# FOREWORD

This manual covers the service procedures of the TOYOTA FORKLIFT 7FGU/7FDU35 ~ 80 series and 7FGCU35 ~ 70 series. Please use this manual for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of December 2000. 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.

For the service procedures of the mounted engine, read the repair manuals listed below as reference together with this manual.

(Reference)

Repair manuals related to this manual are as follows:

TOYOTA G4 (GM6-262) ENGINE
REPAIR MANUAL (No. C4630)

TOYOTA 11Z, 12Z, 13Z, 14Z ENGINE
REPAIR MANUAL (No. C4615)

**TOYOTA MOTOR CORPORATION**

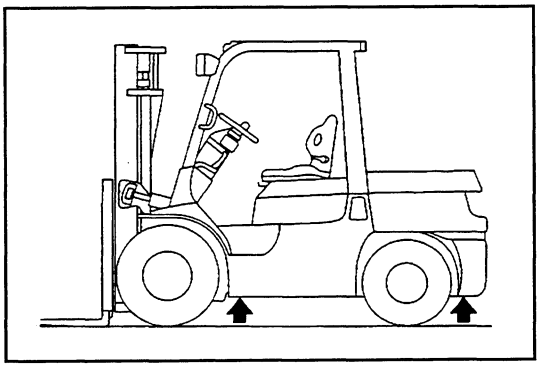
## OPERATIONAL TIPS

1. Safe operation
   (1) After jacking up, always support with wooden blocks or rigid stands.
   (2) When hoisting the vehicle or its heavy component, use wire rope(s) with a sufficient reserve in load capacity.
   (3) Always disconnect the battery terminal before the inspection or servicing of electrical parts.

2. Tactful operation
   (1) Prepare the mechanic tools, necessary measuring instruments (circuit tester, megger, oil pressure gauge, etc.) and SSTs before starting operation.
   (2) Before disconnecting wiring, always check the cable color and wiring state.
   (3) When overhauling functional parts, complicated portions or related mechanisms, arrange the parts neatly to prevent confusion.
   (4) When disassembling and inspecting such a precision part as the control valve, use clean tools and operate in a clean location.
   (5) Follow the described procedures for disassembly, inspection and reassembly.
   (6) Replace, gaskets, packings and O-rings with new ones each time they are disassembled.
   (7) Use genuine Toyota parts for replacement.
   (8) Use specified bolts and nuts. Observe the specified tightening torque at the time of reassembly. Tighten to the center of the specified tightening torque range.
   If no tightening torque is specified, tighten the bolt or nut according to the standard tightening torque table.

3. Grasping the trouble state
   When a trouble occurs, do not attempt immediate disassembly or replacement but first check if the trouble requires disassembly or replacement for remedying.

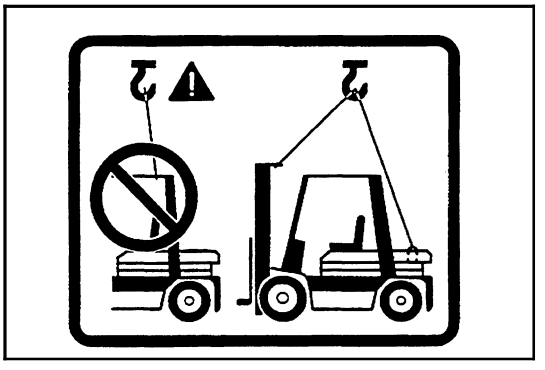
4. Disposal of waste fluid, etc.
   When draining waste fluid from the vehicle, receive it in a container.
   If any oil, fuel, coolant, oil filter, battery or other harmful substance is directly discharged or scrapped without permission, it will either adversely affect human health or destroy the environment. Always sort waste fluids, etc. and treat them properly by requesting disposal by specialized companies.



5. Jack up points

   Front side:
   Jack up at the bottom surface of the frame.

   Rear side:
   Jack up at the under the counterweight.

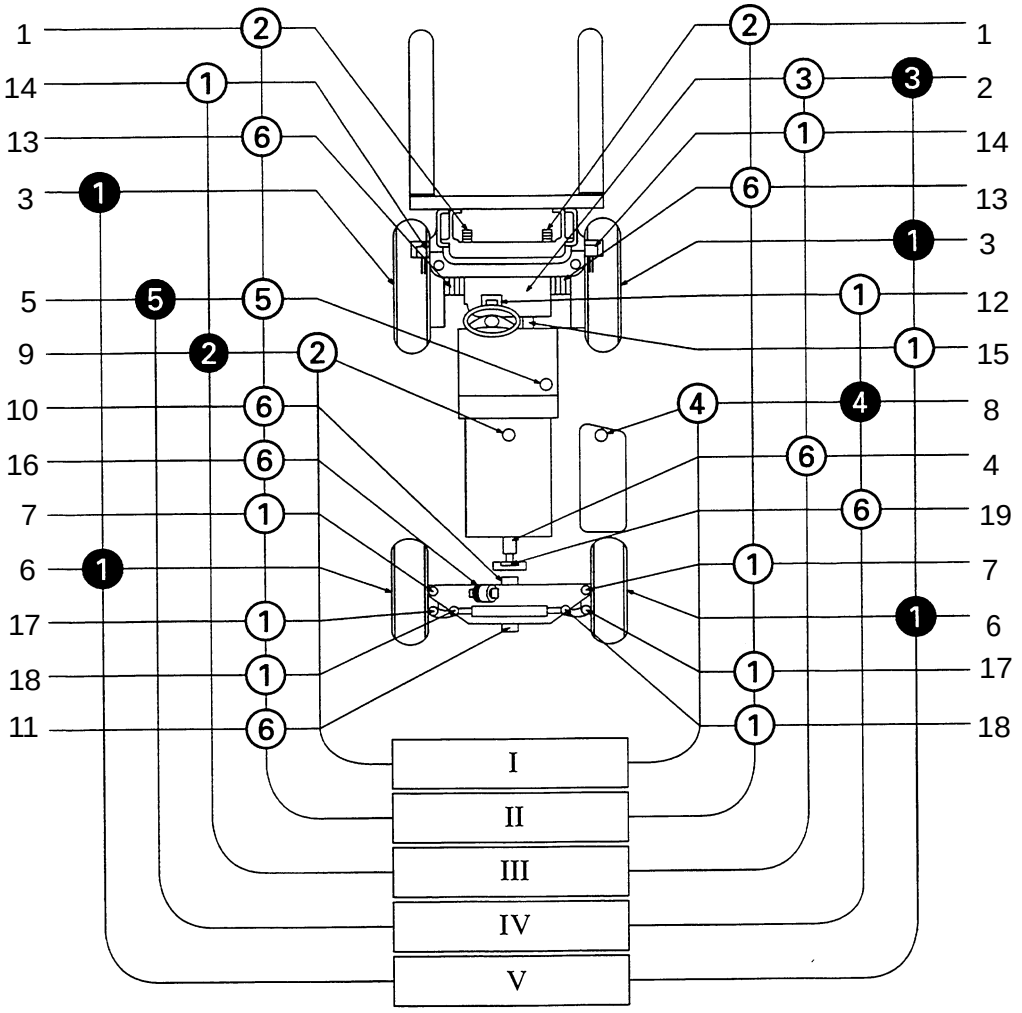


## HOISTING THE VEHICLE

When hoisting the vehicle, sling with wire rope(s) at the mast hook holes and the counterweight hook holes.

# LUBRICATION CHART

## Pneumatic Tire Model (Pn35~50)

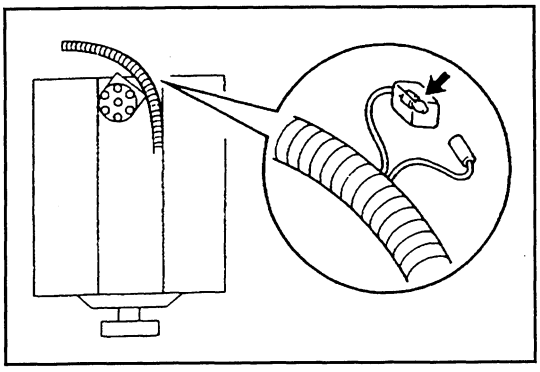


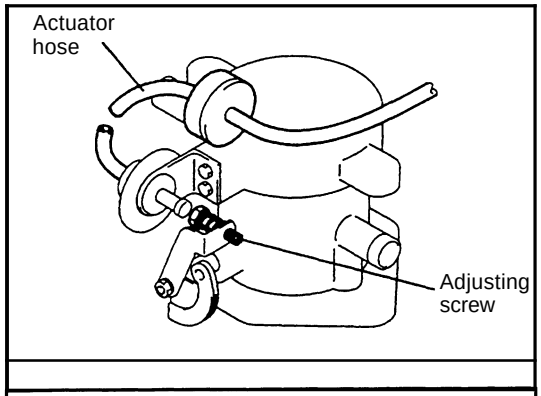

○ Inspection
● Replacement
① MP grease
② Engine oil
③ Hypoid gear oil
④ Hydraulic oil
⑤ Automatic transmission fluid
⑥ Molybdenum disulfide grease

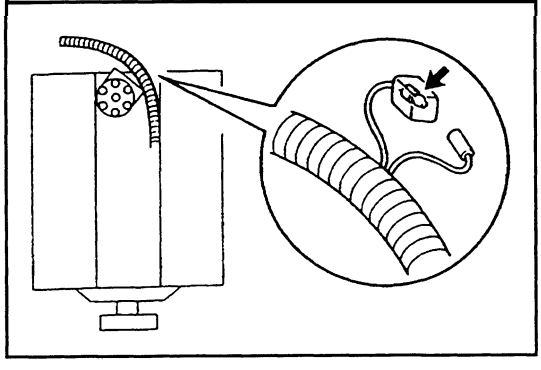
I. Inspect every 8 hours (daily)
II. Inspect every 40 hours (weekly)
III. Inspect every 170 hours (monthly)
IV. Inspect every 1000 hours (6 monthly)
V. Inspect every 2000 hours (annual)

1 Chain
2 Differential
3 Front wheel bearing
4 Oil pump drive shaft
5 Torque converter case
6 Rear wheel bearing
7 Steering knuckle king pin
8 Oil tank
9 Engine crank case
10 Rear axle beam front pin
11 Rear axle beam rear pin
12 Tilt steering locking mechanism
13 Mast support bushing
14 Tilt cylinder front pin
15 Propeller shaft
16 Swing lock cylinder lower pin
17 Tie rod end pin
18 Rear axle cylinder end pin
19 Oil pump spline shaft

# ENGINE





## IDLE UP INSPECTION·ADJUSTMENT

**<Air Governor System,**

1. Install a tachometer.
2. Check the idle-up speed.
   (1) Start the engine. Disconnect the vacuum hose from the idle-up actuator and measure the speed.

   **Standard: See page 1-9.**

   (2) If the standard is not satisfied, make adjustment by turning the adjusting screw.

   **Note: Turn the adjusting screw clockwise to increase speed.**

   (3) After adjustment, connect the vacuum hose.

## NO-LOAD MAXIMUM SPEED INSPECTION·ADJUSTMENT

**<Electronic Governor System>**

**Note: The maximum speed is controlled electronically.**

1. Install a tachometer

2. Inspect the no-load maximum speed when the accelerator pedal is fully depressed.

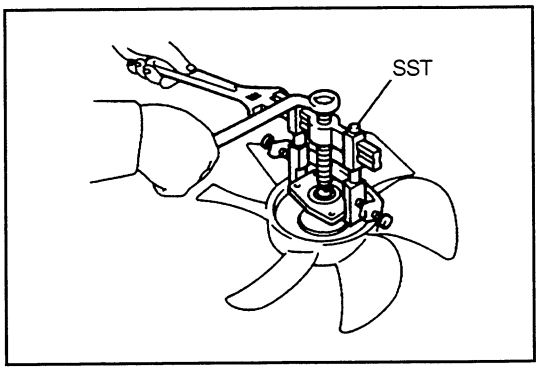
   **Standard: See page 1-9.**

   Since adjustment is impossible, refer to the trouble-shooting section when the standard is not satisfied.

**<Air Governor System>**

1. Install a tachometer.
2. Inspect and adjust the no-load maximum speed.
   (1) Measure the speed when the accelerator pedal is fully depressed.

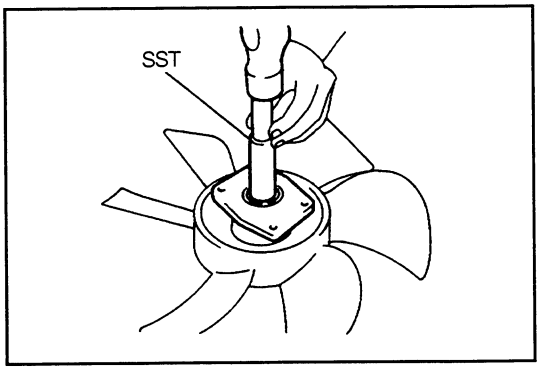
   **Standard: See page 1-9.**




## Point Operations

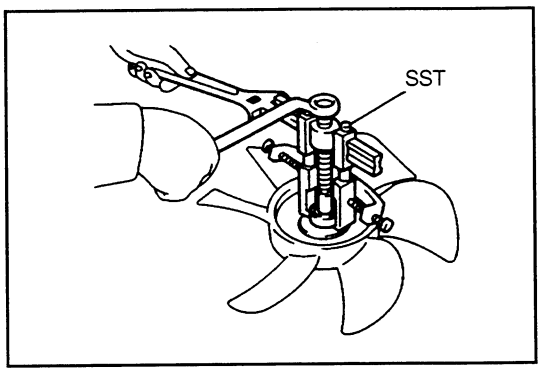
**[Point 1]**
Disassembly:
Bearing housing removal

1. Remove the snap ring.
2. Use the SST and remove the bearing housing.
   SST 09950-40011

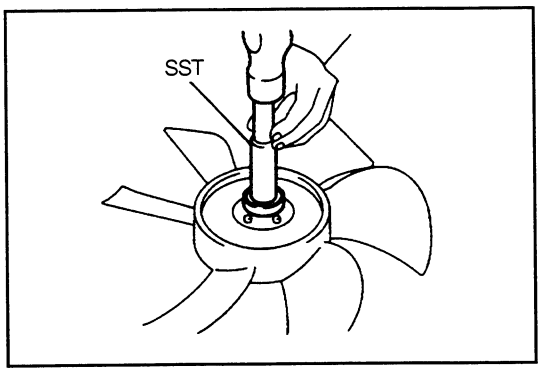



Reassembly:
Bearing housing installation

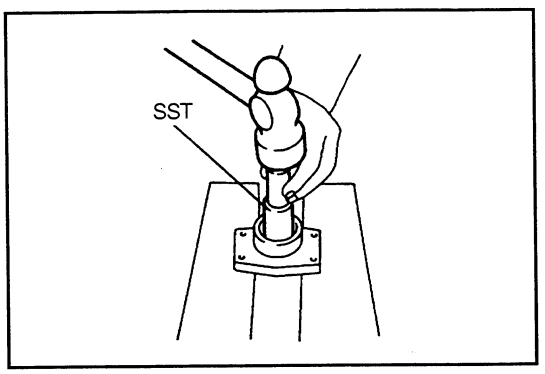
1. Use the SST and install the bearing housing.
   SST 09623-30011
2. Install the snap ring.



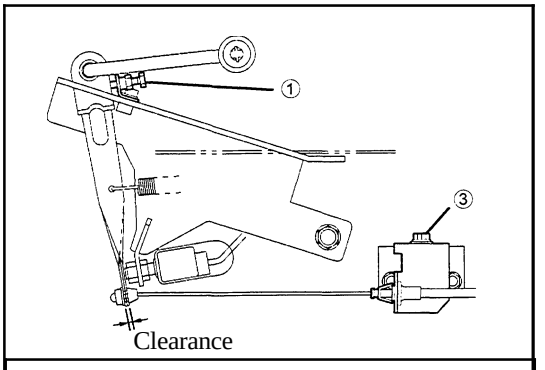

**[Point 2]**
Disassembly:
Use the SST and remove the bearing on the fan side.
SST 09950-40011




Reassembly:
Use the SST and install the bearing on the fan side.
SST 09623-30011

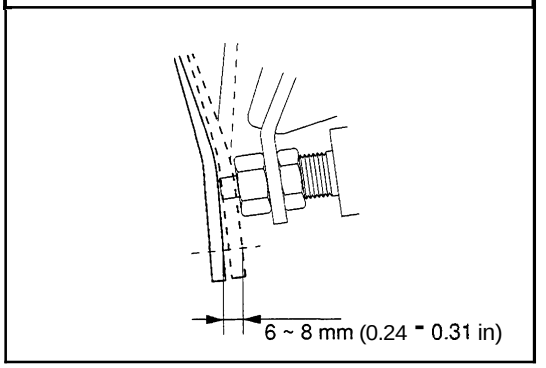



Disassembly:
Use the SST and remove the bearing on the housing side.
SST 09623-30011




**3.** Adjust by turning accelerator link stopper bolt ① to make the clearance between the accelerator pedal link and switch case end face satisfies the standard.

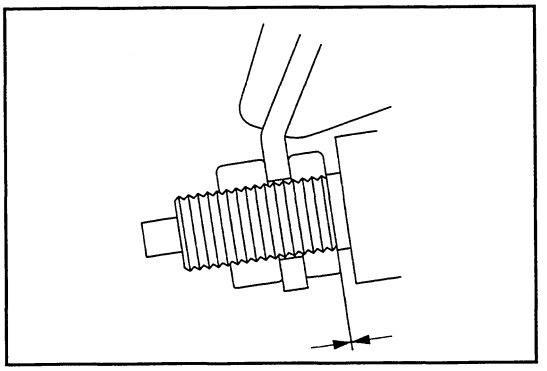
**Standard: $1^{+1}_{-0.5}$ mm ($0.04^{+0.04}_{-0.02}$ in)**




4. Check to see that the accelerator link departs from the switch shaft end face within the range of the accelerator wire play.

**Standard: 6 ~ 8 mm (0.24 ~ 0.31 in)**

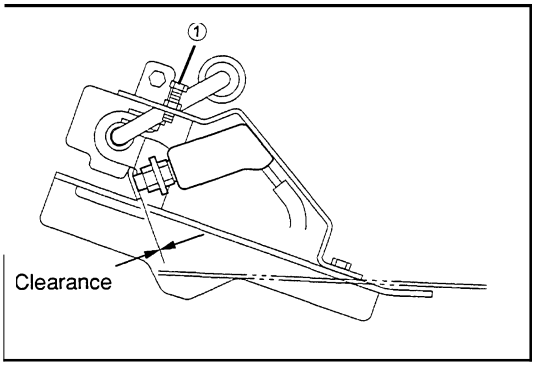
If the standard is not satisfied, make adjustment at accelerator wire bracket ③.



**G4 (GM6-262) <Electronic Governor System> engine**

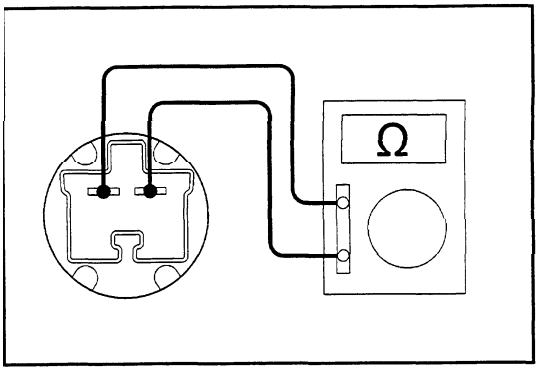
1. Inspect and adjust the accelerator pedal height.

2. Adjust the accelerator pedal switch mounting position. Install the switch on the bracket so that the nut is flush with the end of the threaded portion of the switch case.




**3.** Adjust the clearance between the accelerator pedal link and switch case end face to the standard, and fix the stopper bolt ①.

