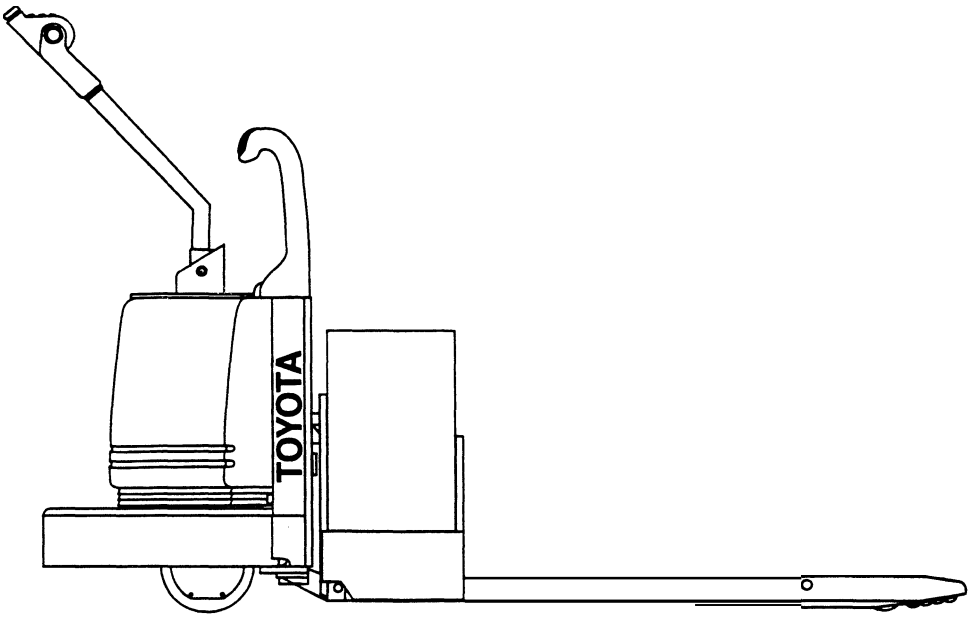


Models **6HBW30, 6HBE30, 6HBE40, 6HBC30, 6HBC40, 6TB50**

Serial No.: 20011 and Up

00700-CL380 Issued: **8/29/97**

Battery Safety

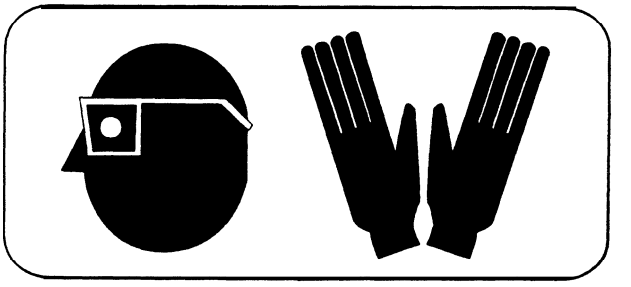
⚠WARNING

As a battery is being charged, an explosive gas mixture forms within and around each cell. If the area is not properly ventilated, this explosive gas can remain in or around the battery for several hours after charging. Be sure there are no open flames or sparks in the charging area. An open flame or spark can ignite this gas, resulting in serious damage or injury.

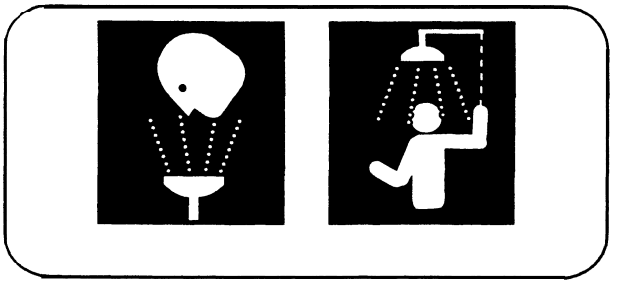
⚠WARNING

Battery electrolyte is a solution of sulfuric acid and water. Battery acid causes burns. Should any electrolyte come in contact with your clothing or skin, flush the area immediately with cold water. Should the solution get on your face or in your eyes, flush the area with cold water and get medical help immediately.

Wear personal protective equipment to protect eyes, face and skin when checking, handling or filling batteries. This equipment includes goggles or face shield, rubber gloves (with or without arm shields) and a rubber apron.



Make sure a shower and eyewash station are nearby in case there is an accident.

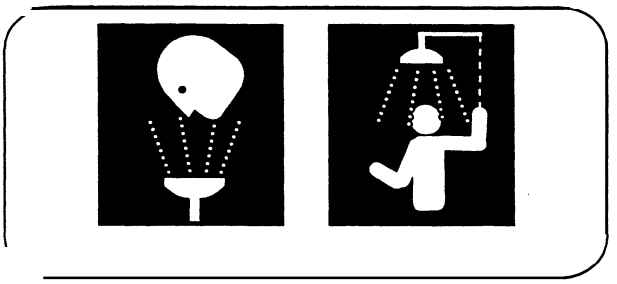


Welding Safety

⚠WARNING

Flame cutting or welding on painted surfaces may produce potentially harmful fumes, smoke and vapors. Prior to performing flame cutting or welding operations, it is recommended that the coating be removed in the vicinity where the operation(s) will be performed.

Coating removal may be by mechanical methods, chemical methods or a combination of methods. Flame cutting and/or welding operations should be carried out only in well ventilated areas using local exhaust if necessary.



Before working on this truck, make sure that:

- Fire protection equipment is nearby.
- You know where the nearest eyewash station is.
- Disconnect the battery before you attempt to inspect, service or repair the lift truck. Discharge residual charge in the motor controller by pressing the horn button.
- Check for shorts to frame as described on See "Checking for Shorts from Battery to Truck Frame" on page 5-4. If any shorts are detected, remove them before you proceed with the welding operation.
- Clean the area to be welded.
- Protect all truck components from heat, weld spatter and debris.
- Attach the ground cable as close to the weld area as possible.
- Do not perform any welding operations near the electrical components.

Scheduled Maintenance

Electrical Troubleshooting Guidelines

Many problems are caused by a faulty or dirty battery. Make sure the battery is clean. Check the electrolyte level and state of charge. See "Battery Safety" on page 2-7. Be sure to block the truck whenever a troubleshooting procedure requires turning key switch SW1 ON. This will avoid accidents caused by unexpected truck travel.

