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**TAYLOR-DUNN<sup>®</sup>**



*Models Included:  
P0-032-49 (P 2-49)  
Equipped with the GT drive system*



## **MANUAL MP-249-02**

*Operation, Troubleshooting and  
Replacement Parts Manual*

Revision: A

Serial Number Starting: 165452

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## TAKING DELIVERY OF YOUR VEHICLE

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Inspect the vehicle immediately after delivery. Use the following guidelines to help identify any obvious problems:

- Examine the contents of all packages and accessories that may have come in separate packages with the vehicle.
- Make sure everything listed on the packing slip is there.
- Check that all wire connections, battery cables, and other electrical connections are secure.
- Check battery cells to be sure they are filled.
- Check the tire pressure, tightness of lug nuts, and for any signs of damage.

Check the operation of each of the following controls:

- Accelerator
- Brake
- Parking Brake
- Key-Switch
- Forward/Reverse Switch
- Reverse Beeper (if equipped)
- Front Headlight Switch
- Steering Wheel
- Horn

## What To Do If a Problem is Found

If there is a problem or damage as a result of shipping, note the damage or problem on the bill of lading and file a claim with the freight carrier. The claim must be filed within 48 hours of receiving the vehicle and its accessories. Also, notify your Taylor-Dunn® dealer of the claim.

If there is a problem with the operation of the vehicle, **DO NOT OPERATE THE VEHICLE**. Immediately contact your local Taylor-Dunn® distributor and report the problem. The report must be made within 24 hours of receiving the vehicle and its accessories.

The only personnel authorized to repair, modify, or adjust any part of this or any Taylor-Dunn® vehicle is a factory authorized service technician.

## **⚠ WARNING**

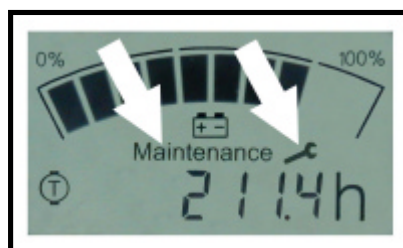
**The only personnel authorized to repair, modify, or adjust any part of this or any Taylor-Dunn® vehicle is a factory authorized service technician. Repairs made by unauthorized personnel may result in damage to the vehicles systems which could lead to an unsafe condition resulting in severe bodily injury and/or property damage. Unauthorized repairs may also void the vehicles warranty.**



*Model B 2-10 Ambulance*



Fault Code	Description	Corrective action
01004	Discharged battery or defective wiring.	Charge the battery. If the battery is good, check wiring to the controller.
01005	Speed control overheated.	Allow the controller to cool off. May be the result of an overloaded vehicle or an obstruction to the controller heat sink.
01008	Optional speed encoder or speed encoder wiring defective	Repair as required
02000	Start up switches not operated in the correct order or a defective switch.	Reset switches and start again.
02001	Defective wiring	Refer to troubleshooting
04003	Start up switches not operated in the correct order or a defective switch.	Reset switches and start again.
04004	Both the forward and reverse directions are selected at the same time	Check the forward/ switch and wiring for shorts.
04005	Start up switches not operated in the correct order or a defective switch.	Reset switches and start again.
04006	Accelerator pedal depressed before the seat interlock switch is closed	Recycle start up switches and try again. Possible defective seat switch.
04007	-	Defective wiring
04009	Discharged battery or defective wiring.	Charge the battery. If the battery is good, check wiring to the controller.
04010	Battery voltage too high	Incorrect battery installed.
04011	Personality fault	Reprogram the controller
04012	Personality fault	Reprogram the controller
04013	Defective wiring or batteries	Refer to troubleshooting
05000	Line contactor coil or wiring shorted	Replace contactor or repair wiring
05006	MOSFET shorted	Refer to troubleshooting
05008	Line contactor welded contacts or wiring shorted	Replace contactor or repair wiring
05009	MOSFET shorted	Refer to troubleshooting
05046	Line contactor contacts open or defective wiring	Replace contactor or repair wiring. Could also be result of open circuit breaker



*Display showing Maintenance and Wrench icons*

### **Maintenance monitor:**

**Operation:** The SMD notifies the operator 10-hours (standard) before a scheduled maintenance is due. During this warning period, the meter will continue to alert the operator. This should allow sufficient time for the operator to schedule the maintenance that is due, with minimal down time. If the scheduled maintenance is not performed before the warning period elapses, then the vehicles maximum speed will be significantly reduced.

