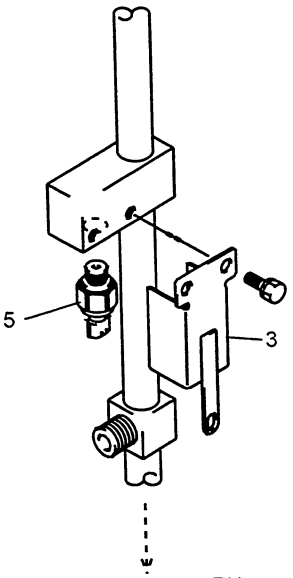
LOAD SENSOR

REMOVAL·INSTALLATION

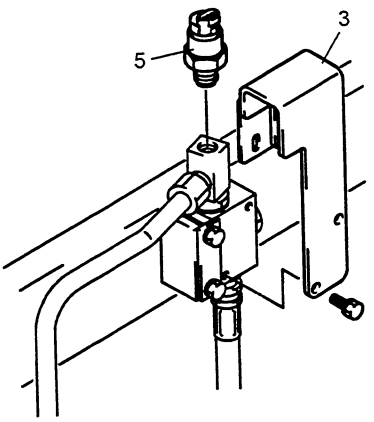
T = N·m (kgf-cm) [ft-lbf]



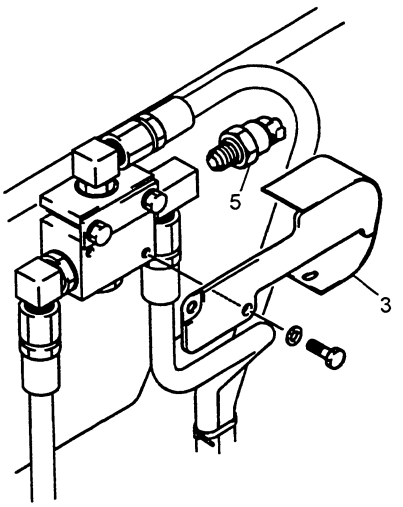
FSV (35 ~ 55 model)



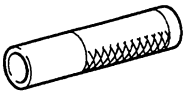
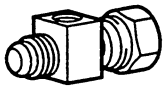
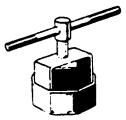
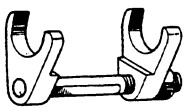
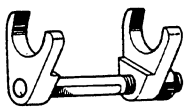
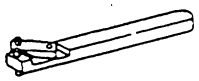
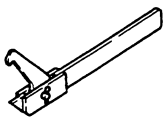
V (15 ~ 32 model)
FSV (15 ~ 32 model)



QFV

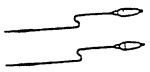
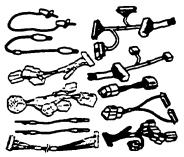
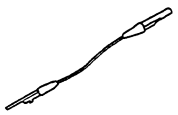
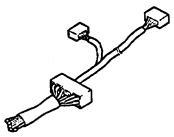
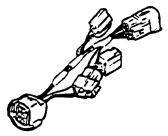
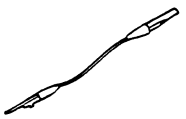
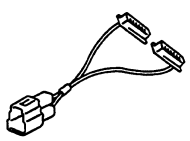


Load sensor T = 35.3 ~ 43.1 (360 ~ 440) [26.0 ~ 31.8]

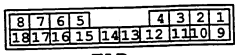
Illustration	Part No.	Part Name	Section											
			1	5	6	7	8	9	10	13	14	15	16	17
	09370-10410-71	Front axle bearing replacer			O	O	O							
	09370-20270-71	Drive pinion bearing replacer					O							
	09381-41950-71	H.S.T pump bearing replacer		O										
	09450-23320-71	Adapter						O						
	09509-76002-71 (09509-55020)	Rear wheel bearing nut wrench				O								
	09510-31960-71	Brake hold down spring remover and replacer							O					
	09610-10160-70	Oil control valve spring remover and replacer											O	
	09610-10161-71	Oil control valve spring remover and replacer											O	
	09610-20170-71	Tilt lock valve cup remover & replacer									O			
	09620-10100-71	Cylinder cap remover and replacer							O		O			