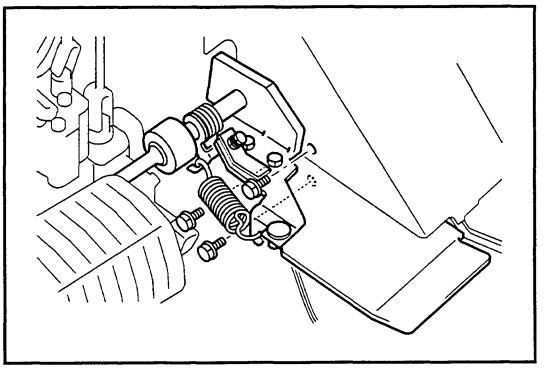
**Standard: $1^{+1}_{-0.5}$ mm ($0.04^{+0.04}_{-0.02}$ in)**

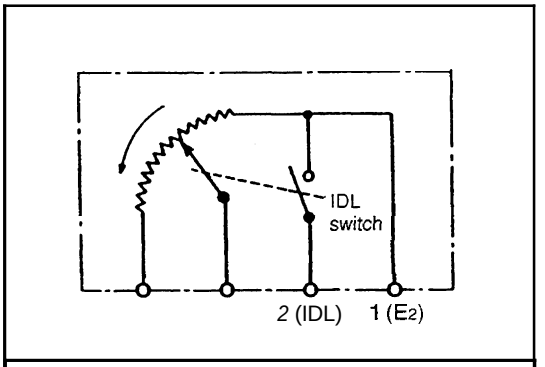


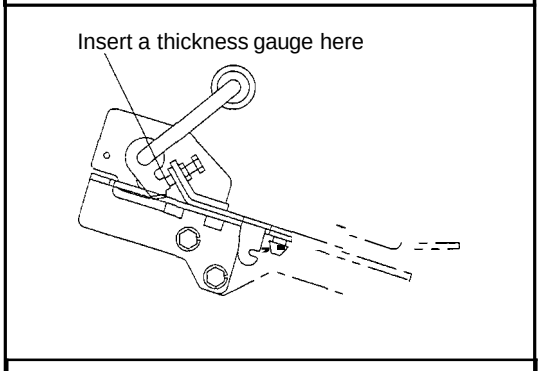

**Accelerator pedal switch inspection**

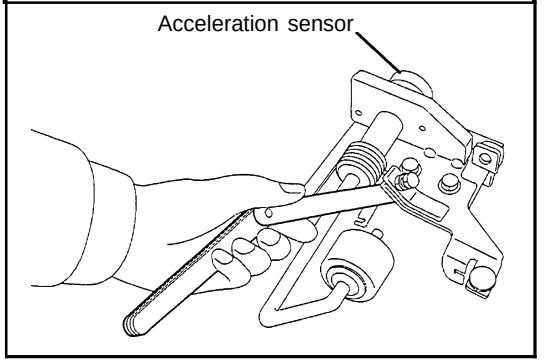
1. Inspect the ON/OFF state of the accelerator pedal switch.

| Switch position | Standard |
|---|---|
| Free | Closed |
| Pressed | Opend |






**Acceleration Sensor Adjustment**

1. See that the accelerator pedal heights (on the return and depression sides) are standard. (See the accelerator pedal height section.)

2. Remove the accelerator link bracket W/sensor.
   (1) Accelerator link bracket set bolts
   (2) Disconnect the acceleration sensor wiring.
   (3) Accelerator link bracket W/sensor

3. Adjust the acceleration sensor mounting position. (Adjustment of ON-OFF transition point of IDL switch in sensor)
   (1) Loosen the sensor set screw.
   *(2)* Use a circuit tester and check ON-OFF of the acceleration sensor switch.
   Between connector terminals $E_2$ and IDL

   **Note:**
   **Carefully operate so as not to damage the sensor terminals.**

   (3) Insert each of the following thickness gage between the accelerator link stopper bolt and accelerator link.
   EEC specification models: 2.5 mm (0.098 in)
   Other models: 0.8 mm (0.031 in)

   (4) In the state of (3), manually turn the acceleration sensor gradually. Tighten the acceleration sensor set screw for fixing at the position where the signal is set from ON to OFF.

4. Check the IDL ON/OFF state after fixing the acceleration sensor (between terminals 1 and *2* in the same way as in step 3).

   (1) Insert each of the following thickness gages between the accelerator link stopper bolt and accelerator link for confirmation:

**Standard**

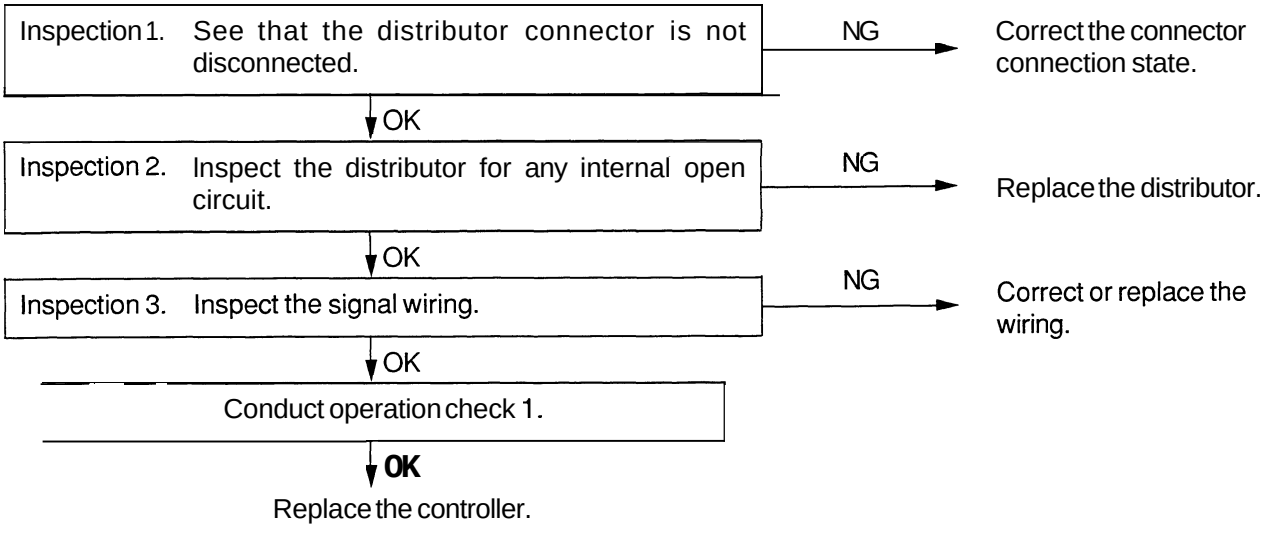
| | ON | OFF |
|---|---|---|
| EEC specification models | 2.3 mm (0.198 in) | 2.7 mm (0.244 in) |
| Other models | 0.6 mm (0.024 in) | 1.0 mm (0.039 in) |

- **Diagnostic Code 9 (Engine Pulse)**

Parform the following check for “operation check 1" in the flowchart:

**Operation check**

1. The ignition timing shall be normal.

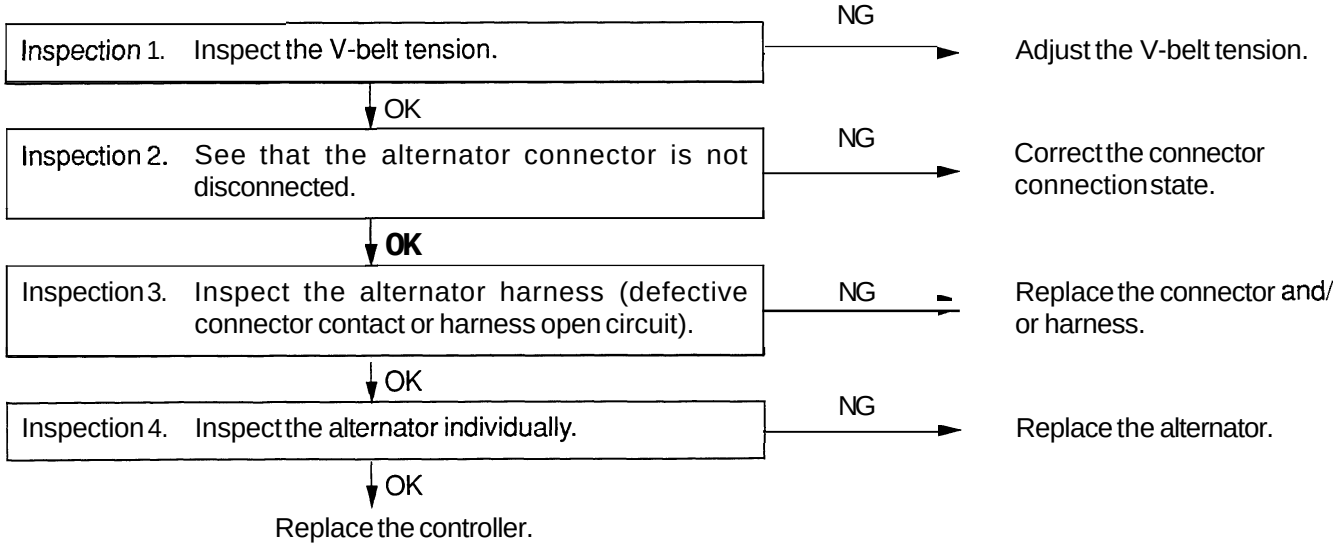



- **Diagnostic Code 10 (Alternator Abnormality)**

Conduct the following operation check after the end of the job:

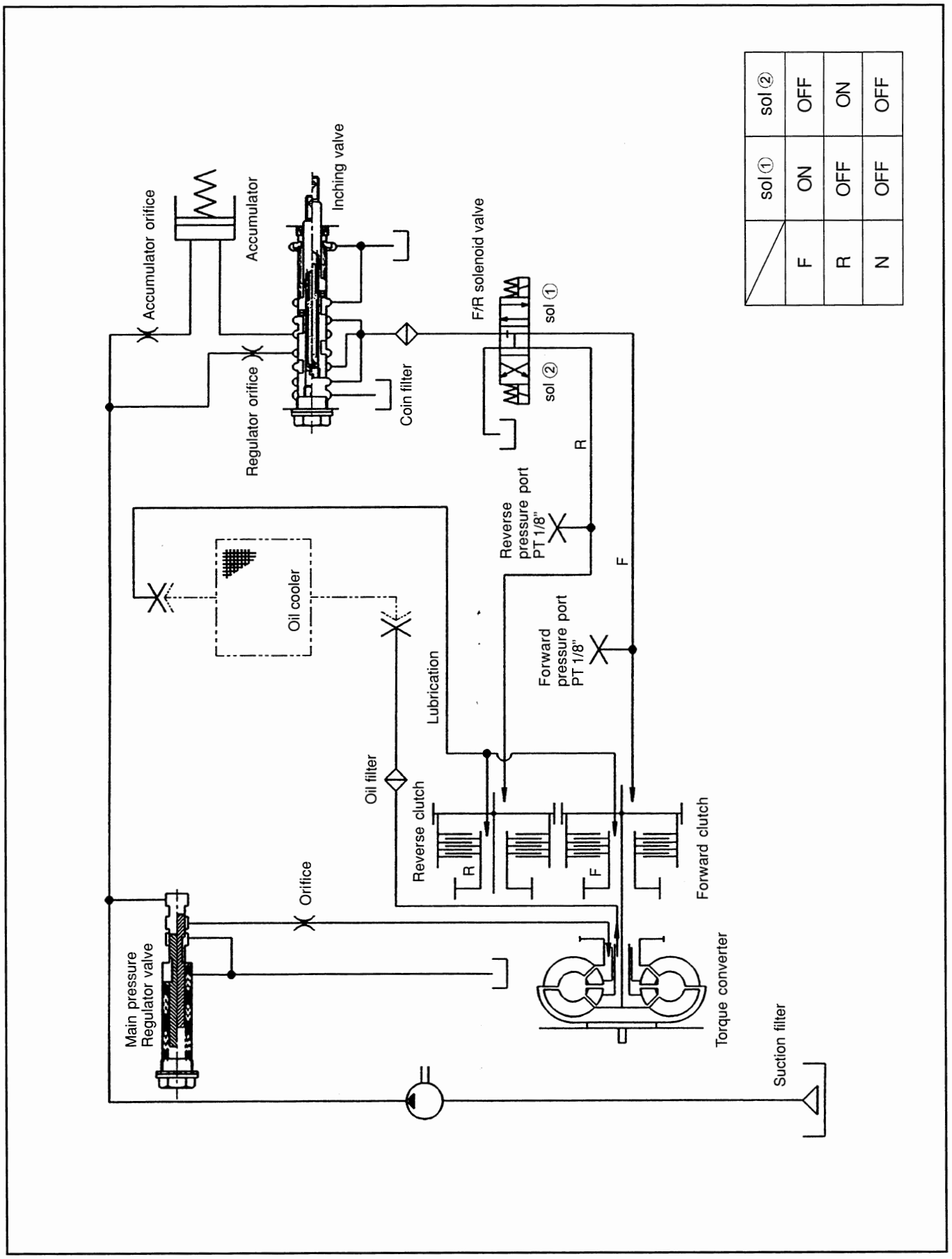
**Operation check**

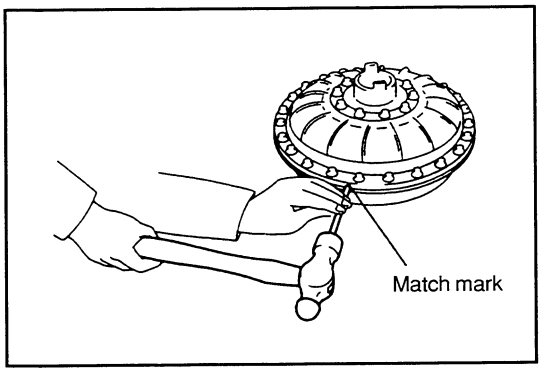
1. Turn the engine switch to ON, to ST (engine starting) and to ON again. Fully depress the accelerator pedal and see that the maximum engine speed is controlled.



# HYDRAULIC CIRCUIT DIAGRAM



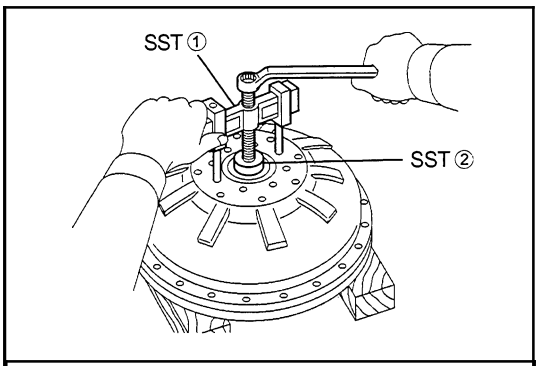




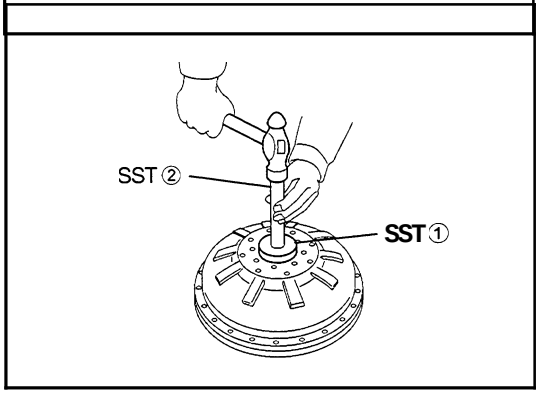

## Point Operations

**[Point 1]**
Disassembly:
Punch a match mark on the drive cover and pump impeller.

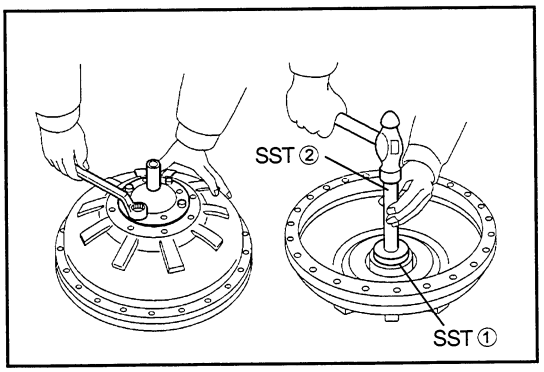
Reassembly:
Align the match marks on the drive cover and pump impeller.




Disassembly:
Remove the drive cover.
SST 09950-50012...①
09950-60010...②

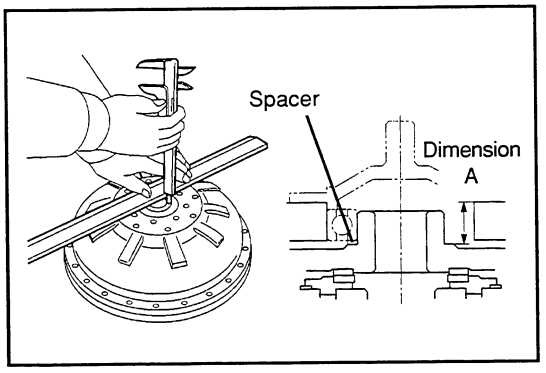



Disassembly:
Remove the bearing.
SST 09950-60010...①
09950-70010...②



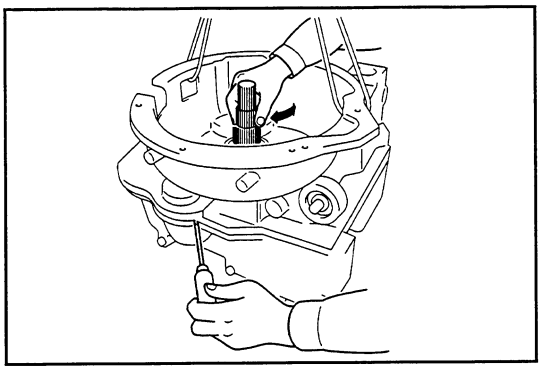

Reassembly:
Bearing installation
1. Temporarily install the pilot boss on the drive cover.
2. Install the bearing.
SST 09950-60010...①
SST 09950-70010...②

3. Remove the pilot boss.
Install the pilot boss and flexible plate after the torque converter is installed in the housing.

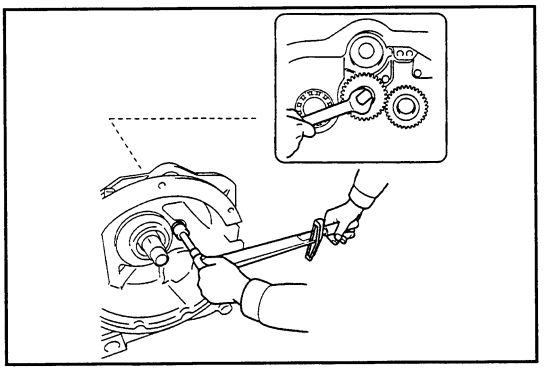



**[Point 2]**
Reassembly:
Select the turbine runner spacer before installing the turbine runner as follows.

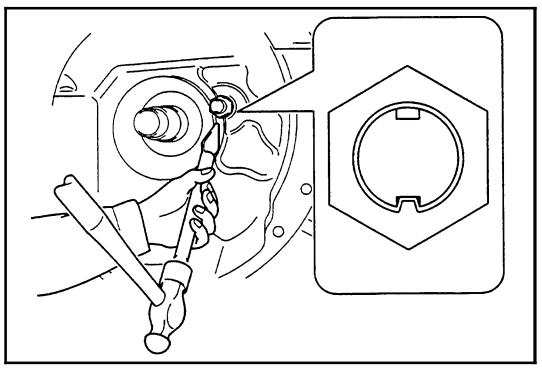
1. Measure dimension A after temporarily installing the turbine runner (without spacer) on the drive cover.
Remove the O-ring of the pump impeller beforehand.



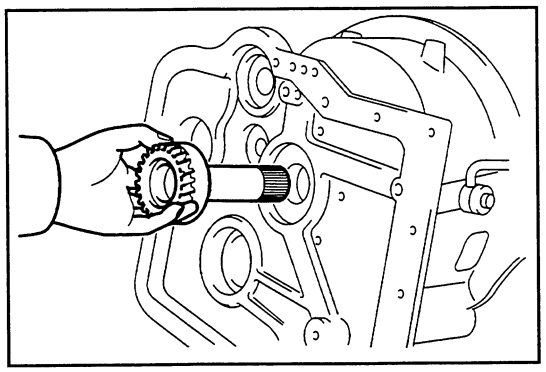
Reassembly:
When joining the case, use a screwdriver and adjust so that the No. 1 stator gear meshes with the countershaft gear.



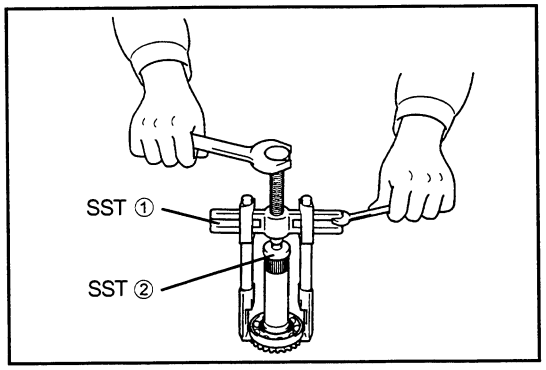
**[Point 8]**
Reassembly:
Tighten the lock nut to the specified torque.
T = **147.1 - 176.5** N·m **(1500 - 1800** kgf-cm)
[1**08.5** ~ **130.2** ft-lbf]



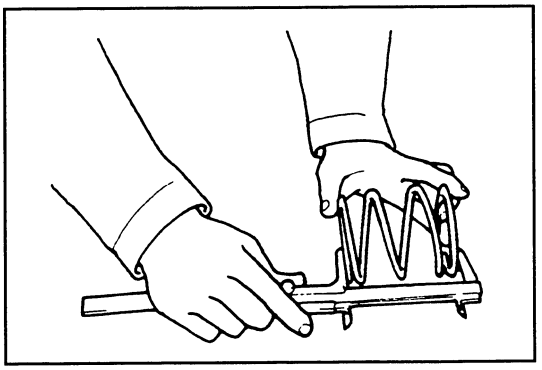
Swage the lock nut securely at one point.



