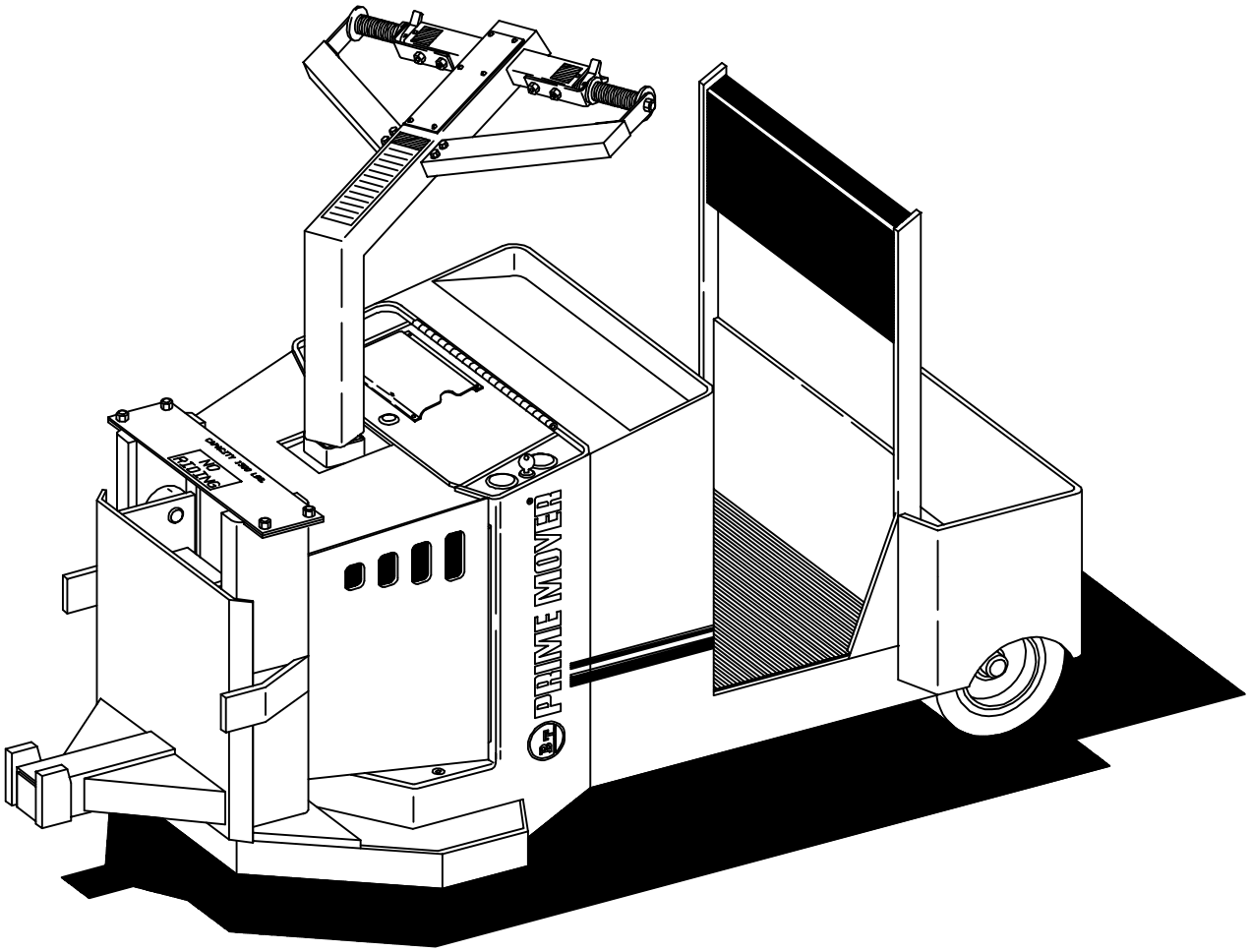
REPAIR MANUAL

Manual Part Number 301648-000
TCB ELECTRIC TUGGER CAR BODY CARRIER TCB



⚠WARNING Read and observe all warnings on this unit before operating it.

⚠WARNING **DO NOT** operate this equipment unless all factory installed guards and shields are properly secured in place.

ISSUED FEBRUARY 1992

BT PRIME-MOVER®

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2.0 Brake Solenoid

The brake on the TCB is released by an electric solenoid. The solenoid must be properly adjusted for the brake to release.

