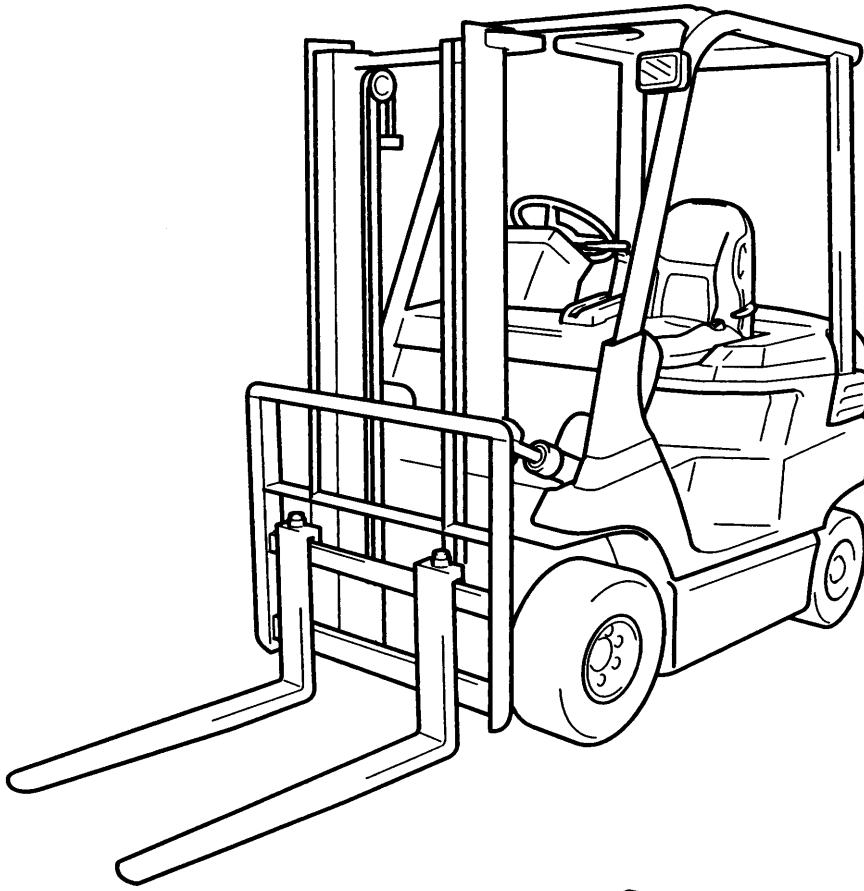


SECTION INDEX

7FB(H) 10-35

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EXTERIOR VIEWS



SI UNITS

Meaning of SI

SI represents the International System of Units, which has been established for unifying various systems of units used in the past, for smoother international technical communication.

New Units Adopted in SI

Characteristic	New unit	Conventional unit	Conversion rate* ¹ (1 [conventional unit] = X [SI unit])
Force* ²	N (newton)	kgf	1 kgf = 9.80665 N
Torque* ² (moment)	N·m	kgf·cm	100 X kgf·cm = 9.80665 N·m
Pressure* ²	P (pascal)	kgf/cm ²	1 kgf/cm ² = 98.0665 kPa = 0.0980665 MPa
↑	↑	mmHg	1 mmHg = 0.133322 kPa
Revolving speed	r/min	rpm	1 rpm = 1 r/min
Spring constant* ²	N/mm	kgf/mm	1 kgf/mm = 9.80665 N/mm
Volume	L	cc	1 cc = 1 mL
Power	W	PS	1 PS = 0.735499 kW
Heat quantity	W·h	cal	1 kcal = 1.16279 W·h
Specific fuel consumption	g/W·h	g/PS·h	1 g/PS·h = 1.3596 g/kW·h

<Reference>

- *1: X represents the value in SI unit as converted from 1 [in conventional unit], which can be used as the rate for conversion between conventional and SI units.
- *2: In the past, kilogram [kg] representing the mass was often used in place of weight kilogram [kgf] that should be used as the unit of force.

Conversion between Conventional and SI Units

Value in SI unit = Conversion rate × value in conventional unit	Conversion rate: Figure corresponding to X in the conversion rate column in the table above
Value in conventional unit = Value in SI unit ÷ Conversion rate	

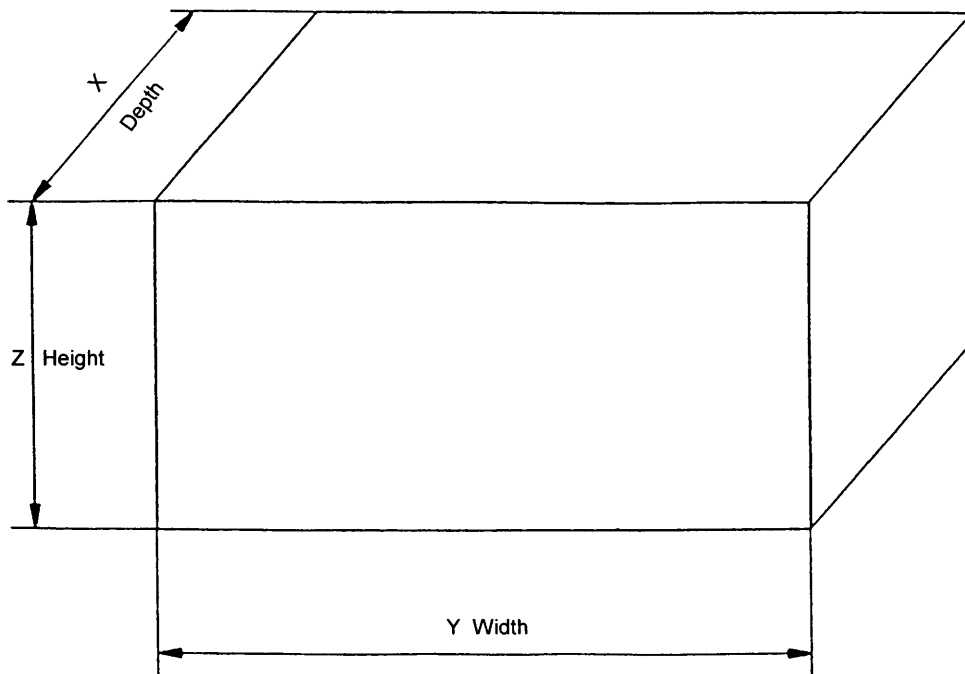
Caution:

At the time of conversion, change the unit of the value in conventional or SI unit to the one in the conversion rate column in the table above before calculation. When converting 100 W to the value in conventional unit PS, change it to 0.1 kW first and divide by 0.735499 as the conversion rate.