A CAUTION

Unless otherwise directed, disconnect the battery connector when you check electrical circuits or components with an ohmmeter. Electrical current can damage the ohmmeter.

Save time and trouble by looking for simple causes first.

Visually inspect all wiring and electrical components for:

- Loose connections or connectors
- Loose or broken terminals
- Damaged terminals, blocks, or strips.
- Broken wiring and shorted conditions (especiallythose that are close to metal edges or surfaces)

Use an ohmmeter to check for wiring continuity.

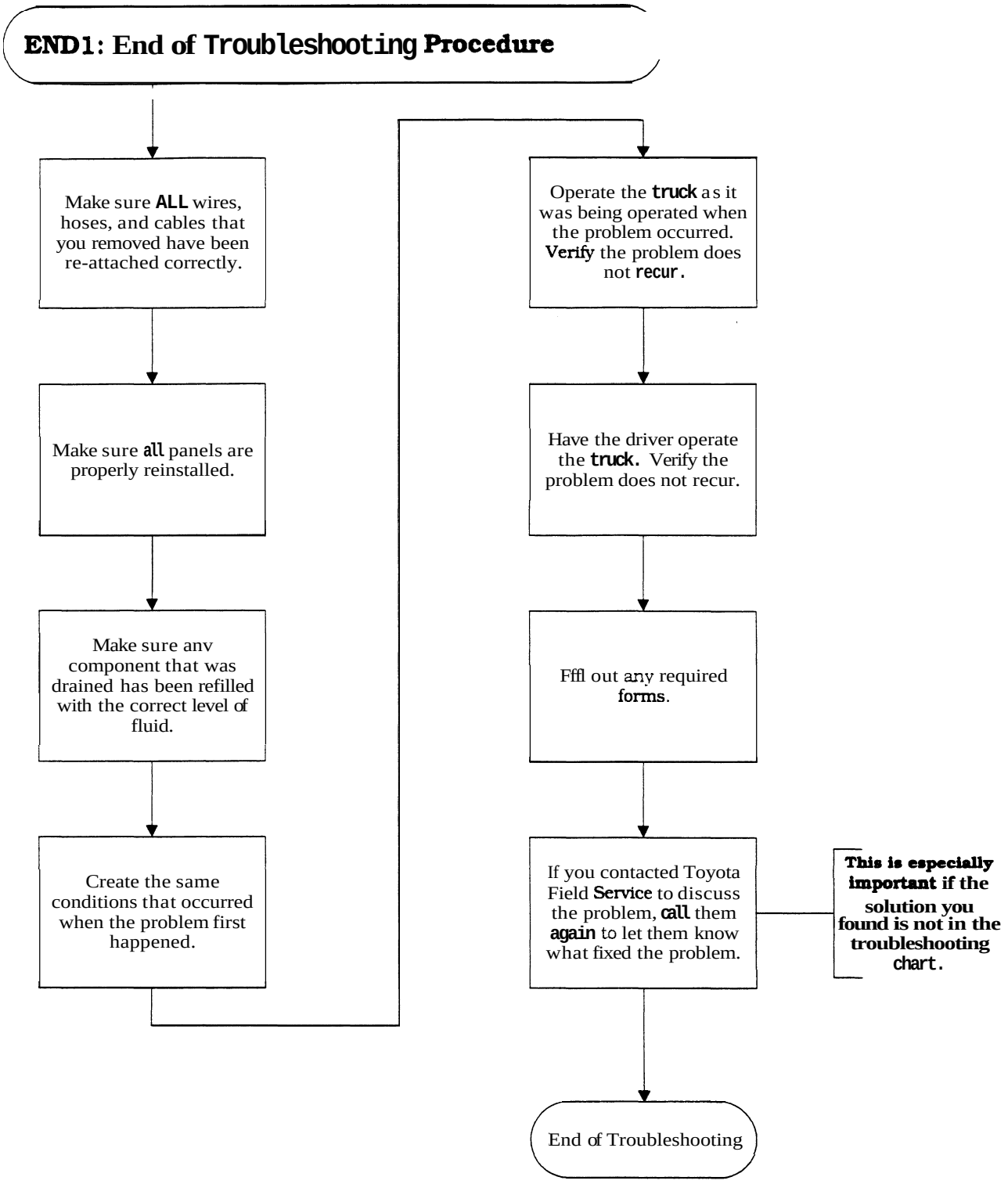
For information on pin, connector, and harness connections, see "Wiring Harness" on page 6-16.

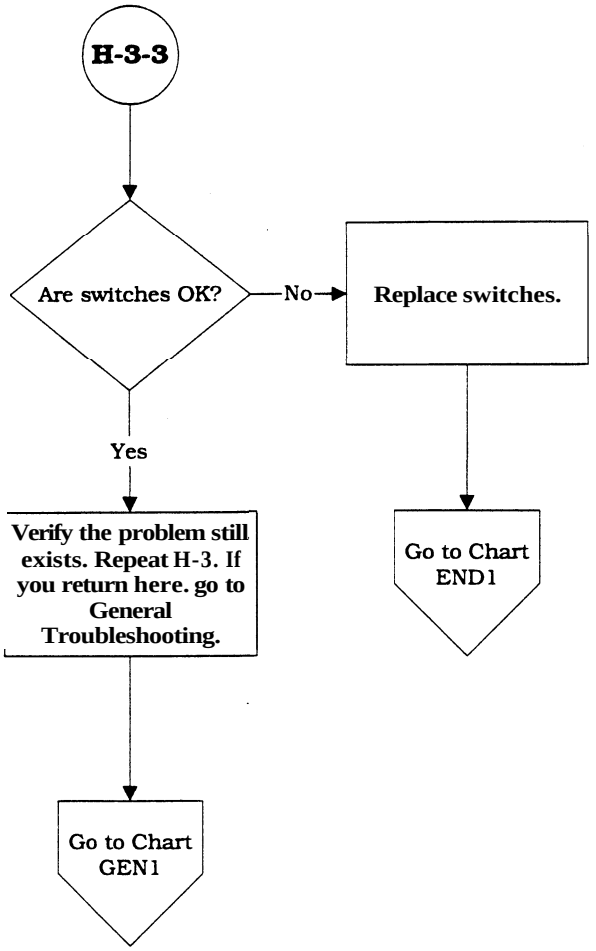
3. Connect the PMT to the motor controller.
4. Connect the battery and turn the key switch on.
5. Hold the more info key, and press diagnostics key.