**Warning period:** The warning starts when the Maintenance Indicator is ON and the Wrench icon is flashing. The Wrench icon will continue to flash until the warning time has expired.

**Maintenance Due:** Once the warning has expired and the maintenance is due, the Wrench icon will stop flashing and remain ON. Additionally, the vehicles maximum speed will be significantly reduced until the maintenance is performed and the display is reset. The display should only be reset by an authorized technician. Refer to the ***Illustrated parts*** section for information regarding tools required to reset the Smart View Display.

## Troubleshooting Guide

Symptom	Probable Cause
Steering Pulls in One Direction	Front End Out of Alignment
	Low Tire Pressure
Hard Steering	Dry Lube Points in Steering Linkage
	Damaged King Pin/Ball Joint
	Low Tire Pressure
Excessive Steering Play	Worn Ball Joints
	Mis-Adjusted or Worn Steering Gear
	Loose Steering Linkage
Lack of Power or Slow Operation	Brakes or Parking Brakes Dragging
	Batteries Discharged or Defective
	Worn Drive Gears
	Front End Out of Alignment
	Defective Speed Control
Abnormal Noise	Worn Drive Gears or Bearings
	Worn Front /Rear Axle Bearings
	Loose Lug Nuts
	Motor Bearings Worn
Oil Leak in Rear Bearing Area	Rear Wheel Bearing and/or Gasket Failed
	Drive Over Filled
Brake Pedal Soft or Spongy	Air in Brake Lines
Brake Pedal Low	Brake Worn (1/16" Wear Limit)
	Brake Fluid Low
	Brakes Out of Adjustment
Braking Power Low	Brake Worn (1/16" Wear Limit)
	Brake Pads Contaminated with Fluid
	Brake Pedal Linkage Binding
	Brakes Out of Adjustment
	Air in Brake Lines

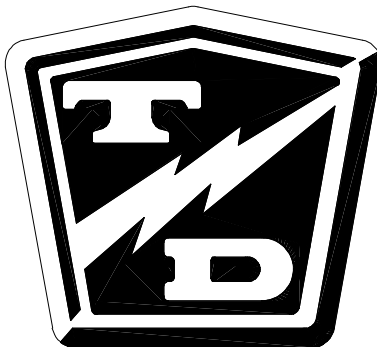
*Note: This list is provided as a guide only. It is not all inclusive of causes that may result in a specific symptom.*

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# Steering Component Service



9. Install in reverse order.
10. Realign the front wheels.

*NOTE: Refer to the **Steering** section for information regarding realignment of the front wheels.*

11. Lower the vehicle.
12. Reconnect the main positive and negative cables at the batteries.
13. Remove the blocks from behind the wheels.
14. Release the park brake and test drive the vehicle.

## **Replacing the Tie Rod**

The Tie Rod is the linkage that connects the two steering knuckles together. Refer to the illustration below..

### **⚠ WARNING**

1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. Confirm the electric park brake is set.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

### **⚠ WARNING**

**Always use a lifting strap, hoist, and jack stands, of adequate capacity to lift and support the vehicle. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.**

6. Raise the front of the vehicle and support with jack stands.
7. Remove the ball joints or rod ends from the steering knuckles.

*NOTE: Refer to the **Replacing the Ball Joints** section for information regarding the removal of the ball joints or rod ends.*

8. Remove the tie rod as an assembly.
9. Install in reverse order.
10. Realign the front wheels.

*NOTE: Refer to the **Steering** section for information regarding realignment of the front wheels.*

11. Lower the vehicle.
12. Reconnect the main positive and negative cables at the batteries.
13. Remove the blocks from behind the wheels.
14. Release the park brake and test drive the vehicle.