**[Point 9]**
Disassembly:
Remove the stator shaft No. 1 W/bearing by tapping its tip end with a plastic hammer.

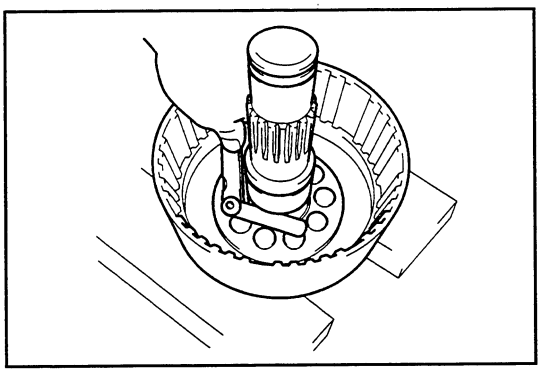



**[Point 10]**
Disassembly:
SST **09950-4001**1 ..... ①
**09950-60010** ..... ②



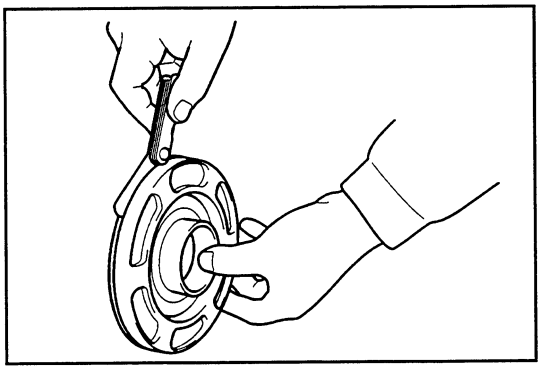
Inspection:
Measure the free length of the clutch piston return spring.

**Standard: 56 mm (2.20 in)**
**Limit: 50 mm (1.97 in)**



**[Point 3]**
Inspection:
Measure the side clearance of the seal ring.

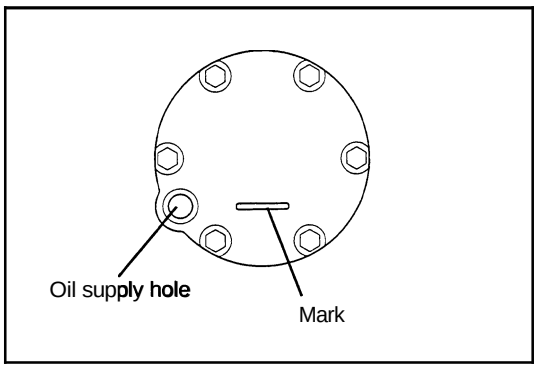
**Limit: 0.30 mm (0.012 in)**



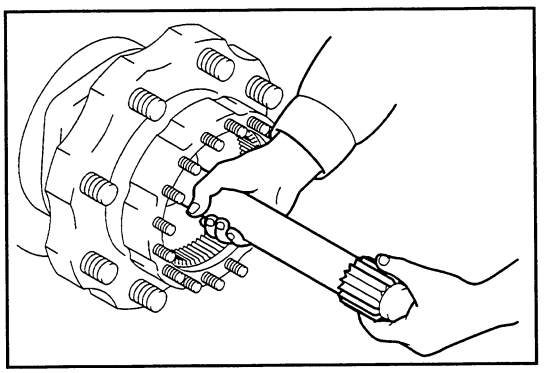
Inspection:
Measure the side clearance of the piston ring.

**Limit: 0.15 mm (0.0059 in)**

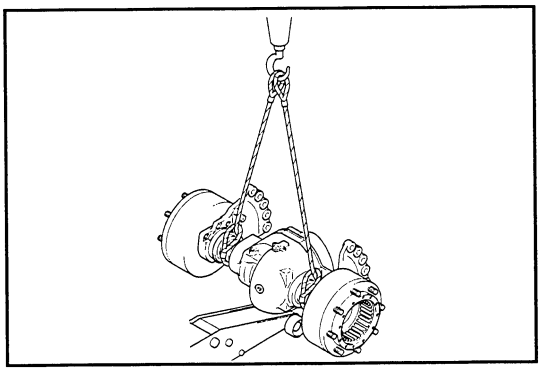
# DIFFERENTIAL



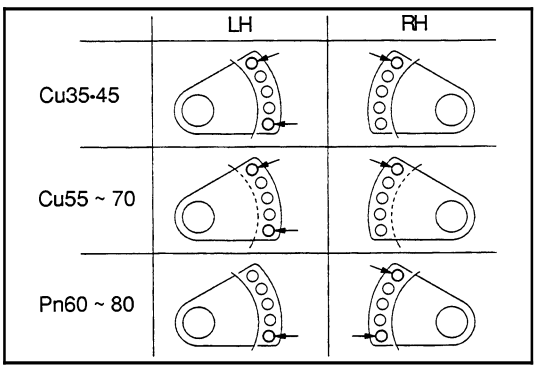

Installation:
After reassembly, set the "—" mark on the carrier cover in horizontal state and fill planetary gear oil full to the brim of the oil supply hole.



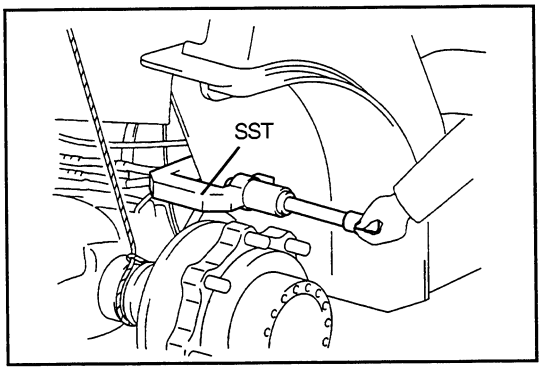
**[Point 2]**
Removal·Installation:
Operate carefully so as not to bring the axle shaft into contact with the oil seal lip to damage it.



**[Point 3]**
Removal:
1. Sling the front axle with a wire rope and slightly hoist it. Support the differential with a garage jack under it.

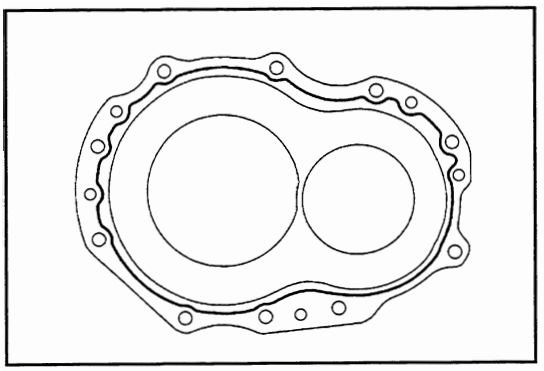



2. Remove the front axle bracket set bolts.
Use the SST to remove the reamer bolts in the illustrated positions.

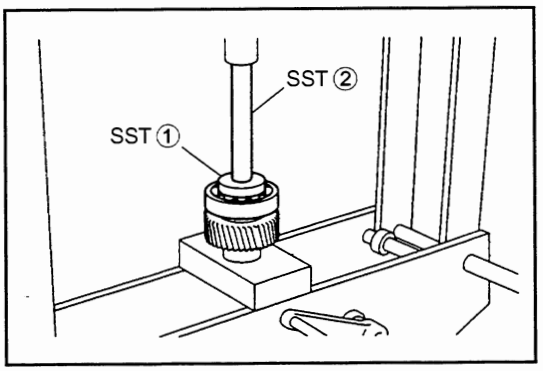



Cu35·45 model:
SST 09310-23320-71
Cu55 - 70, Pn60 - 80 model:
Use a bar and remove the reamer bolts.

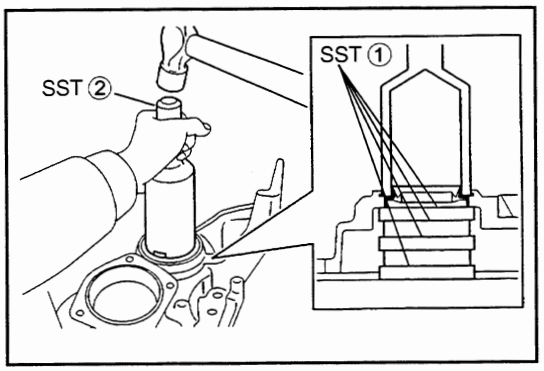
3. Operate the hoist and garage jack, to remove the front axle & differential ASSY.



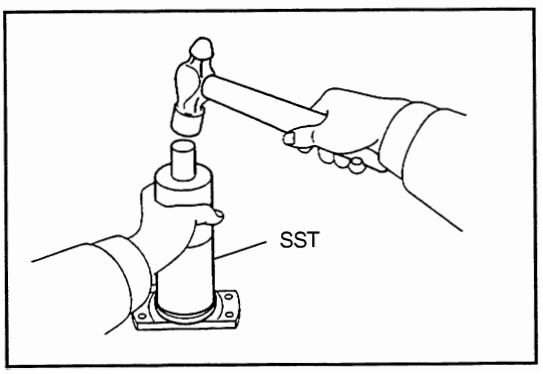
Reassembly:
Apply sealing agent (08826-00090) on the bearing retainer surface to come into contact with the differential carrier cover.




**[Point 6]**
Reassembly:
SST 09950-60010 --- ①
09950-70010 --- ②



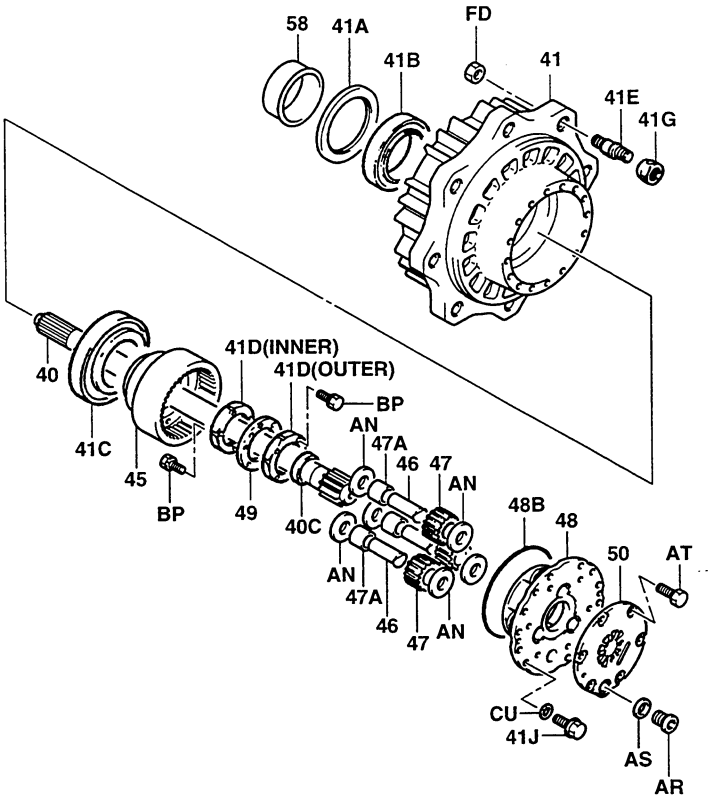

**[Point 7]**
Reassembly:
Use the SST to drive in the new oil seal to be flush with the inside end face of the differential carrier cover.
SST 09950-60020 --- ①
09214-76011 --- ②
After installation, apply grease on the oil seal lip portion.




**[Point 8]**
Reassembly:
SST 09316-60011

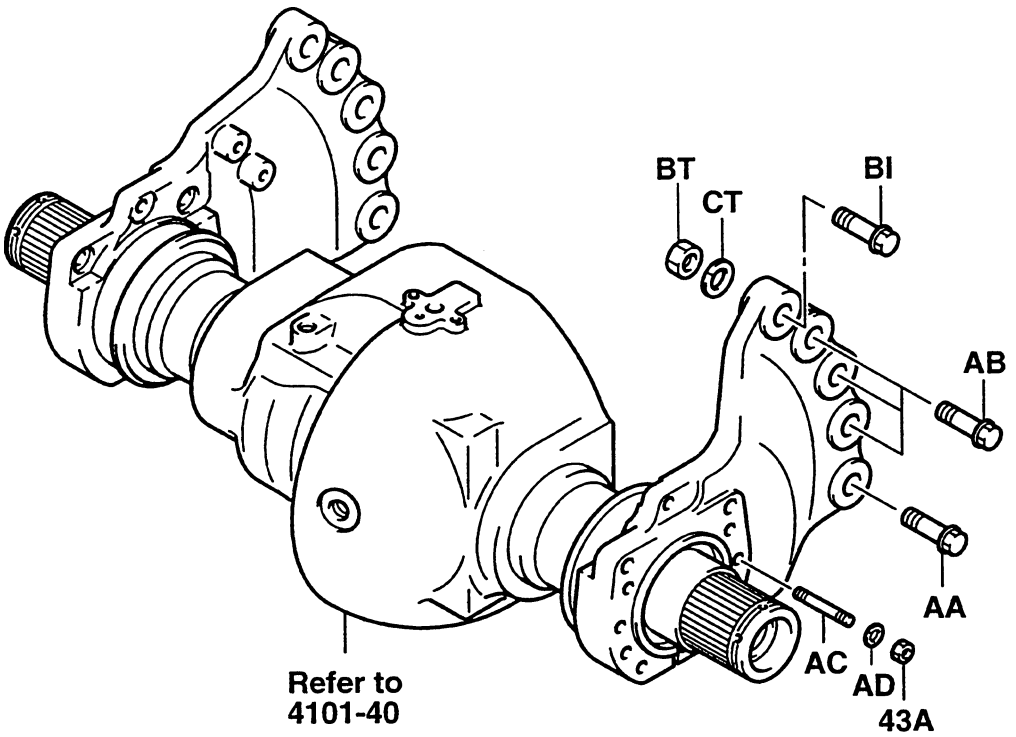
4201

Cu55 ~ 70 model




4201-219A

Cu35 ~ *70* model




4201-220A

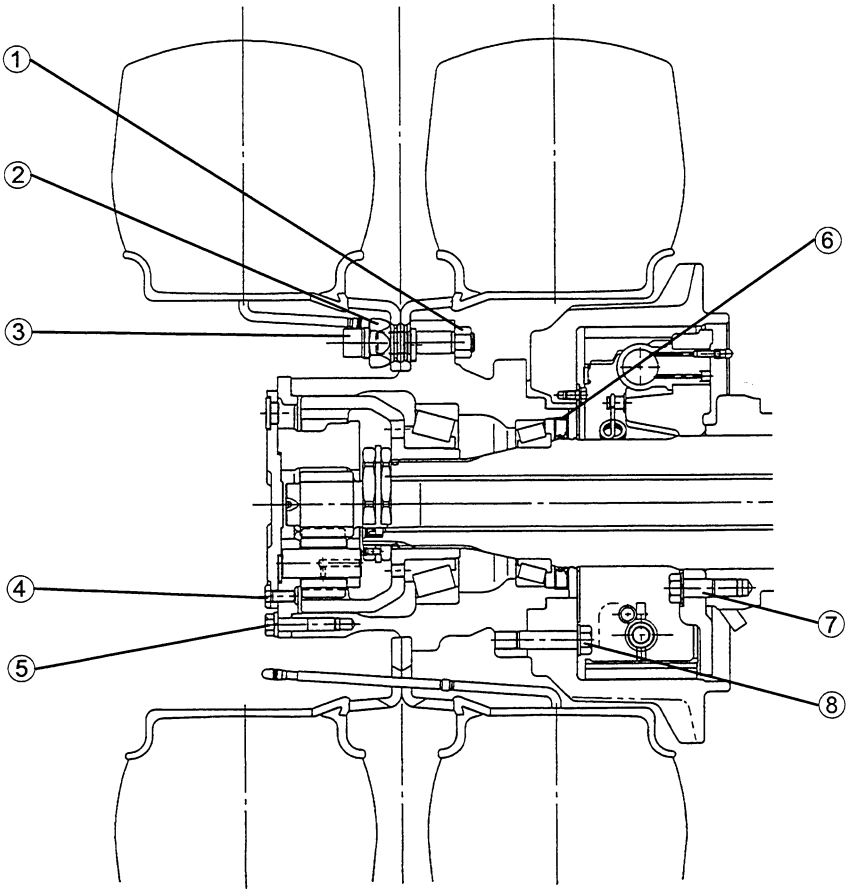
## Installation Procedure

The installation procedure is the reverse of the removal procedure.

**Note:**
**The tightening torque for each portion is as follows:**

T = N•m (kgf-cm) [ft-lbf]

Pn60 - 80 model

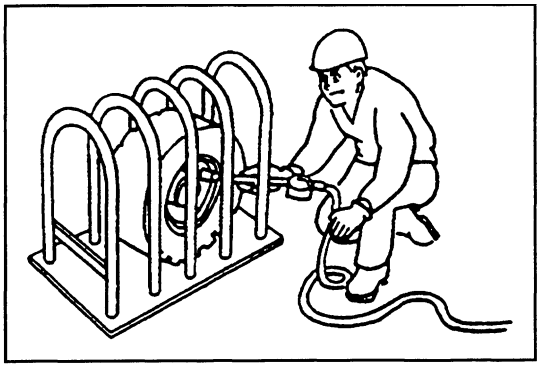



① Apply locking agent (08833-00070)
T = 294.2 ~ 588.4 (3000 ~ 6000) [217.1 ~ 434.11
② T = 294.2 ~ 588.4 (3000 ~ 6000) [217.1 ~ 434.11
③ T = 294.2 ~ 588.4 (3000 ~ 6000) [217.1 ~ 434.11
④ Apply locking agent (08833-00080)
T = 20.4 ~ 30.6 (208 ~ 312) [15.0 ~ 22.6]
⑤ T = 98.1 - 127.5 (1000 ~ 1300) [72.4 ~ 94.11
⑥ Apply sealing agent (08826-00080)
⑦ Apply locking agent (08833-00070)
T = 300.0 ~ 400.0 (3060 ~ 4080) [221.4 - 295.2]
⑧ T = 137.3 ~ 205.9 (1400 ~ 2100) [101.3 ~ 151.91

# REAR AXLE



6



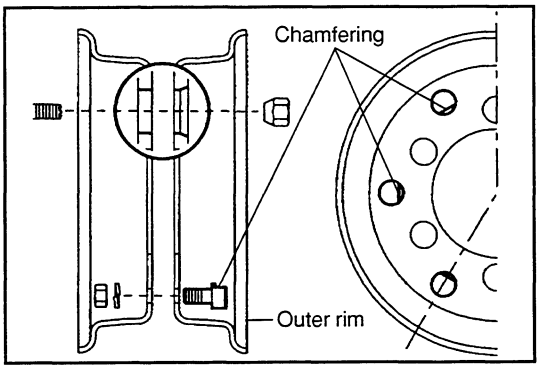
# TIRES·WHEELS (PNEUMATIC TIRE)

1. Adjusting the Inflating Pressure

Caution:
- Do not inflate tires beyond the specified pressure because it may cause dangerous tire bursting.
- When inflating a tire removed from the vehicle, place it in a safety fence.

Specified Inflating Pressure

| Classification | Specification | Tire size | Rim type | Inflating pressure kPa (kgf/cm²) [psi] |
|---|---|---|---|---|
| Pn35 model | STD | 7.00-12-12PR | Divided | 686 (7.00) [100] |
| | OPT | | Side ring | |
| Pn40 model | STD | 7.00-12-12PR | Side ring | 686 (7.00) [100] |
| Pn45 model | STD | 7.00-12-12PR | Divided | 834 (8.50) [121] |
| | OPT | | Side ring | 686 (7.00) [100] |
| Pn50 model | STD | 7.00-12-14PR | Side ring | 980 (10.0) [142] |
| Pn60·70 model | STD | 8.25-15-12PR | Side ring | 686 (7.00) [100] |
| Pn80 model | STD | 8.25-15-14PR | Side ring | 785 (8.00) [114] |



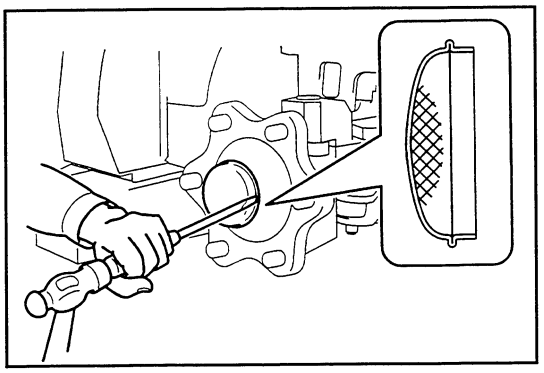

2. Wheel Disassemly·Reassembly

Caution:
Always discharge air fully before disassembling the wheel. Otherwise, it is very dangerous since the rim may come off suddenly due to the internal pressure.

Note:
Install each divided rim set bolt with its head on the outer rim side and the chamfered portion facing the center of the wheel.