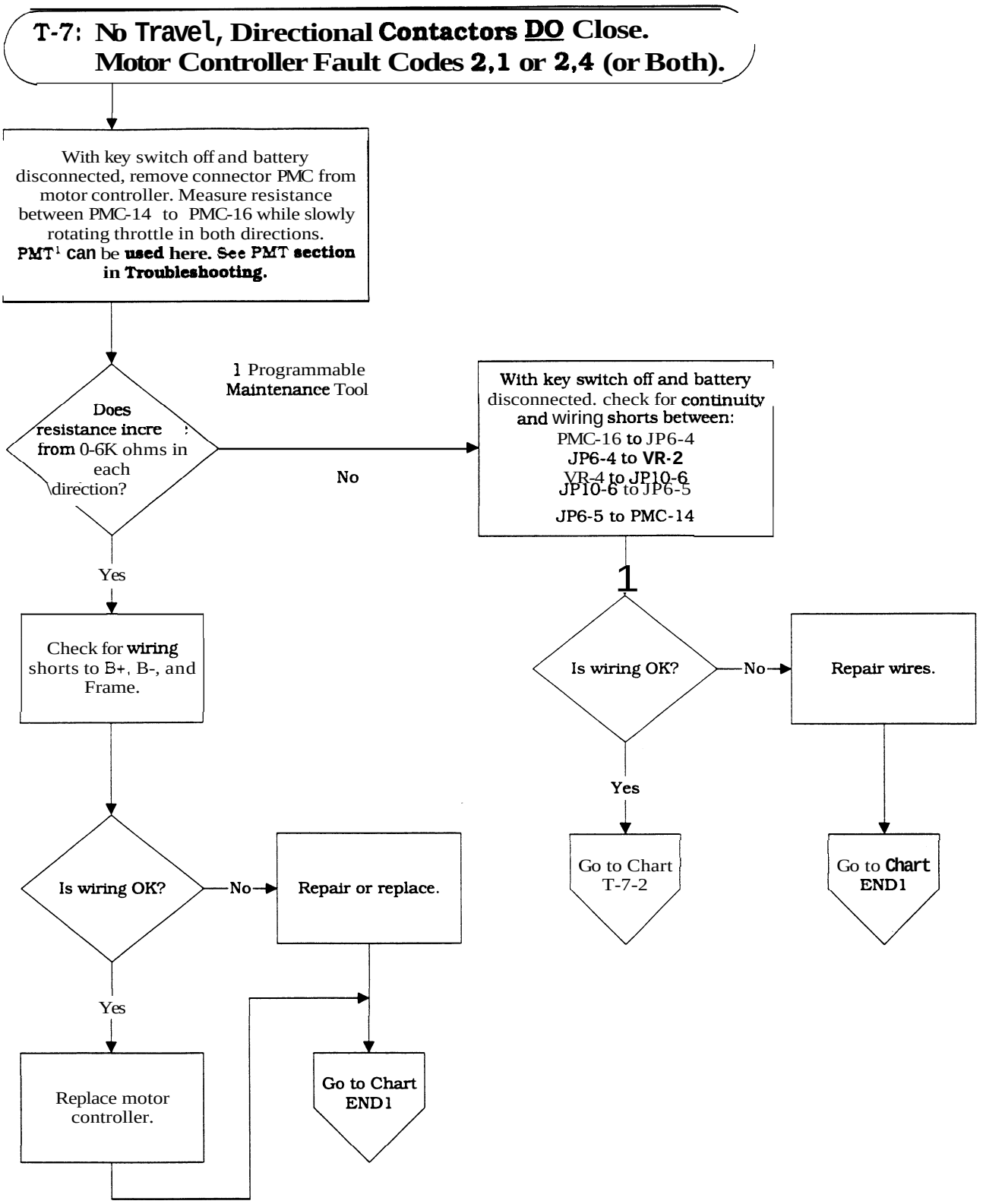
Clear

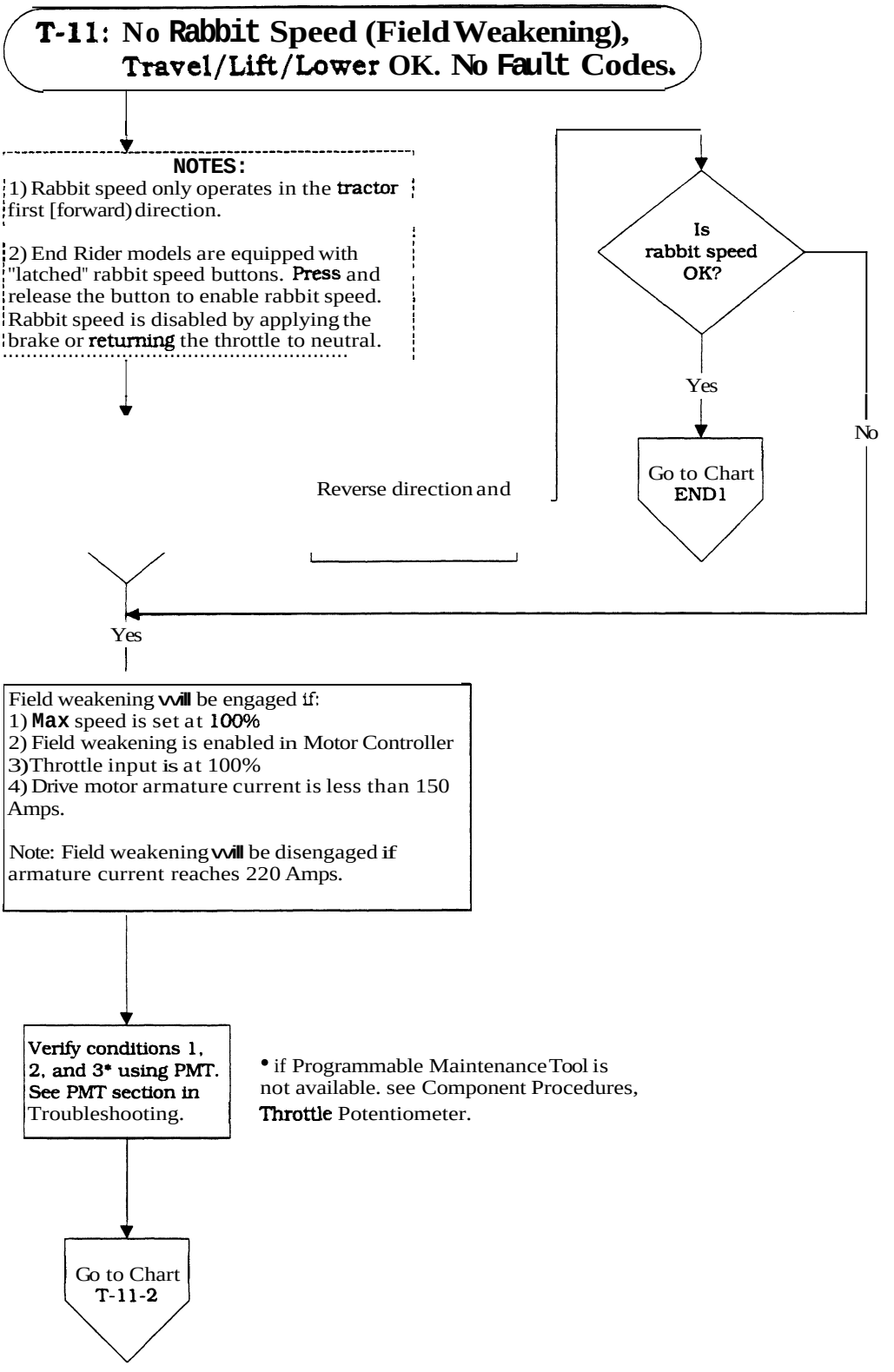
After you have diagnosed and corrected the problem, you should clear the diagnostic history file. This allows the motor controller to accumulate a new file of faults. By checking the new history file at a later date, you can easily determine whether the problem was completely fixed.