Brake shoe spring free length	mm (in)	Standard	20.0 (0.79)
		Limit	18.0 (0.71)
Brake lining thickness	mm (in)	Standard	4.0 (0.16)
		Limit	1.0 (0.04)
Brake drum bore	mm (in)	Standard	160 (6.30)
		Limit	162 (6.38)
Brake booster (35 ~ 55 model)			
Master cylinder piston side clearance	mm (in)	Limit	0.032 (0.0013)
Power piston side clearance	mm (in)	Limit	0.032 (0.0013)
Parking brake (15 ~ 32 model)			
Parking brake operating force (measured at center of lever knob)	N (kgf) [lbf]	Standard	147 ~ 196 (15 ~20) [33 ~ 44]
Parking brake (35 ~ 55 model)			
Parking brake operating force (measured at center of lever knob)	N (kgf) [lbf]	Standard	196 ~ 245 (20 ~25) [44 ~ 55]
Dead-man brake cylinder			
Cylinder bore	mm (in)	Standard	70.0 (2.756)
		Limit	70.35 (2.7697)
Piston rod outside diameter	mm (in)	Standard	30.0 (1.181)
		Limit	29.92 (1.1780)
Piston rod bend	mm (in)	Limit	1.0 (0.039)
Tight tening torque Unit: N·m (kgf-cm) [ft-lbf]			
Cylinder piston castle nut		Standard	225.4 ~ 284.2 (2300 ~ 2900) [166.4 ~ 209.8]
Cylinder cover		Standard	284 ~ 421 (2900 ~ 4300) [209.8 ~ 311.1]
Brake pedal (15 ~ 32 model)			
Brake pedal height (from toe board: with pad)	mm (in)	Standard	144 ~ 149 (5.67 ~ 5.87)
Brake pedal play	mm (in)	Standard	5 ~ 9 (0.197 ~ 0.354)
Brake master cylinder push rod play	mm (in)	Standard	1 ~ 2 (0.039 ~ 0.079)
Brake pedal depressed height (with pad)	mm (in)	Standard	71 (2.80) or more
Brake pedal (35 ~ 55 model)			
Brake pedal height (from toe board: with pad)	mm (in)	Standard	144 ~ 149 (5.67 ~ 5.87)
Brake pedal play	mm (in)	Standard	5 ~ 9 (0.197 ~ 0.354)
Brake master cylinder push rod play	mm (in)	Standard	1 (0.039)
Brake pedal depreessed height (with pad)	mm (in)	Standard	71 (2.80) or more

SST LIST

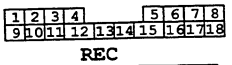
Illust.	Part No.	Part Name	Use
	09230-13700-71	IC check pin	
	09230-21440-71	AC controller diagnosis kit	
	(09231-13130-71)	Sub-harness for CN105	• To check the traveling system fan ON/OFF signal • To check MOS drive power supply ON/OFF signal
	(09232-13130-71)	For CN1, 86, 90	
	(09233-13130-71)	Sub-harness for CN113 (15 ~ 32 model), CN111, 112 (35 ~ 55 model)	To check if the CPU board and DC/MD board drives the MOS normally
	(09234-13130-71)	Sub-harness for CN106, 110	To check in combination with SST3 If the check result in connection with SST3 is NG, this sub-harness is used to discriminate if the cause of NG lies in the CPU or DC/MD.
	(09237-13130-71)	Sub-harness for CN19	• To discriminate whether the steering angle sensor or the harness/ CPU board is defective by replacing STS1 and STS2 signals • To check steering angle sensor power supply
	(09238-13130-71)	Sub-harness for CN25	To check the acceleration potentiometer short harness, harness from the CPU board to the acceleration potentiometer and the CPU board
	(09239-13130-71)	Sub-harness for CN106, 107	• To check the traveling/material handling system fan ON/OFF signal • To check MOS drive power supply ON/OFF signal

CN101



TAB

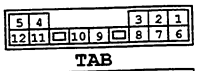
NO	P	C	J
1	45	-	DSF
2	46	-	DSR
3	65	-	LSB
4	66	-	LSPB
5	67	-	LSD
6	63	-	LSAT1
7	61	-	LST
8	60	-	LSL1
9			
10	68	-	DSL2
11	69	-	DSAT2
12	51	-	LS-
13			
14	343	-	ISPS-
15	342	-	ISPS+
16	196	-	BMPS
17	193	-	BMP
18			



REC

NO	P	C	J
1	45	G	CN9-5
2	46	SL	CN9-4
3	65	BR	CN6-2
4	66	V	CN15-2
5	67	G-Y	CN141-17
6	63	L	CN11-3
7	61	LG	CN141-15
8	60	G-Y	CN11-1
9			
10	68	O	CN39-1
11			
12	51	R	CN37-13
13			
14	343	SL	CN28-6
15	342	LG	CN28-5
16	196	GR	CN55-3
17	193	G	CN41-3
18			

CN102



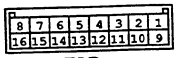
TAB

NO	P	C	J
1	64	-	SWAC
2	52	-	POTA
3	80	-	SSD+
4	82	-	SSD2
5	81	-	SSD1
6	88	-	TP+
7	89	-	TP-
8	50	-	POT-
9	86	-	TD+
10	87	-	TD-
11	53	-	POTA+
12			