1. Adjust the plunger so there is 1" of it exposed below the plunger barrel. This is accomplished by adjusting the nut at the top of the solenoid.

2. With the brake solenoid de-energized, adjust the clevis that is on the plunger until the pin will slide through the clevis and brake operating level.

3. Adjust the repair spring so that there is no tension on it when the brake is released.

3.0 Interlock Switch

The interlock switch is located inside the motor shield and is controlled by the brake operating linkage. As the brake is applied, the brake operating lever comes off the high point of the adjusting screw. As it falls to a low point, the shaft moves left and activates the interlock. Thus, when properly adjusted, the drive motor turns off when the brake is applied. Any required brake adjustment should be performed prior to an adjustment of the interlock. Adjusting procedure:

1. Loosen screws holding the interlock switch to the bracket.

2. Slide the switch left away from the brake as far as possible.

3. Adjust brake, if necessary, according to instructions.

4. Place brake in "braked" position.

5. Slide switch assembly to the right until the switch snaps.

6. Move an additional 1/32" and tighten screws.

7. Check that the actuating rod makes solid contact with the switch lever.

8. Check that the switch snaps near the middle of actuating rod movement.

4.0 Lift Limit Switch

The lift limit switch turns the hydraulic pump motor "OFF" when a fully raised position has been reached. This prevents undo loading of the pump motor running at relief pressure after the cylinder has reached the end of travel.

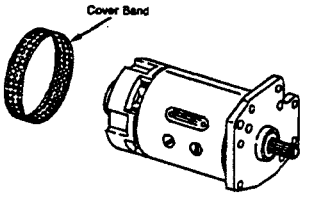
To adjust the switch raise the forks to within one inch of maximum cylinder travel. Slide switch away from lift linkage as far as possible.

Slide switch toward lift linkage until it clicks, then 1/32 inch further and tighten

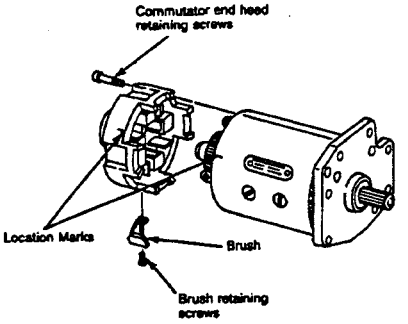
Return

DISASSEMBLY

1. Remove the cover band from the commutator end of the motor (if equipped).



2. Use a brush hook to reach into the motor and lift the brush springs. Pull the brushes out of the brush holders. Either position the brushes outside the motor or remove the brush retaining screws and remove the brushes from the motor.



3. Scribe or center punch locating marks in the end head and the frame. Although locating marks are not always necessary because of locating pins in some motors, they can save a lot of time when the motor does not have locating pins.

4. Remove the commutator end head retaining screws. Almost all motors have a slip fit bearing at the commutator end, and the end head can be removed with very little trouble.

   On motors that have a shaft extension on both ends of the armature, the attachment on the commutator end of the shaft must be removed before the end head can be separated from the motor.

35. High bar-to-bar voltage
36. High ratio of brush contact to commutator surface area
37. Insufficient cross connection of armature coils

LOAD OR SERVICE CONDITION

38. Overload
39. Rapid change of load
40. Reversing operation of non-interpole machine
41. Plugging
42. Dynamic braking
43. Low average current density in brushes
44. Contaminated atmosphere
45. "Contact poisons"
46. Oil on commutator or oil mist in air
47. Abrasive dust in air
48. Humidity too high
49. Humidity too low
50. Silicone contamination

DISTURBING EXTERNAL CONDITION

51. Loose or unstable foundation
52. External source of vibration
53. External short circuit or very heavy load surge
54. "Commutation factor" too high
55. "Commutation factor" too low
56. Contact drop of brushes too high
57. Contact drop of brushes too low
58. Coefficient of friction too high
59. Lack of film forming properties in brush
60. Lack of polishing action in brush
61. Brushes too abrasive
62. Lack of carrying capacity

Return

6. Negative side of brake solenoid pull in coil.

0 volts - replace brake solenoid.

Battery volts - repair open wire from brake solenoid to battery negative, or replace time module.

7.4 Lift

7.4.1 No lift - with handle switch. Control circuit.

7.4.1.1 Condition for test: Battery plugged in, key switch on, handle lift switch activated to lift.

Test for battery volts at:

1. Positive side of lift switch.

   0 volts - repair open wire from key switch.