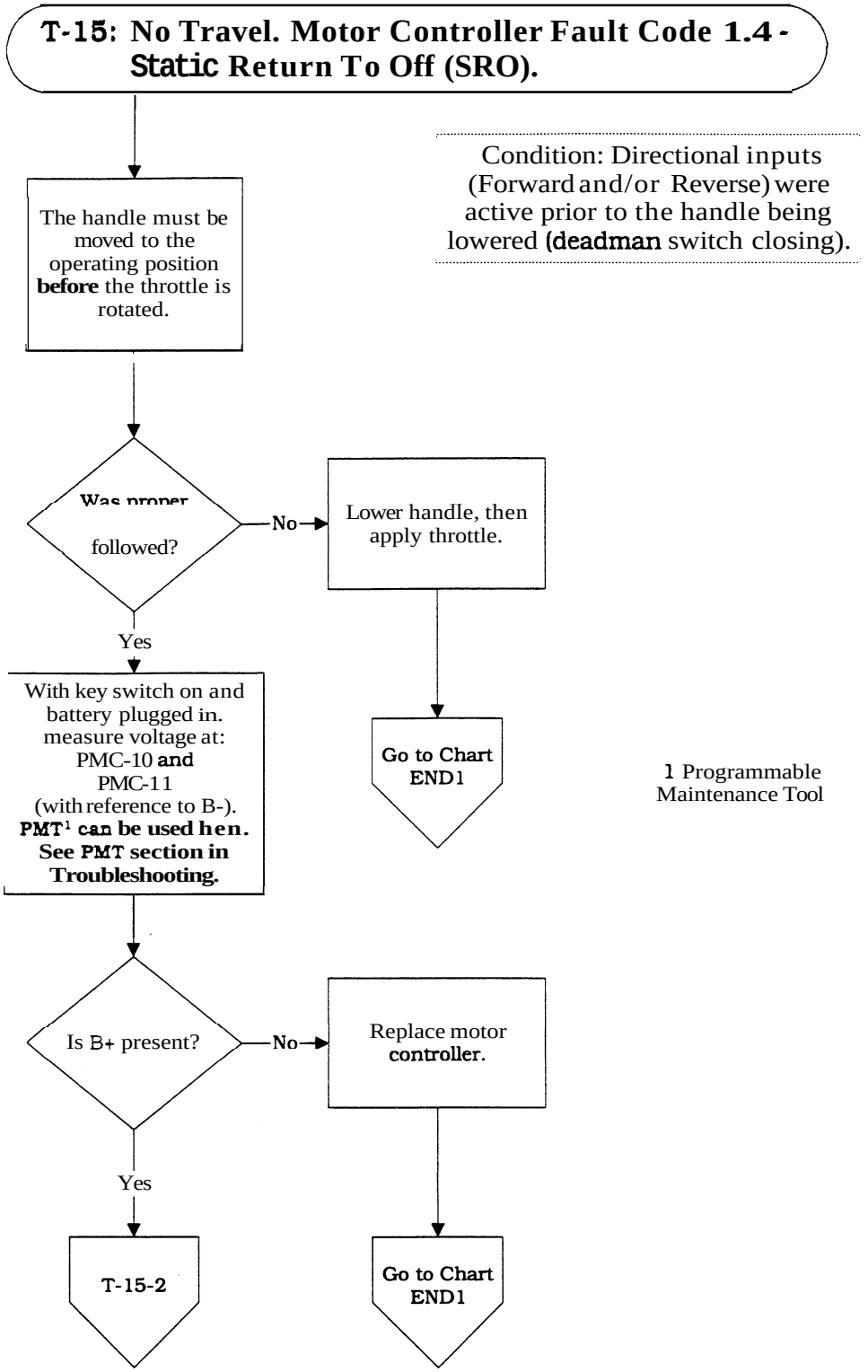
1. Hold the more info key, and press the program key. Release both keys after you enter the Special Program mode.
2. Scroll through the mode using the scroll display keys until "CLEAR DIAG HIST" is the top line in the display.
3. Press the more info key again. The PMT will prompt you to acknowledge or cancel.
4. Press the value up key to clear the diagnostic history. Press the value down key to cancel.