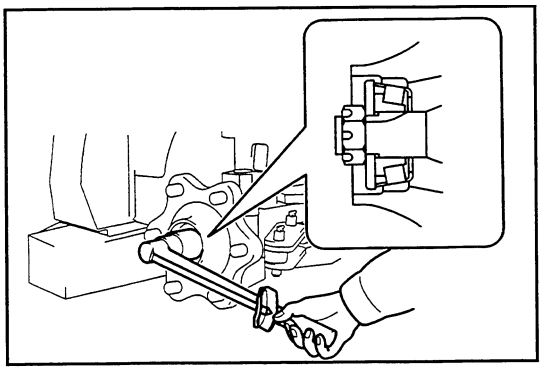
T = N·m (kgf-cm) [ft-lbf]

| | |
|---|---|
| Pn35 - 45 model | T = 117.7 ~ 176.5 (1200 ~ 1800) [86.82 - 130.231 |

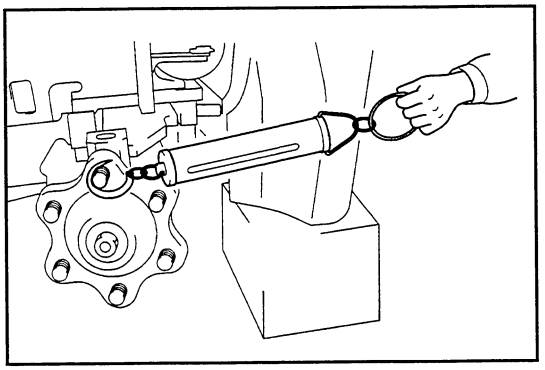


## Point Operations

**[Point 1]**
Installation:
Fill MP grease in the hub cap, and install by tapping the flange portion.
(Instead of MP grease filling, spraying grease over the castle nut is also usable.)



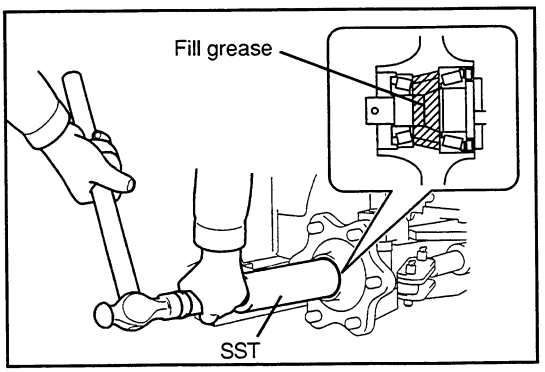
**[Point 2]**
Installation:
Adjust the rear axle hub starting force.
1. Install the claw washer in the correct direction.
2. Install the castle nut and temporarily tighten it to a torque of 12 to 32 N·m (120 to 330 kgf-cm) [8.7 to 23.9 ft-lbf].
3. Rotate the hub by 3 to 5 turns to run in the bearing.



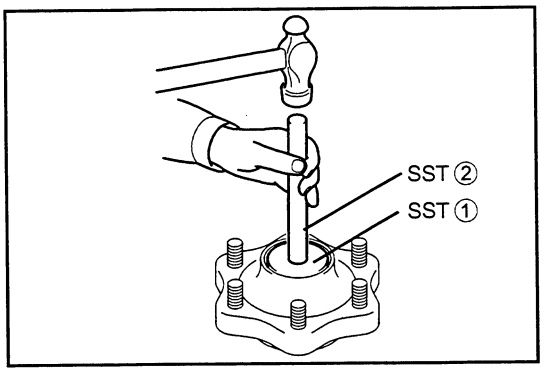
4. Set a spring scale on a hub bolt, and measure the starting force.

   **Standard: 78 ~ 157 N (8.0 ~ 16.0 kgf) [17.6 ~ 35.3 lbf]**

5. If the standard is not satisfied, adjust the degree of castle nut tightening for adjustment.
6. Install a new cotter pin.

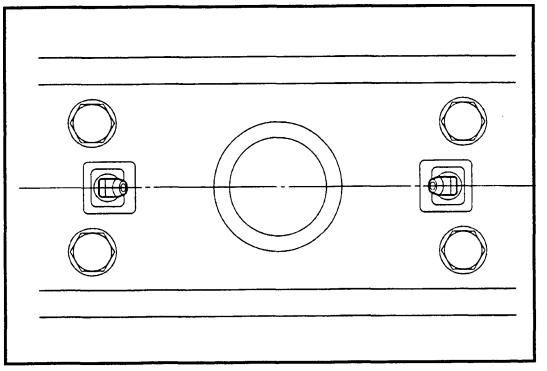



**[Point 3]**
Installation:
Install the axle hub and outer bearing.
1. Fill MP grease in the axle hub and knuckle spindle.
2. Install the axle hub.
3. Use the SST and install the outer bearing roller.
   SST 09370-20270-71




**[Point 4]**
Removal:
Use a brass bar and remove the bearing outer race.

Installation:
SST 09950-60020 --- ①
09950-70010 --- ②



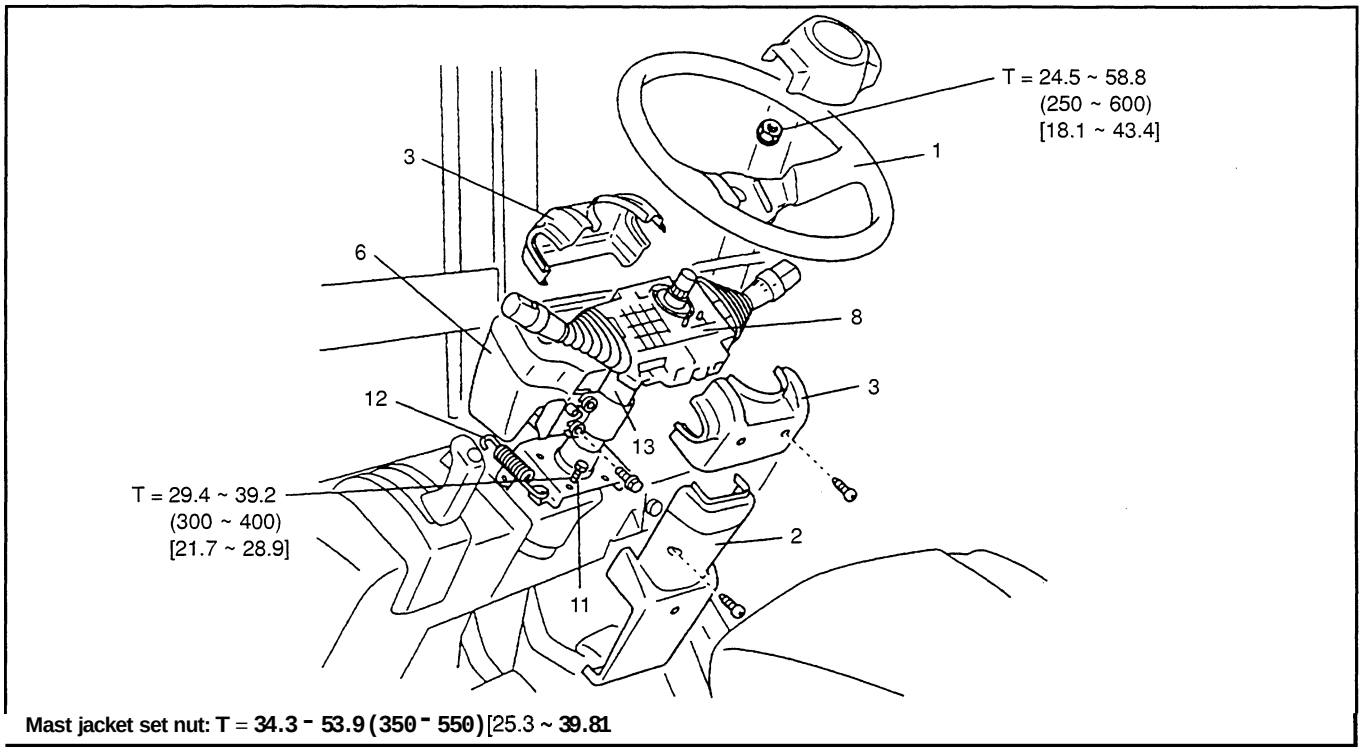
## Point Operations

**[Point 1]**
Installation:
Install the fitting in the illustrated direction.

# STEERING WHEEL·MAST JACKET

## REMOVAL-INSTALLATION

T = N·m (kgf-cm) [ft-lbf]




**Mast jacket set nut: T = 34.3 - 53.9 (350 - 550) [25.3 ~ 39.8]**

### Removal Procedure

1 Remove the steering wheel. **[Point 1]**

2 Remove the combination meter ASSY cover.

3 Remove the lever switch ASSY cover. **[Point 2]**

4 Remove the combination meter ASSY set bolts.

5 Disconnect the combination meter wiring.

6 Remove the combination meter ASSY.

7 Disconnect the lever switch ASSY wiring.

8 Remove the lever switch ASSY.

9 Remove the tilt lock mechanism. **[Point 3]**

10 Disconnect the engine hood opening device.

11 Remove the steering valve set bolt and keep the valve free.

12 Remove the return spring.

13 Remove the mast jacket ASSY.

### Installation Procedure

The installation procedure is the reverse of the removal procedure.

**Note:**

- **Apply MP grease on each sliding portion of the tilt lock mechanism and engine hood opening device.**
- **Fill MP grease at the coupling between the tilt steering shaft and steering valve.**

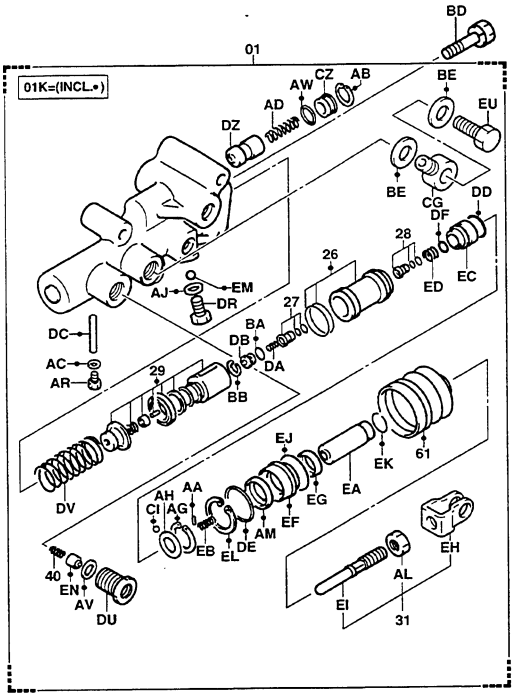
# BRAKE



8

## Brake Booster

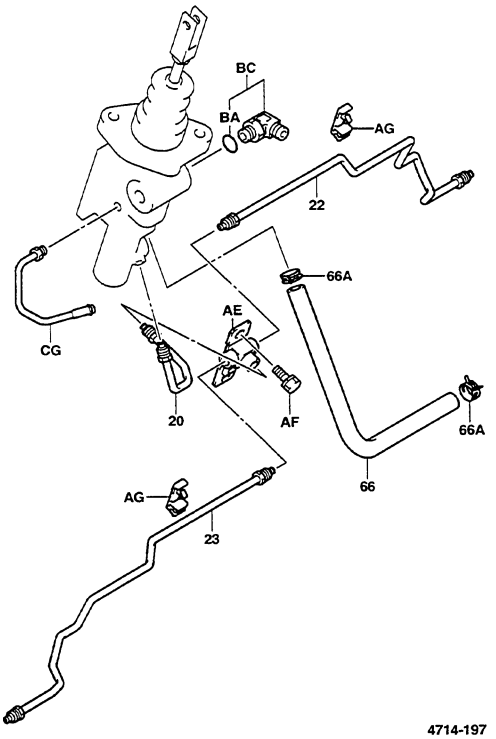
4707



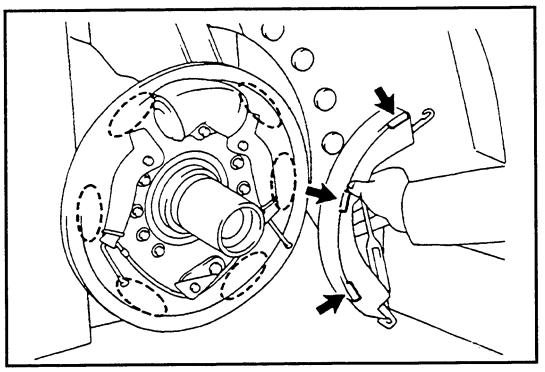

4707-023

## Brake Pipe

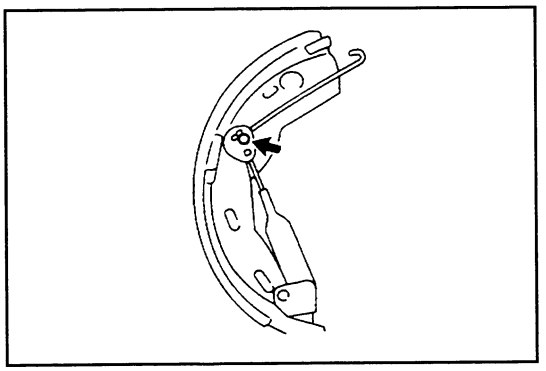
4714



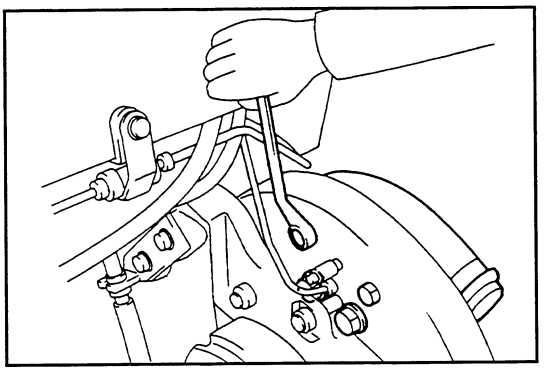

4714-197



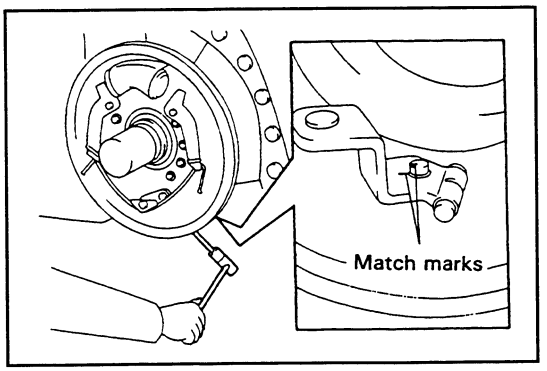
Reassembly:
Apply grease on the brake shoe rim and backing plate sliding contact portion before reassembly.



**[Point 6]**
Reassembly:
Apply grease on the illustrated portion of the adjuster lever link.

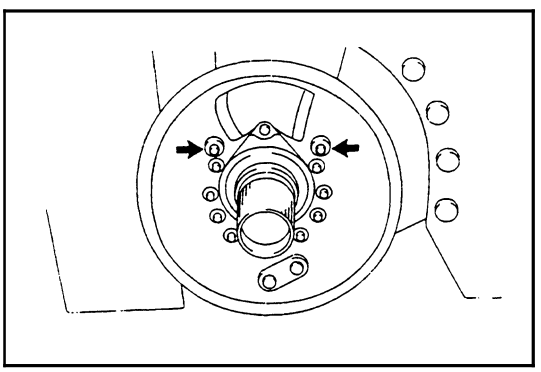


**[Point 7]**
Reassembly:
Apply locking agent (08833-00070) on the threaded portion of the set bolts before reassembly.

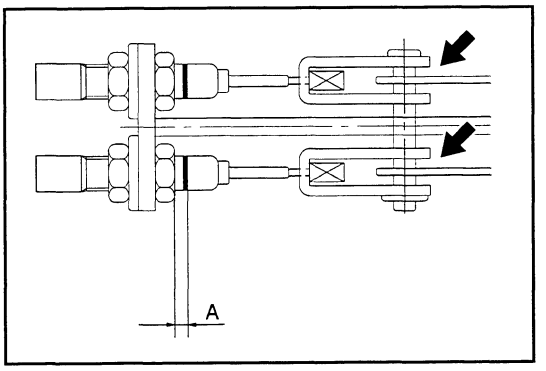


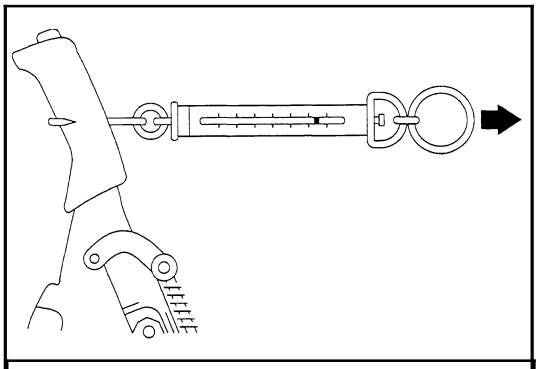

**[Point 8]**
Reassembly:
Install the actuator lever

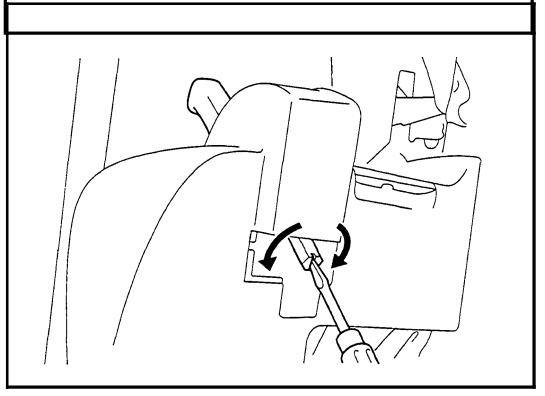
1. Apply grease to the spline and lever sliding contact portion.
2. Align the match marks for installation.



**[Point 9]**
Reassembly:
Apply grease on two parking brake lever shaft portions.





## PARKING BRAKE INSPECTION* ADJUSTMENT

1. Check the parking brake cable set position.

   **Standard: A = 3 - 5 mm (0.12 - 0.20 in)**

2. Apply chassis grease on the portions indicated by arrows.

**3.** Inspect and adjust the parking brake lever operating force.

(1) Set a spring scale at the center of the lever knob, and measure the operating force by pulling it backward.

**Standard:**
**Pn35 ~ 45, Pn60·70, Cu35 ~ 70 model**
**196 ~ 245 N (20 ~ 25 kgf) [44 ~ 55 lbf]**
**Pn50, Pn80 model**
**245 ~ 294 N (25 - 30 kgf) [55 ~ 66 lbf]**

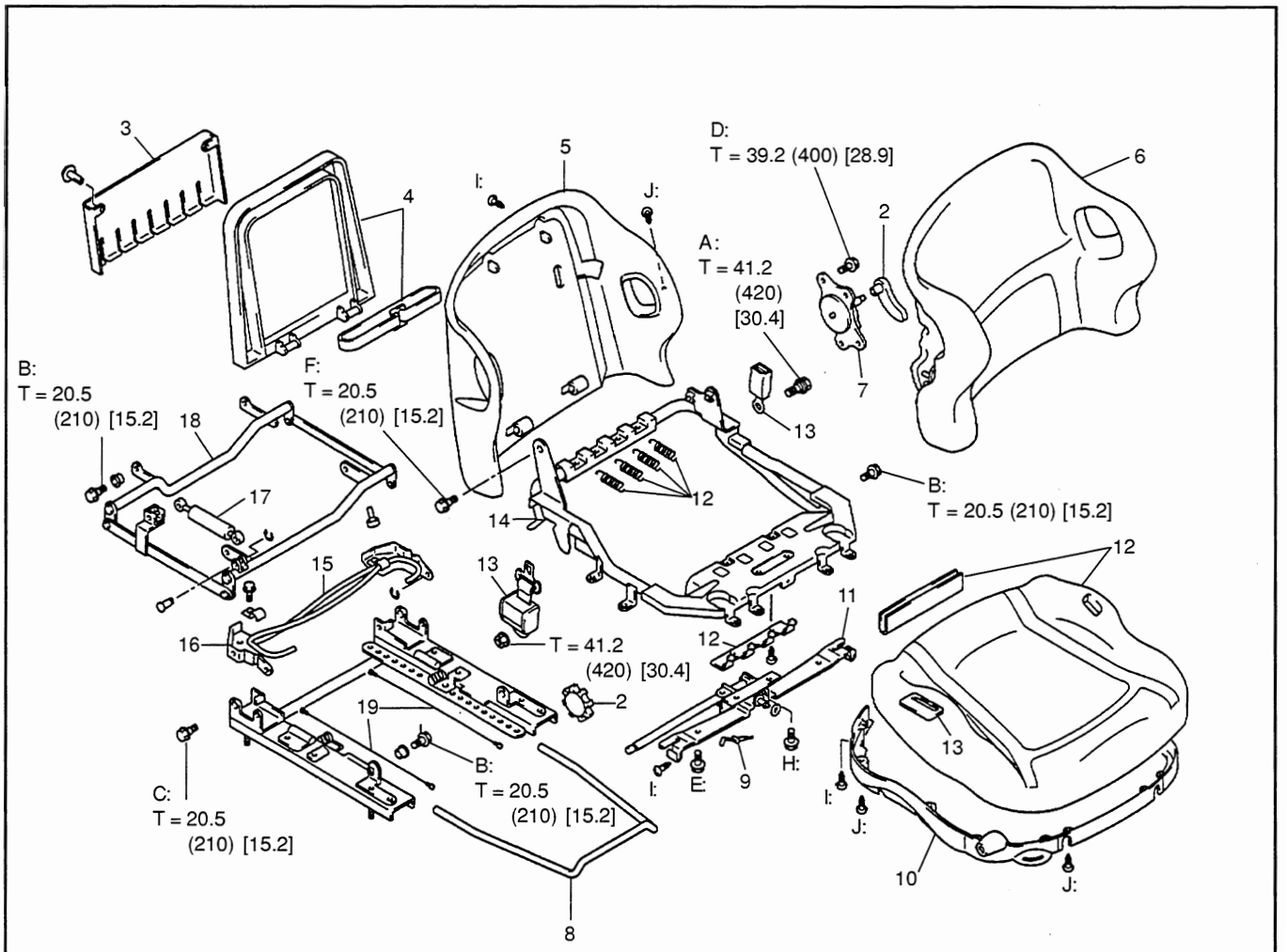
(2) If the operating force is out of the standard range, release the parking brake and make adjustment at the adjusting portion.