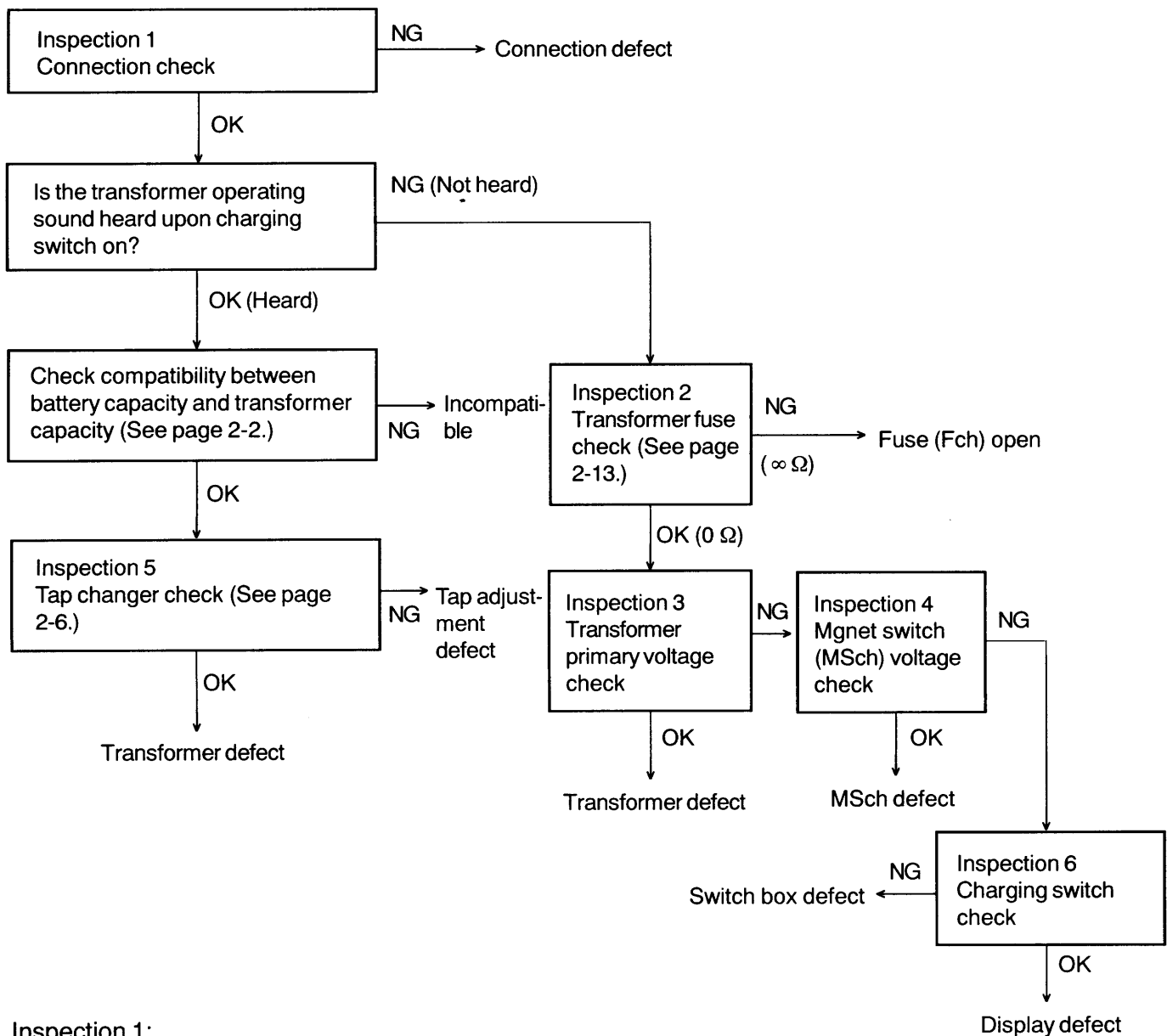
BATTERY COMPARTMENT AND REQUIRED WEIGHT

When the battery is to be purchased locally, always adjust the weight to satisfy the minimum required weight as shown in the table below.

	Compartment dimensions mm (in)			Minimum required battery weight (with case) Kg (lb)	Remarks	
	Depth X	Width Y	Height Z			
7FB10, 14	747 (29.4)	821 (32.3)	460	550 (1213)		
7FB15, 18			(18.1)	655 (1444)		
7FBH10 ~ 18			540	805 (1775)		
40-7FB15	822 (32.4)	911 (35.7)	(21.3)	855 (1885)		
7FB20			460	760 (1676)		
7FB25			(18.1)	825 (1819)		
7FBH20, 25			540	1045 (2304)		
40-7FB20, 25			(21.3)			
7FB30, J35		954 (37.6)	570 (22.4)	1225 (2700)	920 (2029)	



Error Code F7: Charging Starting Failure



Inspection 1:

Connection check

- (1) The P1 and N1 terminals of the transformer and controller shall be connected correctly without any loosening.
- (2) The CN60, CN66 (applicable to 48 V, 330 to 565 AH battery) and CN61 connection shall be connected correctly and securely.
- (3) The AC and DC plugs shall be free from contact defect.
(No roughened terminal or heating during power conduction)
- (4) The power cable shall not be damaged.

OK → Transformer operating sound check

NG → Connection defect

Inspection 2:

Transformer fuse (Fch) check (See page 2-13.)

OK (0 Ω) → To Inspection 3

NG (∞ Ω) → Fuse (Fch) open

PS system**SCPU board****CN140 connector: For software writing and not connected****CN141 connector basic conditions
(battery plug ON, key switch ON)**

Connector No. ↔ Connector No.	Conditions	Standard	Remarks
CN141-1 (SSTXA)	Immeasurable	—	
CN141-2 (SXTSA)	Immeasurable	—	
CN141-3 (309, SSTMA)	Immeasurable	—	
CN141-4 (307, SMTSA)	Immeasurable	—	
CN141-5 (324, SS+)	CN141-15 (325, SS-)	Traveling stopped Battery plug OFF and traveling stopped	0 V 0 V, 620 Ω
CN141-5 (324, SS+)	CN141-15 (325, SS-)	Battery plug OFF and traveling stopped	620 Ω
CN141-6 (312, STS1)		Immeasurable	—
CN141-7 (313, STS2)		Immeasurable	—
CN141-8 (314, STSC)		Immeasurable	—
CN141-9 (SSTXK)		Immeasurable	—
CN141-10 (SXTSK)		Immeasurable	—
CN141-11 (310, SSTMK)		Immeasurable	—
CN141-12 (308, SMTSK)		Immeasurable	—
CN141-13 (138, SL/L-)	CN141-16 (315, STS-)		Approx. 5 V
CN141-14 (137, SL/L+)	CN141-16 (315, STS-)		Approx. 5 V
CN141-15 (325, SS-)	CN146-6 (312, STS1)	Traveling stopped	Approx. 2.5 V
CN141-16 (315, STS-)	CN146-6 (312, STS1)		0 V
CN141-17 (311, STS+)	CN141-16 (315, STS-)		Approx. 15 V
CN141-18		Unused	—