END1: End of Troubleshooting Procedure
Make sure ALL wires, hoses, and cables that you removed have been re-attached correctly.
Make sure all panels are properly reinstalled.
Make sure anv component that was drained has been refilled with the correct level of fluid.
Create the same conditions that occurred when the problem first happened.
Operate the truck as it was being operated when the problem occurred. Verify the problem does not recur.
Have the driver operate the truck. Verify the problem does not recur.
Fffl out any required forms.
If you contacted Toyota Field Service to discuss the problem, call them again to let them know what fixed the problem.
This is especially important if the solution you found is not in the troubleshooting chart.
End of Troubleshooting


H-3-3
Are switches OK?
No
Replace switches.
Yes
Verify the problem still exists. Repeat H-3. If you return here. go to General Troubleshooting.
Go to Chart END1
Go to Chart GEN1


T-7: No Travel, Directional Contactors DO Close.
Motor Controller Fault Codes 2,1 or 2,4 (or Both).
With key switch off and battery disconnected, remove connector PMC from motor controller. Measure resistance between PMC-14 to PMC-16 while slowly rotating throttle in both directions. PMT1 can be used here. See PMT section in Troubleshooting.
Does resistance increase from 0-6K ohms in each direction?
1 Programmable Maintenance Tool
No
Yes
With key switch off and battery disconnected. check for continuity and wiring shorts between:
PMC-16 to JP6-4
JP6-4 to VR-2
VR-4 to JP10-6
JP10-6 to JP6-5
JP6-5 to PMC-14
1
Is wiring OK?
No
Repair wires.
Yes
Go to Chart T-7-2
Go to Chart END1
Check for wiring shorts to B+, B-, and Frame.
Is wiring OK?
No
Repair or replace.
Yes
Replace motor controller.
Go to Chart END1


T-11: No Rabbit Speed (Field Weakening), Travel/Lift/Lower OK. No Fault Codes.
NOTES:
1) Rabbit speed only operates in the tractor first [forward) direction.
2) End Rider models are equipped with "latched" rabbit speed buttons. Press and release the button to enable rabbit speed. Rabbit speed is disabled by applying the brake or returning the throttle to neutral.
Is rabbit speed OK?
Yes
No
Go to Chart END1
Reverse direction and
Yes
Field weakening will be engaged if:
1) Max speed is set at 100%
2) Field weakening is enabled in Motor Controller
3)Throttle input is at 100%
4) Drive motor armature current is less than 150 Amps.
Note: Field weakening will be disengaged if armature current reaches 220 Amps.
Verify conditions 1, 2, and 3* using PMT. See PMT section in Troubleshooting.
• if Programmable Maintenance Tool is not available. see Component Procedures, Throttle Potentiometer.
Go to Chart T-11-2


T-15: No Travel. Motor Controller Fault Code 1.4 - Static Return To Off (SRO).
Condition: Directional inputs (Forward and/or Reverse) were active prior to the handle being lowered (deadman switch closing).
The handle must be moved to the operating position before the throttle is rotated.
Was proper followed?
No
Lower handle, then apply throttle.
Go to Chart END1
Yes
With key switch on and battery plugged in. measure voltage at: PMC-10 and PMC-11 (with reference to B-). PMT1 can be used hen. See PMT section in Troubleshooting.
Is B+ present?
No
Replace motor controller.
Go to Chart END1
Yes
T-15-2
1 Programmable Maintenance Tool

Component Procedures

2. Battery performance varies depending on the type of application. If you use more than one truck, one battery. and one charger, keep the same batteries and charger assigned to each truck. This makes it easier to diagnose any battery or charging problem.
3. Consult your battery and battery charger manufacturer's manual for specific charging procedures.
4. Wear personal protective equipment. See 'Battery Safety" on page 2-7.
5. **Turn** key switch **OFF,** disconnect the battery, and remove the battery from the truck.
6. Inspect the battery.
7. Check the electrolyte level in each cell. Electrolyte should cover the top of the battery plates. If electrolyte level is below the plates, add just enough water to cover the plates. See "Adding Water" on page 6-12. **Do not fill to level yet.** Electrolyte level **will** rise during charging.
8. Using a hydrometer, measure and record the specific gravity of each cell. See "Specific Gravity" on page 6-13.
9. Check and record the voltage of each cell.
10. To get the maximum use out of each battery, recharge only when effectively discharged. Routinely recharging batteries when only partially discharged **will** decrease battery life. At maximum recommended discharge, the specific gravity should read 1.150 or less.
11. Ensure that filler plugs are clean and vent holes are open. Tighten all filler plugs.

A CAUTION

NEVER plug the battery **charger into the truck. This will severely damage the truck's electrical system. Plug the charger ONLY into the connector from the** battery.

Key Switch

The Toyota walkies are equipped with a three position key switch, which energizes all truck operations except the horn. The horn can be sounded when the key switch is OFF.

Inspection

With the battery plugged in and key switch ON, battery voltage B+ should be present on both terminals of the switch. Test the key switch with an ohmmeter after removing the wires from the switch terminals. In the OFF position, the ohmmeter should read greater than 1 megaohm, and in the ON position, the ohmmeter should read less than 1 ohm. If not, replace the switch.

Removal

1. Turn the key switch OFF and disconnect the battery connector.
2. Remove the tractor cover.
3. Remove the mounting nut from the stem of the key switch.
4. Remove the key switch.
5. Disconnect wires from the bottom of the key switch.

Installation

1. Connect the wires to the terminals.
2. Install the new key switch and tighten the locking nut.
3. Reconnect the battery connector and check operation.
4. Turn the key switch OFF and disconnect the battery connector.
5. Install tractor cover.
6. Reconnect the battery connector.

Return Spring Adjustment 6HBW30 and 6HBE30 or 6HBE40

Trucks Without Coast

Adjust the preload so that the handle will return to full vertical position when released from any position

Trucks With Coast

Coast spring cannot be adjusted. Adjust preload on handle return spring so the brake does not drag with the coast control engaged. This should provide enough preload for the handle to return to the vertical position when released from any position.

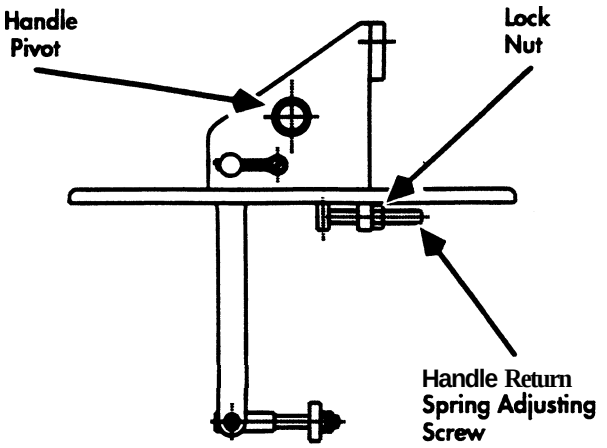


Figure 6-11: Return Spring Adjustment

Rabbit Speed [Field Weakening) Contactor Models 6HBE30/6HBE40, 6HBC30/ 6HBC40 and 6TB50

Assembly Removal

1. Turn the key switch off and disconnect the battery connector.
2. Remove the tractor cover
3. Disconnect the wires on the X and Y terminals. Note the location for the correct installation later. See Figure 6-17.