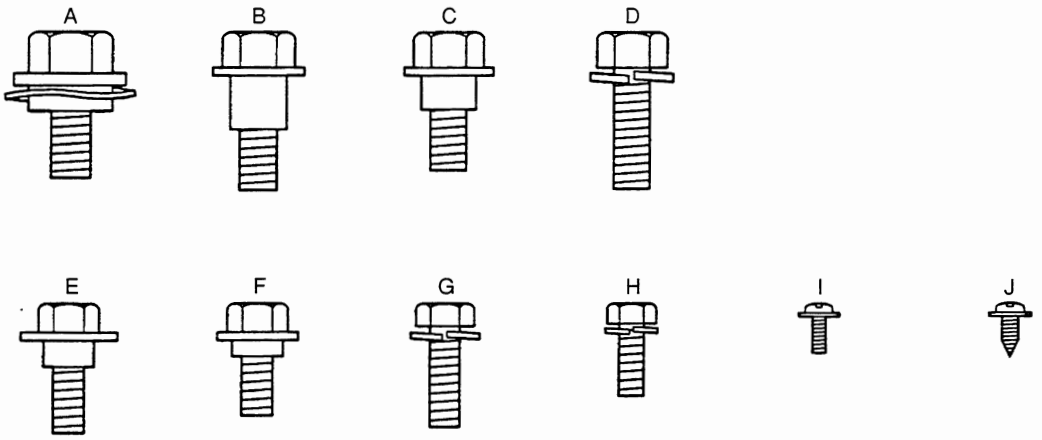
Clockwise turn: Increases the operating force.
Counterclockwise turn: Decreases the operating force.

# DRIVER'S SEAT (ORS W/FULL SUSPENSION SEAT: OPT)

## DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf-cm) [ft-lbf]



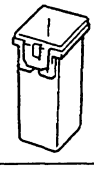
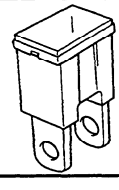



## PORTIONS PROTECTED BY FUSES

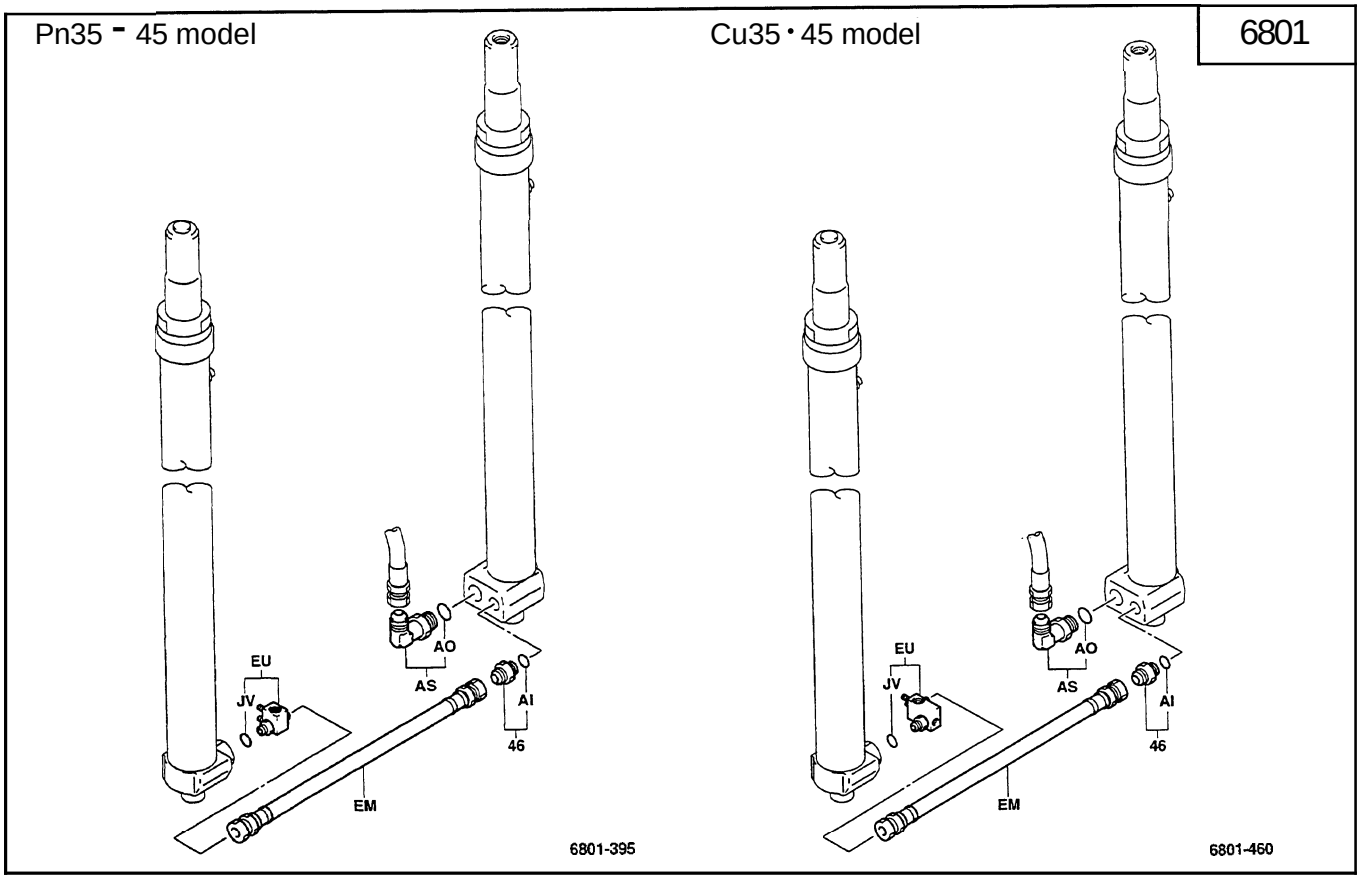
| NO | Name | Capacity | Main protected portions |
|---|---|---|---|
| ① | FUEL | 7.5A | Fuel solenoid |
| ② | — | | — |
| ③ | ST (Starting motor) | 7.5A | Starting motor relay (IG) and pre-heating timer (IG) |
| ④ | SFT (Shift) | 7.5A | Electric shift TIC |
| ⑤ | SAS-ECU | 7.5A | SAS controller and SAS warning lamp relay |
| ⑥ | IGN (Ignition) | 7.5A | Alternator, pre-heating timer, ignition coil, LPG main solenoid, LPG slow solenoid and fuel cut |
| ⑦ | TURN (Turn) | 7.5A | Turn signal lamp and flasher relay |
| ⑧ | GAUGE (Meter) | 10A | Hour meter, water temperature gauge, fuel gauge, warning lamps (charge, engine oil pressure, air cleaner, lock indicator, sedimenter, glow indicator, fuel, brake, cooling water and battery), back-up buzzer, T/C oil thermometer, strobo, back-up lamp and SAS buzzer |
| ⑨ | — | — | — |
| ⑩ | — | — | |
| ⑪ | HORN (Horn) | 7.5A | Horn |
| ⑫ | ALT-S (Alternator sending) | 5A | Alternator sending |
| ⑬ | HEAD (Headlamp) | 15A | Headlamp and meter illumination |
| ⑭ | — | — | |
| ⑮ | TAIL (Tail) | 7.5A | Tail lamp and clearance lamp |
| ⑯ | TWC | 7.5A | TWC (three way catalytic) controller |
| ⑰ | STOP (Stop lamp) | 7.5A | Stop lamp |

### Including options

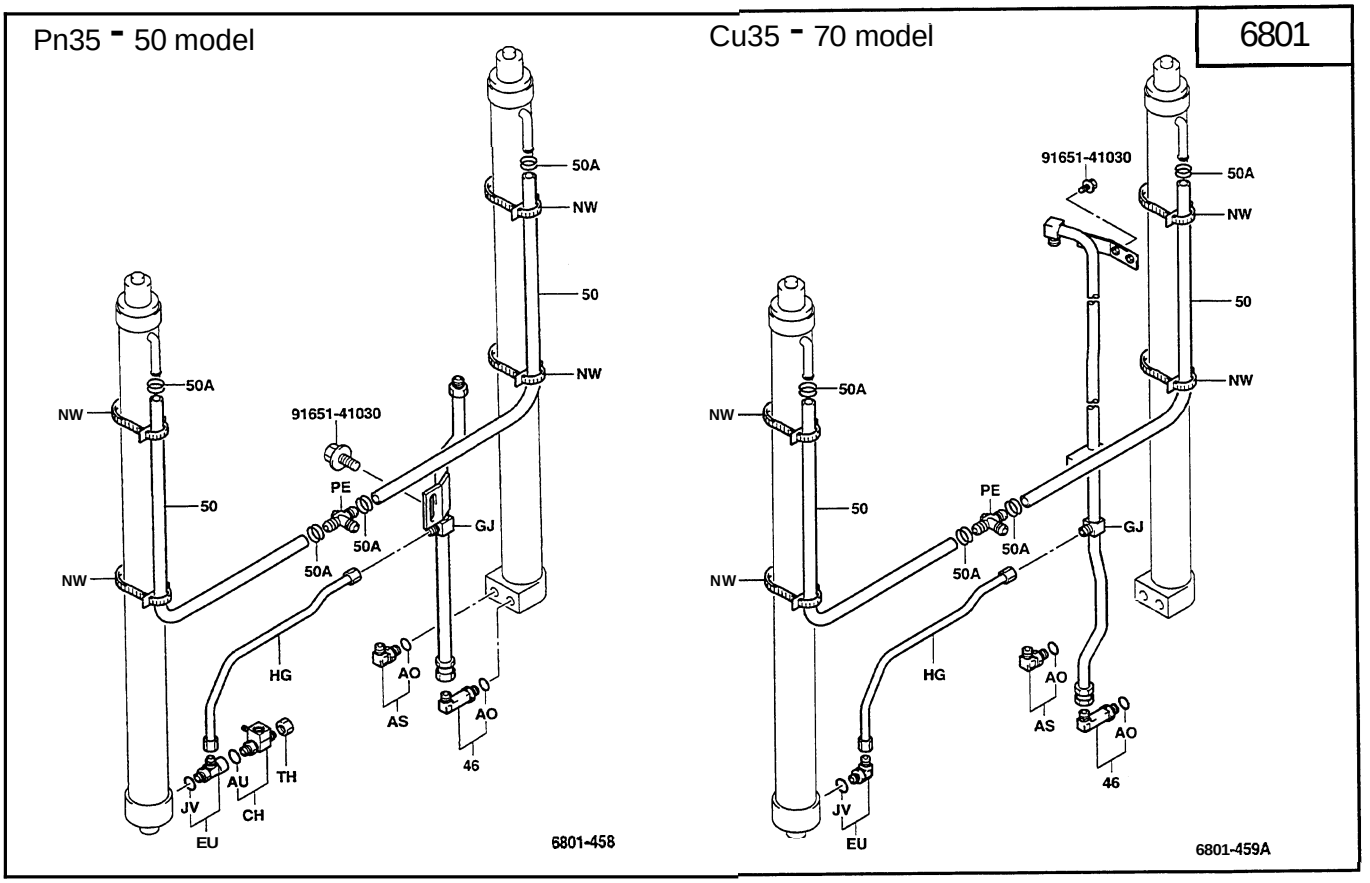
### Fusible links

| NO. | Name | Capacity | Type |
|---|---|---|---|
| FL ① | — | — |  Cartridge type |
| FL ② | AM1 | 40A | |
| FL ③ | HEAD | 40A | |
| FL ④ | GLOW | 120A |  Screw-fastened type |
| FL ⑤ | ALT | 80A | |

## FV Mast

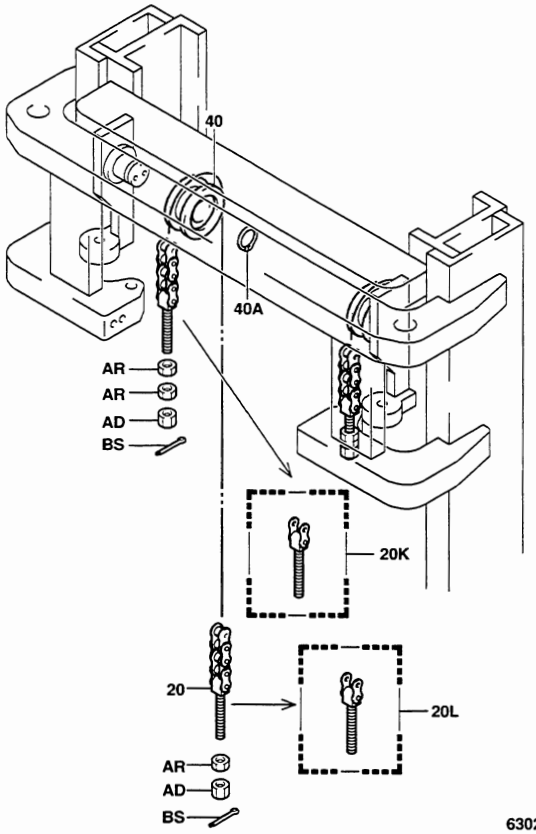



## FSV Mast

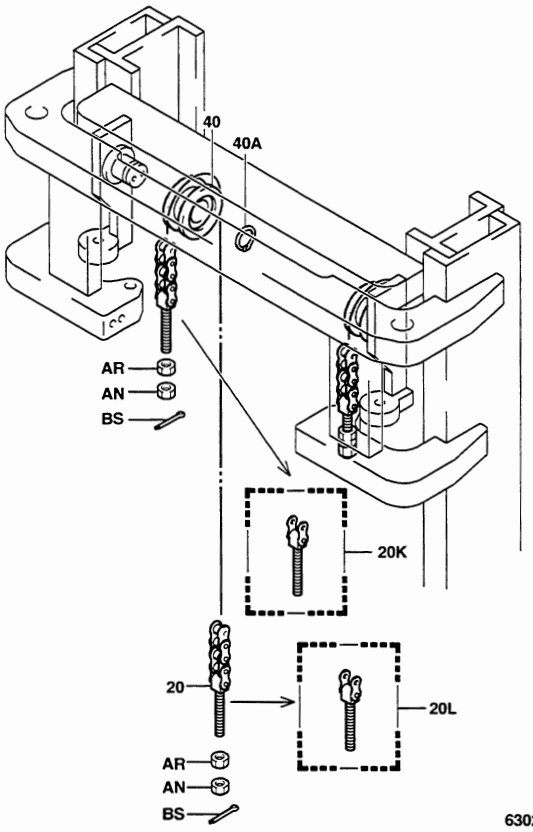


6302

Pn60·70, Cu55 ~ 70 model




Pn80 model

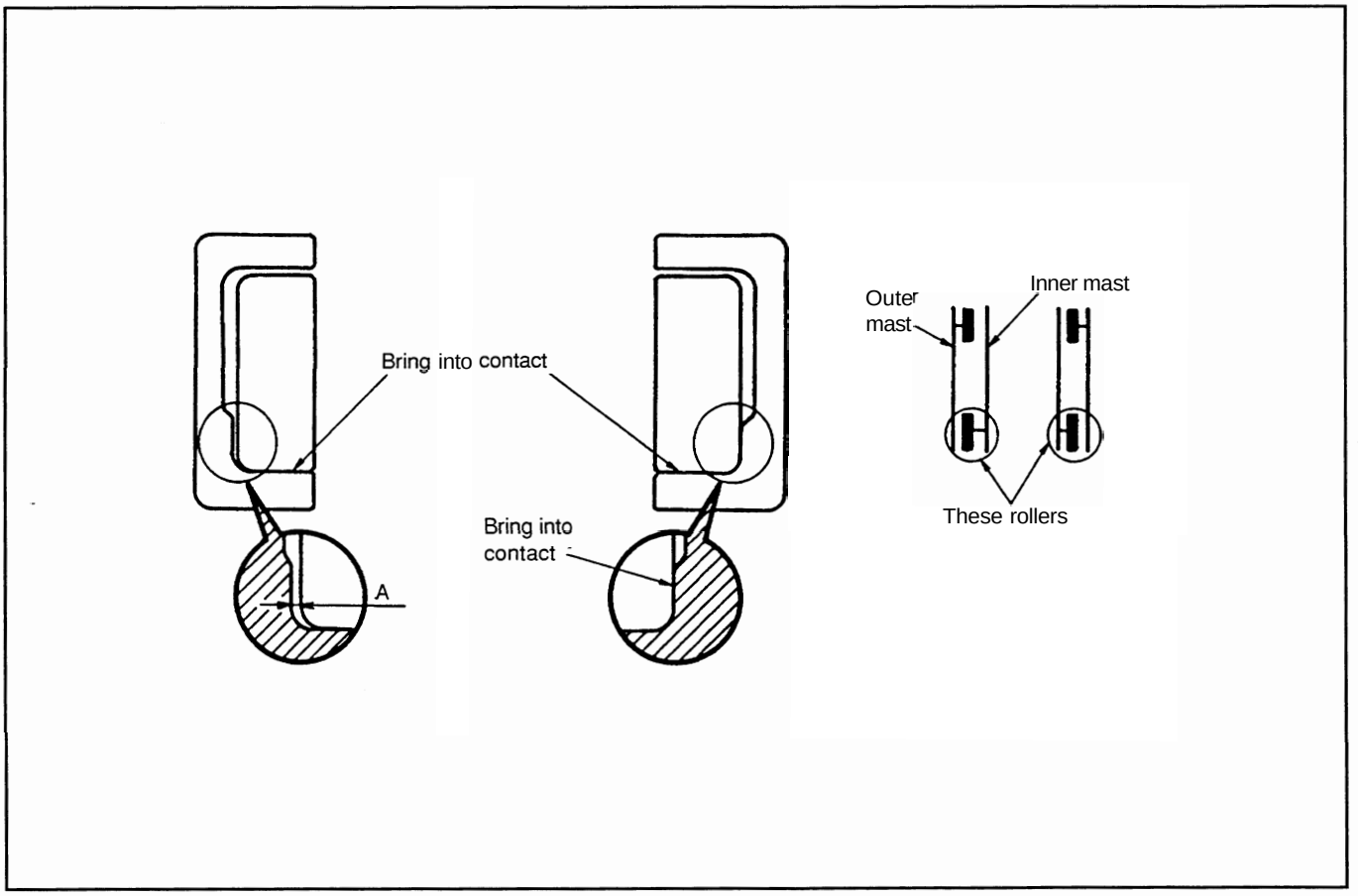


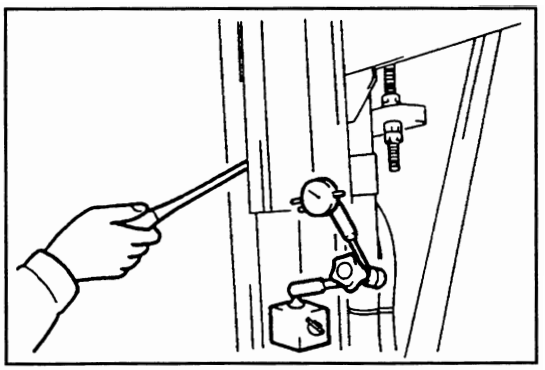

11

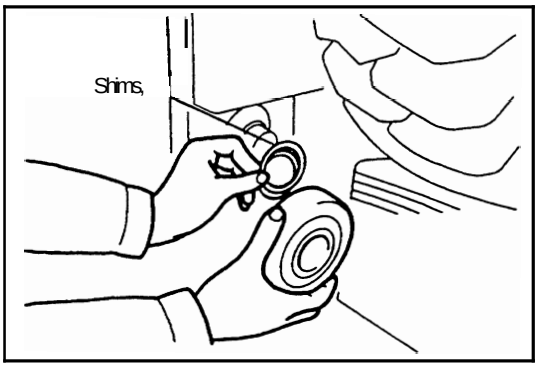
## MAST ADJUSTMENT (V MAST)

### Lift Roller Adjustment at Mast

1. Inner mast roller clearance adjustment






(1) Adjust the mast overlap to approx. 500 mm (19.69 in).
(2) Shift the inner mast to one side to bring the roller into contact with the outer mast, and measure the clearance between the roller side face and mast on the opposite side where they are the closest.