REC

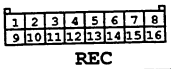
NO	P	C	J
1	64	GR	CN25-4
2	52	SL	CN25-1
3	80	B	CN57-1
4	82	BR	CN57-3
5	81	G	CN57-2
6	88	L	CN41-2
7	89	V	CN41-1
8	50	R	CN25-3
9	86	O	CN57-4
10	87	P	CN57-6
11	53	Y	CN25-2
12			

CN103



TAB

NO	P	C	J
1	307	-	SMTSA
2	308	-	SMTSK
3	309	-	SSTMA
4	310	-	SSTMK
5	144	-	SMTDK
6	143	-	SDTMK
7	142	-	SDTMA
8	141	-	SMTDA
9	326	-	SS0-
10	324	-	SS0+
11			
12	345	-	ERR+
13	346	-	ERR-
14			
15			
16			



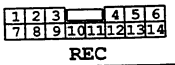
REC

NO	P	C	J
1	307	SL	CN141-6
2	308	V	CN141-8
3	309	P	CN141-5
4	310	LG	CN141-7
5	144	SL	CN1-7
6	143	O	CN1-4
7	142	P	CN1-8
8	141	LG	CN1-3
9	326	GR	CN141-14
10	324	BR	CN141-13
11			
12	345	Y	CN28-7
13	346	V	CN28-8
14			
15			
16			

CN111

TAB

NO	P	C	J
1	41	-	B48V
2	10	-	MPS+
3	338	-	(H15V+)
4	11	-	S20V+
5	16	-	D15V
6	43	-	VBKY
7			
8	9	-	MPS-
9	315	-	V20V-(H15V-)
10	338	-	B20V+
11	44	-	VBMB
12	12	-	S20V-
13	14	-	GNDO
14			



REC

NO	P	C	J
1	41	Y	J3
2	10	G	CN55-1
3	338	GR	CN19-1
4	11	G-Y	CN142-5
5	16	GR	CN1-2
6	43	L	J2
7			
8	9	O	CN55-2
9	315	BR	CN19-3
10			
11			
12	12	V	CN142-11
13	14	BR	CN1-1
14			