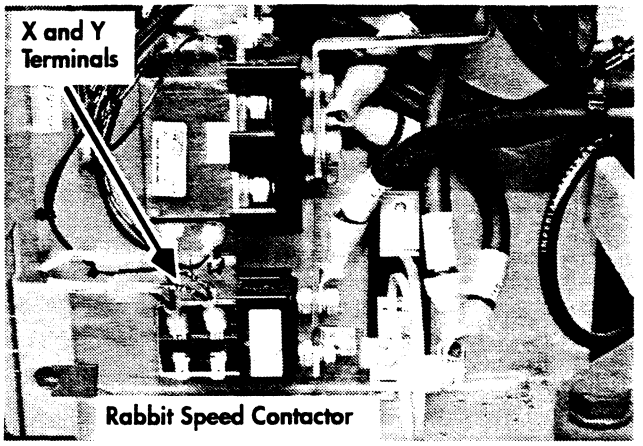


Figure 6-17: Rabbit Speed Contactor

4. Remove the nuts holding the bus bar and cable to the contactor. See Figure 6-18.

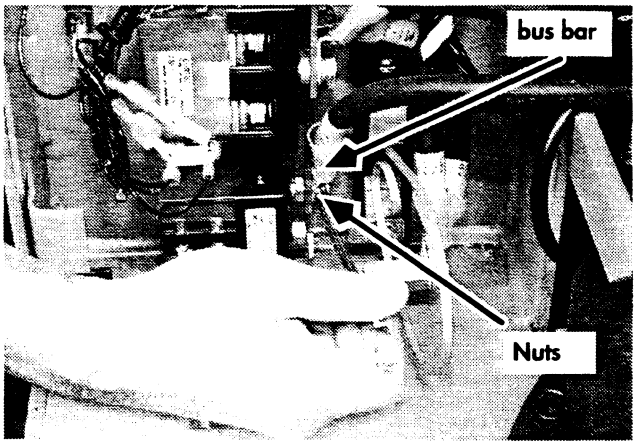


Figure 6-18: Disconnecting Bus Bar From Contactor

5. Remove the two screws holding the contactor to the frame. See Figure 6-19.

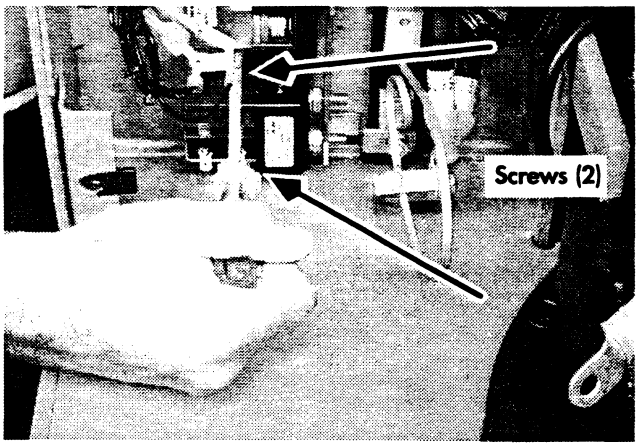


Figure 6-19: Removing Contactor Assembly From Frame

8. Remove the brake drum. It may be necessary to use a puller.
9. Remove the shoe springs. See Figure 6-41.
10. Remove the brake shoes. See Figure 6-41.
11. Remove the five (5) bolts holding the brake assembly to the drive motor assembly.
12. Remove the brake.

Installation

1. Install the brake using the five (5) mounting bolts to the drive motor assembly.
2. Install the clevis pin holding the lever to the spring assembly using a new cotter pin.
3. Install the brake shoes.
4. Install the shoe springs.
5. Install the brake drum using the 3/4 x 16 nut.
6. Install the control handle.
7. Adjust the brake.
8. Test operate the truck.

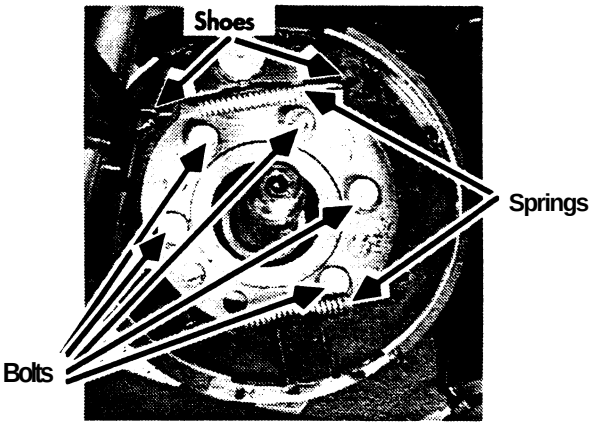


Figure 6-41: Brake Shoes and Springs

8. Lift out the drive motor, control handle frame, and drive unit mounting plate.
9. Remove pinion gear lock nut and pinion gear. Remove seven (7)bolts mounting the motor to the drive unit mounting plate. See Figure 6-48.
10. Remove the bolts mounting the control handle frame to the drive motor. Separate the motor from the handle frame.

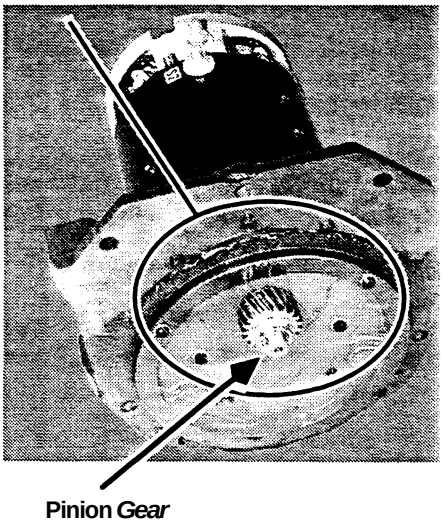


Figure 6-48: Drive Unit, Pinion Gear

Installation

1. Position the control handle frame on brush end of drive motor and attach with hex head cap screws (4).Apply thread locking compound (P/N 00590-01931-71) and torque to 25-30 ft. lbs.

