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Business**

[®]
Taylor-Dunn



Models Included:

SS-025-34 (SS-534)

SS-025-36 (SS-536)

SS-025-46 (SS-546)

MX-026-00 (MX-600)

MANUAL MS-534-09

*Operation, Maintenance, and
Replacement Parts Manual*

**Published: 8/21/2009
Revision: A**

Serial Number Starting: 180000

Taylor-Dunn Contact information

Service, Parts, Sales:

Taylor-Dunn has a network of dealers distributed around the globe to support our vehicles. Information regarding vehicle sales, replacement parts, or service should be obtained through your local dealer. A dealer locator can be found on the Taylor-Dunn website at www.taylor-dunn.com.

If you do not have access to the internet, you can call the factory direct at:
01 (714) 956-4040

Feedback regarding this or any Taylor-Dunn vehicle manual can be sent to:
Taylor-Dunn Manufacturing
Attn: Tech Writer
2114 West Ball Road
Anaheim, CA 92804





B2-48 With Dump Bed Option



B2-10 Ambulance



*B2-48 with Steel Cab, Foldaway
4-Passenger Seat and Stake Sides*



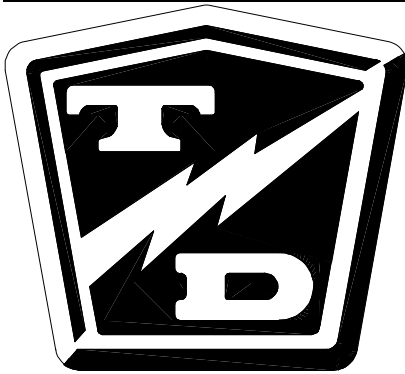
P2-50 30,000 Pound Tow Tractor



ET 3000



ET1-50 Full Size Truck



Taylor-Dunn®

Models: SS-534, 536, 546, and MX-600

Operator and Service Manual Section Index



SS-534



SS-536



SS-546

MX-600



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This quick reference section index guide will assist you in locating a desired topic or procedure.

Refer to each sectional Table of Contents for the page number location for specific topics or procedures.



TAYLOR - DUNN

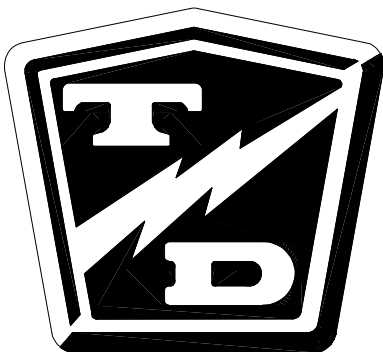


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Introduction





INTRODUCTION

ABOUT THIS MANUAL

The purchase of this vehicle shows a belief in high quality products manufactured in the USA. Taylor-Dunn®, a leading manufacturer of electric burden and personnel carriers since 1949, wants to be sure this vehicle provides years of reliable service. Please continue to read this manual and enjoy this high quality Taylor-Dunn® vehicle.

This manual is to serve as a guide for the service, repair, and operation of Taylor-Dunn® vehicles and is not intended as a training guide. Taylor-Dunn® has made every effort to include as much information as possible about the operation and maintenance of this vehicle.

Included in this manual are:

- Vehicle Description
- Safety Rules and Guidelines
- Operational Information
- Operator Responsibilities
- Owner Responsibilities
- Control Operation and Location Information
- Maintenance and Troubleshooting Information
- Standard Parts List

Before servicing, operating, training or performing maintenance on this or any other Taylor-Dunn® vehicle, read the appropriate Taylor-Dunn® manual.

Each Taylor-Dunn® manual references the applicable models and serial numbers on the front cover.

Please, be aware of all cautions, warnings, instructions, and notes contained in this manual.

WHO SHOULD READ THIS MANUAL

This manual is intended for use by anyone who is going to operate, own, perform maintenance on, service, or order parts for this Taylor-Dunn® vehicle. Each person should be familiar with the parts of this manual that apply to their use of this vehicle.

RESPONSIBILITIES

Of the Owner...

The owner of this or any Taylor-Dunn® vehicle is responsible for the overall maintenance and repairs of the vehicle, as well as the training of operators. Owners should keep a record of conducted training and maintenance performed on the vehicle. (OSHA Regulation, 29 CFR 1910.178 Powered Industrial Truck Operator Training).

Of the Operator...

The operator is responsible for the safe operation of the vehicle, preoperational and operational checks on the vehicle, and the reporting of any problems to service and repair personnel.

Of the Service Personnel...

The service personnel are responsible for the service and maintenance of the vehicle. At no time should a service person allow any untrained personnel to service or repair this or any Taylor-Dunn® vehicle. For the purposes of training, a qualified service person may oversee the repairs or services being made to a vehicle by an individual in training. At no time should an untrained individual be allowed to service or repair a vehicle without supervision. This manual is not a training guide.

Of the Passengers ...

The passengers are responsible to remain fully seated, keeping their hands, arms, and legs inside the vehicle at all times. Each passenger should be fully aware of the vehicle's operation. All forms of recklessness are to be avoided. Do not engage in horseplay.



*Model B 2-10 shown with stake sides
and steel cab with doors options*

HOW TO USE THIS MANUAL

This manual is organized into five main sections:

INTRODUCTION

This section describes how to use this service manual and how to identify your vehicle.

Safety Rules and Operating Instructions

This section outlines the safety and operational issues, location and operation of controls, and the operational checks that are to be performed on this vehicle. It also includes various subjects that should be included in the operator and service training program.

Maintenance Service and Repair

These sections gives specific information on the servicing of the vehicle and a schedule for maintenance checks.

Electrical and Charger Troubleshooting

This section identifies the troubleshooting procedures for testing the electrical system and battery charger.

Illustrated Parts

This section provides an illustrated view of various assemblies. The illustrations are accompanied by tables identifying the parts.




Model R 3-80 shown equipped with a cargo box and steel cab with doors options


Conventions

Symbols and/or words that are used to define warnings, cautions, instructions, or notes found throughout this manual. Refer to the examples below.


⚠ WARNING

A shaded box with the word "Warning" and the symbol  above denotes a warning. A warning alerts the reader of a hazard that may result in injury to themselves or others. Be sure to follow any instructions contained within a warning and exercise extreme care while performing the task.

⚠ WARNING

A shaded box with and the word "Warning" and the symbol  above denotes a warning. This warning alerts the reader of a high voltage hazard that may result in injury to themselves or others. Be sure to follow any instructions contained within a warning and exercise extreme care while performing the task.

⚠ CAUTION

A box with the word "CAUTION" and the symbol  above denotes a caution and is used to inform the reader that property damage may occur. Be sure to exercise special care and follow any instructions contained with in a caution.

Note: Alerts the reader to additional information about a subject.



Model B 2-48 equipped with the Dump Bed option



INTRODUCTION

HOW TO IDENTIFY YOUR VEHICLE

This manual applies to vehicles with the same model and serial numbers listed on the front cover.

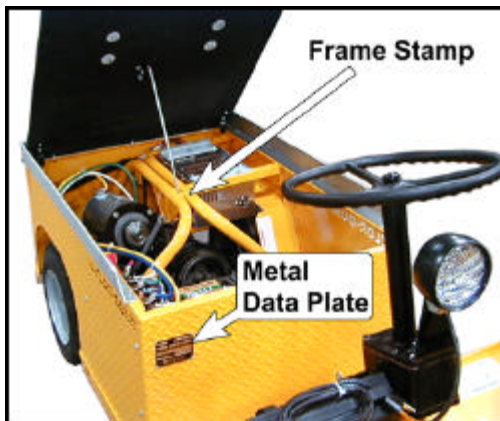
These vehicles are designed for driving on smooth surfaces in and around facilities such as industrial plants, nurseries, institutions, motels, mobile home parks, and resorts. They are not to be driven on public highways.

⚠ WARNING

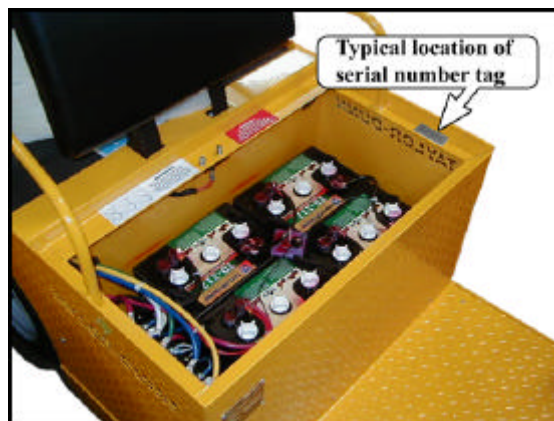
This vehicle is not designed to be driven on public roads or highways. It is available in maximum designed speeds ranging from 4 to 9 mph. Do not exceed the maximum designed speed. Exceeding the maximum designed speed may result in steering difficulty, motor damage, and/or loss of control. Do not exceed locally imposed speed limits. Do not tow at more than 5 mph.

This vehicle conforms to requirements for Type E vehicles as described in O.S.H.A. Standard Section 29 CFR 1910.178 (Powered Industrial Trucks) and with all applicable portions of the American National Standard for Personnel and Burden Carriers (ANSI B56.8).

The locations of the model and serial numbers are illustrated below:



SS-534



With the exception of the SS-534, the frame serial number can be found under the driver seat. It is on a tag welded to the seat frame.

TAKING DELIVERY OF YOUR VEHICLE

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.

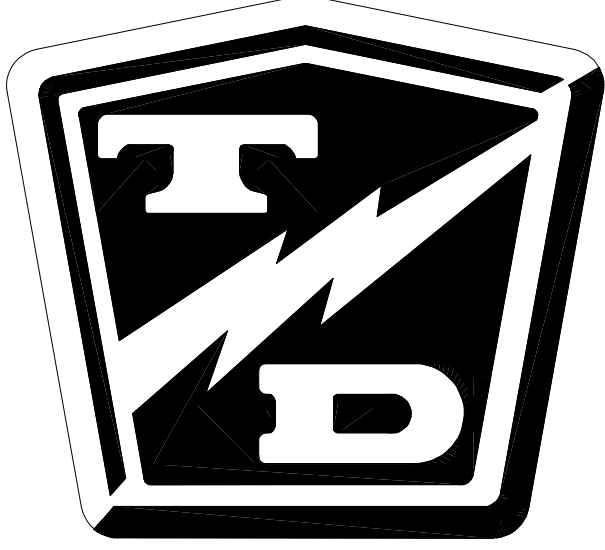
⚠ WARNING

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 C-426

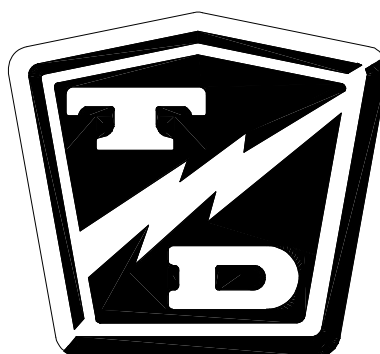
TAYLOR - DUNN



Chapter - 2

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Safety Rules and Operating Instructions



SAFETY RULES AND OPERATING INSTRUCTIONS

STANDARD SPECIFICATIONS*

ITEM	Model	SPECIFICATION
Occupancy	SS-534, MX-600 SS-536, SS-546	Driver Drive + 1-Passenger on fold down seat
Dimensions	SS-534 SS-536 SS-546 MX-600	76.5L x 28.5W x 42 H Inches (1943L x 724W x 1067H mm) 86.5L x 30W x 41H Inches (2197L x 762W x 1041H mm) 89L x 30W x 41H Inches (2261L x 762W x 1041H mm) 86L x 32W x 41H Inches (2174L x 813W x 1041H mm)
Turning Radius	SS-534, SS-536 SS-546 MX-600	75 inches (1905 Millimeters) 81 inches (2057 Millimeters) 81 inches (2057 Millimeters)
Maximum Speed (Hard level surface, no load)		10 mph (16 kph) Do not exceed safe speed for conditions
Dry Weight (Without Battery)	SS-536, MX-600 SS-534 SS-546	543 pounds (246 kg) 481 pounds (218 kg) 598 pounds (271 kg)
Battery specifications:		
Min/Max Battery Weight	All	232 lbs to 320 lbs (105 kg to 145 kg)
Voltage	All	24 DC
Deck Dimensions	SS-534 SS-536, SS-546 MX-600	23.5 x 27.5 inches (597 x 699 mm) 19 x 30 inches (483 x 762 mm) 27 x 30 inches (686 x 762 mm)
Maximum Carried Load	SS-534 SS-536, SS-546, MX-600	500 pounds (227 kg) Note: Load centered on deck 600 pounds (272 kg) Note: Load centered on deck
Electrical System	All	Curtis PMC , 275 Amp Motor Control
Transmission	SS-534 SS-536, SS-546, MX-600	Open Belt drive Reduction to Automotive Hypoid Differential Oil Bath Helical Gear Reduction to Automotive Type Hypoid Differential.
Motor	All	4.5Horse Power (## kW) @ 935 rpm
Brakes	SS-534 SS-536, SS-546, MX-600	Rear Drive Line Band Brake, Hand Operated Mechanical Park Brake Rear Drum, Hand Operated Mechanical Park Brake
Steering		Manual
Tires		4.80 x 8 Load Range B Pnuematic
Instrumentation		Battery Status Gauge, Key Switch, Horn Switch, Forward/Reverse Switch, Headlight Switch

This vehicle conforms to requirements for Type E vehicles as described in O.S.H.A. Standard Section 1910.178 (Powered Industrial Trucks) and with all applicable portions of the American National Standard for Operator Controlled Industrial Tow Tractors (ANSI B56.8).