Lift Interrupt Function and Cancellation Procedure

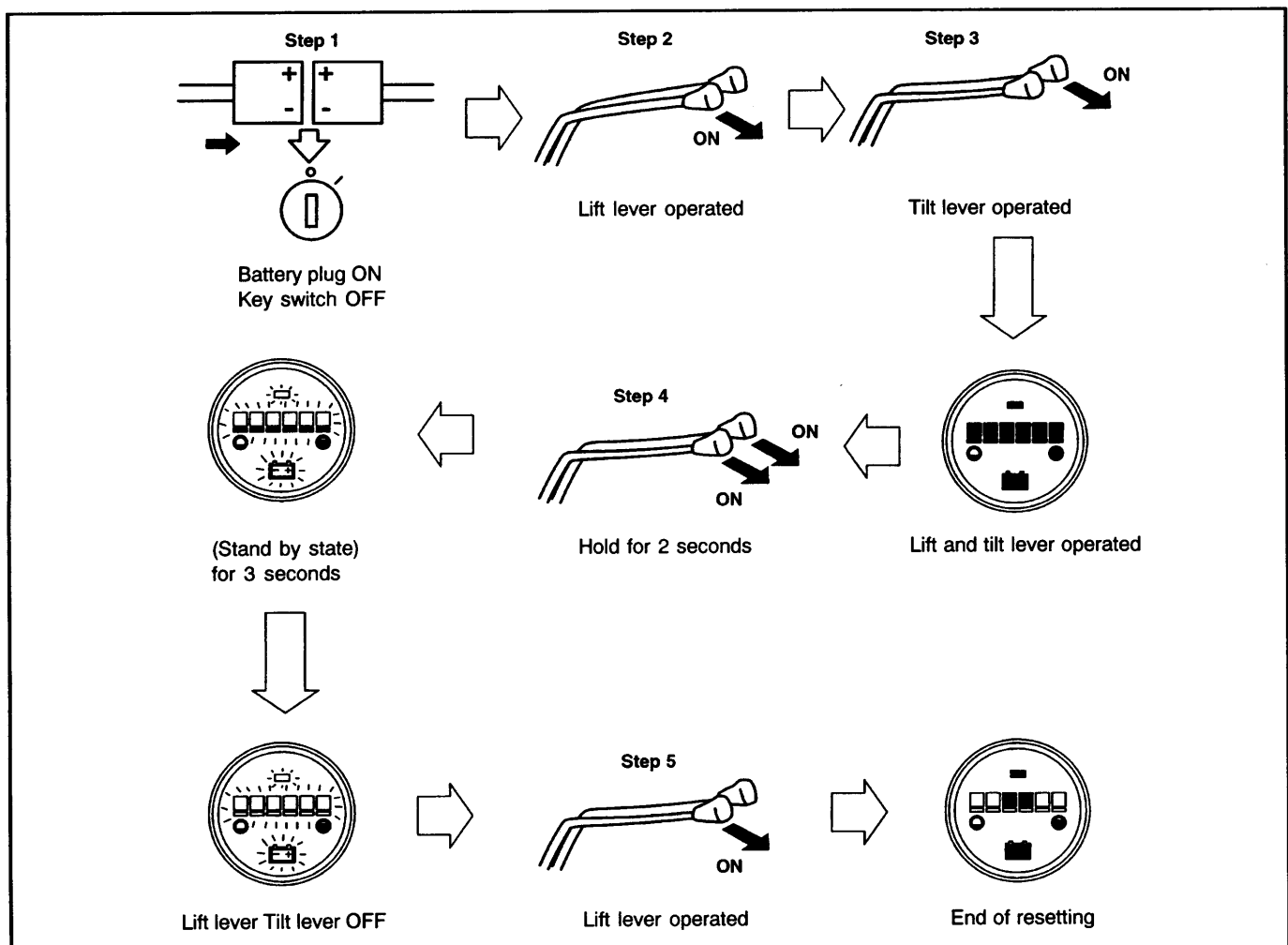
The lift interrupt function is enabled at the time of shipment from the factory to disable Material handling during traveling. Cancel the lift interrupt function as follows for vehicle demonstration or according to the request from a user:

1. Place the vehicle stationary, set the mast in the vertical position, set the fork at the bottom position, chock wheels and apply the parking brake.
2. Turn the key switch OFF.
3. Operate the lift lever momentarily to the UP side.
4. Operate the tilt lever momentarily to the backward tilt side.
5. Operate the lift and tilt levers to the UP and backward tilt sides, respectively, for 2 seconds or more and hold them there.
6. Leave the vehicle without any operation for 3 seconds or more.
7. Operate both the lift and tilt levers momentarily to the OFF positions.
8. Operate the lift lever momentarily to the UP side.

Note:

Accurately perform each operation.