2. Negative side of lift switch.

   0 volts - replace lift switch.

3. Positive side of lift limit switch.

   0 volts - repair open wire from lift switch to lift limit switch.

4. Negative side of lift limit switch.

   0 volts - replace lift limit switch.

5. Positive side of pump contactor.

   0 volts - repair open wire from lift limit switch to pump contactor.

6. Negative side of pump contactor.

   0 volts - replace pump contactor.

   Battery volts - repair open wire from negative side of pump contactor to battery negative.

1G	One contactor closes with normal operation but opposite contactor will not close.	Close key, brake and start switches (all switches needed to close F or R contactor except the direction switch). Volts on TB5 and TB6 should be near zero volts. Wait one second, then close the directional switch of the contactor that will not close. Volts at the other direction input (TB5 or TB6) should remain at zero volts. Volts at the non-closing direction (TB5 or TB6) and top of the contactor coil should be battery volts. If not, check wiring and switches.
1H	PMT trips after operating in 1A and with accelerator is returned to SCR range.	Check for cause of long 1A dropout time, i.e., defective 1A driver, low resistance in 1A filter, shorted turns in 1A coil, or low voltage coil.

8.0 Directional Control Switch

To remove the control switch from the control housing, follow these steps:

REMOVAL

1. Remove access cover on the control handle.
2. Remove the four (4) screws that hold the switch in the handle.
3. Pull control switch out and remove attached wires. (Note their position)
4. Remove gear and shim(s).

INSTALLATION

1. Place miter gear and shim(s) inside handle prior to inserting master switch shaft.

   NOTE: NUMBER OF SHIMS TO BE DETERMINED BY THE FREE PLAY BETWEEN MITER GEARS.

2. Insert master switch into handle with wires attached and tighten four (4) mounting screws.
3. Check for free play between miter gears. (0 free play without binding)
4. Add or remove shims to achieve correct free play.
5. Install access cover on the control handle.

MASTER CONTROL SWITCH

DISASSEMBLY

1. Remove potentiometer wires and potentiometer.
2. Remove the module retaining screws.
3. Gently pry off potentiometer bracket.
4. Remove the switch housing and cam making sure that the snap switches go with the housing.

   NOTE: THE CONTACTS ON THE SWITCH ARE SILVER AND NEED ONLY BE REPLACED WHEN WORN THIN. DO NOT FILE CONTACTS; DISCOLORATION AND SLIGHT PITTING OF THE CONTACTS IS NOT HARMFUL. WHEN CONTACTS NEED REPLACING, THE SNAP SWITCH IS REPLACED; THERE IS UP TO FOUR (4) SNAP SWITCHES IN THE SWITCH HOUSING. THERE IS ALSO A BLANK SPACER USED TO REPLACE THE SWITCH IF NOT ALL FOUR (4) SNAP SWITCHES ARE USED.

5. Remove cover from spring return housing.
6. Slide off of the shaft, the shaft bearings, spring drive, spring support, spring and lock nut.

Return

CYLINDER ASSEMBLY REMOVAL INSTALLATION

The lift cylinder is a positive displacement type cylinder; all seals are at the head end of tube and the piston end of rod has only a bearing for guidance.

Scheduled maintenance service involves inspecting cylinder and hydraulic connections for leaks, check tightness of the mounting retainers, and clean dirt from around sealing area of rod.

DO NOT dismantle the cylinder unnecessarily. If a loss of performance occurs, the system as a whole must be investigated before assuming that the cylinder is at fault.

CYLINDER REMOVAL

1. Lower lift frame (4).

2. Remove four capscrews (7) from top of lift frame channel and remove plate (6).

3. Remove capscrew (1) securing lift cylinder rod to lift frame.

4. Attach suitable hoist to lift frame. Remove lift frame from the channels.

5. Disconnect hydraulic hose from the lift cylinder. Lift the cylinder from the truck.

6. Place on a clean bench for disassembly and repair.

CYLINDER DISASSEMBLY

1. Thoroughly clean outside of cylinder assembly.

2. Pull rod out until end of rod and snap ring can be seen through inlet port.

3. Insert screwdriver in inlet port and slide snap ring in deep groove in rod assembly.

4. Remove rod assembly from barrel assembly.

5. It is not necessary to inspect wiper seal, seal or lock ring. These parts should be replaced as new items and are included in the seal repair kit available for this cylinder.

Return