* - Specifications are subject to change without notice.

*** - Not available at time of printing



SAFETY RULES AND GUIDE-LINES

It is the responsibility of the owner of this vehicle to assure that the operator understands the various controls and operating characteristics of this vehicle (extracted from the American National Standards Institute Personnel and Burden Carriers ANSI B56.8). As well as, following the safety rules and guidelines outlined in ANSI B56.8 and listed below.

These vehicles are designed for driving on smooth surfaces in and around facilities such as industrial plants, nurseries, institutions, motels, mobile home parks, and resorts. They are not to be driven on public highways.

WARNING

These vehicles are not designed to be driven on public roads or highways. They are available in maximum designed speeds ranging from 4.5 to 9 mph. Do not exceed the maximum designed speed. Exceeding the maximum designed speed may result in steering difficulty, motor damage, and/or loss of control. Do not exceed locally imposed speed limits. Do not tow this vehicle at more than 5 mph.

Refer to **Vehicle Operational Guidelines, Safety Guidelines** section for important safety information regarding operating this vehicle.

WARNING

Read and follow all of the guidelines listed below. Failure to follow these guidelines may result in severe bodily injury and/or property damage.

WARNING

Before working on a vehicle:

- 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.**

DRIVER TRAINING PROGRAM

According to ANSI B56.8, the owner of this vehicle shall conduct an Operator Training program for all those who will be operating this vehicle. The training program shall not be condensed for those claiming to have previous vehicle operation experience. Successful completion of the Operator Training program shall be required for all personnel who operate this vehicle.

The Operator Training program shall include the following:

- Operation of this vehicle under circumstances normally associated with your particular environment.
- Emphasis on the safety of cargo and personnel.
- All safety rules contained within this manual.
- Proper operation of all vehicle controls.
- A vehicle operation and driving test.

Driver Qualifications.

Only those who have successfully completed the Operator Training program are authorized to drive this vehicle. Operators must possess the visual, auditory, physical, and mental ability to safely operate this vehicle as specified in the American National Standards Institute Controlled Personnel and Burden Carriers ANSI B56.8.

The following are minimum requirements necessary to qualify as an operator of this vehicle:

- Demonstrate a working knowledge of each control.
- Understand all safety rules and guidelines as presented in this manual.
- Know how to properly load and unload cargo.
- Know how to properly park this vehicle.
- Recognize an improperly maintained vehicle.
- Demonstrate ability to handle this vehicle in all conditions.



VEHICLE CONTROLS

1) Horn Switch

The horn switch is located on the left side of the floorboard. Depress the switch with your foot to sound the horn, release it to turn it off.

2) Start Switch

The start switch is located at the lower right of the dash panel of the Model SS and the front of the panel on the model MX. Rotate the switch clockwise to turn the vehicle power on, counterclockwise to turn the vehicle power off.

The switch should be in the "OFF" position whenever the operator leaves the vehicle.

3) Headlight Switch

4) Battery Status Gauge

The battery status gauge displays the relative charge of the batteries. Refer to details later in this section.

5) Strobe Light Switch (optional)

6) Forward/Off/Reverse Switch

The forward/reverse switch determines the direction of travel. Push the top of the switch to travel in forward, push the bottom of the switch to travel in reverse. The switch also has a center Off position. The switch should be in the Off position whenever the driver leaves the vehicle.

7) Hour Meter (optional)

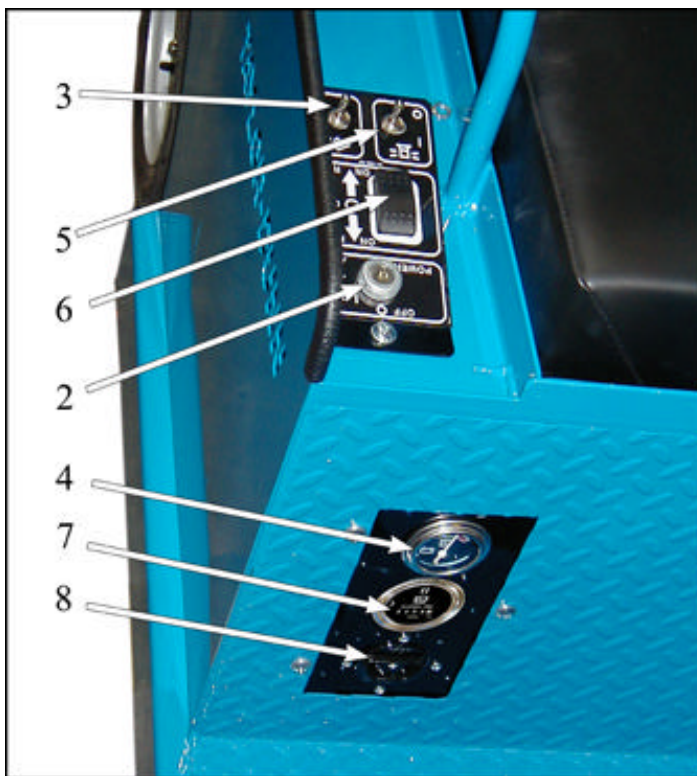
The hour meter counts the number of hours the vehicle is in operation.

8) Charger Connector (MX-600 only)

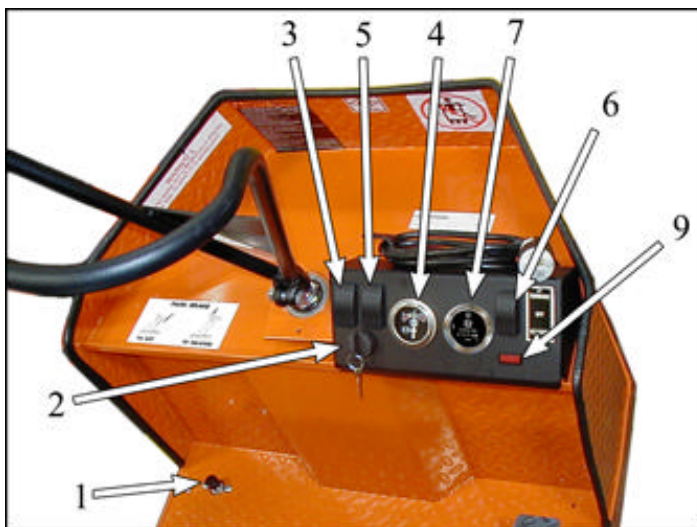
Connection for portable charger.

9) Power Light (SS only)

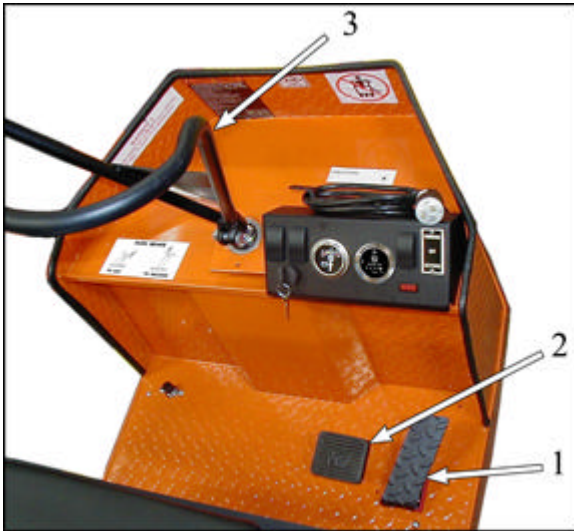
The power light will be illuminated whenever the start switch is on.



MX-600



SS Models



1) Accelerator Pedal

The accelerator pedal is located to the right of the brake pedal. It controls the speed of the vehicle and operates similar to the accelerator pedal in an automobile. Depress the pedal to increase speed and release the pedal to decrease speed.

2) Foot Brake Pedal

The foot brake pedal, is located to the left of the accelerator pedal, it is for operation with the right foot only. It works similar to the brake in an automobile. Applying pressure to the brake pedal slows the vehicle according to the amount of pressure applied. Relieving pressure from the pedal releases the braking action.

2) Park Brake, Foot Operated

The parking brake is part of the foot brake pedal. To set the parking brake, push down on the lower half of the brake pedal until the pedal locks in the down position. To release the park brake, apply pressure on the upper half of the brake pedal until the pedal disengages from the locked position.

3) Steering

Tiller (standard on models SS-534, 536, and MX):

This is a loop tiller type and operates similar to a bicycle handle bar. To turn right, turn the tiller to the left (clockwise rotation). To turn left, turn the tiller to the right (counterclockwise rotation).

Steering Wheel (optional on SS-534, 536, and MX, standard on SS-546:

The steering wheel and steering system are similar to an automobile. To turn right, turn the steering wheel clockwise. To turn left, turn the steering wheel counterclockwise.



Seat Adjustments

The SS-536 and SS-546 both have a fold down seat back to allow a passenger to ride on the rear of the vehicle. The seat back must be down whenever carrying a passenger.

Charger Interlock

The charger interlock is designed to disable the vehicle from being driven while the built in charger AC charger cord is plugged into a functioning power source or the portable charger is plugged into the DC receptacle.



SAFETY RULES AND OPERATING INSTRUCTIONS

Driver Seat Interlock (SS-536, SS-546, MX-600)

This vehicle is equipped with a driver seat interlock. The vehicle control system will not run unless the driver is seated properly in the driver seat..

Whenever the driver leaves the vehicle, the driver should turn the key-switch off, place the forward-off-reverse switch in the center "OFF" position, and set the park brake.

⚠ WARNING

The seat interlock switch is only one part of the vehicle safety system. The interlock switch should not be relied upon as the only safety feature used to disable or disengage this vehicle. Doing so could result in unexpected movement of the vehicle causing severe bodily injury and/or property damage.



Battery Status Indicator, Analog

The battery status indicator is located to the left of the hour meter. The normal operating range is in the green zone. Park the vehicle for a few minutes for an accurate reading. The vehicle needs charging if it is in the yellow zone. During and immediately following charging, the needle will be in the red zone to the right. The needle will move through the green zone toward the yellow zone as the batteries discharge. Charge the batteries when the needle is in the yellow zone. If it is in the red zone to the left, the batteries are empty and the truck should be taken out of service and charged to avoid damaging the batteries.