## **CENTER THE STEERING GEAR**

*NOTE: The drag link must be disconnected from the pitman arm or the pitman arm removed from the steering gear to perform this procedure. Refer to the appropriate section for details.*

1. Remove the pitman arm or drag link.
2. Rotate the input shaft clockwise until it stops.
3. While counting the rotations, rotate the input shaft counter clockwise until it stops.
4. Rotate the input shaft clockwise 1/2 the rotations counted in the previous step.
5. Mark the input and pitman shaft in relation to the housing.



## BLEED THE BRAKE SYSTEM

### ⚠ WARNING

Do not ingest brake fluid or allow contact with skin or eyes. Always wear protective clothing and a face shield when working with or around brake fluid.

#### SKIN CONTACT

Flush area immediately with water for several minutes. If a rash or skin irritation develops, get medical attention immediately.

#### EYE CONTACT

Immediately flush the eye with water for 15 minutes and call physician.

#### INGESTION

Get medical attention immediately.

*NOTE: Start this procedure at the wheel furthest from the master cylinder, then work toward the wheel closest to the master cylinder.*

### ⚠ WARNING

1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. Confirm the electric park brake is set.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

6. Thoroughly clean the area around the master cylinder cap and remove the cap.



*Master Cylinder located under the driver seat*

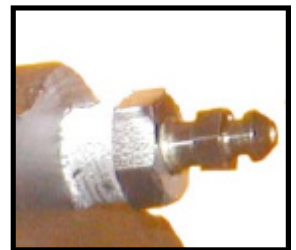
### ⚠ WARNING

- Only use DOT 3 brake fluid from a new sealed container.
- DOT 3 brake fluid is corrosive and will damage paint finishes.
- Dispose of brake fluid in accordance with local state and federal regulations.
- Read and follow all warnings on the brake fluid container.

### ⚠ WARNING

Always use brake fluid from a new sealed container. Never reuse any brake fluid that has been removed from the brake system. Use of contaminated brake fluid will degrade the braking performance and may cause property damage or severe bodily injury.

7. Add brake fluid from a new sealed container to the master cylinder. Fill to 1/4" from the top of the master cylinder chamber.
8. The master cylinder fluid level will drop as the brakes are bled. Periodically check and fill the master cylinder during this procedure. Do not allow the fluid level in the master cylinder to drop too low as this will allow air into the brake lines.
9. Attach a clear hose to the bleeder valve on the brake cylinder that is to be bled. Route the hose into a clear container for waste brake fluid.
10. Pump the brake pedal a few times and then press and hold light pressure to the brake pedal.
11. Open the bleeder valve on the hydraulic brake body.
12. Depress the foot pedal to the floor and then close the bleeder valve. Do not release pressure on the brake pedal until the bleeder valve is closed.
13. Slowly release the foot pedal, allowing it to return to its released position.



*Typical bleeder valve*



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### **REPAIR THE MASTER CYLINDER**

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*NOTE: Hydraulic brake system components must be kept clean. Make sure your work area is free from dirt and debris and will contain any brake fluid spills.*

Remove the master cylinder from the vehicle. See **Replace the Master Cylinder** section .

Drain all fluid from the master cylinder and discard.

Remove the rubber boot.

Depress the plunger and remove the plunger spring clip retainer.

Pull the plunger and all seals out of the master cylinder bore.

Thoroughly clean, inspect and replace parts as required.

If any damage is found in the bore of the master cylinder then it must be replaced.

Lubricate all parts with clean brake fluid from a sealed container.

Reassemble in reverse order.

If the master cylinder is not to be immediately installed onto a vehicle, plug the brake line fitting hole to prevent any contaminants from entering the master cylinder.



## MOTOR REMOVAL AND INSTALLATION

Some vehicles are equipped with an automatic electric brake. The automatic electric brake is sandwiched between the drive motor and the gear case. The electric brake is retained by the drive motor mounting screws. Once the motor is removed the electric brake will no longer be retained by any hardware.