**Standard: A = 0 ~ 0.8 mm (0 ~ 0.031 in)**

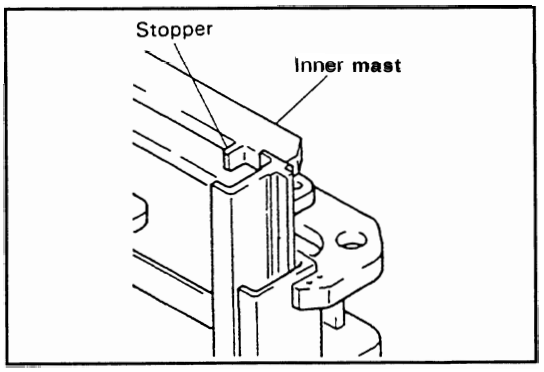
If the standard is not satisfied, make adjustment by changing the inner mast roller shim thickness. (See page 11-21 for the mast roller removal and installation.)

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

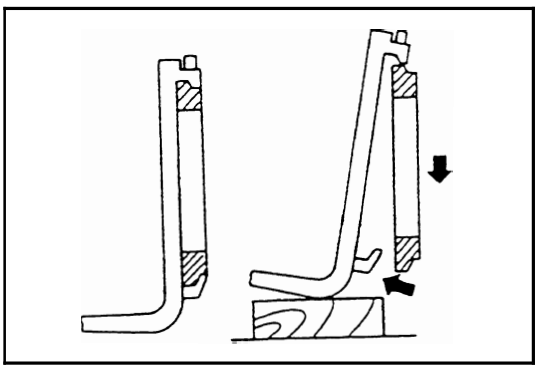
(3) Distribute shims equally to the rollers on the left and right side.
**(4)** After the adjustment, see that the inner mast moves smoothly in the outer mast.

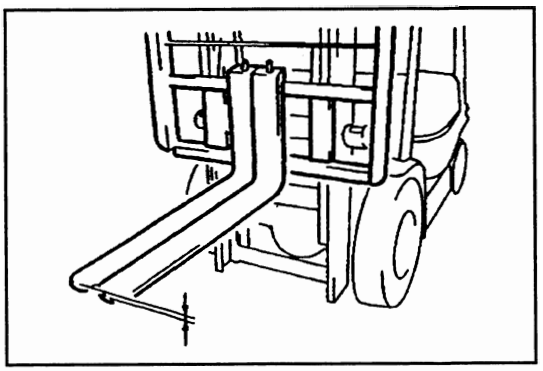
## ADJUSTMENT

1. Park the vehicle on a flat ground and set the mast vertical.
2. Lower the fork to the ground, and make adjustment to eliminate any chain sag by turning the adjusting nut.
3. Check to see that the chain tension is equal on the left and right side.
4. Check to see no chain twist.
5. See that the fork height is the standard.
6. With the fork raised fully, check to see that the lift bracket freeing prevention stopper at the inner mast is not in contact with the lift bracket.




**Note:**
**The stopper shows the instance of the V mast. Depending on the models, the type of the stopper differs although the principal of the stopper means is the same.**





# FORK

## REMOVAL

1. Set the fork at approx. 20 cm (7.9 in) above the ground.
2. Place a wooden block under the knotched portion of the fork rail.
3. Unlock the fork by lifting the fork stopper pin, and shift the fork blades, one at a time, to the center.
4. Slowly lower the fork for removal.

## INSTALLATION

The installation procedure is the reverse of the removal procedure.

## INSPECTION

1. Inspect misalignment of the fork tip ends.

   **Limit: 10 mm (0.39 in)**

   If the limit is exceeded, inspect individual fork bend, looseness of fork installation and lift bracket finger bar distortion.

3. Roller selection

(1) In Pn35, Cu35•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 |
|---|---|---|---|---|
| Pn35, Cu35•45 | No. 1 | 124.5 (4.902) | 125.0 (4.921) | — |
| | No. 2 | 125.2 (4.929) | | Oversize |
| Pn45 | No. 1 | 164.5 (6.476) | 165.0 (6.496) | — |

Outer mast roller

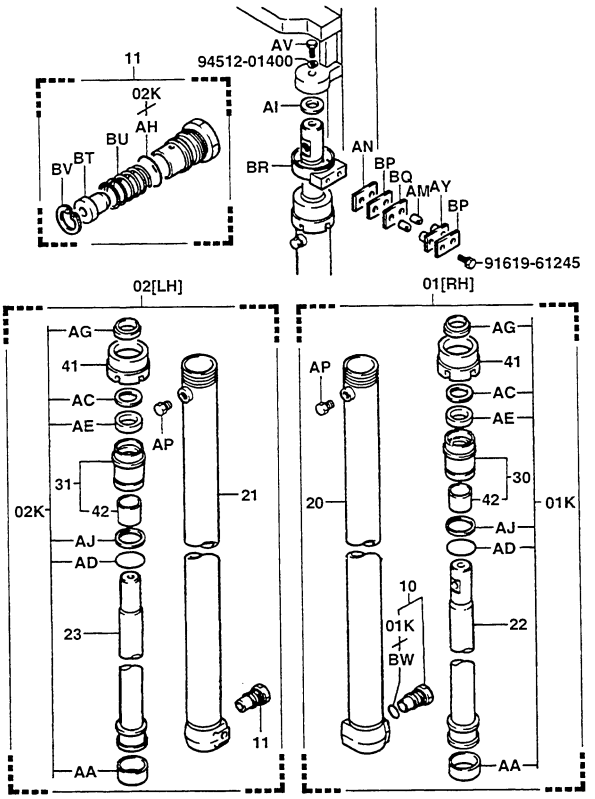
| Model | Outside diameter mm (in) |
|---|---|
| Pn35, Cu35•45 model | 124.5 (4.902) |
| Pn45 model | 164.5 (6.476) |

# CYLINDER

## Rear Lift Cylinder (FV)

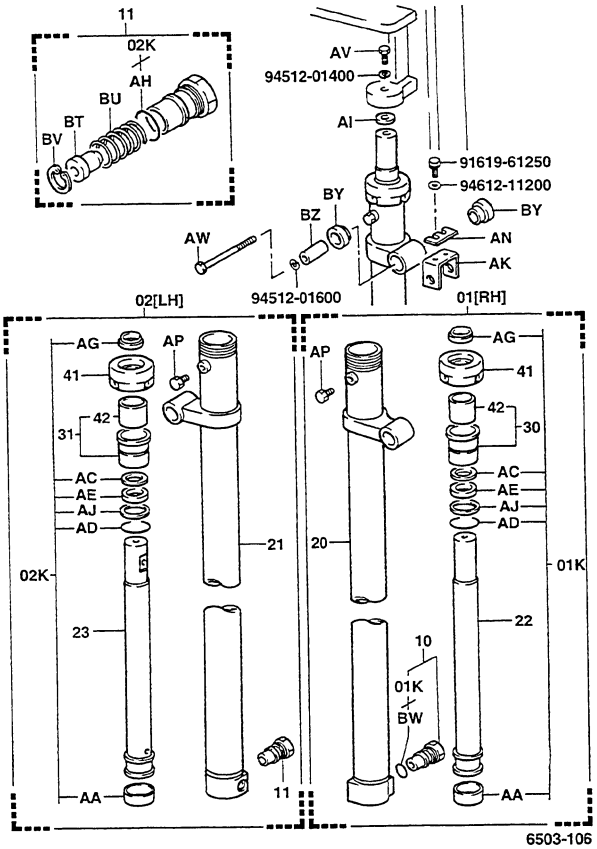
6503

Pn35•40, Cu35 model




6503-139

Pn45, Cu45 model

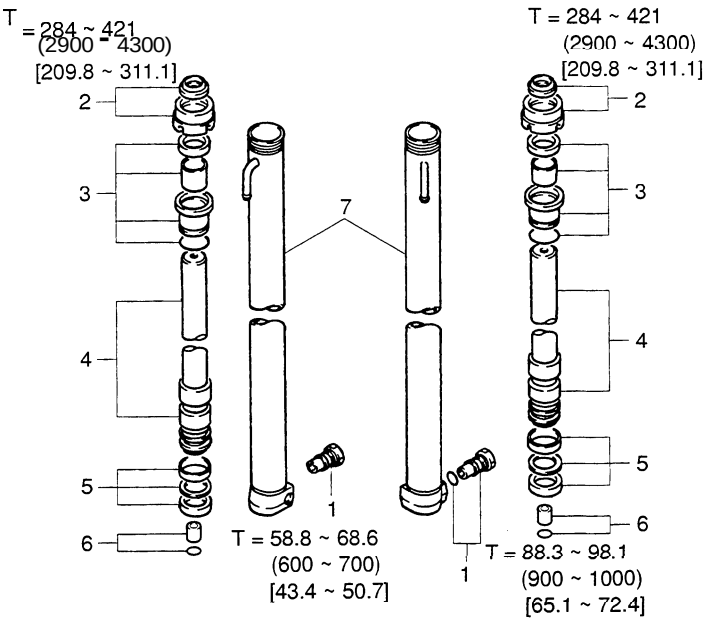



6503-106

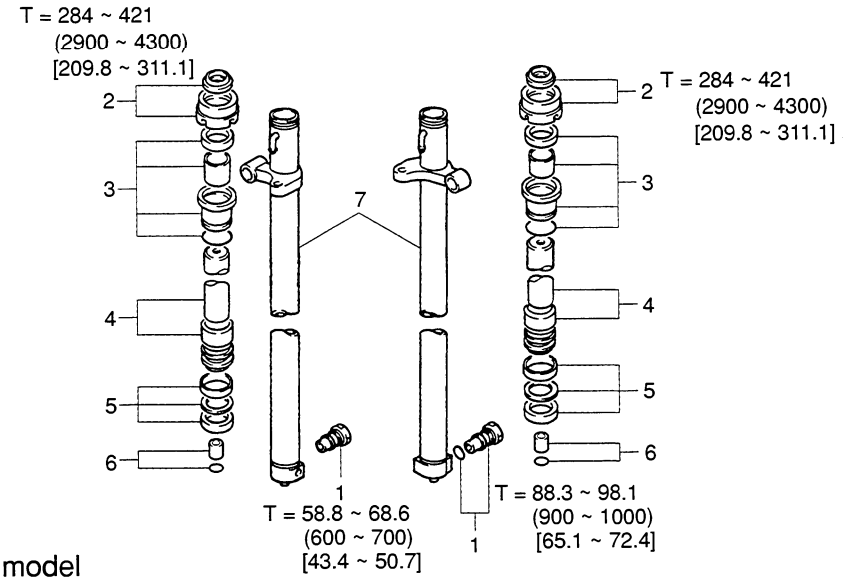
## DISASSEMBLY-INSPECTION-REASSEMBLY(FSV)

T = N•m (kgf-cm) [ft-lbf]

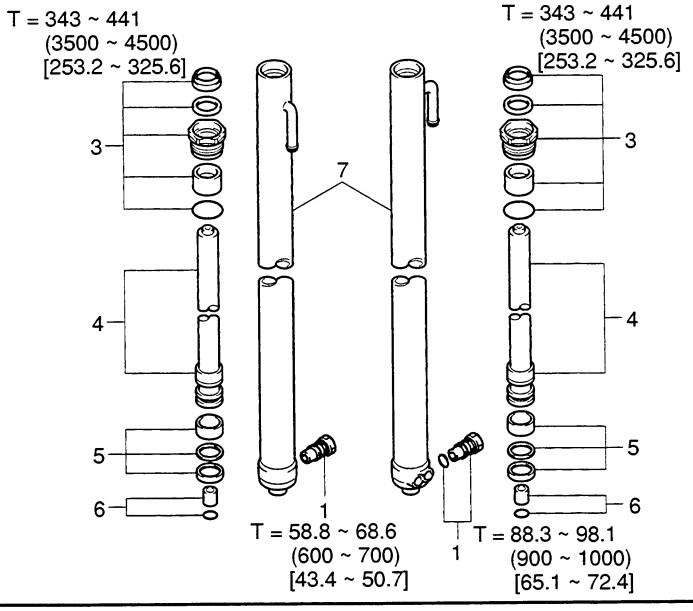
Pn35•40, Cu35 model




Pn45•50, Cu45 model

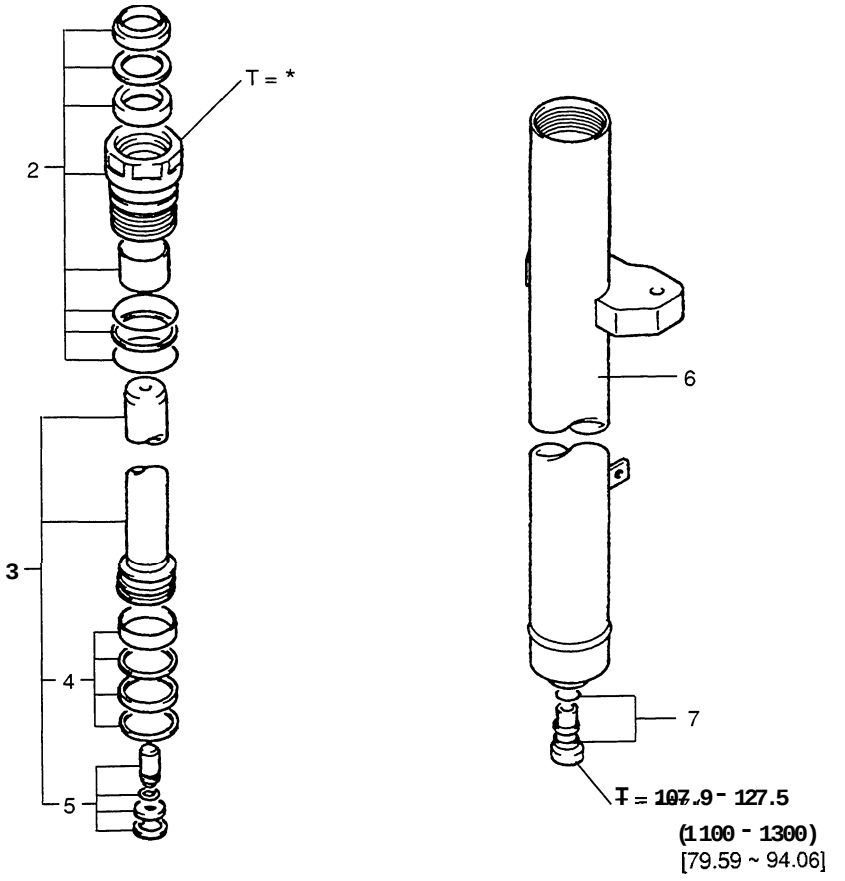



Pn60•70, Cu55 ~ 70 model



## DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf-cm) [ft-lbf]




*

| FV-FSV | | FSV |
|---|---|---|
| Pn35.40, Cu35 model | Pn45·Cu45 model | Pn50 - 70, Cu55 - 70 model |
| 343.2 ~ 441.3(3500 ~ 4500) [253.2~325.6] | 392 - 490(4000 - 5000)[289.4 ~ 361.81 | |

### Disassembly Procedure

1 Remove the chain wheel supporter.

2 Remove the cylinder rod guide.

3 Remove the piston rod. **[Point 1]**

4 Remove the wear ring and U packing.

5 Remove the check valve. **[Point 2]**

6 Remove the lift cylinder. **[Point 3]**

7 Remove the safety down valve.

# OIL PUMP

# PERFORMANCE TEST

As the performance test in servicing of the oil pump, judge the quality by the lifting speed of the lift cylinder by installing the oil pump on the vehicle. Bench test measurements shall be made for strict testing of the performance.

**Note:**
**The engine rpm and relief pressure shall be adjusted to satisfy respective standards.**
**(See the engine rpm adjustment procedure on page 1-9, and the relief pressure adjustment procedure on page 14-16, 14-17.)**

1. Set the engine tachometer.
2. Operate the oil pump for running in.

**Note:**
- **Do not operate material handling levers.**
- **Immediately stop the engine if any abnormality is observed.**

(1) Start the engine and operate at the idling speed to 1,000 rprn for 10 minutes.
(2) If no abnormality is found in the oil pump, operate for another 10 minutes by raising the engine speed to 1,500 to 2,000 rpm.

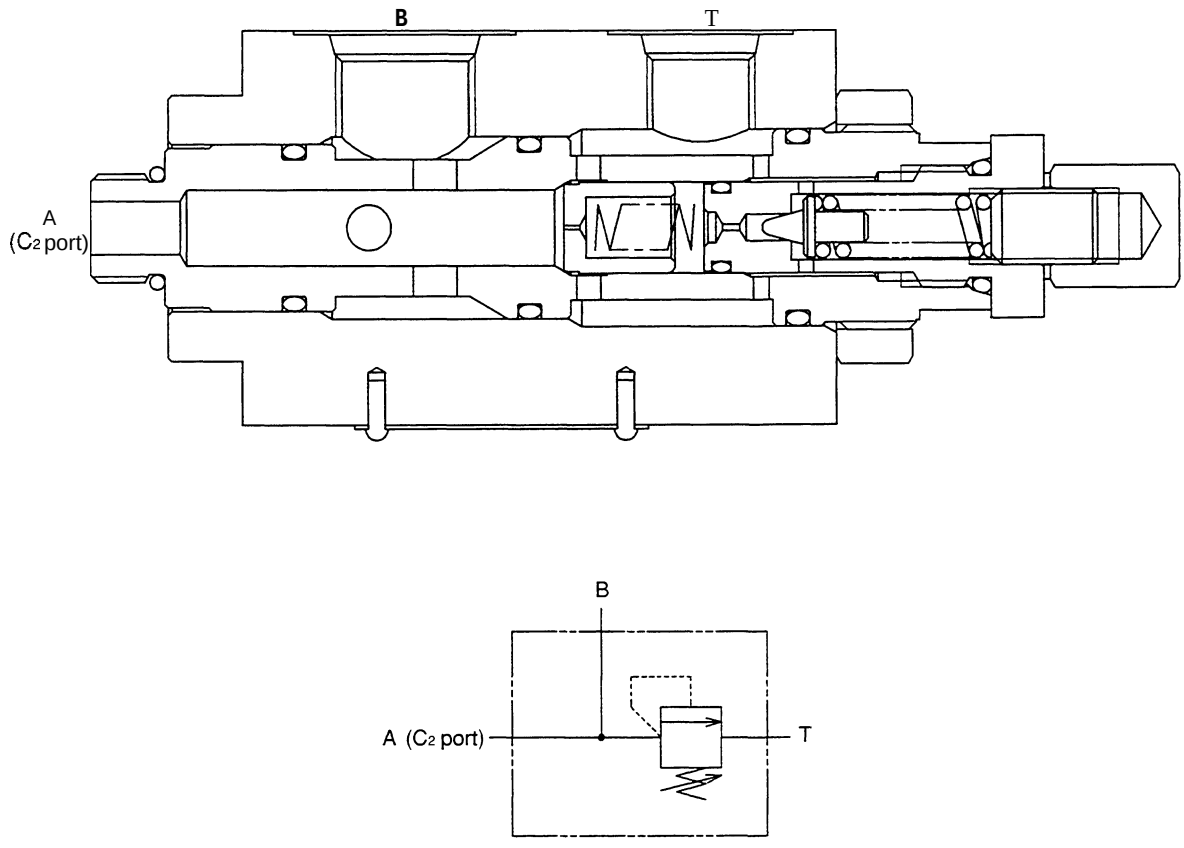
**3.** Measure the full-stroke lifting time of the lift cylinder, and calculate the lifting speed for performance judgment.