9. Cancellation of the lift interrupt function is completed.

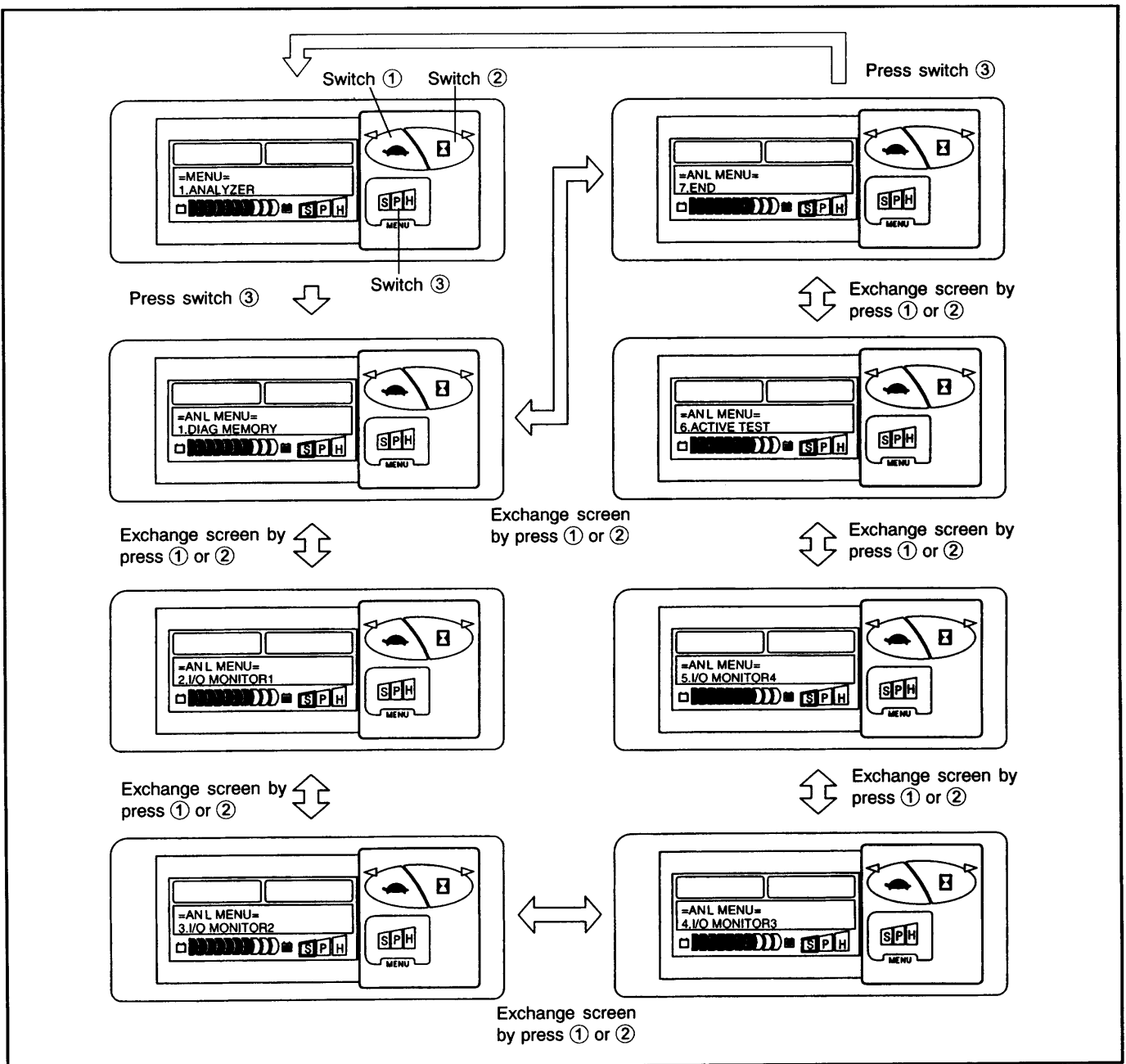


Operation Procedure

1. Input the password on the normal function menu (as instructed before) to display the MASK MENU screen.
2. Check that 1. ANALYZER is selected (highlighted) on the screen and press switch ③ (enter) to call the ANALYZER MENU screen.
3. Select the menu for the desired test using switches ① and ② and then press switch ③ (enter) to display the set screen.
 - Switch ①: The cursor moves to the preceding item.
 - Switch ②: The cursor moves to the next item.
 - Switch ③: Enters (Changes to the test screen for the selected item.)

Note:

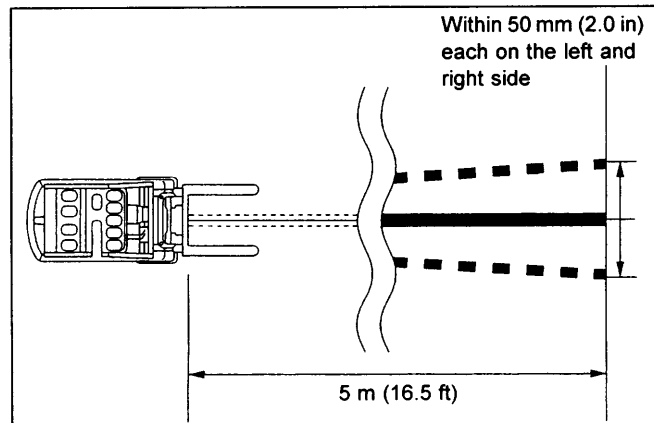
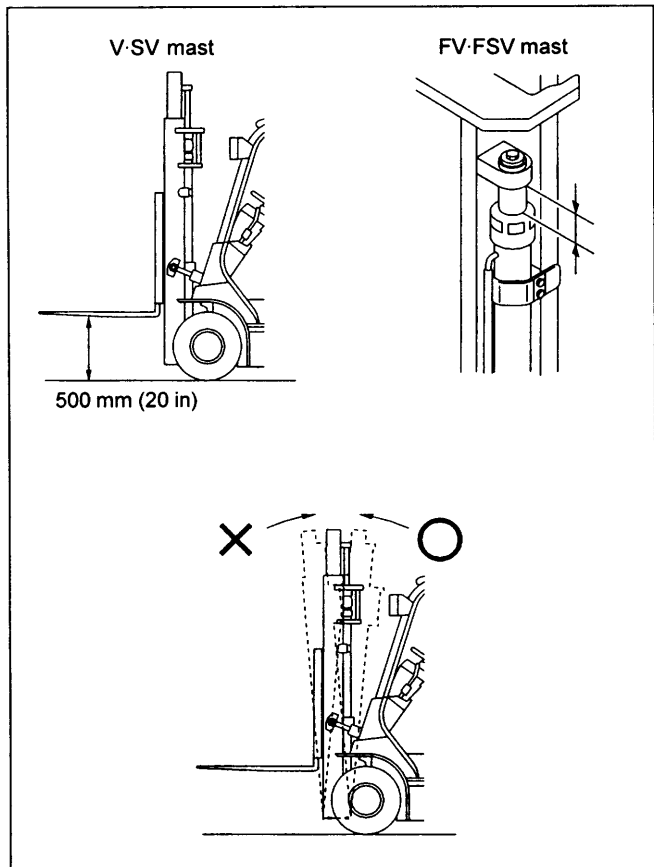
If you select 7. END on the MASK MENU screen and press switch ③, the ANALYZER MENU screen appears again.



Before Starting Matching

Set the vehicle to the standard vehicle condition before starting matching. The standard vehicle condition means when the vehicle satisfies the conditions described below.