### ⚠ WARNING

1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

6. Remove the wires from the motor.

*NOTE: Label the motor wires with the number of the motor terminal before they are removed from the motor.*

7. If equipped, remove the motor support bracket u-bolt (only used on larger motors).



*Support bracket u-bolt*

8. Remove the motor mounting bolts and slide the motor off of the input shaft.
9. Install the motor in reverse order.

*NOTE: Apply a light coating of grease to the splines on the transmission input shaft only.*

10. Reconnect the main positive and negative cables at the batteries.
11. Remove the blocks from behind the wheels.
12. Release the park brake and test drive the vehicle.

## REAR HUB OR ROTOR

*NOTE: The torque specification for the axle hub bolt is 275 ft-lbs. An impact wrench will be required to remove the bolt.*

*NOTE: The axle hub bolt has a special thread locking compound applied to the threads. If this bolt is removed, it must be replaced.*

### ⚠ WARNING

1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

### ⚠ WARNING

**Always use a lifting strap, hoist, and jack stands, of adequate capacity to lift and support the vehicle. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.**

6. Raise the wheel off of the ground.
7. Remove the tire/wheel assembly, Refer to **Tires and Wheels** section for information regarding removing the tire/wheel assembly.
8. Remove the axle hub bolt and washer and remove the hub from the axle.



9. Remove the outer brake pad. Refer to section **Brake Service** for information regarding removing the brake pads.
10. Remove the rotor.

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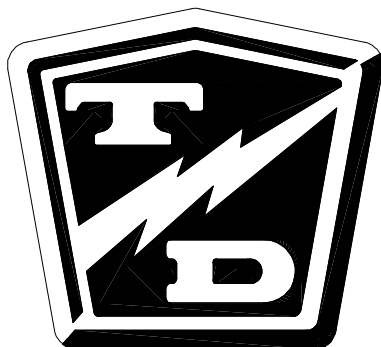
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# **Suspension**



## REMOVING

### ⚠ WARNING

- Explosive mixtures of Hydrogen gas are present within battery cells at all times. Do not work with or charge battery in an area where open flames (including gas furnace or water heater pilots), sparks, cigarettes, or any other sources of combustion are present. Always provide ample ventilation in rooms where batteries are being charged. Failure to do so may result in severe bodily injury and/or property damage.
- A battery is a live electrical source. It cannot be disconnected or neutralized. Do not drop any tool or conductive object onto the battery. A conductive object that comes in contact with the battery terminals will initiate a short circuit of the battery. This could cause the battery to explode resulting in severe bodily injury and/or property damage.
- Battery electrolyte is poisonous and dangerous. It contains sulfuric acid. Avoid contact with skin eyes or clothing. Wear rubber gloves and safety glasses while servicing batteries. **DO NOT INGEST!** This may result in severe bodily injury.

### ⚠ WARNING

1. Make sure the key-switch is in the "OFF" position, then remove the key.
  2. Place the forward-reverse switch in the center "OFF" position.
  3. Confirm the electric park brake is applied.
  4. Place blocks under the front wheels to prevent vehicle movement.
  5. Disconnect the main positive and negative cables at the batteries.
6. Thoroughly clean the battery and battery compartment. Refer to **Cleaning** in this section for information regarding cleaning the batteries.
  7. Using a hoist or forklift equipped with a proper battery lifting device (see next page), slowly raise the battery out of the vehicle.
  8. Inspect the battery compartment for signs of corrosion.

### ⚠ CAUTION

Battery electrolyte will stain and corrode most surfaces. Immediately and thoroughly clean any surface outside of the battery that the battery electrolyte comes in contact with. Failure to clean may result in property damage.

9. If minimal signs of corrosion are seen, then the damaged paint should be stripped off and the entire battery compartment cleaned and repainted.
10. If there are excessive signs of corrosion, then it may be necessary to replace some of the frame members or completely rebuild the battery compartment.
11. Inspect the battery cables and terminals. If any of the cables or terminals show signs of corrosion, then they must be repaired or replaced.
12. Install the battery in reverse order.
13. Remove the blocks from the wheels and test drive.