**Lifting Speed**

mm/sec (fpm)

| Model | Engine | V mast | | FV mast | | FSV mast | |
|---|---|---|---|---|---|---|---|
| | | Full load | No load | Full load | No load | Full load | No load |
| Pn35.40 | G4 (GM6-262) | 510 (101) | 550 (109) | 480 (95) | 520 (102) | 480 (95) | 520 (102) |
| | 132 | 510 (101) | 550 (109) | 480 (95) | 520 (102) | 480 (95) | 520 (102) |
| Pn45 | G4 (GM6-262) | 440 (87) | 480 (95) | 420 (83) | 440 (87) | 420 (83) | 440 (87) |
| | 132 | 480 (95) | 520 (102) | 440 (87) | 480 (95) | 440 (87) | 480 (95) |
| Pn50 | G4 (GM6-262) | 440 (87) | 480 (95) | | — | 420 (83) | 440 (87) |
| | 132 | 480 (95) | 520 (102) | — | — | 440 (87) | 480 (95) |
| Pn60 • 70 | G4 (GM6-262) | 410 (81) | 440 (87) | — | — | 410 (81) | 440 (87) |
| | 132 | 410 (81) | 440 (87) | — | — | 410 (81) | 440 (87) |
| Pn80 | G4 (GM6-262) | 370 (73) | 430 (85) | — | — | — | — |
| | 13Z | 370 (73) | 430 (85) | — | — | — | — |
| Cu35 | G4 (GM6-262) | 510 (101) | 550 (109) | 480 (95) | 520 (102) | 480 (95) | 520 (102) |
| Cu45 | G4 (GM6-262) | 440 (87) | 480 (95) | 420 (83) | 440 (87) | 420 (83) | 440 (87) |
| CU55 | G4 (GM6-262) | 420 (83) | 440 (87) | — | — | 400 (79) | 420 (83) |
| Cu60 • 70 | G4 (GM6-262) | 410 (81) | 440 (87) | — | — | 400 (79) | 420 (83) |

**Relief Valve (For Forward Tilt) (Pn60 ~ 80, Cu60·70 Model)**




## SPECIFICATIONS

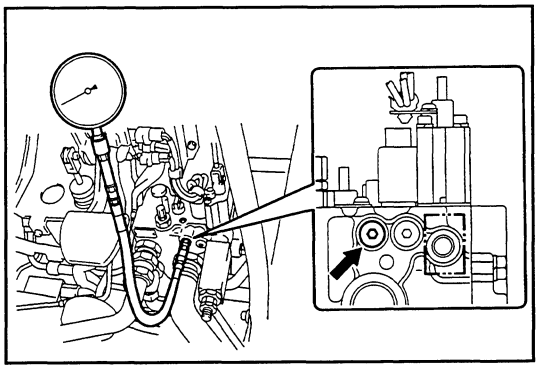
| Item \ Model | | Pn35 - 50 | Pn60 ~ 80<br>Cu60 · 70 | Cu35 - 55 |
|---|---|---|---|---|
| Oil control valve type | | Add-on type<br>(1-, 2-spool monoblock) | | |
| Relief set pressure<br>kPa (kgf/cm²) [psi] | Lift | 18140 (185) [2630] | 20590 (210) [2990]<br>(Forward tilt:<br>13240 (135) [1920])* | 18140 (185) [2630] |
| | Tilt | | | |
| Flow divider flow rate<br>ℓ/min (USgal/min) | | 17.0 (4.49) | 22.0 (5.81) | ← |
| Others | | Built-in flow divider valve | | |

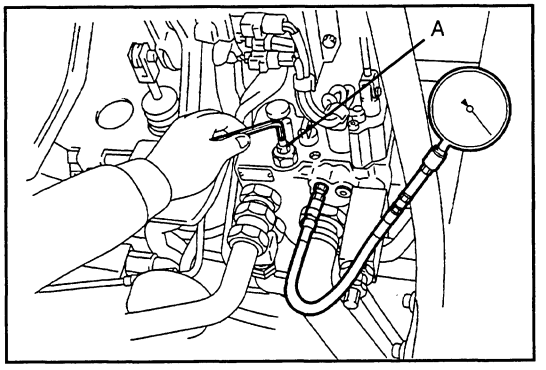
*: The relief set pressure on the forward tilt side is controlled by connecting another relief valve to the $C_2$ port.

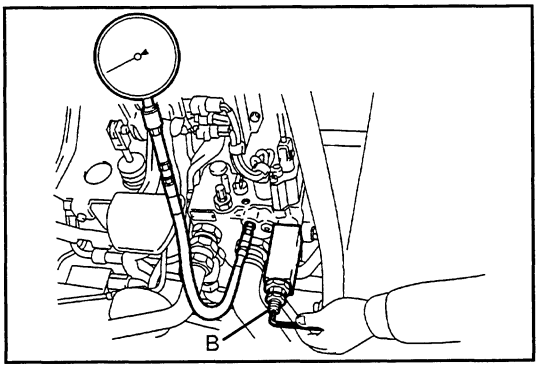
# RELIEF PRESSURE ADJUSTMENT (Pn60 ~ 80, Cu60·70 MODEL)

**Note:**

- **Always make adjustment according to the procedure described below. Careless adjustment may generate a high pressure to cause damage to the oil pump or other hydraulic devices.**
- **Always check that the no-load maximum speed is as specified.**






1. Install an oil pressure gauge.
   (1) Remove the oil pressure detection port plug (illustrated) installed on the front side of the oil control valve, and install the oil pressure gauge.
   Plug size: 9/16-18UNF-2B
2. See that the adjusting screw (A) is loosened.
   (1) Remove the cap nut and packing, loosen the lock nut, and loosen the adjusting screw (A) until it is about to come off from the body.
3. Start the engine, and check no oil leakage and abnormal noise generation.
4. Adjust the lift and tilt (backward) relief pressure.
   (1) Operate the tilt lever for backward tilting, and gradually tighten the adjusting screw (A) until the mast starts to be tilted backward.
   Tilt the mast fully backward.
   (2) With the engine running at the maximum speed, operate the tilt lever for backward tilting. Gradually tighten the adjusting screw (A) for adjustment of the pressure upon relief to the standard below, and lock the screw by means of the lock nut.

**Standard** kPa (kgf/cm$^2$) [psi]

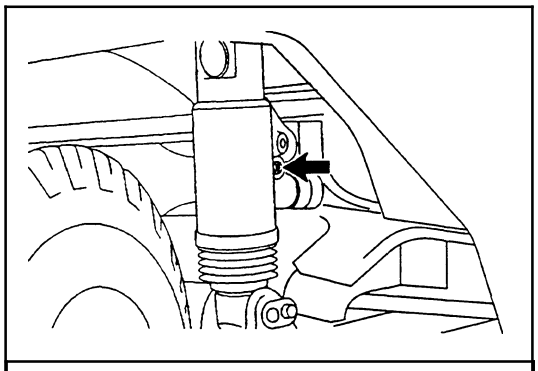
| | |
|---|---|
| For both tilt (backward) and lift | $20590^{+490}_{0}$ ($210^{+5}_{0}$) [$2990^{+70}_{0}$] |

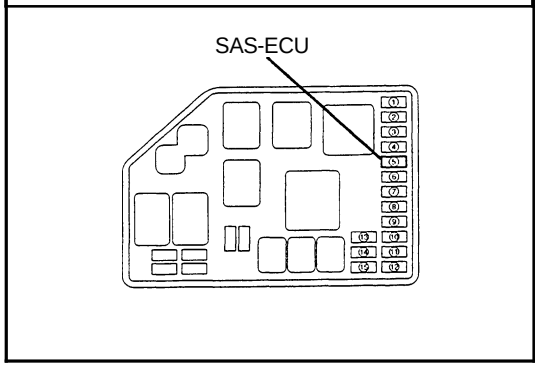
5. See that the adjusting screw (B) is loosened.
   (1) Remove the cap nut and packing, and loosen the adjusting screw (B) until it is about to come off from the body.
6. Adjust the tilt (forward) relief pressure.
   (1) Operate the tilt lever for forward tilting, and gradually tighten the adjusting screw (B) until the mast starts to be tilted forward.
   Tilt the mast fully forward.
   (2) With the engine running at the maximum speed, operate the tilt lever for forward tilting. Gradually tighten the adjusting screw (B) for adjustment of the pressure upon relief to the standard below.

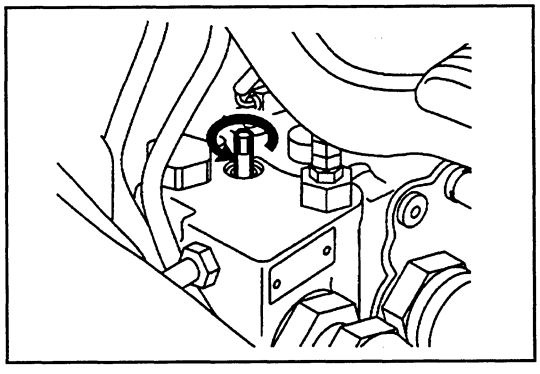
**Standard** kPa (kgf/cm$^2$) [psi]

| | |
|---|---|
| Tilt (forward) | $13240^{+490}_{0}$ ($135^{+5}_{0}$) [$1920^{+70}_{0}$] |

7. After the adjustment, place the packing, tighten the cap nut and check the relief pressure again.
8. Remove the oil pressure gauge, and tighten the plug.





3. Temporary measures

(1) If swing lock fails to unlock for some trouble when the key switch is turned ON, it may be unlocked manually for temporary action.
Loosen the illustrated plug of the swing lock cylinder by 1 to 2 turns for unlocking. Care should be taken not to over-loosen it. After the repair, tighten it properly.
**T = 8 ~ 10 N·m (80 ~ 100 kgf-cm)**
**[5.8 ~ 7.24 ft-lbf]**

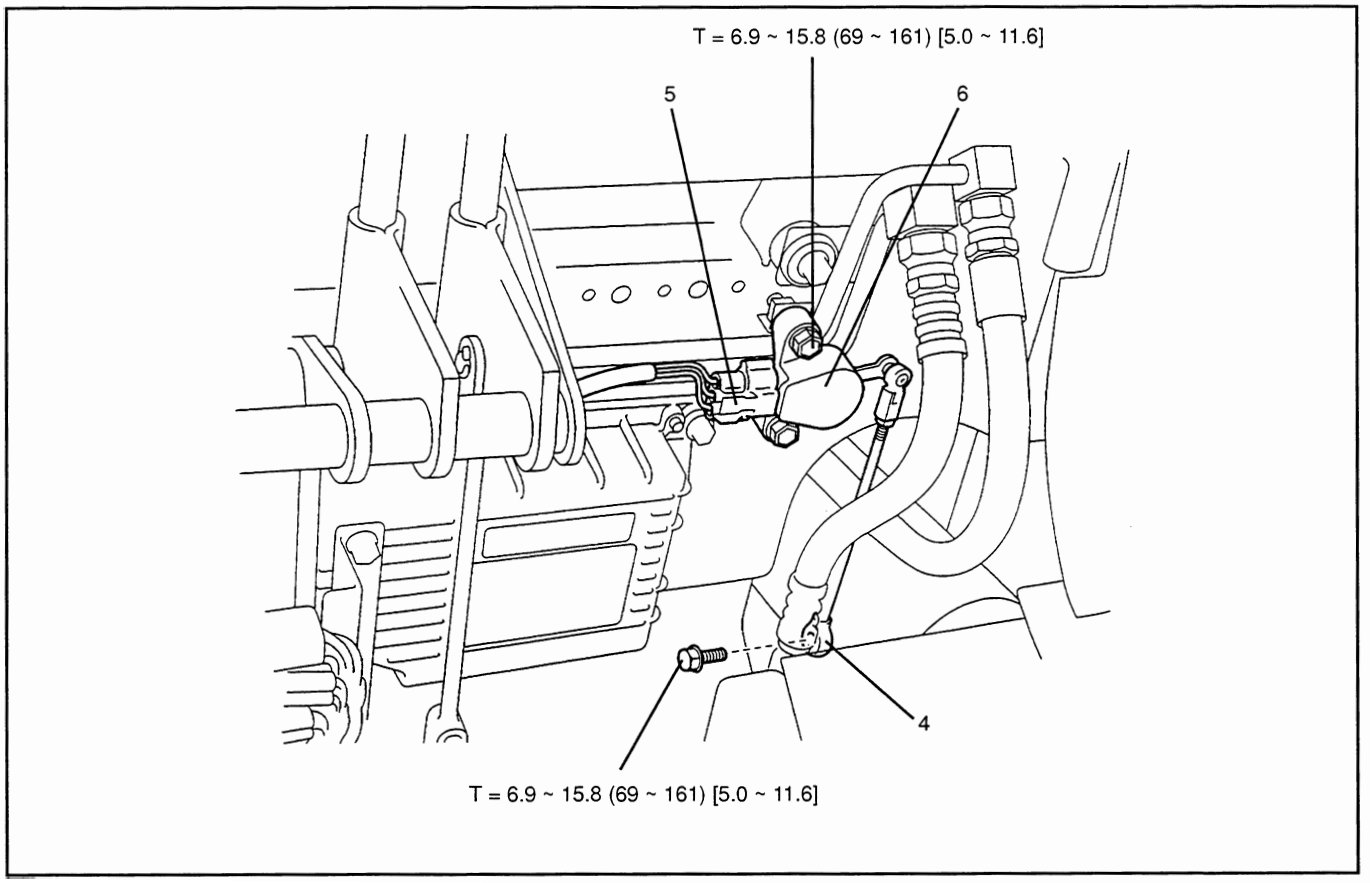
(2) If the mast should fail to tilt forward or backward because of the failure of the forward or backward tilt limit switch, tilting operation may be made by extracting SAS-ECU fuse in the relay box for temporary measure. Care should be taken in this case that SAS functions are suspended. The swing control enters the lock state.

(3) If the mast should fail to lower because of some trouble, it can be lowered manually.
Loosening the illustrated valve on the top of the oil control valve lowers the mast. Operate the lift lever for lowering with the manual lowering valve loosened.
After the repair, tighten it appropriately.

**T = 26.5 ~ 32.4 N·m (270 ~ 330 kgf-cm)**
**[19.5 ~ 23.9 ft-lbf]**

## TILT ANGLE SENSOR REMOVAL-INSTALLATION

T = N•m (kgf-cm) [ft-lbf]




### Removal Procedure

1 Remove the toe board.

2 Remove the lower panel.

3 Remove the instrument panel (RH).

4 Disconnect the tilt angle sensor link.

5 Disconnect the connector.

6 Remove the tilt angle sensor.

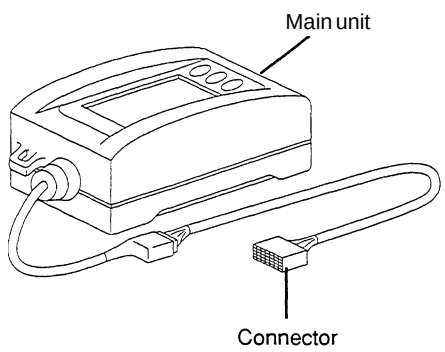
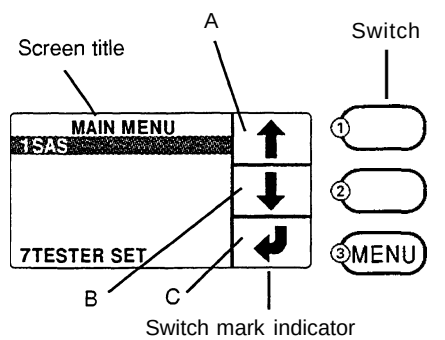
### Installation Procedure

Reverse the removal procedure.

**Note:**
- **Apply MP grease at the joint of the sensor and link rod end.**
- **When the tilt angle sensor is remove/installed or replaced, or when the length of the tilt angle sensor link is adjusted or replaced, proceed with the re-setting procedure. (Read 15-23.)**

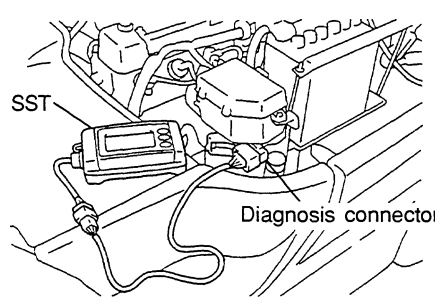
## BASIC OPERATION

Name of Sections and the Switch Functions

| Name of section | Position of indication | Mark | Function | Switch |
|---|---|---|---|---|
|  | A | ↑ | • Move the cursor to the above item.<br>• Move to the preceding page. | Selector switch ① |
| | | | • Move the cursor to right or left. | |
| | | SAVE | • Save the screen. | |
| | | SET | • Re-set the display screen. | |
| | | START | • Initialize the file. | |
| | | <Blank> | <No function> | |
|  | B | ↓ | • Select the item below.<br>• Move to the following page. | Selector switch ② |
| | | <Blank> | <No function> | |
| | C | ↵ | Determine an item for selection. | Menu switch ③ |
| | | <Blank> | • Move to MENU screen. | |

Caution on using:

- Keep the main unit, wire harness, connector, etc. away from the exhaust and other heated sections.
- Operate the switch with finger tip.
- Don't give it strong impact from dropping or collision.
- Don't leave it under the direct rays of the sun for long time.

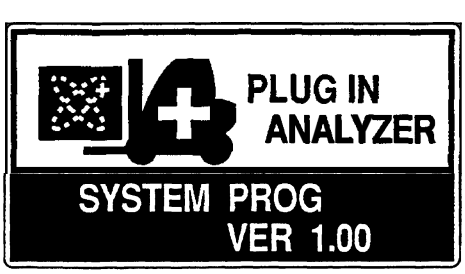



Connection and Operation of SST

1. Turn the key switch OFF.
2. Open the diagnosis connector cover of the vehicle and properly connect the connector on the SST side.
   SST 09240-23321-71

Note:
Since the connector has no locking device, securely connect it to prevent contact defect upon closing the engine hood with the connector in connected state.

3. Turn the key switch ON or start engine.



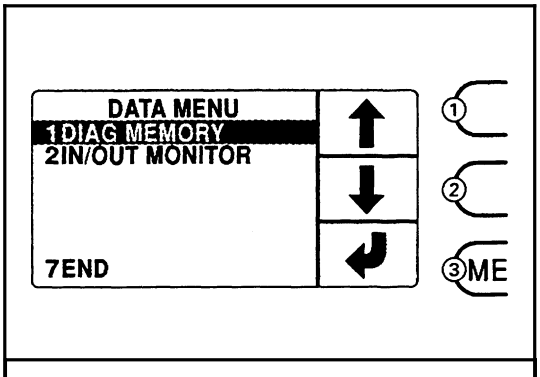

4. Display of the initialization screen
   After about 15 seconds of display, "LANGUAGE SET" or "MAIN MENU" screen appears. The screen may be changed during this period by pressing the menu switch ③.

**"4. DATA MANAGE"**

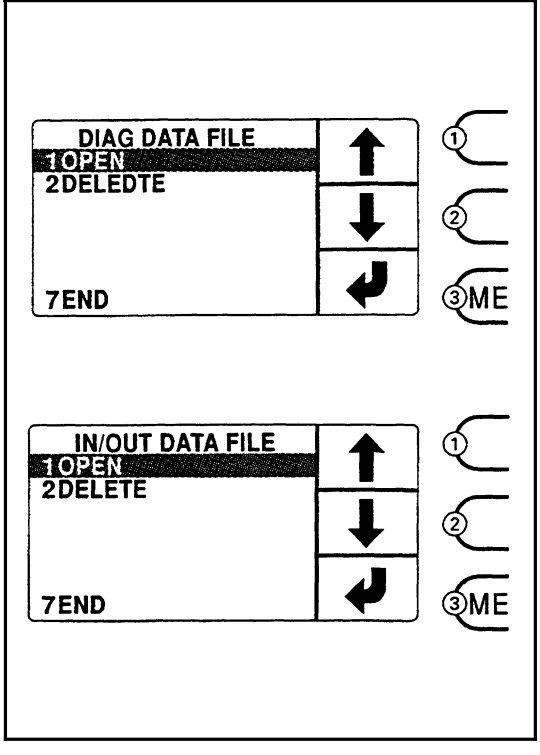
This menu has DATA MENU for DIAG MEMORY and IN/OUT MONITOR. It can display saved data of DIAG MEMORY and IN/OUT MONITOR or erase them.

File numbers on "OPEN" and "DELETE" screens indicate the number displayed when the saving ends normally, and the file number is displayed after processing it according to the following rules:

| Saved to: | | | File name | | Max. number of file |
|---|---|---|---|---|---|
| 1 DIAG MEMORY | | | Manufacturing number of the opposite SAS controller | Example: 800001 | 10 |
| 2 IN/OUT MONITOR | IN/OUT MENU | 1 SWING CONTROL | Add "S" to the end of the manufacturing number of the SAS controller. | Example: 800001S | Total: 20 |
| | | 2 MAST CONTROL | Add "T" to the end of the manufacturing number of the SAS controller. | Example: 800001T | |
| | | 3 ST. KNOB CONTROL | | — | |
| | | OTHER | Add "O" to the end of the manufacturing number of the SAS controller. | Example: 800001O | |




1. Select and enter "4. DATA MANAGE" on "ANALYZER MENU" screen and have "FILE MENU/DATA MENU" displayed on the screen.
2. "DATA MENU" screen
   Move the cursor to a desired menu on "DATA MENU" using selector switch ① and ②, enter it by pressing MENU switch ③ and move to "DIAG DATA FILE" or "IN/OUT DATA FILE."




3. "DIAG DATA FILE" screen
   "IN/OUT DATA FILE" screen
   (1) Select the menu using selector switch ① and ② and press MENU switch ③ to determine the setting.
   - OPEN: Moves to "FILE OPEN" screen. (Step 4)
   - DELETE:
     Moves to "FILE DELETE" screen. (Step 5)
   - END: Returns to "FILE MENU" screen.

| Error code | Content | Phenomenon generated to the machine | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Rear wheel swing control | | Mast tilt control | | | | |
| | | Lateral G lock | Yaw rate lock | Mast forward tilt angle control | Automatic horizontal stop control | Mast backward tilt speed control | Manual forward tilting operation | Manual backward tilting operation |
| 67 | Lifting height switch abnormality | Controlled as the lower lifting height | ← | Operates to a maximum forward tilt position | Stops when knob switch is turned ON | ← | Normal control | Backward tilting speed is faster for a high lifting height |
| (AF)*1 | Controller abnormality | Constant locking | ← | Operable to a maximum forward tilt position | Does not stop horizontal | Slower backward tilting speed for a lower lifting height | Normal control | Slower backward tilting speed for a lower lifting height |
| EF | Controller abnormality | Constant locking | ← | Operable to a maximum forward tilt position | Does not stop horizontal | Slower backward tilting speed for a lower lifting height | Normal control | Slower backward tilting speed for a lower lifting height |
| F1*2 | Communication abnormality between the controller and the hour meter | Normal control | ← | Normal control | ← | ← | ← | ← |

*1: Stores sub-error codes only to the SAS control without display on the hour meter.