1. **Tire inflating pressure check**
Adjust the tire inflating pressure to the specified level.
If it is insufficient or if there is a difference between the front and rear wheels or between LH and RH wheels, Matching will become inaccurate.
2. **Floor levelness check**
If matching is conducted on an inclined or rough floor surface, errors in matching will result. So, perform matching on a flat, horizontal floor (inclination: Within 0.5°).
Generally the inclination of floors in ordinary plants, warehouses and buildings is within 0.5° , which does not influence matching adversely. Be careful since some parts of floors may be inclined over 0.5° for some reason or other.
3. **No-load vertical condition check**
The voltage of the load sensor signal in no-load state is stored in the controller. Therefore, the following conditions must be satisfied:
 - For the V/SV mast, set the fork height to about 500 mm (20 in.) and use a goniometer to see that the mast is vertical.
 - For the FV/FSV mast, set the rear cylinder rod projection to about 100 mm (4 in.) and use a goniometer to see that the mast is vertical.
 - For the vehicle with an attachment, install the attachment.
 - Set the mast vertical by operating tilting it in the forward tilting direction from the backward tilted position.
 - On a vehicle with attachment (U61C671-1-2 or an attachment whose weight exceeds that shown in the table below), set the mast vertical with the attachment at a height of 500 mm (19.7 in) and perform relief at the topmost position. (See the table below showing the Allowable Weight for Installation on Mast.
4. **Tire straight traveling condition check**
The signal voltage of tire angle sensor is stored in the controller when the tires are traveling straight. So, fix the steering wheel and see that the leftward or rightward deviation during traveling 5 meters (16.5 ft.) is within 50 mm (2.0 in.).



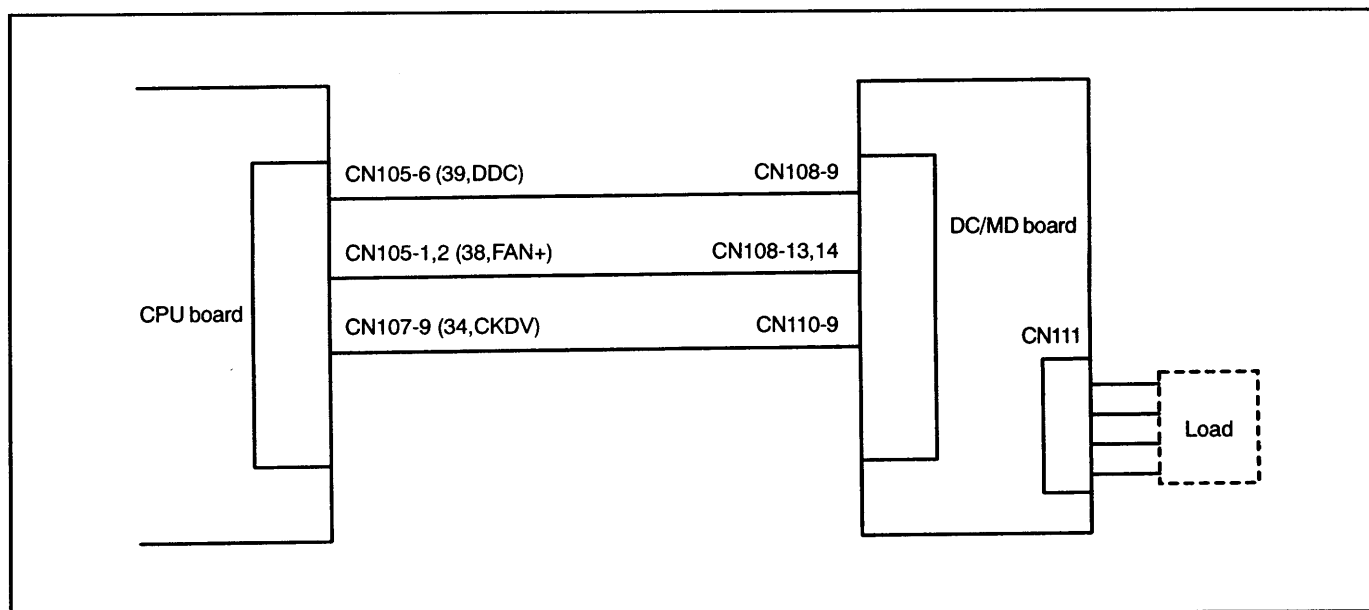
Allowable Weight for Installation on Mast

(kg)

Mast lifting height	Vehicle model										
	7FB10	7FB14	7FB15	7FB18	40-7FB15	7FB20	7FB25	40-7FB20	40-7FB25	7FB30	7FBJ35
Up to 3000	500	650	650	650	600	950	950	950	950	1100	1350
Over 3000 up to 4000	350	550	550	550	450	800	800	750	750	950	1150
Over 4000 up to 5000	350	500	500	500	400	750	750	700	700	900	1100
Over 5000 up to 6000	300	450	450	450	350	700	700	700	700	850	1050

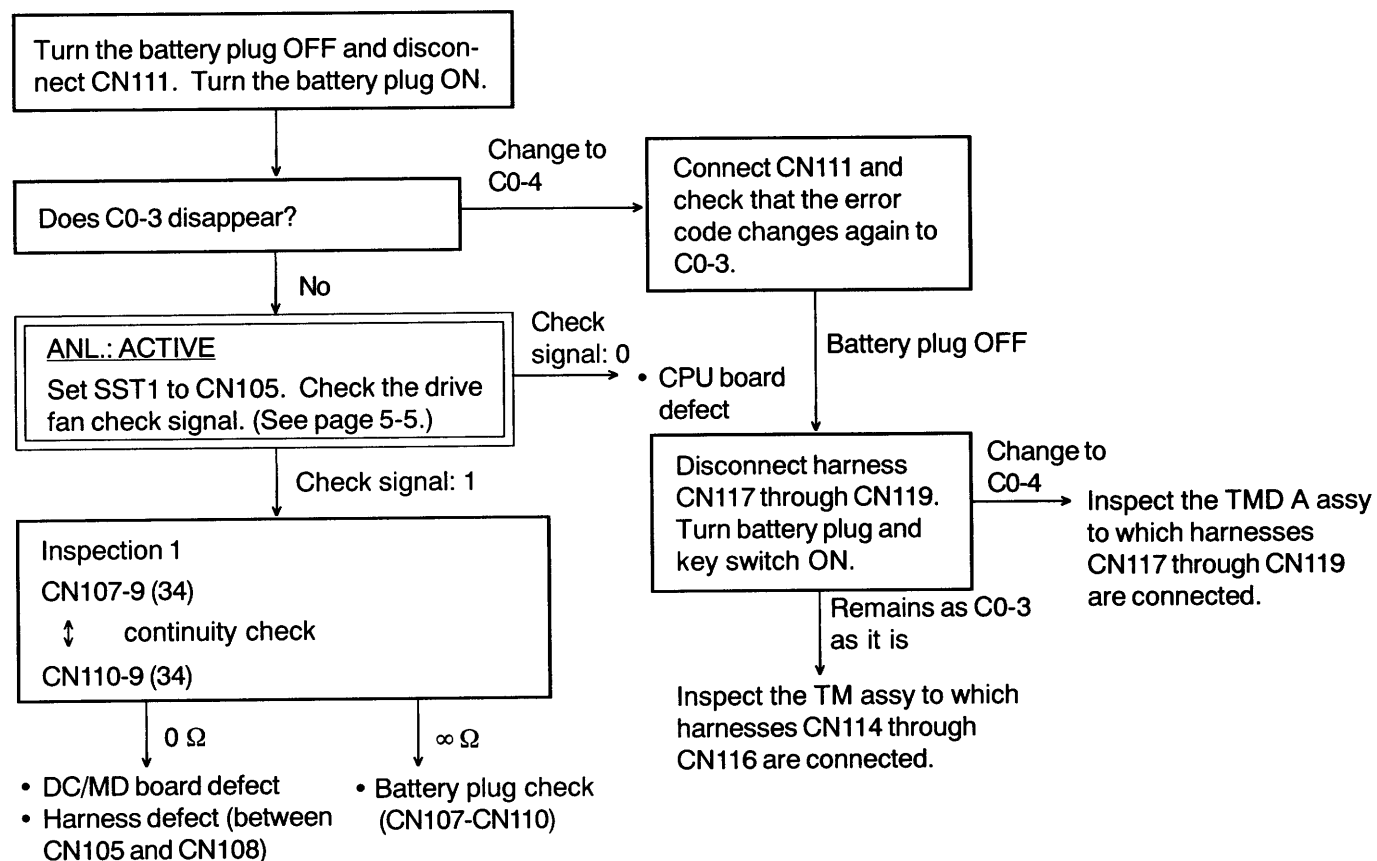
Error Code C0-3: Travel Drive Power Supply Abnormality