⚠WARNING

When installing the hex head bolts that secure the mounting plate, torque the hex bolts to the specified 25-30 Ft. Lbs. (35-42 NM). Failure to torque these bolts properly may cause the braking and steering to fail. See decal to right and on mounting plate on truck.

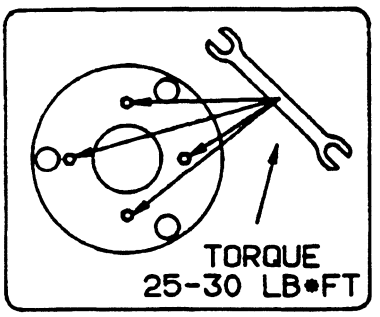


Figure 6-49: Decal on Mounting Plate

2. Position the drive unit mounting plate on the opposite end of motor and secure with hex head cap screws (7).Torque to 120-150 in. lbs.
3. Install pinion gear and lock nut on armature shaft and torque to 50 ft. lbs.

Drive Unit Vent Plug

Make sure the drive unit vent plug is clean and open to keep pressure from building up in the housing. Extra pressure could force lubricant out of the shaft seals. See Figure 6-59.

Cleaning

1. Remove the vent plug from the top cover of the drive housing. See Figure 6-59.
2. Wash it in a suitable cleaning solvent.
3. Dry it with compressed air to make sure it is not clogged.
4. Install the vent plug and tighten it securely.

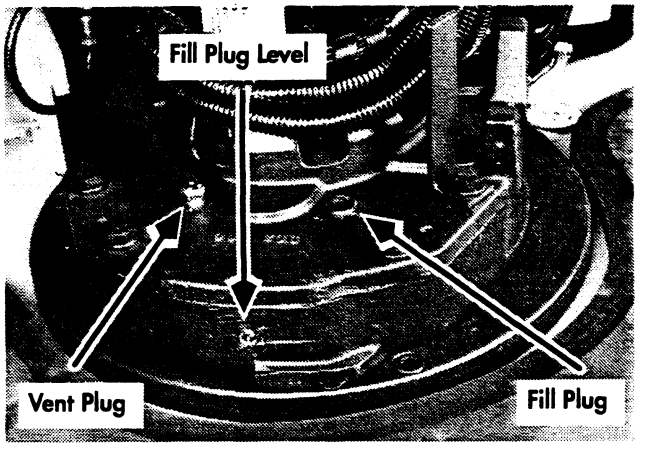


Figure 6-59: Drive Unit Fill Plug and Vent Plug

3. Remove pivot pin retainer screw. See Figure **6-69.**

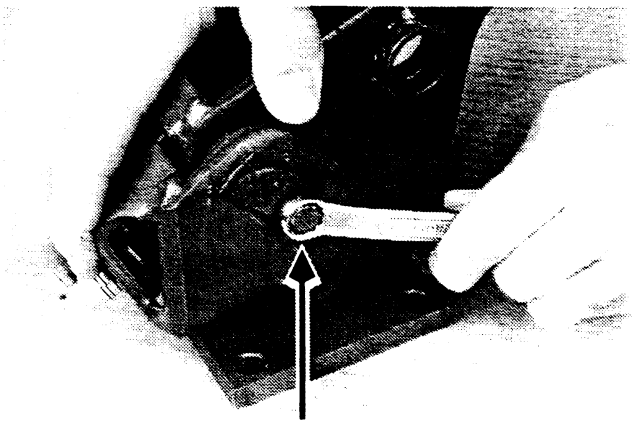


Figure 6-69: Removing Pivot Pin Retainer Screw

4. Use hammer and pin punch to drive out the pivot pin and washers. See Figure **6-70.**
5. If necessary, replace the springs. If spring replacement is not necessary, leave springs compressed for reassembly.

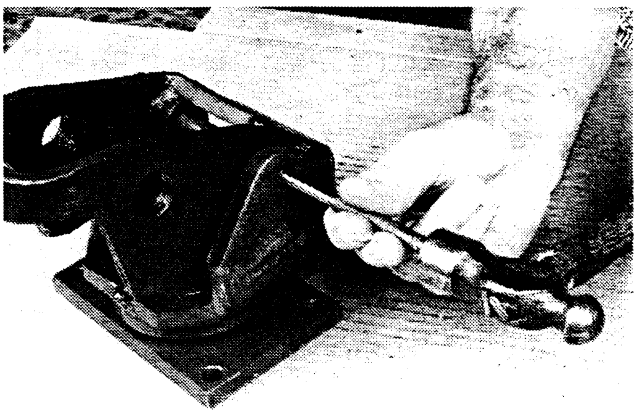


Figure 6-70: Removing Pivot Pin

Caster Assembly

1. Lubricate the pivot pin with white lithium grease (P/N **00590-04833-7**1). See Figure **6-7**1.
2. Align the, washers on each side of the wheel carrier and insert the pivot pin.
3. Secure the pivot pin with the shaft retainer screw.

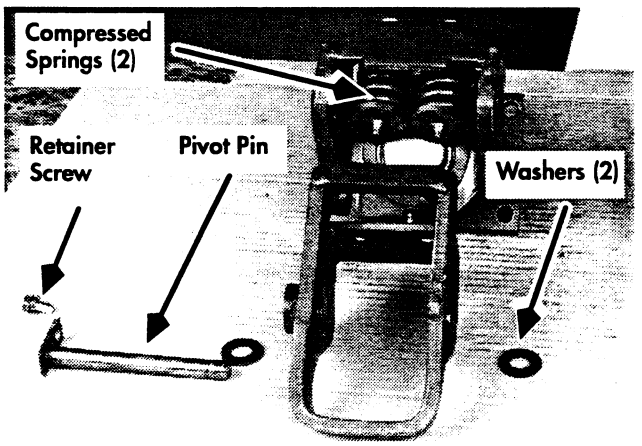


Figure 6-71: Separated Caster

Hydraulic Components

General Guidelines

To prolong the life of your Toyota walkie, adhere to the following guidelines:

- Keep all fittings and connections tight to prevent leaks. Be careful not to tighten brass fittings too much or they may become damaged or distorted.
- Before you remove any component from the hydraulic system, wash the component and surrounding area with cleaning solvent to prevent foreign matter from entering the system. Cap and plug all openings immediately.
- Whenever you remove a fitting with a pipe thread, use a sealing compound on the outside of the threads before you re-install the fitting. (Never use Teflon® tape.) Make sure all parts are clean.
- When you install a hose assembly, make sure it isn't twisted when the fittings are tightened. Always use two wrenches on a swivel-type fitting--one to hold the fitting and the other to tighten the hose.
- Keep hose clamps tight to prevent hoses from chafing and to avoid leaks.