Battery Status Indicator, Digital Bargraph (optional)

The battery status indicator is located to the left of the hour meter. The battery status indicator has a LED bar graph that indicates the relative state of charge of the battery. The top LED will light only when connected to a fully charged battery or after completing a charging cycle. Successive lower LED's will light as the battery charge diminishes. When the second from the bottom LED flashes the battery energy status is in energy reserve and should be placed on charge as soon as possible. When the two bottom LED's are alternately flashing the batteries are empty and the truck should be taken out of service and charged to avoid damaging the batteries. The BSI will reset to fully charged only after a complete charge cycle is completed. A complete charge cycle is defined as battery voltage exceeding 2.35 volts per cell for a minimum of 6 minutes.



VEHICLE OPERATIONAL GUIDELINES

Safety Guidelines

- Only qualified and trained operators may drive this vehicle.
 - Drive only on level surfaces or on surfaces having an incline of no more than 10% (5.6 degrees).
 - Drive slowly when making a turn, especially if the ground is wet or when driving on an incline.
 - This vehicle may overturn easily if turned sharply or when driven at high speeds.
 - Observe all traffic regulations and speed limits.
 - Keep all body parts (head, arms, legs) inside this vehicle while it is moving.
 - Keep the vehicle under control at all times.
 - Yield right of way to pedestrians, ambulances, fire trucks, or other vehicles in emergencies.
 - Do not overtake another vehicle at intersections, blind spots, or other dangerous locations.
 - Do not drive over loose objects, holes, or bumps.
 - Yield right of way to pedestrians and emergencies vehicles.
 - Stay in your driving lane under normal conditions, maintaining a safe distance from all objects.
 - Keep a clear view ahead at all times.
-

Starting:

1. Place shift lever is in the center "OFF" position.
2. Apply the foot brake.
3. Release the parking brake.
4. Turn the start switch to the "ON" position.
5. Wait 1-second then place the shift lever in the desired direction of travel.
6. Slowly depress the accelerator pedal.

While driving:

- Slow down and sound the horn to warn pedestrians or when approaching a corner or other intersection.
- No reckless driving.
- Do not drive this vehicle on steep inclines or where prohibited.
- Allow for longer stopping distances when driving down a grade.
- Immediately report any accidents or vehicle problems to your supervisor.
- Use the low speed model while towing heavy loads. While towing heavy loads, the low speed mode will increase the efficiency of the system and extend running time between charges.
- Do not carry more than the maximum number of passengers allowed for this vehicle.

Changing Directions:

Reversing the direction of an electric vehicle while still in motion is called "plugging" or "plug braking."

This vehicle is equipped with dynamic plug braking which allows reversing direction of the vehicle while still in motion.

When reversing direction while the vehicle is in motion, the control system will send reverse current to the drive motor and smoothly slow to a stop then accelerate in the opposite direction.

Do not rely on plug braking to stop quickly such as in an emergency.

Towing Loads

- Do not exceed the towing capacity of the vehicle.
- Do not exceed the load capacity of the trailer. Refer to documentation supplied with your trailer for information regarding load capacity of the trailer.
- Make sure all loads are securely tied down. Refer to documentation supplied with your trailer for information regarding attaching loads to the trailer.
- Do not back up when towing more than one trailer.
- Drive slowly when towing loads with a high center of gravity.
- When turning, be sure to allow for "corner cutting" of the trailer.
- Allow for longer stopping distances when towing heavy loads.



SAFETY RULES AND OPERATING INSTRUCTIONS

Parking

Before leaving the vehicle:

- Place the forward/off/reverse switch in the center "OFF" position.
- Turn the start switch to the "OFF" position and remove the key.
- Set the park brake.

In addition:

- If parking this vehicle on an incline, turn the wheels to the curb, or block the wheels.
- Do not block fire aisles, emergency equipment, stairways, or exits.

Towing the Vehicle

To tow this vehicle, attach a tow strap to the front bumper tow-bar.

Use another driver to steer this vehicle while it is being towed. Be sure the driver uses the brakes when the towing vehicle slows or stops. Do not tow the vehicle faster than 5 mph. or its maximum designed speed, whichever is lower.





CHARGING YOUR VEHICLE

⚠ 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.

⚠ CAUTION

The key switch must be in the "OFF" position when charging the batteries. Failure to turn the key switch "OFF" may result in damage to the vehicles electrical system.

Charger Interlock

This vehicle is equipped with a charger interlock that will prevent operation of the vehicle when a charger is connected to the charging receptacle.

Charging Time

Charging time will vary depending on the type charger used and the size of the battery. Refer to the documentation provided with the charger for more information.

New Battery Break in

New batteries require a break in period of up to 40-cycles. The batteries will not have their full capacity during this break in period and may require longer charging times.

⚠ WARNING

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.

To obtain the maximum battery life:

Charge the batteries only after they reach a normal discharge as indicated on the Battery Status Indicator (BSI). Failure to follow this guideline could result in the batteries entering an overcharge state, which will reduce the life of the batteries. If you find it necessary to charge the batteries before they are completely discharged we recommend waiting until they are discharged a minimum of 25% to reduce the possibility of overcharging. Refer to Vehicle Controls in this section for information on how to read the BSI.

Do not discharge the batteries beyond a normal discharge as indicated on the BSI. Refer to Vehicle Controls in this section for information on how to read the BSI.

Check the battery electrolyte once a week. Do not charge the batteries if the battery electrolyte is low. Charging when the electrolyte is low will damage the batteries and shorten their life-span. Only authorized personnel should perform battery maintenance including maintaining the battery electrolyte level. Refer to Section **Maintenance, Service and Repair** for battery maintenance information.

Do not interrupt the charging cycle. When the charger is plugged in, allow it to turn off before disconnecting. Interrupting the charging cycle could lead to overcharging or discharging the batteries too deep. Both circumstances will shorten the life of the batteries.



SAFETY RULES AND OPERATING INSTRUCTIONS

Signet Charger Operation (Model HBS)

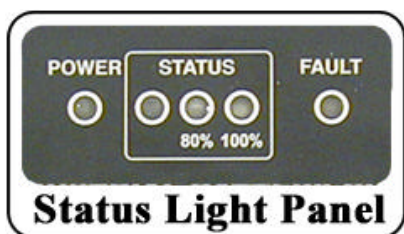
The Signet® HBS series chargers are fully automatic. The charger will turn itself ON when the AC power cord is connected to the AC power source and turn itself OFF when the batteries are fully charged. Once the charge cycle is complete, the charger will continue to monitor the batteries. If the battery voltage drops during storage, the charger will start a new cycle to keep the batteries fully charged.

NOTE: If the charger restarts during a short time period of storage, then it could be an indication of faulty batteries.

Refer to the data plate on the charger for the voltage and type power required for the charger.

There is a series of LED's on the faceplate of the charger that serve two functions:

1. Status of charge. The **STATUS** LED's will display an approximate percent of charge during the charging cycle. Refer to the table below.
2. Error condition. If the **FAULT** LED is on or flashing, it is an indication that a problem occurred during the charge cycle (charger may also be beeping). Refer to the **Charger Troubleshooting** section for information on error fault codes.



Charging State	LED1	LED2	LED3
0 to 50%	Blinking	OFF	OFF
50% to 75%	ON	Blinking	OFF
75% to 100%	ON	ON	Blinking
Cycle complete	ON	ON	ON

Lestronic II® Charger Operation

The Lestronic II® charger is a semi-automatic charging system. The charger will turn itself ON when the AC power cord is connected to the AC power source and turn itself OFF when the batteries are fully charged. Refer to the data plate on the charger for the voltage and type power required for the charger.

When plugged in, the charger assumes that the batteries require charging and will charge for a minimum of approximately 4-hours. This charger should not be plugged in until the batteries are discharged beyond 50% or the batteries may be overcharged.



STORING / RETURNING TO SERVICE

Both storing your vehicle and returning it to service should only be performed by authorized personnel.

Storing Your Vehicle

- Clean the batteries, then fill and charge before putting the vehicle in storage. Do not store batteries in a discharged condition.
- Lube all grease fittings.
- Clean, dry, and check all exposed electrical connections.
- Inflate tires to proper pressure (if applicable).
- For extended storage, the vehicle should be elevated so that the tires do not touch the ground.

If stored for a prolonged period, the batteries should be charged as follows:

Storage Temperature (F)	Charging Interval (months)
Over 60	1
Between 40 and 60	2
Below 40	6



Returning to Service

- Check the battery's state of charge and charge if required.
- Perform ALL maintenance checks in the periodic checklist.
- Remove any blocks from the vehicle and/or place the vehicle down on to the ground.
- Test drive before putting into normal service.



SAFETY RULES AND OPERATING INSTRUCTIONS

PERIODIC MAINTENANCE CHECKLIST, SS-536, 546, MX-600

Taylor-Dunn Preventative Maintenance Schedule for Dana Drive

Date: _____ Model #: _____ Hour Meter: _____
 Inspected By: _____ Serial #: _____
 Serviced By: _____ Unit ID#: _____

Interval (hours) ¹	Inspected ²	Service Required	Service Complete	Item Description
Operator Daily Checklist				Master cylinder fluid level
				Parking brake for secure hold
				Battery water level
				Tire inflation (pneumatic tires)
				Tire tread / damage
				All lights (head, tail, brake, warning, dash panel)
				Steering (hard steering, excessive play, unusual noises)
				Inspect brake and throttle pedal (play, binding, noise)
				Horn
				Motion alarm (if equipped)
500				Fluid leaks (brakes, rear axle, battery, hydraulic system)
				Adjust service and park brake systems
				Inspect all steering linkages and hardware
				Tighten steering shaft to steering gear coupler (if equipped)
				Lubricate the vehicle
				Wash batteries and clean terminals
				Inspect for fluid leaks
				Check all electrical interlocks for proper operation
				Inspect wheel bearings for play and noise
				Inspect front fork collar bearings for play and noise (3-wheel vehicle only)
1000				Inspect and tighten all hardware (first 500 hours only, then 1000 hours and every 1000 hours)
				Inspect and tighten all hardware
				Clean and repack front wheel bearings, replace grease seals
				Inspect all electrical connections for signs of overheating
				Tighten all electrical connections
				Inspect all wiring for cracks, fraying or wear
				Blow carbon from motor
				Inspect motor brushes and commutator
				Inspect steering king pins for play
				Align front end
2000				Change rear axle oil
				Flush hydraulic brake system
				Inspect suspension bushings (spring, shock)
				Inspect suspension bumpers
				Replace brake pedal/treadle return spring
				Inspect frame for damage

Notes (1) and (2), Refer to "Maintenance Guidelines for Severe Duty" in the vehicles service manual



PERIODIC MAINTENANCE CHECKLIST, SS-534

Taylor-Dunn Preventative Maintenance Schedule for Belt Drive

Date: _____ Model #: _____ Hour Meter: _____
 Inspected By: _____ Serial #: _____
 Serviced By: _____ Unit ID#: _____

Interval (hours) ¹	Inspected ²	Service Required	Service Complete	Item Description
Operator Daily Checklist				Master cylinder fluid level
				Parking brake for secure hold
				Battery water level
				Tire inflation (pneumatic tires)
				Tire tread / damage
				All lights (head, tail, brake, warning, dash panel)
				Steering (hard steering, excessive play, unusual noises)
				Inspect brake and throttle pedal (play, binding, noise)
				Horn
				Motion alarm (if equipped)
				Fluid leaks (brakes, rear axle, battery, hydraulic system)
500				Adjust service and park brake systems
				Inspect all steering linkages and hardware
				Tighten steering shaft to steering gear coupler (if equipped)
				Lubricate the vehicle
				Wash batteries and clean terminals
				Inspect for fluid leaks
				Check all electrical interlocks for proper operation
				Inspect wheel bearings for play and noise
				Adjust drive belts
				Inspect front fork collar bearings for play and noise (3-wheel vehicle only)
				Inspect and tighten all hardware (first 500 hours only, then 1000 hours and every 1000 hours)
1000				Inspect and tighten all hardware
				Clean and repack front wheel bearings, replace grease seals
				Inspect all electrical connections for signs of overheating
				Tighten all electrical connections
				Inspect all wiring for cracks, fraying or wear
				Blow carbon from motor
				Inspect motor brushes and commutator
				Inspect steering king pins for play
2000				Align front end
				Change rear axle oil
				Flush hydraulic brake system
				Inspect suspension bushings (spring, shock)
				Inspect suspension bumpers
				Replace brake pedal/treadle return spring
				Inspect frame for damage

Notes (1) and (2), Refer to "Maintenance Guidelines for Severe Duty" in the vehicles service manual



SAFETY RULES AND OPERATING INSTRUCTIONS

Daily Visual inspection:

Tire condition and pressure.