*2: Because of an error code output by the hour meter, no storage is made on the SAS controller.

*3: If an error is detected in the locked state, locking is maintained until the ignition switch is turned OFF.

Error code 54-1

Inspect for disconnection and internal wetting of the CN1, CN4, CN7, and CN11 connectors.
NG → Inspection 1
After correction, make sure that the SAS lamp goes out.
NG

OK

Inspection 2
Inspect continuity with the diode (between CN1-25 and frame).
NG → Diode defect.

OK

Inspection 3
Inspect continuity between harness CN1-25 and CN11-1, between the SWN line and frame, and between CN11-2 and frame.
NG → Harness defect.

OK

Inspection 4
Resistance between solenoid CN11-1 and CN11-2 and inspect continuity between CN11-1 and frame.
NG → Solenoid defect.

OK

Controller defect.

Inspection 1:

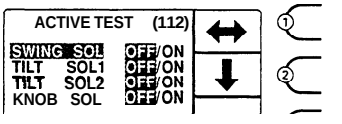
After correction, make sure that the SAS larnp goes out.

Connect all connectors then turn the ignition switch ON (stop the engine).

Analyzer: MAIN MENU → SAS MENU +ANALYZER MENU → ACTIVE TEST

**Standard:**

The SAS larnp shall not blinkupon returning to the ANALYZER MENU by setting the SWING SOL to ONH (for 1 second or more) and OFF (for 1 second or more).



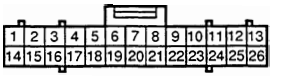

↓

Return to the ANALYZER MENU.

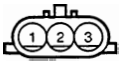
Inspection 1:
Inspect continuity between CN1 and CN27.

Turn the ignition switch OFF and disconnect CN1 and CN27.

**Standard:**
CN1-14 ~ CN27-1: Continuity shall exist.
CN1-17 ~ CN27-2: Continuity shall exist.
CN1-14 ~ CN1-22: No continuity.
CN1-17 ~ CN1-22: No continuity.



CN1 (REC)



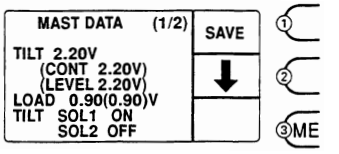
CN27 (REC)

Inspection 2:
Inspect the potential change upon tilt operation.

Turn the ignition switch ON (start the engine).

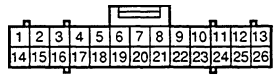
Analyzer: MAIN MENU → SAS MENU + ANALYZER MENU → IN OUT MENU → MAST DATA

**Standard:**
The tilt value shall be 0.1 ~ 4.8 V when the mast is tilted fully backward from the full forward position. The value shall rise as the mast is tilted backward.



Inspection 1:
Inspect resistance through the tilt solenoid No.1 wiring.

Turn the ignition switch OFF and disconnect CN1.



CN1 (REC)

**Standard:**
CN1-13 (Digital circuit tester ⊕) - CN1-24 (Digital circuit tester ⊖): Resistance Approx. 10 Ω
CN1-13 (Analog circuit tester ⊖) ~ CN1-24 (Analog circuit tester ⊕): Resistance Approx. 10 Ω

Inspection 2:
Inspect resistance through the tilt solenoid No.1 only.

Turn the ignition switch OFF and disconnect CN12.

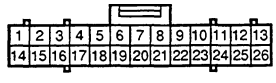
CN12 (TAB)

**Standard:**
CN12-1 (Digital circuit tester ⊕) - CN12-2 (Digital circuit tester ⊖): Resistance Approx. 10 Ω
CN12-1 (Analog circuit tester ⊖) ~ CN12-2 (Analog circuit tester ⊕): Resistance Approx. 10 Ω

Inspection 3:
Inspect continuity between CN1 and CN12.

Turn the ignition switch OFF and disconnect CN1 and CN12.

**Standard:**
CN1-13 - CN12-1: Continuity shall exist.
CN1-24 - CN12-2: Continuity shall exist.
CN1-13 ~ CN1-24: No continuity.



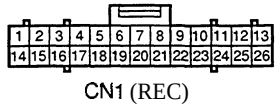
CN1 (REC)

CN12 (REC)

Inspection **4:**
Inspect continuity between the tilt solenoid No.1 + line and power (12 V) line.

Turn the ignition switch OFF and disconnect CN1.

**Standard:**
CN1-11 ~ CN1-13: No continuity.



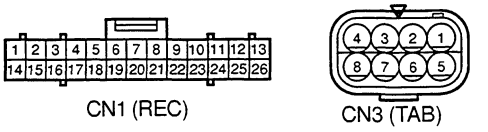
CN1 (REC)

Inspection 4:
Inspect continuity between CN1 and CN3.

Turn the ignition switch OFF and disconnect CN1 and CN3.

(1) If continuity does not exist between connector terminals in which continuity should exist in inspection 3:

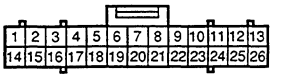
**Standard:**
CN1-23 - CN3-3: Continuity shall exist.
CN1-3 - CN3-7: Continuity shall exist.
CN1-4 - CN3-4: Continuity shall exist.



CN1 (REC) CN3 (TAB)

(2) If continuity exist between connector terminals in which continuity should not exist in inspection 3:

**Standard:**
CN1-23 - CN1-3: No continuity.
CN1-23 - CN1-4: No continuity.
CN1-3 - CN1-4: No continuity.



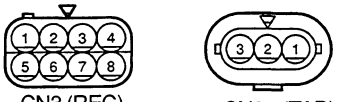
CN1 (REC)

Inspection 5:
Inspect continuity between CN3 and CN31.

Turn the ignition switch OFF and disconnect CN3 and CN31.

(1) If continuity does not exist between connector terminals in which continuity should exist in inspection 3:

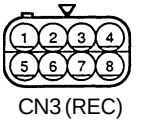
**Standard:**
CN3-3 ~ CN31-1: Continuity shall exist.
CN3-7 ~ CN31-2: Continuity shall exist.
CN3-4 ~ CN31-3: Continuity shall exist.



CN3 (REC) CN31 (TAB)

(2) If continuity exists between connector terminals in which continuity should not exist in inspection 3:

**Standard:**
CN3-3 - CN3-7: No continuity.
CN3-3 - CN3-4: No continuity.
CN3-7 ~ CN3-4: No continuity.



CN3 (REC)

Inspection 4:

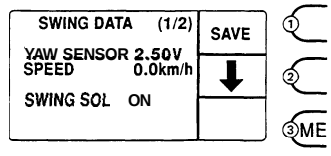
① Let the vehicle travel with acceleration on a circle whose radius is approx. 2 m (79 in), and check if the yaw sensor voltage variation is appropriate (check for each of right and left turns).

Analyzer: MAIN MENU → SAS MENU -+ANALYZER MENU → IN OUT MENU → SWING DATA

**Standard:**

At a low fork height with no load, travel with gradual acceleration (a t a speed of 5 to 6 km/h (3.1 ~ 3.7 mile/h)) on a circle whose radius is approx. 2 m (6.6 ft) (with respect to the center of the vehicle). The yaw sensor voltage shall vary smoothly.

| | |
|---|---|
| In right turn | 2.5 V (stationary state) → approx. 3.0 V |
| In left turn | 2.5 V (stationary state) → approx. 2.0 V |



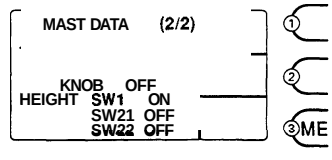

Inspection 5:

Check functioning of each fork height switch (ON/OFF of fork height SW1 and SW21).

Analyzer: MAIN MENU → SAS MENU -+ANALYZER MENU → IN OUT MENU → MAST DATA

**Standard:**

① Lift and lower the fork at around 2,200 mm (86.6 in) to actuate the fork height switch.
Only fork height SW1 is ON at a low fork height (below the fork height switch).
Only SW21 is ON at a high fork height (above the fork height switch).



With analyzer

Inspect for link bending and damages of the tilt angle sensor.
NG → After repair, check active fork leveling.
OK
Inspection 1
Inspect the tilt angle sensor.
NG → Tilt angle sensor defect.
OK
Inspection 2
Inspect the stored leveling value of the tilt angle sensor.
NG → After re-setting again, check active fork leveling.
OK
Controller defect.

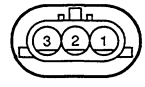
Inspection 1:
Inspect the tilt angle sensor.

Turn the ignition switch OFF and remove the tilt angle sensor.

**Standard:**

| | |
|---|---|
| CN27-1 ~ CN27-3 | 1.5kΩ ± 0.3kΩ |

| | Sensor lever free | Sensor lever with full-stroke |
|---|---|---|
| CN27-2 ~ CN27-3 | 0kΩ | 1.5kΩ ± 0.3kΩ |



CN27 **(TAB)**

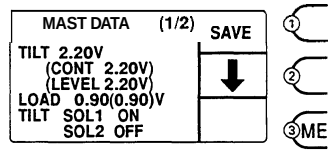
Inspection 2:
Inspect the stored leveling value of the tilt angle sensor.

Turn the ignition switch ON (start the engine).

Analyzer: MAIN MENU → SAS MENU + ANALYZER MENU → IN OUT MENU → MAST DATA

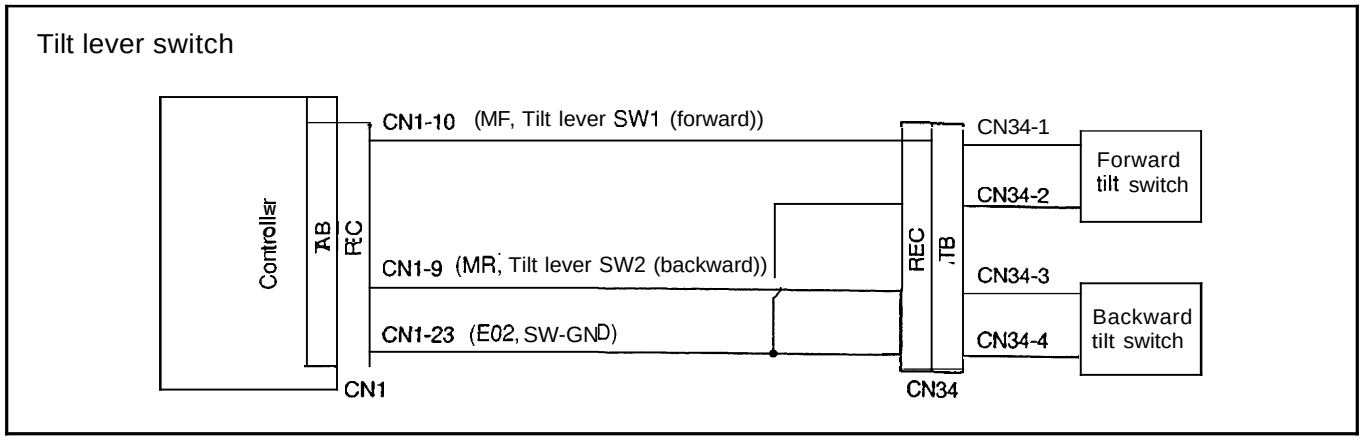
**Standard:**
The TILT value shall be the LEVEL value ± 0.05 V when the mast is upright.

**Note:**
**Set the mast slowly forward from the backward-tilted position.**



- **The mast does not perform forward/backward tilt.**

**Related Portion**




Without analyzer

OK — Neither forward nor backward tilting fails.

NG

Check CN34 connector for disconnection. — NG → Check tilting operation after correction. — NG

OK

Inspection 1
Check the tilt lever switch wiring for continuity. — OK → Touch tilt solenoid No.1 (solenoid valve on the upper rear side (truck FWD) of the control valve) and check the solenoid operating sound when the tilt lever is operated.(Check with the engine in stopped state.)*

- NG → Sticking defect of the controlvalvefor solenoid No.1.
- OK → Controller defect.

NG

Inspection 2
Check continuity of the tilt lever switch alone (without removal from the vehicle). — OK → Inspection 3
Check continuity between CN1 and CN34.

- NG → Harness defect.
- OK → CN34 connector defect.

NG

Inspection 4
Check continuity of the tilt lever switch alone (after removal from the vehicle). — NG → Tilt lever switch defect.

OK

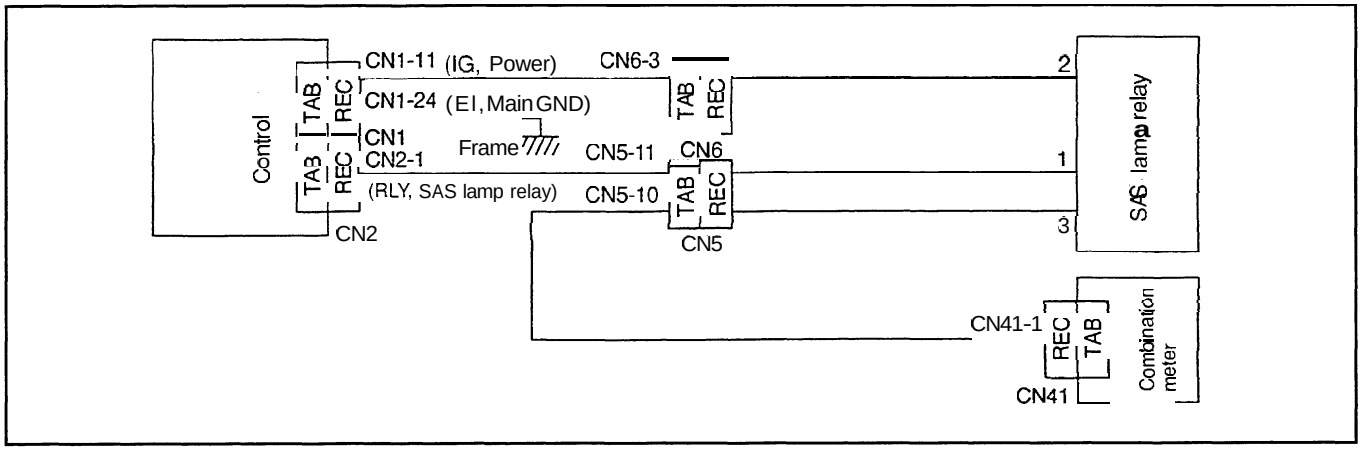
Tilt lever switch installation defect.

Go to the next page.

* Since the solenoid may be hot after lifting operation, carefully prevent the hand from getting scalded.

● **The SAS warning lamp is always lit.**

**Related Portion**




**Estimated Causes:**

① Re-setting not complete
② SAS-ECU fuse defect
③ Connector contact defect
④ Power system harness defect
⑤ SAS lamp relay defect
⑥ Low battery voltage
⑦ Controller defect

Re-setting complete (when the controller is replaced).
NG → After re-setting, SAS lamp indication.
OK
NG

Inspect the SAS-ECU fuse.
NG → After correction, SAS lamp indication.
OK
NG

Inspect for slip off of the CN1, CN2, CN5, CN6, and CN41 connectors.
NG → After correction, SAS lamp indication.
OK
NG

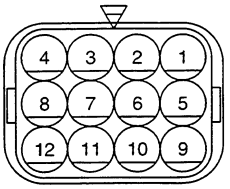
Inspection 1
Inspect continuity between CN1 and CN6, between CN2 and CN5, between CN1 and the frame, between CN6 and the relay block, between CN5 and the relay block, and between CN5 and CN41.
NG → Harness defect.
OK

Inspection 2
Inspect the supply voltage of the controller.
NG → Defect of the power supply harness before the relay block.
SAS-ECU fuse defect. Battery voltage defect.
OK

Inspection 3
Inspect the SAS lamp relay.
NG → SAS lamp relay defect.
OK

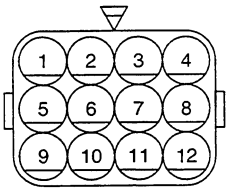
Controller defect.

# CN5




TAB

| No. | C | J |
|---|---|---|
| 1 | R-L | * |
| 2 | R-B | * |
| 3 | R-W | * |
| 4 | G-Y | * |
| 5 | R-G | * |
| 6 | W | * |
| 7 | LG-B | * |
| 8 | G | * |
| 9 | G-W | * |
| 10 | P-G | CN41-1, CN37-1 |
| 11 | L-W | CN2-1 |
| 12 | W-B or B/W-B (UL-S) | * /W/SPLICE-B (UL-S) |




REC

| No. | C | J |
|---|---|---|
| 1 | R-L | * |
| 2 | R-B | * |
| 3 | R-W | * |
| 4 | G-Y | * |
| 5 | R-G | * |
| 6 | W | * |
| 7 | LG | * |
| 8 | G | * |
| 9 | G-W | * |
| 10 | P-G | SAS LAMP RLY-3 |
| 11 | L-W | SAS LAMP RLY-1 |
| 12 | B-Y/ W-B (UL-S) | * /SAS LAMP RLY-4 (UL-S) |

## TORQUE CONVERTER & TRANSMISSION ASSY

| | | | |
|---|---|---|---|
| Transmission cover & control valve | | | |
| Regulator valve spring free length mm (in) | Inner | Standard | 153.5 (6.043) |
| | | Limit | 135.5 (5.315) |
| | Outer | Standard | 148.0 (5.827) |
| | | Limit | 131.0 (5.157) |
| Accumulator spring free length mm (in) | Inner | Standard | 150.0 (5.906) |
| | | Limit | 135.0 (5.315) |
| | Outer | Standard | 153.5 (6.043) |
| | | Limit | 138.5 (5.453) |
| Inching regulator spring free length mm (in) | | Standard | 27 (1.06) |
| | | Limit | 24 (0.94) |
| Inching return spring free length mm (in) | | Standard | 63.3 (2.49) |
| | | Limit | 58 (2.28) |
| Torque converter | | | |
| Pump boss outside diameter mm (in) | | Standard | 70.00 (2.7559) |
| | | Limit | 69.85 (2.7450) |
| Stator (No.2) roller outside diameter mm (in) | | Standard | 8.30 (0.3268) |
| | | Limit | 8.17 (0.3217) |
| Stator (No.2) hub to cam clearance mm (in) | | Standard | 0.03 - 0.07 (0.0012 - 0.0028) |
| | | Limit | 0.15 (0.0059) |
| Stator **shaft** No.2 **&** oil pump | | | |
| Stator shaft outside diameter (at portion in sliding contact with oil pump gear) mm (in) | | Standard | 55.0 (2.165) |
| | | Limit | 54.9 (2.161) |
| Driven gear to pump body clearance mm (in) | | Standard | 0.12 - 0.20 (0.0047 ~ 0.0078) |
| | | Limit | 0.3 (0.012) |
| Pump drive gear bush to stator shaft clearance mm (in) | | Standard | 0.03 ~ 0.079 (0.0012 ~ 0.00311) |
| | | Limit | 0.15 (0.0059) |
| Pump body surface to drive/driven gear clearance mm (in) | | Standard | 0.05 - 0.10 (0.0020 ~ 0.0039) |
| | | Limit | 0.13 (0.0051) |

| Tightening torque | Unit: N·m (kgf-cm) [ft-lbf] | | | |
|---|---|---|---|---|
| Lift cylinder cover FV rear cylinder cover | V: Pn35 - 80, Cu35 - 70 | | Standard | 343.2 - 441.3 (3500 ~ 4500) [253.2 ~ 325.61 |
| | Pn35 - 45 | RH cyl. | Standard | 343.2 - 441.3 (3500 ~ 4500) [253.2 - 325.61 |
| | Cu35.45 | LH cyl. | Standard | 284 - 421 (2900 ~ 4300) [209.8 ~ 311. l] |
| FSV rear cylinder | Lift cylinder cover | Pn35 - 50 Cu35·45 RH, LH | Standard | 284 - 421 (2900 ~ 4300) [209.8 - 311. l] |
| | Lift cylinder rod guide | Pn60·70 Cu55 - 70 RH, LH | Standard | 343 - 441 (3500 - 4500) [253.2 - 325.61 |
| Flow regulator valve | | | Standard | 88.3 ~ 98.1 (900 ~ 1000) [65.12 ~ 72.351 |
| Safety down valve | | | Standard | 58.8 - 68.6 (600 - 700) [43.4 - 50.61 |
| Front lift cylinder cover | FV FSV | Pn35·40, Cu35 | Standard | 343.2 ~ 441.3 (3500 - 4500) [253.2 - 325.61 |
| | | Pn45, Cu45 | Standard | 392.3 - 490.3 (4000 - 5000) [289.4 ~ 361.81 |
| | FSV | Pn50 ~ 70 Cu55 - 70 | | |
| Tilt cylinder piston castle nut | | | Standard | 245.2 - 343.2 (2500 - 3500) [180.9 - 253.21 |
| Tilt cylinder cover | | | Standard | 343.2 ~ 441.3 (3500 - 4500) [253.2 - 325.61 |

# FUEL SYSTEM (LPG EXCLUSIVE), ELECTRONIC GOVERNOR CONTROL SYSTEM, IGNITION SYSTEM, 3 WAY CATALYTIC SYSTEM