CN136

TAB

NO	P	C	J
1	101	R	CN29-1
2	41	Y	CN29-3
3	N2	O	CN142-7
4	303	LG	CN142-1

REC

NO	P	C	J
1	101	R	F4
2	41	Y	F5
3	N2	O	CN137-2
4	303	LG	F7

CN137

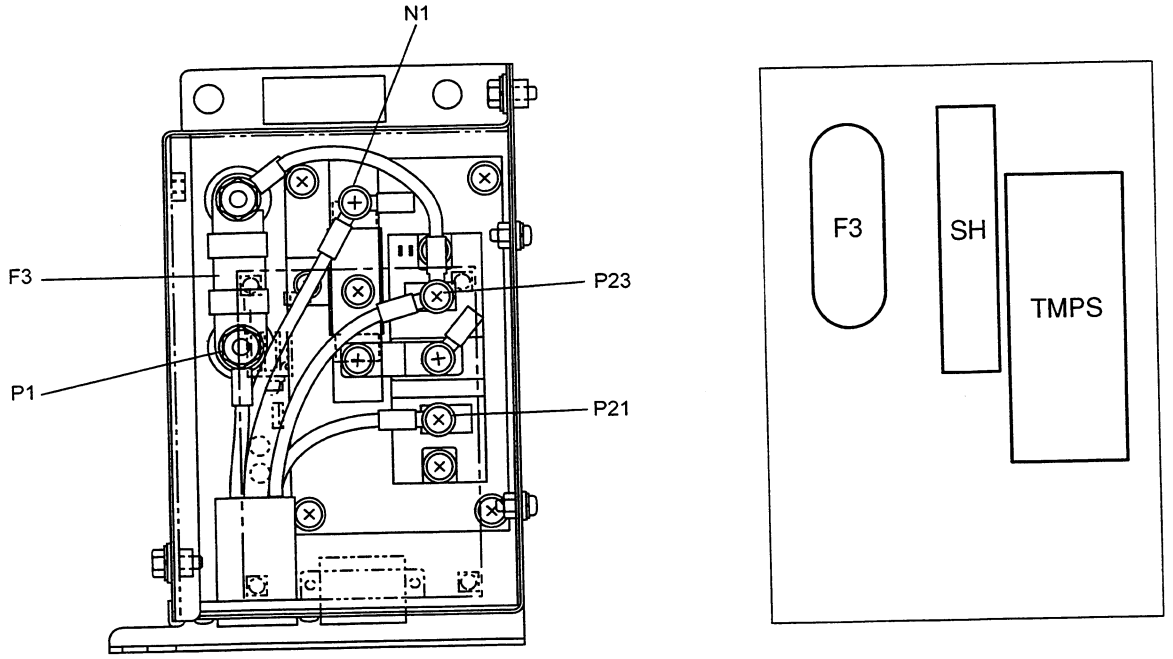
TAB

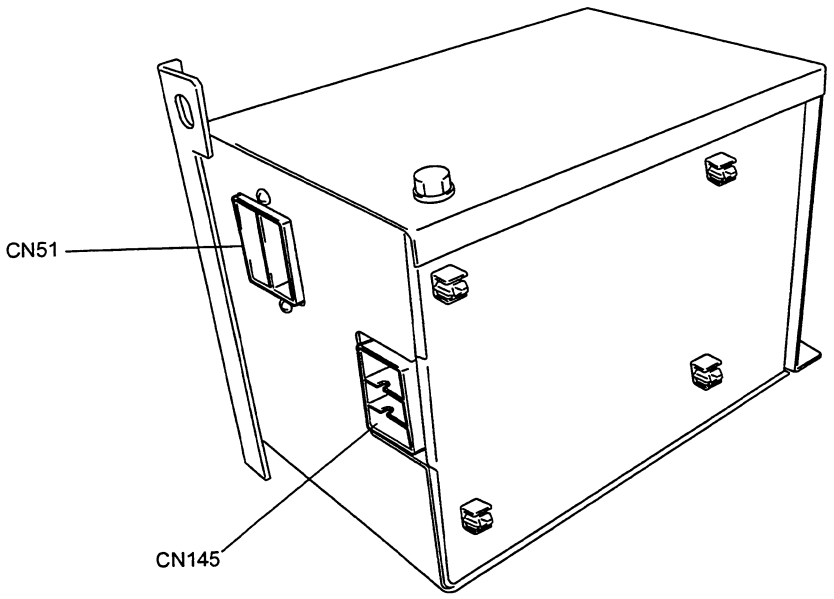
NO	P	C	J
1	2		MB-
2	N2		N2
3	1		MB+
4	6		MP-
5	5		MP+
6	44		F6

REC

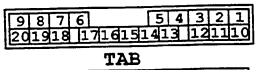
NO	P	C	J
1	2		MB-
2	N2		N2
3	1		MB+
4	6		MP-
5	5		MP+
6	44		F6

EHPS CONTROLLER CONNECTOR·COMPONENT



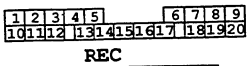


CN161



TAB

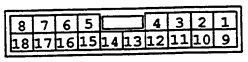
NO	P	C	J
1	45	-	DSF
2	46	-	DSR
3	65	-	LSB
4	66	-	LSPB
5	67	-	LSD
6			
7	60	-	LSL
8	307	-	SMTSA
9	308	-	SMTSK
10			
11	68	-	LSL2
12			
13			
14			
15	324	-	SSO+
16	51	-	LS-
17	86	-	TD+
18	87	-	TD-
19	309	-	SSTMA
20	310	-	SSTMK



REC

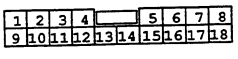
NO	P	C	J
1	45	G	CN9-5
2	46	SL	CN9-4
3	65	BR	CN6-2
4	66	V	CN15-2
5	67	G-Y	CN141-17
6			
7	60	G-Y	CN148-12
8	307	SL	CN141-6
9	308	V	CN141-8
10			
11	68	O	CN39-1
12			
13			
14			
15	324	BR	CN141-13
16	51	R	CN37-13
17	86	O	CN57-4
18	87	P	CN57-6
19	309	P	CN141-5
20	310	LG	CN141-7

CN162



TAB

NO	P	C	J
1	64	-	SWAC
2	52	-	POTA
3			
4			
5	51	-	POT-
6			
7	81	-	SSD1
8	82	-	SSD2
9	88	-	TD2+
10	89	-	TD2-
11	53	-	POTA+
12			
13			
14	325	-	SSD-
15	41	-	VBBT
16			
17			
18	80	-	SSD+



REC

NO	P	C	J
1	64	GR	CN25-4
2	52	SL	CN25-1
3	144	SL	CN1-7
4	141	LG	CN1-3
5	51	R	CN25-3
6	14	BR	CN1-1
7	81	G	CN57-2
8	82	BR	CN57-3
9	88	L	CN58-2
10	89	G	CN58-1
11	53	Y	CN25-2
12	142	P	CN1-8
13	143	O	CN1-4
14	325	GR	CN141-14
15	41	Y	J3
16	16	GR	CN1-2
17	43	L	J2
18	80	B	CN57-1