External frame damage (body).

Operation of all lights and warning alarms and/or horns.

Smooth and proper operation of all controls such as but not limited to:

- Accelerator pedal, Brake pedal, Steering, Parking brake, etc.
- Proper operation of all locking devices such as but not limited to:
Tool box, Removable battery trays, Cargo box, Cab doors, etc.
- Proper operation of all interlocking switches such as but not limited to:
- Key switch, Seat interlock switch, Charger interlock switch, etc.

Inspect for leaking fluids or grease.

MAINTENANCE GUIDELINES FOR SEVERE DUTY APPLICATIONS

1. This maintenance checklist is based on the average application. If the vehicle is operated under “severe conditions”, service procedures should be conducted more frequently than specified. The frequency of service under severe conditions is determined by the use of the vehicle. The owner/operator must evaluate the operating environment to determine the increase in maintenance frequency.

In addition, the whole vehicle should be inspected monthly for signs of damage. The damage must be repaired immediately.

The following list is meant as a guide and is not all-inclusive of a “severe duty” application.

- Extreme temperature.
 - Bumpy, dusty, or ill maintained roads.
 - Excessively wet areas.
 - Corrosive or contaminated areas.
 - Frequent loading of vehicle at/near capacity.
 - Use on multiple shifts.
2. Any deficiencies found during an inspection should be corrected before the vehicle is returned to service.
 3. Battery water level should be inspected on a weekly schedule.

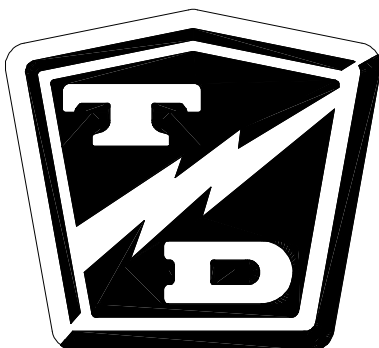
⚠ WARNING

Only properly trained and authorized technicians should perform maintenance or repairs to this vehicle. Repairs or maintenance by improperly trained or unauthorized personnel could cause improper operation of the vehicle or premature failure of components resulting in severe bodily injury and/or property damage.

Chapter - 3

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Lubrication Diagram	5



General Maintenance



Maintenance Guidelines

⚠ WARNING

Periodic maintenance and service must be performed on this vehicle. Failure to complete these scheduled maintenance and service procedures can result in severe bodily injury and/or property damage. It is the owner and/or operators responsibility to insure that proper service and maintenance is performed on the vehicle, described in this manual.

⚠ WARNING

Before starting any repairs:

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 or rear wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

⚠ CAUTION

Turn the Key switch OFF BEFORE disconnecting the batteries. Disconnecting the batteries with the key switch ON may corrupt the controller programming resulting in a fault code 1 (refer to the fault table in the troubleshooting section).

⚠ WARNING

Read and follow all of the guidelines listed below. Failure to follow these guidelines may result in severe bodily injury and/or property damage.

- Avoid fire hazards and have fire protection equipment present in the work area. Conduct vehicle performance checks in an authorized area where safe clearance exists.
- Before starting the vehicle, follow the recommended safety procedures in Section 2, "Safety Rules and Operational Information."
- Ventilate the work area properly.
- Regularly inspect and maintain in a safe working condition, brakes, steering mechanisms, speed and directional control mechanisms, warning devices, lights, governors, guards, and safety devices.
- Inspect and maintain battery limit switches, protective devices, electrical conductors, and connections in conformance with Taylor-Dunn's® recommended procedures.
- Keep the vehicle in clean condition to minimize fire hazards and facilitate detection of loose or defective parts.
- Do not use an open flame to check level or leakage of battery electrolyte.
- Do not use open pans of fuel or flammable fluids for cleaning parts.
- Only properly trained and authorized technicians should perform maintenance or repairs to this vehicle.

Troubleshooting Guide

Symptom	Suspect Component or System	Action
Steering Pulls Left or Right	Front end out of alignment	Realign front end
	Low tire pressure	Inspect tire pressure
Difficult Steering	Lack of lubrication	Lubricate steering linkages
	Damaged or worn steering components	Inspect all steering components
	Low tire pressure	Inspect tire pressure
Excessive Play in Steering	Damaged or worn steering linkages	Inspect steering linkages
	Loose steering linkages	Tighten all hardware
	Loose steering wheel	Inspect steering wheel nut
	Loose front spring hardware	Tighten all hardware
Soft and/or Low Brake Pedal	Air in brake lines	Bleed brake system
	Master cylinder fluid level low	Fill master cylinder and bleed system
	Brake pedal linkage out of adjustment	Adjust linkages
Hard Brake Pedal	Faulty master cylinder	Inspect master cylinder
Lack of Braking Power	Contaminated brake pads	Replace brake pads
	Worn brakes	Replace brakes
	Air in brake lines	Bleed brake system
Brakes Dragging	Brake pedal linkage out of adjustment	Adjust linkages
	Faulty master cylinder	Inspect master cylinder
	Faulty brake caliper	Inspect brake calipers
	Debris in brakes	Inspect brakes
	Parking brake applied	Release parking brake, inspect linkage
Low Power or Running Slow	Faulty or discharged battery	Test battery and charge
	Brakes dragging	Inspect brake system
	Fault in motor control system	Refer to motor control fault codes
Noise, Front End	Loose wheel nuts	Tighten all hardware
	Damaged or worn wheel bearings	Inspect wheel bearings
	Damaged, worn, or debris in brakes	Inspect brakes
	Loose components	Tighten all hardware
	Damaged or worn suspension mounts	Inspect suspension
Noise, Rear End	Loose wheel nuts	Tighten all hardware
	Damaged or worn internal transaxle components	Inspect transaxle
	Damaged or worn suspension mounts	Inspect suspension

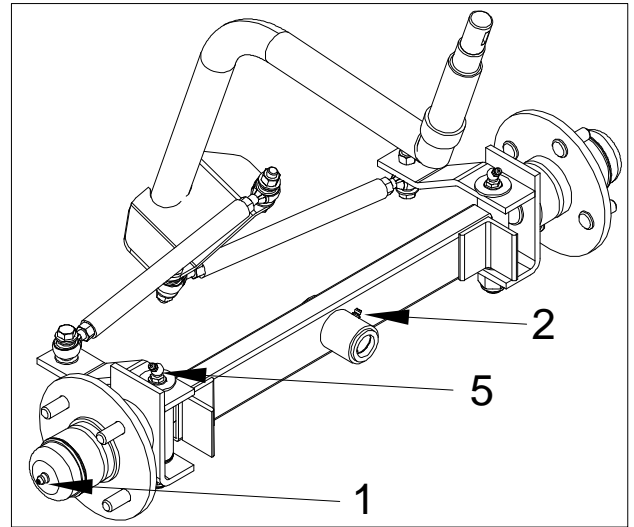
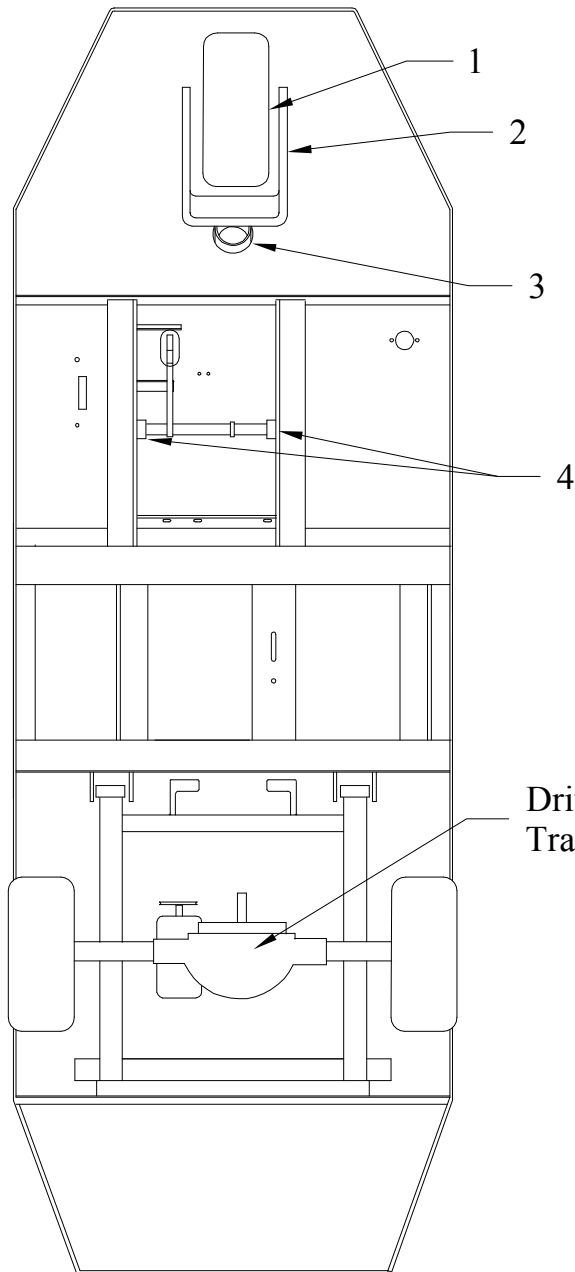
Note: This list is provided as a guide only. It is not all inclusive of causes that may result in a specific symptom.



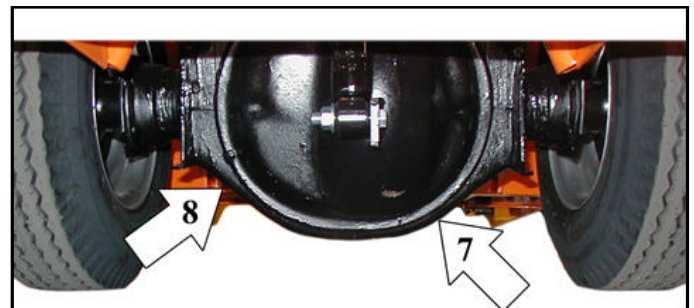
Lubrication and Fluids Chart

Assembly	Item Component	qty	Capacity	Lubricant
<u>Front Axle:</u>				
	5 King Pin (SS-546)	2	-	NLGI Grade 2 lithium multi-purpose grease
	2 Axle Pivot (SS-546)	1	-	NLGI Grade 2 lithium multi-purpose grease
	1 Wheel Bearing	1 or 2	-	NLGI Grade 2 lithium multi-purpose grease
	3 Fork Bearings	1	-	NLGI Grade 2 lithium multi-purpose grease
<u>Linkages:</u>				
	4 Brake pedal pivot	2	-	Multi-purpose spray lubricant
	Park brake pedal pivot	2	-	Multi-purpose spray lubricant
	Park brake cable	4	-	Multi-purpose spray lubricant
<u>Rear Transaxle:</u>				
	SS-536, SS546. MX-600	1		11 ounces SAE 30 MPOtor Oil
	7, 8SS-534	1	2 quarts	SAE 140 API GL-5 Hypoid Gear Oil
<u>Misc:</u>				
	Steering Gear (optional)	1		Multi-purpose spray lubricant
	Fold Down Seat Pivot	2	-	Multi-purpose spray lubricant

Lubrication Diagram



SS-546 Front Axle

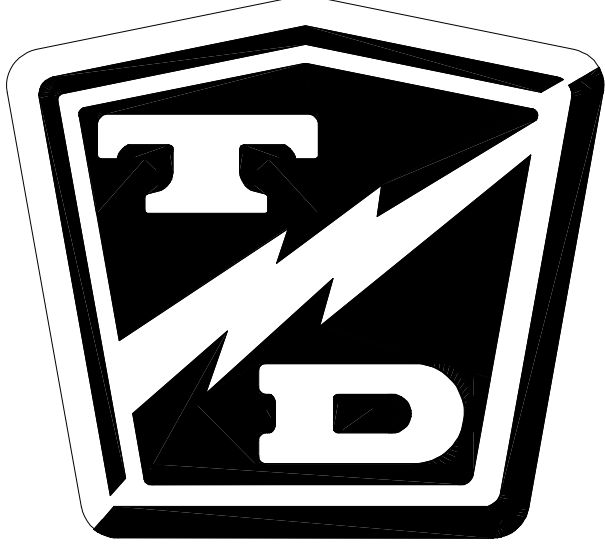


SS-534 Drive (Rear View) Fill #9 is on top of housing



SS-536, 546 Transmission pan (bottom View) Fill and Level plug. Pan must be removed to drain

TAYLOR - DUNN



Chapter - 4

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INSPECT THE FRONT WHEEL BEARINGS

⚠ 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 front of the vehicle and support with jack stands.
7. Grab the top and bottom of the tire/wheel assembly. Feel for any movement or play while pulling and pushing on the top and bottom of the tire. Any movement or play is indication of loose wheel bearings or king pin.
8. Spin the front wheel(s) by hand. The wheel should stop spinning in no more than 2-revolutions. A wheel that continues to spin freely is an indication of a loose wheel bearing.