Related portion



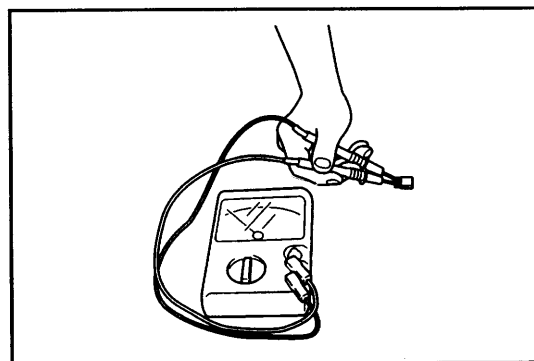
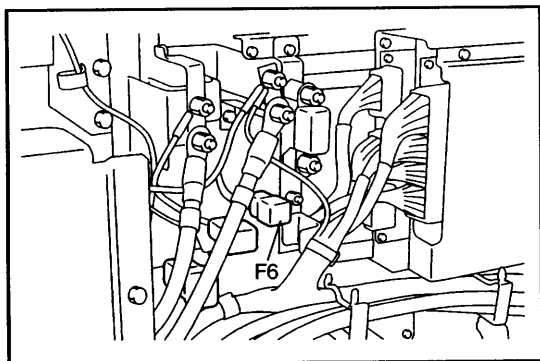
Estimated causes

- ① Short-circuiting of load
- ② DC/MD board defect
- ③ Open circuit of harness



Inspection 3:
F6 Fuse Check
 Battery plug OFF, removed F6 fuse

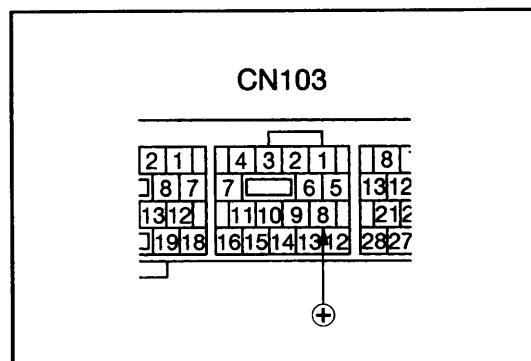
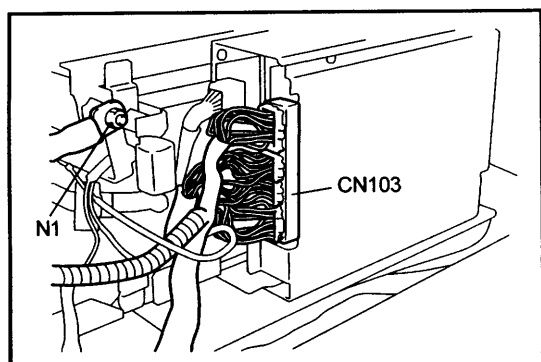
Measurement terminals	Both terminals of fuse F6
Tester range	$\Omega \times 1$
Standard	0 Ω



OK (0 Ω) → Go to Inspection 4.
 NG ($\infty \Omega$) → F6 fuse replacement

Inspection 4:
Voltage Check After F6 Fuse Check
 Battery plug ON

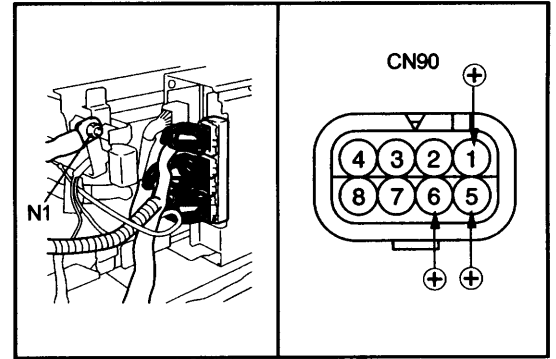
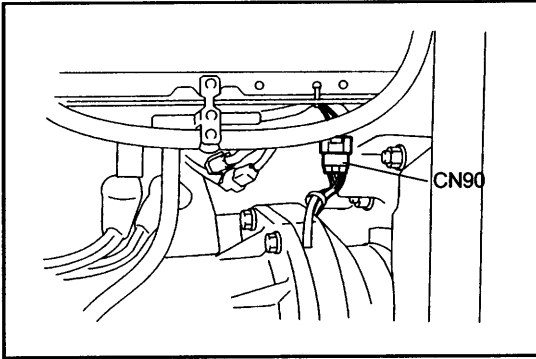
Measurement terminals	C103-8 (44) ⊕ – N1 ⊖
Tester range	DC 200 V
Standard	20 V or more



OK (20 V or more) → CPU board defect
 NG (less than 20 V) → Main harness defect

Inspection 1:
 Lifting height switch ON voltage check
 Battery plug ON, key switch ON