*Typical battery lifting beam*



*Typical forklift attachment to use with the lifting beam*

## **TEST 2.3:**

Test the continuity from the motor A1 terminal to the frame on the motor and from F1 to A1 for open circuits.

**Any reading other than an open circuit indicate a short in the motor. If there is a short in the motor, stop here and repair or replace the motor.**



## **TEST 2.4:**

Reaching this point indicates an open circuit in the motor wiring. Check the continuity of all wires from the controller to the motor.

**Repair any open wires then test drive the vehicle.**

Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.

## **WARNING**

**After any repairs are made, completely retest the vehicle before lowering the drive wheels to the ground. Failure to retest the vehicle could result in unexpected movement of the vehicle resulting in injury or property damage.**

## **CAUTION**

**This troubleshooting guide is written in sequential order. All tests must be performed in the order that they are written. Starting in the middle or skipping sections when not instructed to do so may lead to invalid test results.**

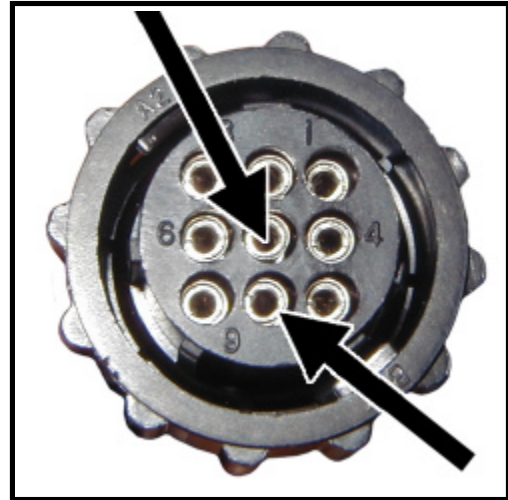
## **TEST 6.5a:**

Test the voltage from pin #5 to pin #8.

Accelerator pedal released.

**If the voltage is low then skip ahead to test 6.5b.  
If the voltage is high then the module has failed.**

Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.



## **TEST 6.5b:**

Accelerator pedal depressed.

**If the voltage equals battery volts, then skip ahead to test #6.6.  
If the voltage does not equal battery volts, then the module has failed or the accelerator pedal return spring on the module is broken.**

Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.

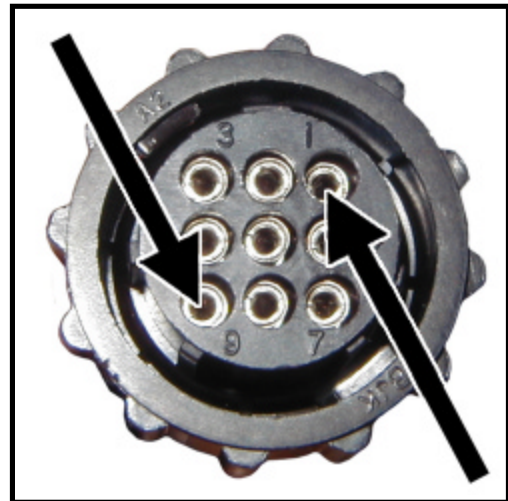
## **TEST 6.6:**

Accelerator pedal depressed.

Test the voltage from pin #9 to pin #1.

**If the voltage is between 4.8 and 5.1 volts, then skip ahead to test #6.7.  
If the voltage is not between 4.8 and 5.1 volts, then the module has failed and must be replaced.**

Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.



## **TEST 6.7:**

**If the test at pin #4 on the 12-pin logic card connector failed, but the test at pin #5 at the accelerator module was good (#6.5), then check the wire from pin #5 (module) to pin #4 (logic card).**

**If the test at pin #10 on the 12-pin logic card connector failed, but the test at pin #1 at the accelerator module was good (#6.6), then check the wire from pin #1 (module) to pin #10 (logic card).**

Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.