NOTE: Refer to the **Adjust Front Wheel Bearings** section for information regarding the adjustment of the wheel bearings.

9. Spin the wheel(s) and listen for any grinding noise. Any noise may be an indication of worn or damaged wheel bearings.

NOTE: Refer to the **Replace Front Wheel Bearings** section for information regarding the replacement of the wheel bearings.

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

ADJUST FRONT WHEEL BEARINGS (3-WHEEL)

⚠ 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 front wheel(s) off of the ground and support with jack stands.
7. Tighten the front axle until the wheel(s) do not spin freely. To test, spin the front wheel by hand. The wheel should stop spinning in no more than 2-revolutions. If the wheel continues to spin, tighten the axle nut and repeat the test.
8. Spin the wheel and listen for any grinding noise. Any grinding noise may be an indication of worn or damaged wheel bearings.

NOTE: Refer to the **Replace Front Wheel Bearings** section for information regarding the replacement of the wheel bearings.

9. Lower the vehicle.
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.



ADJUST FRONT WHEEL

BEARINGS (4-WHEEL)

⚠ 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.

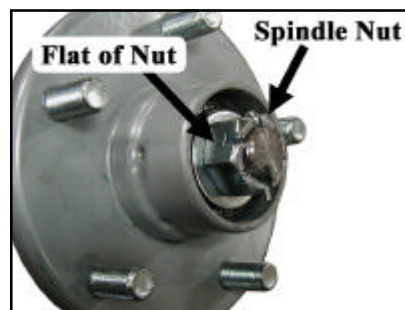
⚠ WARNING

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 hub dust cap and cotter pin.
8. While rotating the hub, tighten the spindle nut to 30 ft-lbs. This seats the bearings.
9. Back off the spindle nut one flat until the hub turns, but is not loose.
10. Spin the wheel and listen for any grinding noise. Any grinding noise may be an indication of worn or damaged wheel bearings.

NOTE: Refer to the **Replace Front Wheel Bearings** section for information regarding the replacement of the wheel bearings.

11. Install a new cotter pin.
12. Install the dust cap.
13. Lower the vehicle.
14. Reconnect the main positive and negative cables at the batteries.
15. Remove the blocks from behind the wheels.
16. Release the park brake and test drive the vehicle.



*Hub with Dust Cap
Removed*



FRONT AXLE REMOVAL AND INSTALLATION (3-WHEEL)

⚠ 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.

Removal

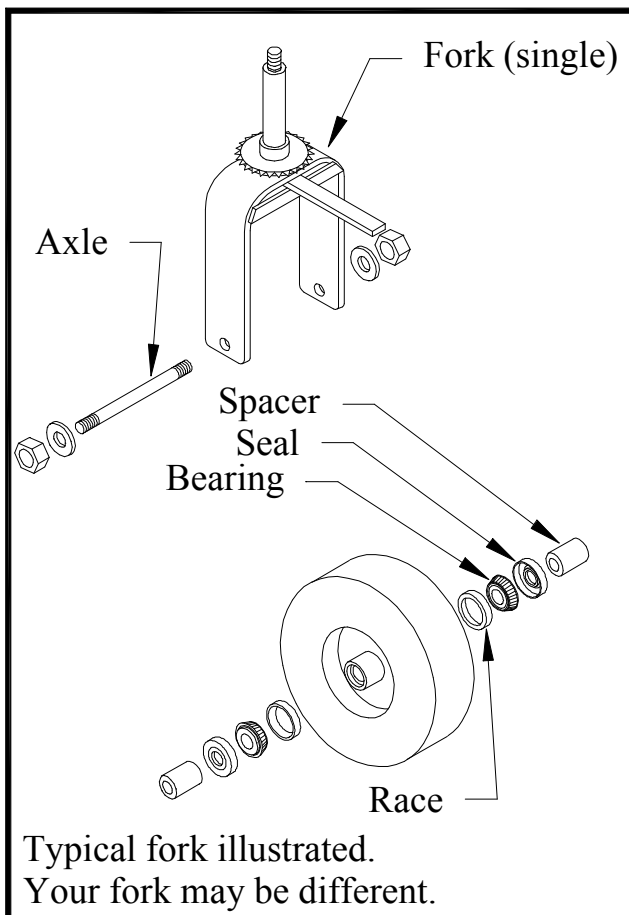
6. Remove the front axle nut.
7. Slowly raise the front of the vehicle until the axle can slide freely out of the fork. The front wheel(s) should still be resting on the ground.
8. Remove the front axle from the fork and support the vehicle with jack stands.

Installation

1. Raise the front of the vehicle so that the hole for the axle is the same height as the front wheel hub.
2. Assemble the bearing spacers into the front wheel hub and place the front wheel(s) into the fork.
3. Insert the axle into the front fork.
4. Install the axle nut(s). Refer to **Adjust Front Wheel Bearings** section for information regarding tightening the front axle.

NOTE: If your vehicle is equipped with two axle nuts, the nuts should be tightened equally so that the same number of axle threads are visible on both ends.

5. Lower the vehicle.
6. Reconnect the main positive and negative cables at the batteries.
7. Remove the blocks from behind the wheels.
8. Release the park brake and test drive the vehicle.





FRONT AXLE REMOVAL AND INSTALLATION (4-WHEEL)

Removal

⚠ 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 front of the vehicle and support with jack stands.
7. Remove the front bumper brace.
8. Disconnect the steering links to the left and right steering knuckles.
9. Remove the cotter pin from the axle pivot and discard.
10. Remove the axle pivot nut and discard.
11. Slide the axle off of the pivot stud and remove.

Installation

1. Install the axle assembly in reverse order of removal.
2. Use a new axle pivot nut and cotter pin.
3. Tighten the pivot nut so that it is in contact with the axle but not so tight as to prevent the axle from pivoting.
4. Lube the axle pivot.
5. Lower the wheels to the ground and test drive.

REPLACE FRONT WHEEL BEARINGS

⚠ 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. 3-wheel only: Remove the front axle and wheel(s). Refer to **Front Axle Removal and Installation** section for information regarding removing the axle.
7. Remove the spacers, seals and bearings from the hub
8. Thoroughly clean all grease from the inside of the hub and the bearings.
9. Drive the races out from the hub.
10. Press new races into the hub.
11. Assemble in reverse order, using new grease seals.
 - a. Pack bearings with grease.
 - b. Refer to **Front Axle Removal and Installation** section for information regarding installing the axle.
12. Lower the vehicle.
13. Reconnect the main positive and negative cables at the batteries.
14. Remove the blocks from behind the wheels.
15. Release the park brake and test drive the vehicle.



HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
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Chapter - 5

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There are three different steering configurations available depending on the vehicle model and options ordered. Make sure you are in the correct section for your vehicle.

Tiller steering is standard on SS-534, SS-536, and MX-600.

Geared steering is optional on SS-534, SS-536, and MX-600.

Geared steering is standard on SS-546.

There are two steering gear assemblies. One for SS-534 and the other for SS-536, SS-546, and MX-600.

Steering Component Service



FRONT END ALIGNMENT, SS-546

⚠ WARNING

1. Make sure the start 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 battery.

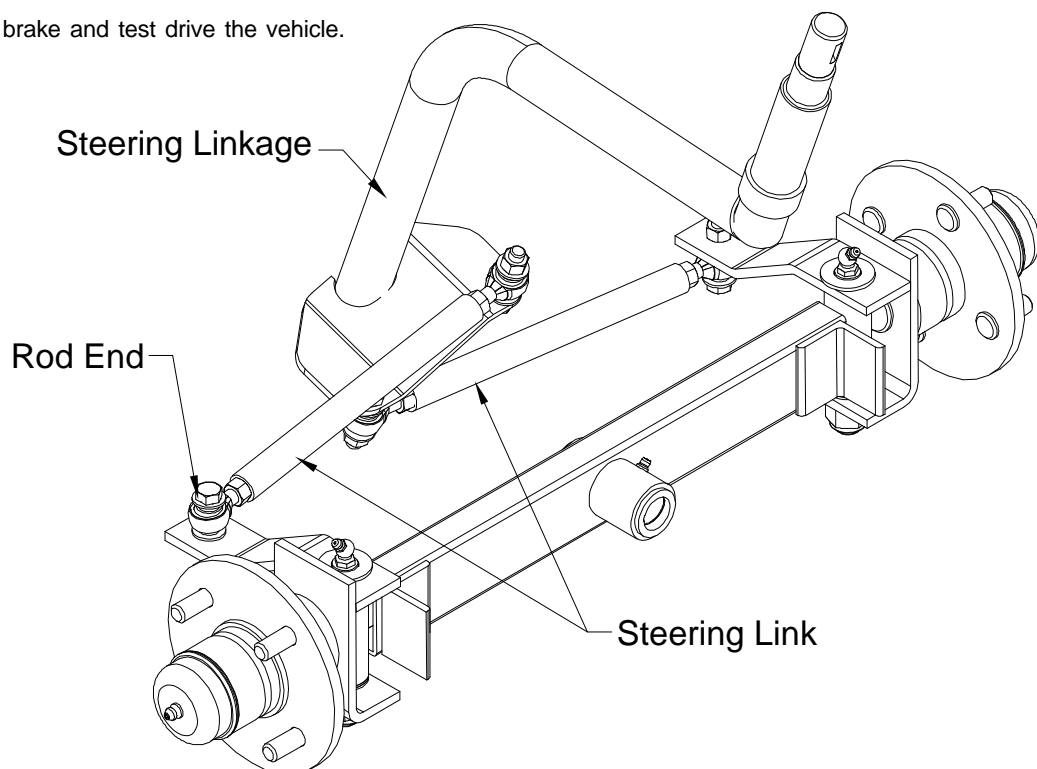
⚠ WARNING

Do not drive the vehicle while the steering wheel or front wheels are tied in position. Driving the vehicle while the steering wheel or front wheels tied in the position may cause loss of control of the vehicle resulting in severe bodily injury and/or property damage.

⚠ 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. Center the steering linkage and tie off the steering wheel so that it cannot rotate.
8. Loosen the the rod end jam nuts on the left and right steering links.
9. Using a piece of chalk, mark a line around the center of both front tires.
10. Adjust the links so that both wheels are in the straight ahead position.
11. Measure the distance between the lines at the front and rear of the tires.
12. Adjust the links so that the distance at the front and rear of the tires is the same.
13. Tighten the rod end jam nuts per torque listed in the Hardware Torque table at the end of this section.
14. Untie the steering wheel.
15. Reconnect the main positive and negative cables at the batteries.
16. Remove the blocks from behind the wheels.
17. Release the parking brake and test drive the vehicle.