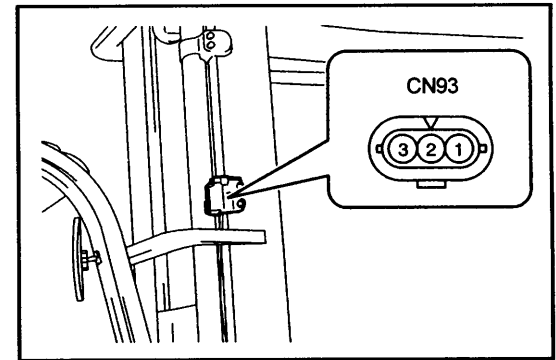
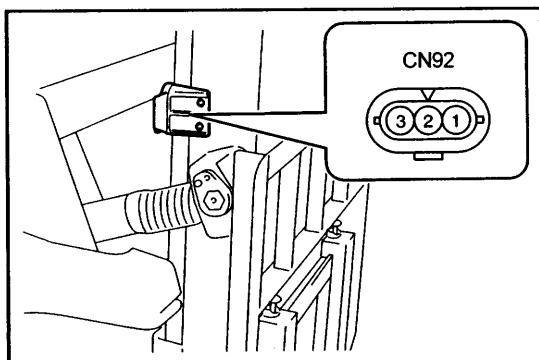
Measurement terminals	CN90-1 (11), 5 (92), 6 (90) (ON position) ⊕ – N1 ⊖
Tester range	DC 10 V
Standard	Approx. 5 V



NG (approx. 0 V) → Harness defect
 OK (approx. 5 V) → CPU board defect

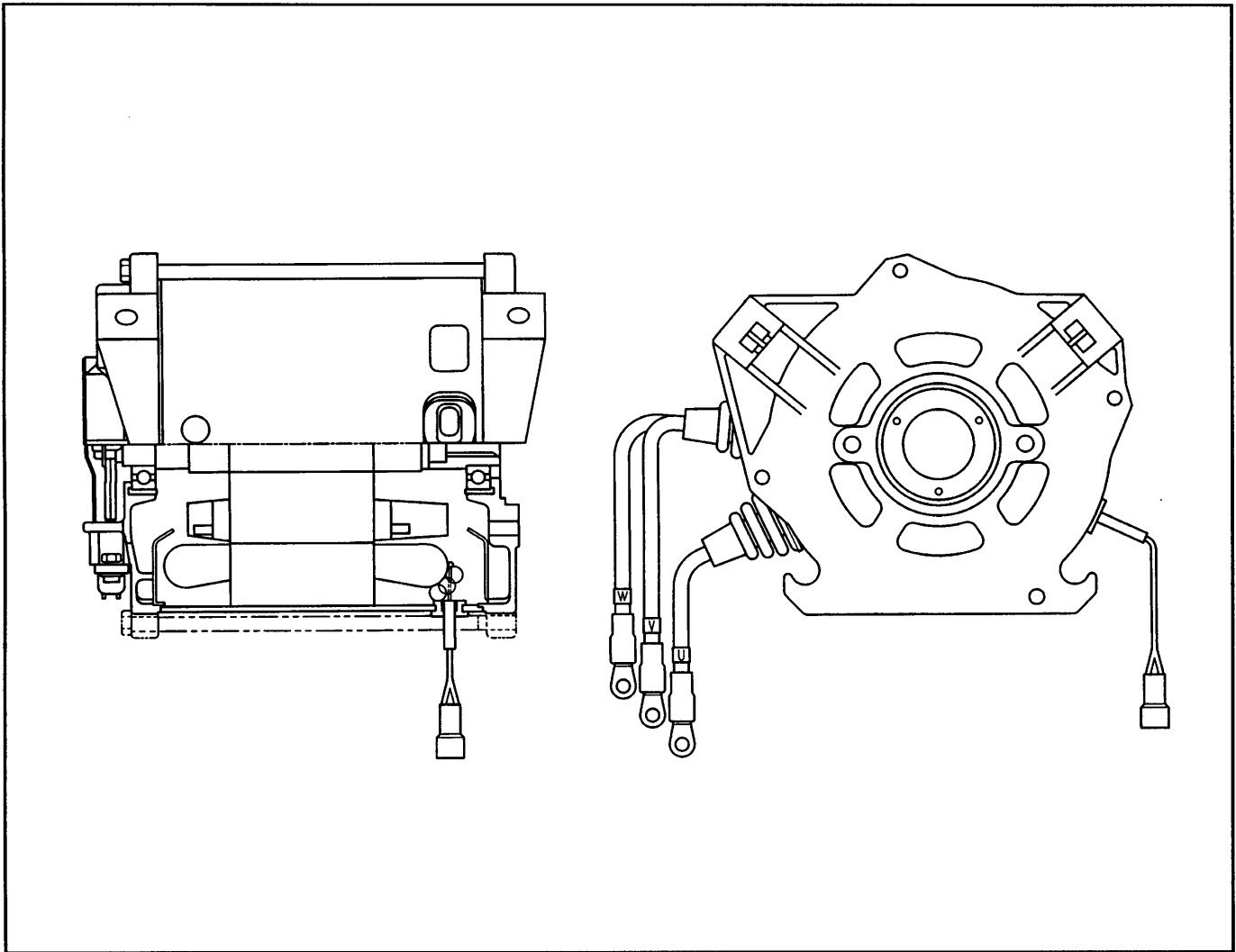
Inspection 2:
 Lifting height switch individual inspection
 Battery plug OFF, connectors CN92 and CN93 disconnection

Measurement terminals	Low lifting height	High lifting height
CN92-1 (51) – CN92-2 (90)	Continuous	Not continuous
CN92-1 (51) – CN92-3 (91)	Not continuous	Continuous
CN93-1 (105) – CN93-2 (91)	Continuous	Not continuous
CN93-1 (105) – CN93-3 (92)	Not continuous	Continuous