Hydraulic Cylinder Seals

Disassembly

1. Remove the lift ram from the truck. See "Hydraulic Ram" on page 6-96.
2. Extend the piston fully from the cylinder. See Figure 6-99.
3. Remove the outer lock ring. See Figure 6-99.
4. Push the piston back inside the tube at least 3/4".

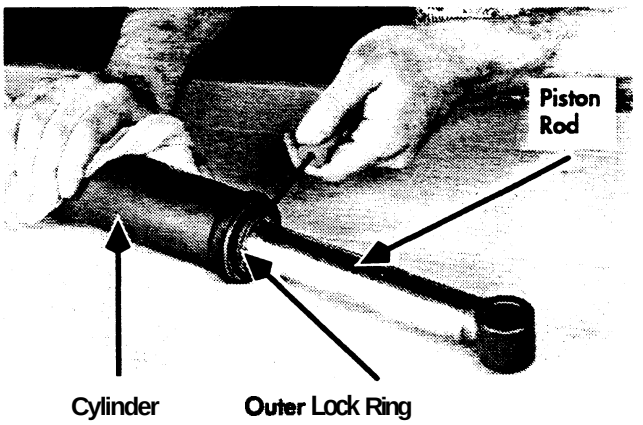


Figure 6-99: Removing Outer Spiral lock Ring

5. Remove the spacer. See Figure 6-100.

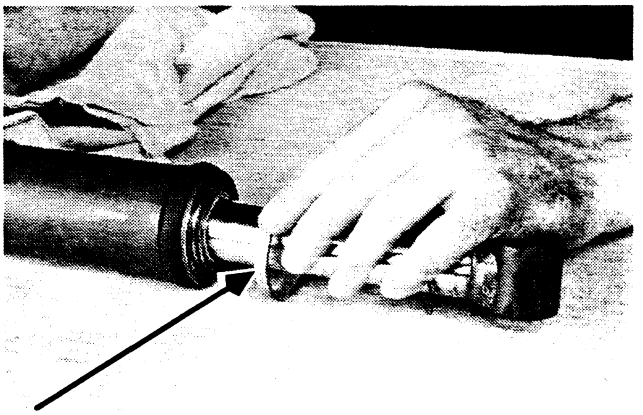


Figure 6-100: Removing the Spacer

6. Remove the lock ring from inside the tube. See Figure 6-101.
7. Cut the sharp edge from back comer of the head lock ring groove.

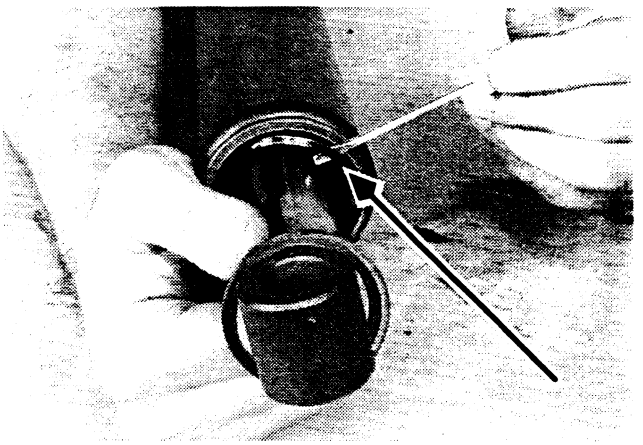


Figure 6-101: Removing Lock Ring From Tube

6. Insert the screws into the motor end plate, through the motor and into the adapter body. See Figure 6-123.
7. Make sure the motor is mating flush with the adapter body and torque screws to 17-19 ft. lbs. (23.0656-25.7792Nm).
8. Install the solenoid.
9. Install the hydraulic unit. *See* "Hydraulic Unit" on page 6-105.

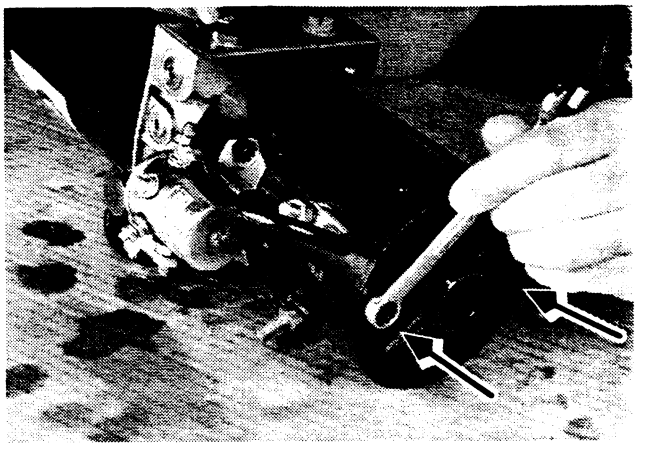


Figure 6-123: Securing the Motor and Adapter Body

Standard/Metric Conversions

To Convert...	Multiply...
Inches to Millimeters	Inches x **25.4**
Millimeters to Inches	Millimeters **x 0.039**
Inches to Centimeters	Inches **x 2.54**
Centimeters to Inches	Centimeters **x 0.394**
Feet to Meters	Feet **x 0.305**
Meters to Feet	Meters **x 3.281**
Yards to Meters	Yards **x 0.914**
Meters to Yards	Meters **x 1.094**
Miles to Kilometers	Miles **x 1.609**
Kilometers to Miles	Kilometers **x 0.621**
Square Inches to Square Centimeters	Square Inches x **6.452**
Square Centimeters to Square Inches	Square Centimeters **x 0.155**
Square Feet to Square Meters	Square Feet **x 0.093**
Square Meters to Square Feet	Square Meters **x 10.753**
square-yards to Square Meters	Square Yards **x 0.836**
Square Meters to Square Yards	Square Meters **x 1.196**
Pints to Liters	Pints x **0.473**
Liters to **Pints**	Liters **x 2.113**
Quarts to Liters	Quarts **x 0.946**
Liters to Quarts	Liters **x 1.057**
Gallons to Liters	Gallons x **3.785**
Liters to Gallons	Liters **x 0.26**
Ounces to grams	Ounces x **28.35**
Grams to ounces	Ounces **x 0.035**
Ounces to kilograms	Ounces **x 0.028**