ROD ENDS, SS-546

NOTE: A set of rod ends will wear at the same rate. If a rod end is worn out, then all should be replaced as a set.

Inspection

⚠ WARNING

1. Make sure the start 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 battery.

6. Grab the steering link and attempt to move it up and down.
7. If the rod end housing moves it is worn out and should be replaced. Tighten the rod end nut per torque listed in the Hardware Torque table at the end of this section.
8. Reconnect the main positive and negative cables at the batteries.
9. Remove the blocks from behind the wheels.
10. Release the parking brake and test drive the vehicle.

Replacing

⚠ WARNING

1. Make sure the start 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 battery.

6. Raise the front of the vehicle and support with jack stands.
7. Loosen the rod end jam nut on the steering link.
8. Remove the rod end nut and discard.
9. Remove the rod end from the steering arm.
10. Using a new nut, install the new rod end into the steering link. Do not tighten the rod end jam nut at this time.
11. Realign the front wheels.

*NOTE: Refer to the **Front End Alignment** for information regarding realignment of the front wheels.*

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





FORK / STEERING SHAFT BEARINGS

⚠ WARNING

1. Make sure the start 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 battery.

⚠ 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. Inspect for lateral play by attempting to move the fork to the left and right (not rotating), there should be no noticeable play.
8. If there is any play in the fork bearings, refer to section ***Replace the Front Fork*** for information regarding adjusting the fork bearings.
9. Lower the front end to the ground.
10. Reconnect the main positive and negative cables at the batteries.
11. Remove the blocks from behind the wheels.
12. Release the parking brake and test drive the vehicle.

REPLACE THE STEERING WHEEL

⚠ WARNING

1. Make sure the start 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 battery.

6. Remove the steering wheel center cap and nut.
7. Using a steering wheel puller, remove the steering wheel.
8. Position the front wheels in the straight ahead position.
9. Lightly grease the steering wheel splines and install the replacement steering wheel orientated as shown in the illustration below.
10. Tighten the steering wheel nut per torque listed in the Hardware Torque table at the end of this section.
11. Reconnect the main positive and negative cables at the batteries.
12. Remove the blocks from behind the wheels.
13. Release the parking brake and test drive the vehicle.



Typical Steering Wheel



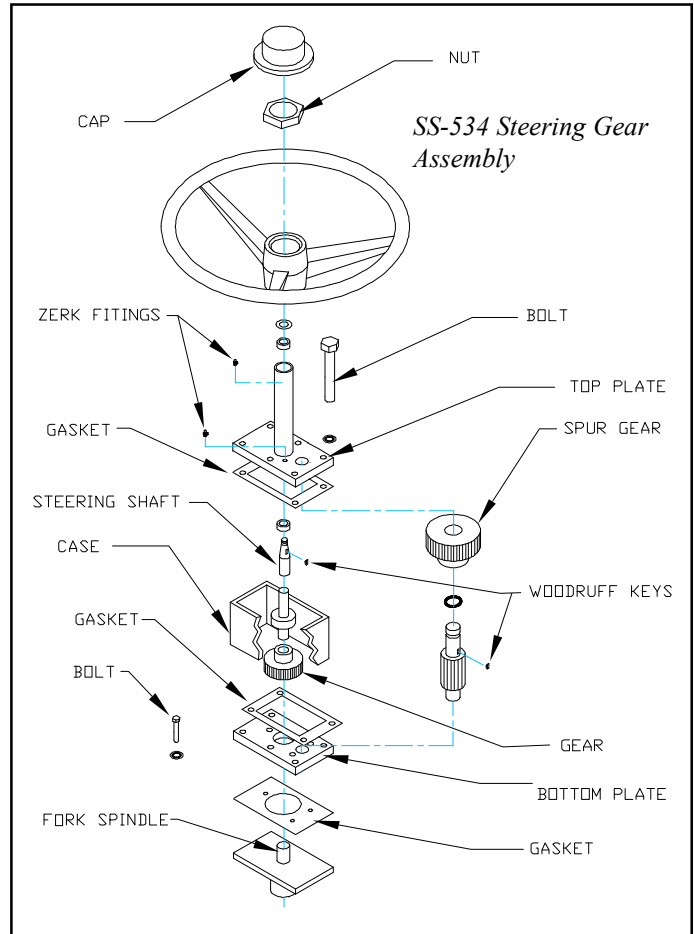
REPLACE THE STEERING GEAR, SS-534

⚠ WARNING

1. Make sure the start 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 battery.

6. Remove the steering wheel.
7. Remove the 6 bolts from the top cover.
8. Lift the top cover off the gear box, discarding the gasket.
9. Remove the gear case.
10. Remove the fork spindle gear.
11. Remove and discard the lower gasket.
12. Remove the 3 remaining bolts from the bottom of the gear box.
13. Thoroughly Clean and inspect all parts.
14. Using new gaskets, reassemble in reverse order.
15. Fill the gear box with grease.

Note: A minor amount of gear lash adjustment can be accomplished by repositioning the upper and lower plates. Loosen the mounting bolts so that they are snug. Lightly tap the upper and/or lower plate to adjust the gear lash then retighten the bolts.



REPLACE THE STEERING GEAR, SS-536, 546, MX-600

⚠ WARNING

1. Make sure the start 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 battery.

6. Remove the four frame to gear box mounting bolts from the bottom of the gear and remove the entire gear assembly from the vehicle.
7. The fork spindle gear will remain on the spindle shaft. A gear puller may be required to pull the gear off of the shaft.



REPLACE THE FRONT FORK

⚠ WARNING

1. Make sure the start 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 battery.

⚠ 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. Remove the tiller or steering gear assembly.
7. Remove the fork spindle nut and discard.
8. While holding the fork assembly so that it cannot fall to the ground, slowly raise the front end of the vehicle until the fork spindle comes out of the bottom of the fork collar.
9. Support the front of the frame with jack stands.
10. Inspect the upper and lower fork collar seals and replace if necessary.
11. Install the fork in reverse order being careful not to damage the lower fork collar seal.
12. Use a new fork spindle nut.
13. Tighten the fork spindle nut until there is no lateral or radial play in the fork spindle bearings.
14. Lower the vehicle to the ground and test drive.

HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Steering wheel nut	28-32	38-43
SS 546 Rod End Nut	20-25	27-33
SS-546 Rod End Jam Nut	20-25	27-33

Chapter - 6a

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⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

Brakes, SS-536, 546, MX-600



AUTO-ADJUST BRAKE MECHANISM THEORY OF OPERATION

The auto-adjust mechanism is located on the bottom of the brake assembly. As the brake pad material wears down, the distance the brake shoes travel to engage the brake drum becomes longer. When the travel becomes long enough, the brake lever engages the auto-adjust lever and causes it to index a tooth on the star wheel adjuster. This rotates the adjuster, which decreases the travel needed for the brake shoes to engage the brake drum.

NOTE: There are no manual adjustments for the brake shoes.

NOTE: The symptom of a low brake pedal may indicate that the auto adjuster is not working or the brake linkage is not adjusted properly. Remove the vehicle from service and repair the brakes.



INSPECT THE SERVICE BRAKE

⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

Auto-Adjust Brake Mechanism Operation

The auto-adjust mechanism is located on the bottom of the brake assembly. As the brake pad material wears down, the distance the brake shoes travel to engage the brake drum becomes longer. When the travel becomes long enough, the brake lever engages the auto-adjust lever and causes it to index a tooth on the star wheel adjuster. This rotates the adjuster, which decreases the travel needed for the brake shoes to engage the brake drum.

NOTE: The auto adjust brakes cannot be manually adjusted.

NOTE: The symptom of a low brake pedal may indicate that the auto adjuster is not working or the brake cable is not adjusted properly. Remove the vehicle from service and repair the brakes.

*NOTE: The brake adjustment is inside of the left and right brake. Do not adjust the brake by means of the brake cables as this will cause misoperation of the brakes. If you hear a single "clunking" noise while braking it may be due to misadjustment of the brake cables or linkage. Refer to **Replace Brake linkages/Cables** for information regarding proper adjustment of the cables and linkages.*

⚠ WARNING

Adjusting the brakes by means of the brake cables could cause a hard brake pedal with little or no braking power. This could cause loss of control of the vehicle resulting in severe bodily injury and /or property damage.

Inspecting the Auto-Adjust Brake Mechanism

⚠ WARNING

1. Make sure the start 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 battery.

⚠ 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 rear of the vehicle and support with jack stands.
7. Using the appropriate procedure, remove the brake drum.
8. Release the park brake.
9. Back off the auto adjuster star wheel one or two turns.
10. Reinstall the brake drum and depress the brake pedal.
11. As the brake pedal is depressed, the auto adjuster indexes the star wheel adjuster causing a click.
12. Lower the vehicle.
13. Reconnect the main positive and negative at the batteries.
14. Remove the blocks from behind the wheels.
15. Test drive the vehicle



Maintenance, Service, and Repair

Brake Shoes

Brake Drum

⚠ WARNING

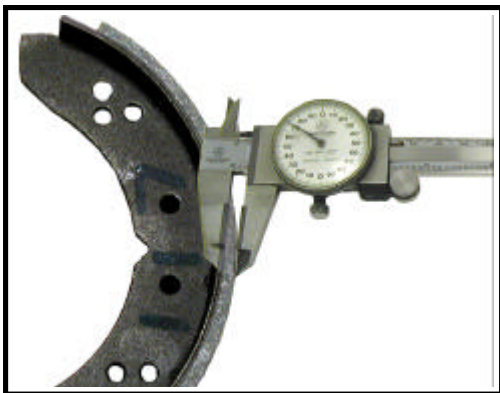
Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

*NOTE: The wheel must be removed to accurately measure the brake shoes. Refer to **Tires and Wheels** section for information on removing the wheel.*

Measure the brake shoe lining at the thinnest point on the shoe. If this is 1/16-inch or less then the brake shoe must be replaced.

NOTE: If this is a riveted lining, then the measurement must be to the top of the rivets.

It is recommended to replace the left and right side brake shoes as a set.



*NOTE: The wheel must be removed to accurately measure the brake drum. Refer to **Tires and Wheels** section for information on removing the wheel.*

The service limit for the inside diameter of the brake drum is 6.330 inches.

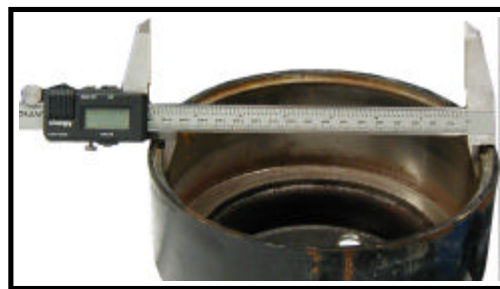
If the brake drum is grooved or worn beyond the service limit then the brake drum must be replaced.

Measure the inside diameter of the brake drum in 3-places.

If the difference between any of the measurements exceeds 0.010-inches then the brake drum must be replaced.

⚠ WARNING

Do not use a brake drum that is worn beyond its service limits. A drum worn beyond its service limits could fail and cause loss of brakes resulting in severe bodily injury and/or property damage.





ADJUST THE BRAKES

NOTE: This vehicle is equipped with self-adjusting brakes. Other than the brake linkages, there is no manual adjustment.

Adjusting the brake linkage is only required when any part of the brake linkages are removed or replaced. Do not adjust the brake linkage to compensate for a low brake pedal. A low brake pedal may be an indication that the auto-adjust mechanism is not functioning properly. Refer to ***Inspecting the Auto-Adjust Brake Mechanism*** for information on the auto-adjust mechanism.