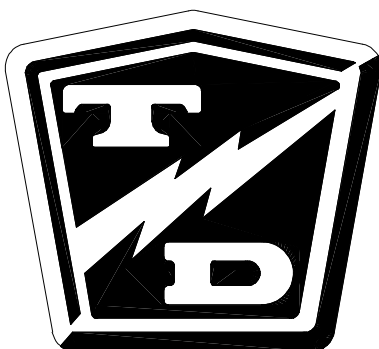
# Illustrated Parts

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Steering Gear			
ITEM #	PART #	DESCRIPTION	QTY
1	18-308-70	Locknut	1
2	18-308-71	Adjuster assembly	1
3	18-308-72	Worm assenbly	1
4	18-308-23	Upper worm bearing	1
5	18-308-22	Upper worm bearing race	1
6	18-308-77	Housing	1
7	18-308-78	Seal, pitman shaft	1
8	18-308-80	Nut, pitman shaft	1
9	18-308-81	Lock washer	1
10	18-308-79	Seal, input shaft	1
11	18-308-82	Gasket	1
12	18-308-76	Pitman shaft	1
13	18-308-75	Gear lash adjuster	1
14	18-308-85	Shim kit	1
15	18-308-84	Side cover	1
16	18-308-86	Jam nut	1
17	18-308-83	Bolt, side cover	3

REAR BRAKES			
ITEM #	PART #	DESCRIPTION	QTY
1	41-351-99	Backing Plate (R)	1
1	41-351-98	Backing Plate (L)	1
2	99-502-99	Wheel Cylinder (R)	1
2	99-502-98	Wheel Cylinder (L)	1
3	42-352-60	Brake shoe kit (left and right, 4 shoes)	1
4	41-352-10	Pin, Brake Shoe Hold Down	4
5	85-209-10	Spring	2
6	41-683-10	Wheel Cylinder Push Rod	4
7	51-352-99	Park Brake Lever (R)	1
7	51-352-98	Park Brake Lever (L)	1
8	41-352-00	Pin, Brake Adjuster	2
9	41-678-10	Socket, Brake aAdjuster	2
10	85-211-10	Spring	2
11	27-352-00	Cable Guide	2
12	85-352-30	Spring	4
13	96-828-00	Cable	2
14	85-352-00	Spring (blk)	1
14	85-352-10	Spring (yel)	1
15	97-352-99	Nut, Brake adjuster (R)	1
15	97-352-98	Nut, Brake adjuster (L)	1
16	97-352-10	Washer	2
17	96-352-99	Screw, Brake Adjuster (R)	1
17	96-352-98	Screw, Brake Adjuster (L)	1
18	51-352-00	Lever, Brake adjuster	1
20	42-351-99	Cam, Park Brake (R)	1
20	42-351-98	Cam, Park Brake (L)	1
21	85-352-20	Compression Spring	2
22	96-000-10	Brake Anchor Bolt	2
Not Shown	88-079-85	1/4-NF Hex Nut (for #22)	2
	96-827-14	Sheathed Cable	1
	96-826-13	Brake Cable	2
	96-754-00	Clevis, 5/16-Pin x 2-516 Long	2
	96-826-09	Clevis Lock	2
	96-762-00	3/8 Clevis	1
	96-771-00	3/8 x 3/4 Clevis Pin	1

<b>Wheels and Tires</b>			
Item #	Part #	Description	Qty
	13-957-10	REAR TIRE ASSEMBLY, 18X5X14, 8 HOLES	2
	10-262-00	TIRE, 18 X 5 X 14 SMOOTH	2
	12-055-00	WHEEL, CAST IRON, 8 HOLE, 14 OD	2
	13-952-10	FRONT TIRE ASSEMBLY, 16 X 4 X 12-1/8, 5 HOLE	2
	10-250-00	TIRE, 16 X 4 X 12 1/8 SMOTH	2
	12-050-00	WHEEL, IRON 5-HOLE, 12-1/8 OD	2
	97-236-00	Wheek nut	26



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