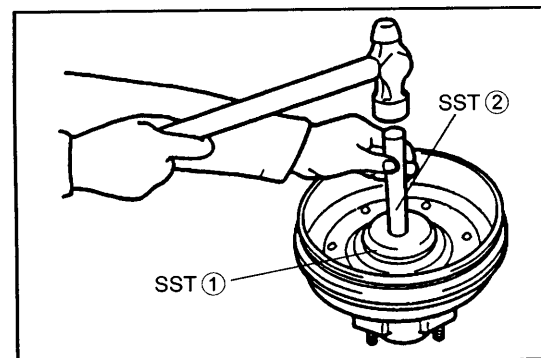
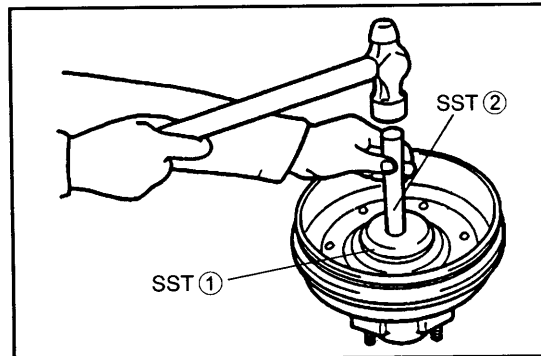
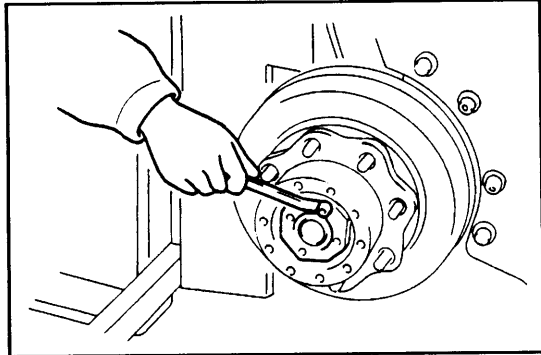
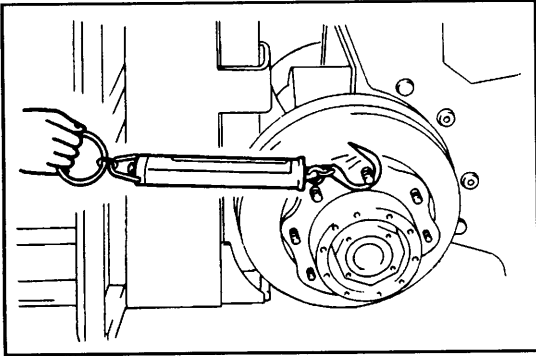
PUMP MOTOR

GENERAL



SPECIFICATIONS

Item		1 ton series (excluding 40-7FB15)	2 ton series (excluding 40-7FB20-25) 40-7FB15	3 and J3.5 ton 40-7FB20-25 (48v)
Type		3-phase AC, open type	←	←
Normal voltage	V	48	←	80
Rated output (5-minutes rating)	kW	9.5	12.2	14.4
Dimensions (outside diameter x length)	mm (in)	φ 230 x 292 (9.06 x 11.50)	φ 230 x 317 (9.06 x 12.48)	φ 230 x 332 (9.06 x 13.07)
Weight (including drive unit case)	kg (lb)	58 (127.9)	68 (150.0)	74 (163.2)
Insulation class		Class F	←	←

**[Point 5]****Installation:**

Adjust the front axle hub starting force.

1. Fully tighten the bearing lock nut. Then loosen it by about 1/12 to 1/6 turn, and tap lightly with a soft hammer.
2. Set a spring scale on a hub bolt, and measure the front axle hub starting force.

Standard:

Applicable vehicle	Wheel type	Starting force at the hub bolt position
1 ton series, and 2 ton series (excluding 40- 7FB20·25)	Divided rim	19.6 ~ 35.3 N (2.0 ~ 3.6 kgf) [4.4 ~ 7.9 lbf]
	Side ring	24.5 ~ 44.1 N (2.5 ~ 4.5 kgf) [5.5 ~ 9.9 lbf]
40-7FB20·25, 3·J3.5 ton	All wheels	24.5 ~ 78.4 N (2.5 ~ 8.0 kgf) [5.5 ~ 17.6 lbf]

3. If the standard is not satisfied, adjust the degree of bearing lock nut tightening for adjustment.
4. Install the nut lock bolt.
Coat thread tightener 08833-76001-71 (08833-00070) on the nut lock bolt before tightening.

[Point 6]**Removal:**

Use a screwdriver or the like to remove the oil seal.

Installation:

- SST 09950-76019-71 --- ①
(SST 09950-60020)
SST 09950-76020-71 --- ②
(SST 09950-70010)

[Point 7]**Removal:**

Use a brass bar to remove the bearing outer race.

Installation:

- SST 09950-76019-71 --- ①
(SST 09950-60020)
SST 09950-76020-71 --- ②
(SST 09950-70010)

HYDROSTATIC STEERING VALVE ASSY

TROUBLESHOOTING

Only hydraulic troubles are covered here. (See Section 5 for electric troubles.)

Phenomenon	Estimated cause	Corrective action
The steering wheel cannot be rotated.	<ul style="list-style-type: none"> The steering valve drive shaft is installed incorrectly or damaged. The piping is damaged. 	<p>Inspect and correct or replace.</p> <p>Replace.</p>
The steering wheel is heavy.	<ul style="list-style-type: none"> The tire inflating pressure is low. The oil pressure does not rise. The high and low pressure pipes are connected reversely. The power steering cylinder rod is bent or the piston is sticking. 	<p>Adjust the inflating pressure.</p> <p>Inspect and adjust the relief pressure.</p> <p>Inspect and correct.</p> <p>Inspect and correct or replace.</p>
The oil pressure does not rise.	<ul style="list-style-type: none"> The high and low pressure pipes are connected reversely. The relief valve is faulty or not closed. The PS pump function is degraded or the oil volume is insufficient. The power steering cylinder piston packing is damaged. 	<p>Inspect and correct.</p> <p>Inspect and correct.</p> <p>Inspect and correct or replace.</p> <p>Replace.</p>
The steering wheel does not return properly.	<ul style="list-style-type: none"> The tire inflating pressure is low. The steering valve spool does not move smoothly. The steering knuckle sliding motion is improper. 	<p>Adjust the inflating pressure.</p> <p>Correct or replace the steering valve ASSY.</p> <p>Add the lubricant or correct.</p>
The steering wheel does not return to the neutral position when released.	<ul style="list-style-type: none"> The steering valve spool does not move smoothly. The steering valve drive shaft is damaged. The centering spring is damaged. The piping is blocked (crushed or clogged). 	<p>Correct or replace the steering valve ASSY.</p> <p>Replace the steering valve ASSY.</p> <p>Replace.</p> <p>Inspect and correct or replace.</p>
The play is excessive and the vehicle wobbles.	<ul style="list-style-type: none"> Oil moves in the steering valve. The steering valve spool is not moving correctly. Air is sucked from the piping. The steering shaft is defective. 	<p>Replace the steering valve ASSY.</p> <p>Correct or replace the steering valve ASSY.</p> <p>Inspect and correct or replace.</p> <p>Inspect and correct or replace.</p>
The steering wheel shim mies.	<ul style="list-style-type: none"> The steering valve drive shaft is installed incorrectly. 	<p>Inspect and correct.</p>
The tires are steered opposite to the steering wheel operated direction.	<ul style="list-style-type: none"> The cylinder piping is connected reversely. 	<p>Inspect and correct.</p>
Abnormal noise is generated.	<ul style="list-style-type: none"> The relief valve is defective. Air is sucked from the piping. The piping is blocked (crushed or clogged). 	<p>Correct, inspect the pressure, and adjust.</p> <p>Inspect and correct or replace.</p> <p>Inspect and correct or replace.</p>