⚠ WARNING

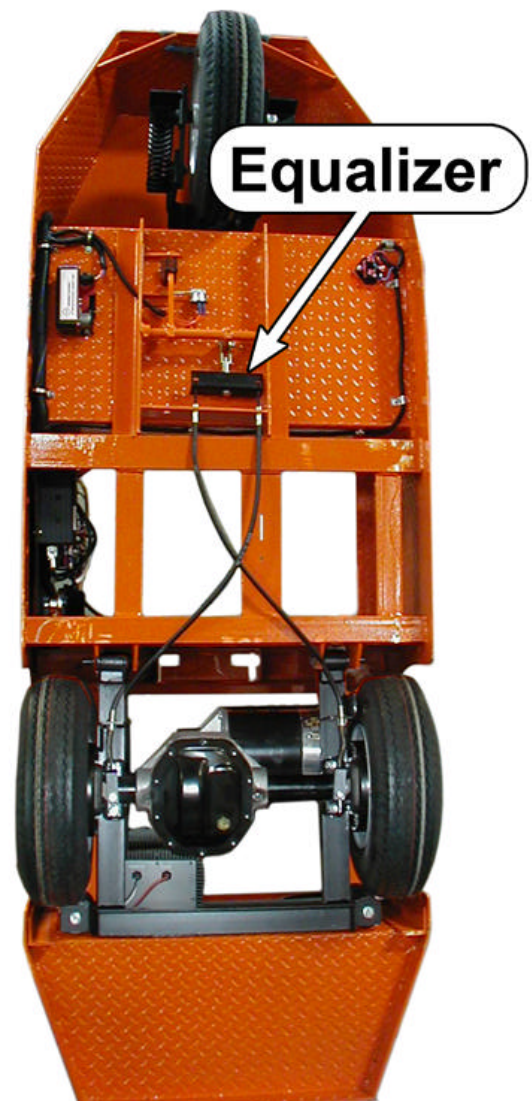
Adjusting the brakes by means of the brake cables could cause a hard brake pedal with little or no braking power. This could cause loss of control of the vehicle resulting in severe bodily injury and /or property damage.

Adjust the Service Brake Linkage

The brake linkage is adjusted by means of the adjustment rod at the brake cable equalizer. The adjustment rod should be adjusted so that all slack is taken out of the linkages but the brake arm on the left and right brake is not actuated. If the brake cables are too tight, then the auto adjust mechanism may not function correctly.

Adjust the Parking Brake

There is no separate adjustment for the parking brake. The parking brake should work properly as long as the service brake linkage is adjusted properly





REPLACE BRAKE SHOES

⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

⚠ WARNING

1. Make sure the start 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 battery.

⚠ WARNING

Do not allow grease to contact any of the braking surfaces. Braking surfaces contaminated with grease may cause the brakes to fail resulting in property damage and/or severe bodily injury.

⚠ 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 rear of the vehicle and support with jack stands.
7. Using the appropriate procedure, remove the brake drum.
8. Release the park brake.
9. Remove the tension springs.
10. Remove the hold down springs.
11. Remove the auto-adjust lever spring.
12. Apply this procedure in reverse order to install the new brake shoes.

NOTE: Be sure all the parts are thoroughly cleaned.

NOTE: Be sure that the anchor points on the brake shoes are given a light coat of hi-temp grease.

13. Lower the vehicle and reconnect the main positive and negative at the batteries.
15. Remove the blocks from behind the wheels.
16. Test drive the vehicle.



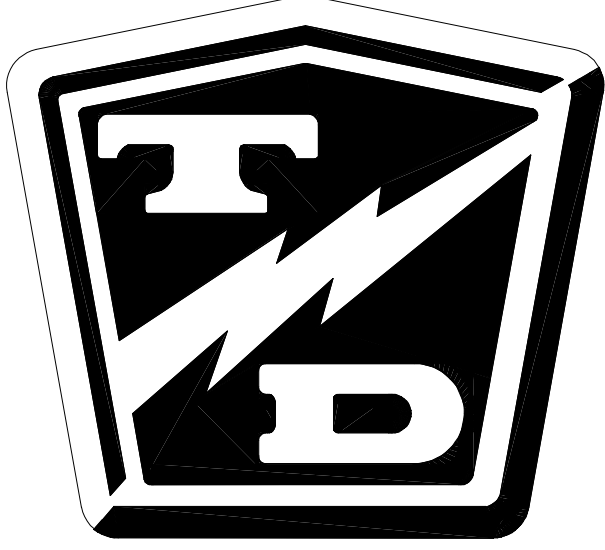
Brake Assembly

HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
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TAYLOR - DUNN



Chapter - 6b

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⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.



INSPECT THE SERVICE BRAKE

⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

Brake Shoes

NOTE: The brake band should be removed to accurately measure the lining.

Measure the brake shoe lining at the thinnest point. If this is 1/16-inch or less then the brake band must be replaced.

Brake Drum

The service limit for the outside diameter of the brake drum is 5.85 inches. The service limit for runout is 0.010 inches.

If the brake drum is grooved or worn beyond the service limits then the brake drum must be replaced.

⚠ WARNING

Do not use a brake drum that is worn beyond its service limits. A drum worn beyond its service limits could fail and cause loss of brakes resulting in severe bodily injury and/or property damage.

INSPECT THE PARKING BRAKE

⚠ WARNING

1. Make sure the start 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 battery.

The parking brake system uses the same components as the service brake with the exception of the parking brake locking mechanism on the brake pedal.

Inspect the locking tab on the frame as well as the brake pedal cogs for any signs of excessive wear.

If any signs of excessive wear is found then the parts should be replaced.

ADJUST THE PARKING BRAKE

The parking brake uses the same components as the service brake. There is no independent adjustment of the parking brake.



ADJUST THE BRAKE BAND

Do not adjust the brakes by means of the brake cable as this may result in loss of braking power.

⚠ WARNING

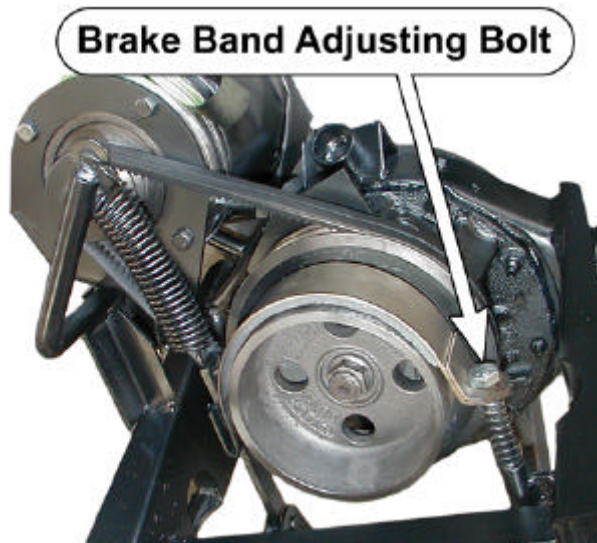
Adjusting the brakes by means of the brake cables could cause a hard brake pedal with little or no braking power. This could cause loss of control of the vehicle resulting in severe bodily injury and / or property damage.

⚠ WARNING

1. Make sure the start 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 battery.

Before adjusting the brake, confirm that the brake linkage is adjusted correctly.

6. Loosen the brake adjusting bolt jam nut.
7. Adjust the brake bolt as required so that the parking brake hold firm on the first detent.
8. Tighten the jam nut.
9. Test drive the vehicle.



ADJUST THE BRAKE LINKAGE

Do not adjust the brakes by means of the brake cable as this may result in loss of braking power.

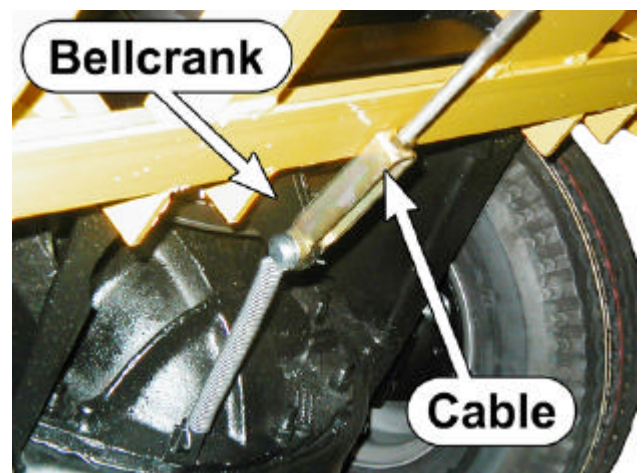
⚠ WARNING

Adjusting the brakes by means of the brake cables could cause a hard brake pedal with little or no braking power. This could cause loss of control of the vehicle resulting in severe bodily injury and / or property damage.

⚠ WARNING

1. Make sure the start 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 battery.

6. Remove the nuts from the brake band adjusting bolt.
7. Depress the brake pedal to the floorboard and hold in position.
8. Adjust the brake cable so that there is 1/4" clearance between the bell crank and the frame.
9. Reinstall the adjusting bolt nuts and adjust the brake band.
10. Test drive the vehicle.





REPLACE BRAKE BAND

⚠ WARNING

Current Taylor-Dunn® brakes are asbestos free. However, there is the possibility that the original brakes were replaced with aftermarket parts containing asbestos. Since this possibility exists, all brake parts should be handled as if they contain asbestos. Refer to Appendix C for recommended handling precautions.

⚠ WARNING

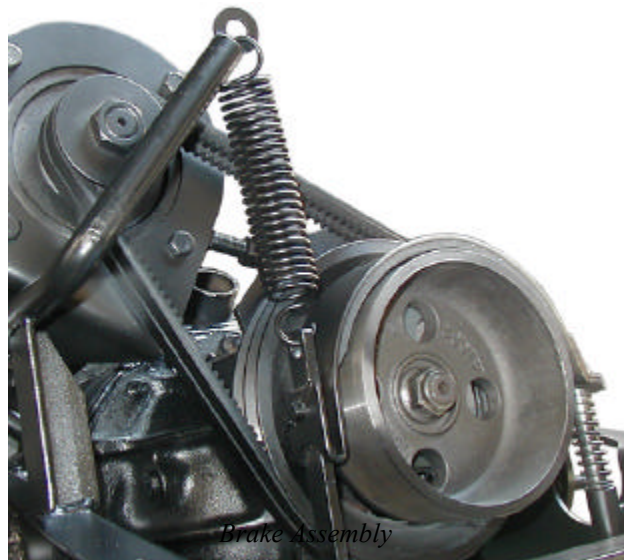
1. Make sure the start switch is in the "OFF" position, then remove the key.
 2. Place the forward-reverse switch in the center "OFF" position.
 3. Set the park brake.
 4. Place blocks under the front wheels to prevent vehicle movement.
 5. Disconnect the battery.
6. Remove the brake adjustment bolt. Discard the locknut.
 7. Remove the lower clevis pin from the brake lever bar.
 8. Remove the brake band and return spring.
 9. Remove the brake band from the brake lever bar.
 10. Fit the new brake band over the brake drum and check fit. Reform the brake band as required to match the diameter of the brake drum.
 11. Using new cotter pins and brake adjustment bolt lock nut, install the brake band in reverse order of disassembly.
 12. Adjust the brake as needed and test drive the vehicle.

REPLACE BRAKE DRUM

Note: The brake drum is a slip fit over the pinion shaft. The pinion nut is a right hand thread but is very tight and may require a large pneumatic impact wrench to remove it.

⚠ WARNING

1. Make sure the start 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 battery.
6. Remove the pinion nut and discard.
 7. Slide the brake drum off of the pinion shaft.
 8. Inspect for leaks around the pinion seal. If there is any indication of leaks, then the pinion seal should be replaced.
 9. Apply a very light coat of grease around the hub of the brake drum where it contacts the pinion seal.
 10. Install the brake drum.
 11. Using a new pinion nut, torque the pinion nut to per torque listed in the Hardware Torque table at the end of this section.





HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

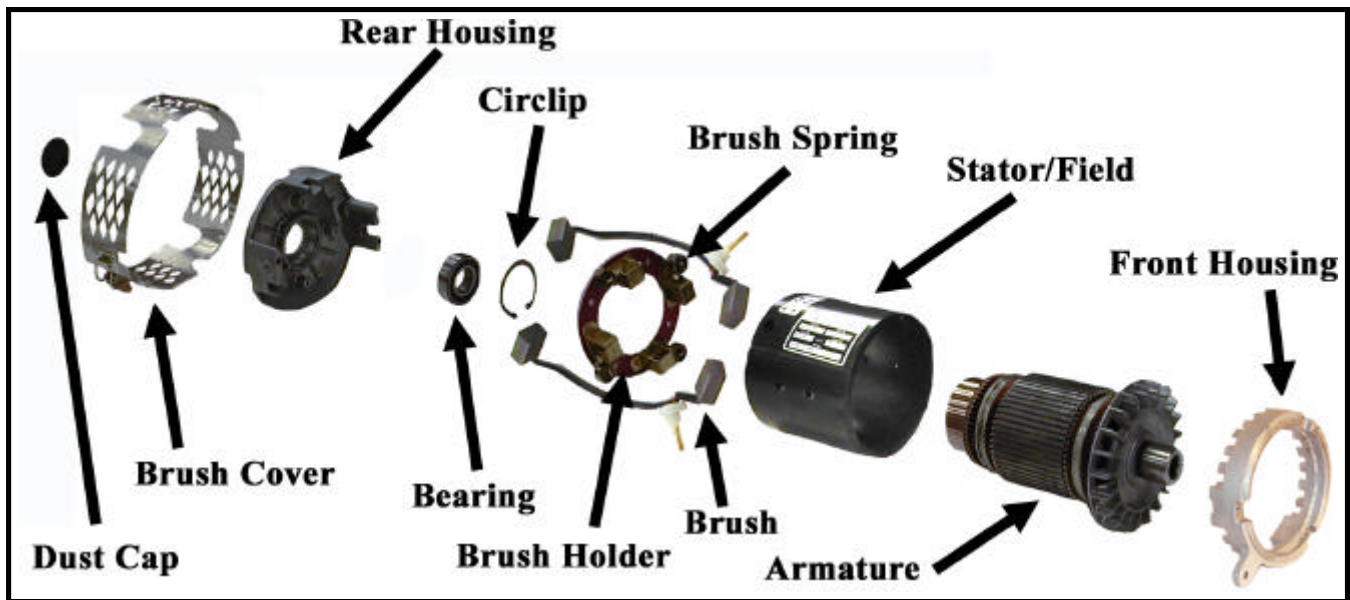
Description	Foot Pounds	Newton Meters
Pinion Nut	175	237

Chapter - 7

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Motor Service



Typical Motor Assembly



REMOVAL

The motor is an integral components of the transaxle assembly. Refer to the Transaxle section for information.

INSPECTION

Refer to the table at the end of this section for service limits and specifications.

Field / Armature Windings (DC motors)

Very expensive equipment is required to electrically test the motor windings. Most failures of the motor windings can be diagnosed by symptoms, visual inspection of the windings and a simple continuity test.

Continuity Test:

Using a standard DVM, test the continuity across the following terminals in this order:

Test #:	Terminals:	Should be:
1)	A1 - A2	0-Ohms
2)	S1 - S2	0-Ohms
3)	A1 - S1	Open Circuit
4)	A1 - Motor Frame	Open Circuit

Any deviance from what the test result "should be" indicates a failure of the motor winding.

A motor with a shorted armature or field winding should exhibit one or more of the following symptoms:

- Lack of power
- Slow acceleration.
- Slow speed.
- Short battery life.
- Excessive motor current.
- Excessive speed (shorted field only).

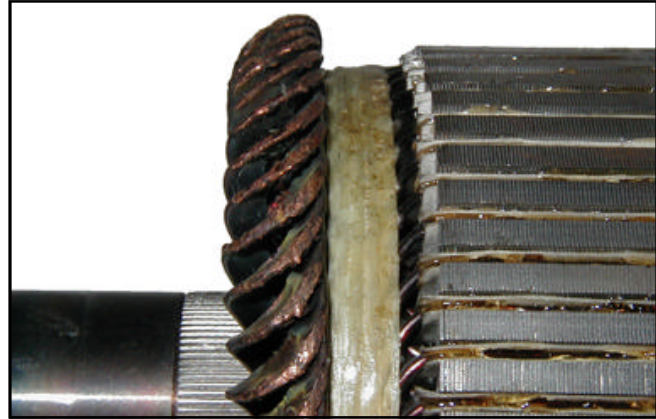
Note: A short in the vehicle wiring or other components could be misinterpreted as a shorted motor. Test all other components before replacing the motor.

Visually inspect the armature windings where they loop around at the shaft end of the armature. The armature windings are coated with a thick insulating enamel. The enamel should be a deep red color. If the enamel is brown, black or cracked then the armature has been overheated and may be shorted.

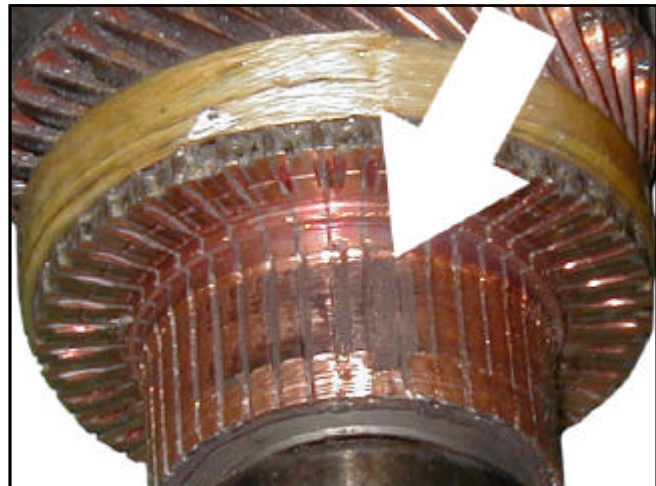
If the loops of wires expanded and contacted the field, then the maximum RPM of the motor has been exceeded (see illustration).

Visually inspect the surface condition of the commutator. Although the commutator may be grooved, it should be the same diameter all the way around.

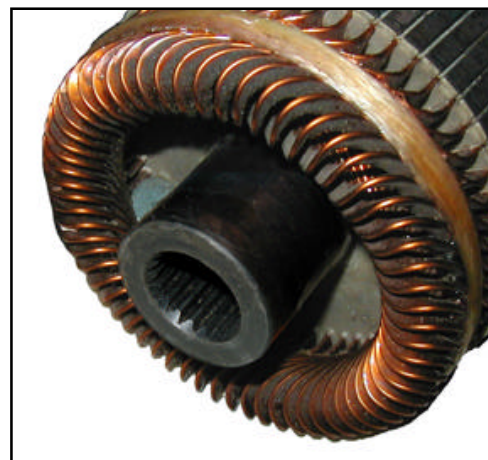
- Raised segments are caused by excessive motor RPM or overheating.
- Burn marks or depressions are caused by a shorted armature or a result of a stalled motor (see illustration).



Expanded armature windings



Typical burn mark on a shorted armature



Normal armature winding loops



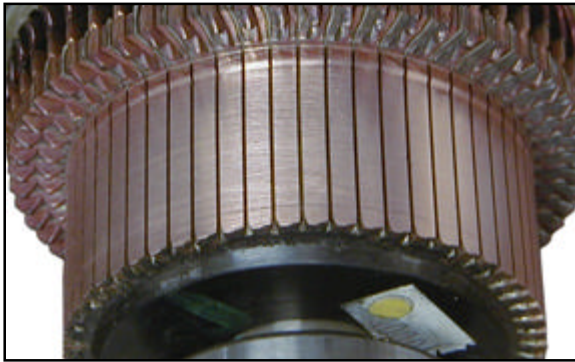
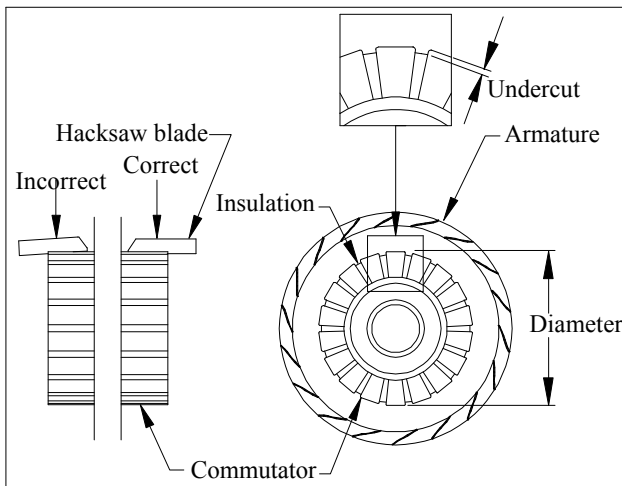
Commutator

Service limits for the commutator can be found in the specification tables at the end of this section.

If the commutator is deeply grooved then it should be cut on a lathe.

Measure the diameter of the commutator. If the diameter is less than the service limit then the armature or motor must be replaced.

Measure the commutator segment undercut. If the undercut is less than the service limit then the insulation can be cut as shown in the illustration. Grind the hacksaw blade the match the width of the insulation.



Bearings

The bearings should spin with no noticeable roughness or grinding and with very little play.

If the bearing free wheels, then the lubrication in the bearing has been depleted and the bearing should be replaced.

Any grinding or roughness is an indication that the bearing is damaged and must be replaced.

Thermal Sensor

Note: The thermal sensor is not available on all motors.

The thermal sensor is a temperature sensitive resistor or switch. The sensor is buried deep within the phase windings.

Testing the thermal sensor consists of checking the resistance.

The tested resistance of the thermal sensor will vary depending on the temperature of the sensor. In most cases, failure of the thermal sensor will result in a significant deviation of the resistance.

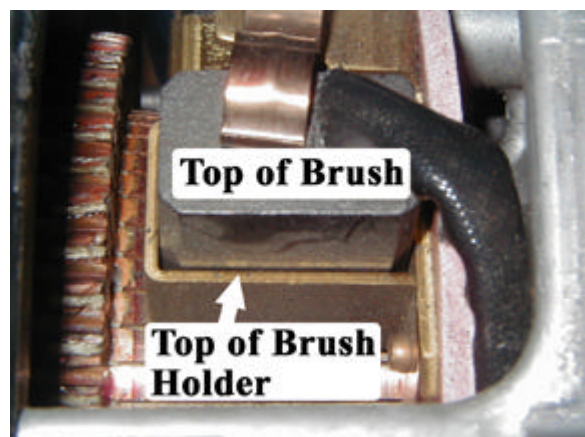
The sensor specifications can be found in the specifications table at the end of this section.

Brushes

The minimum brush length (service limit) can be found in the specification tables at the end of this section.

Do not allow the brushes to wear beyond the service limit. If any one of the brushes lose contact with the commutator, the commutator will be damaged.

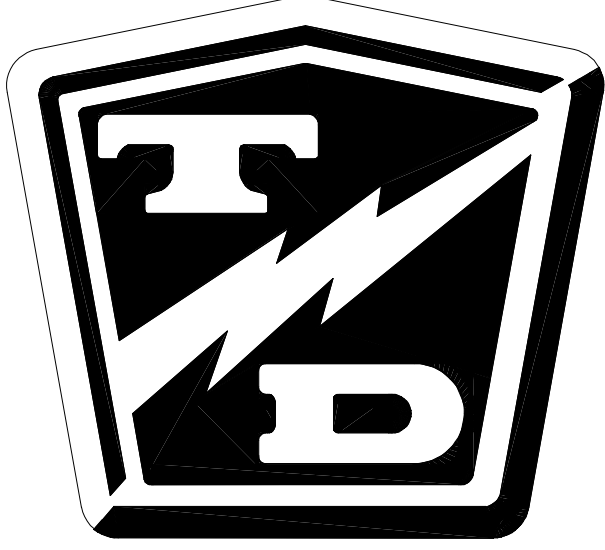
You can use the top of the brush holder to gage the length of the brush. If the top of the brush is even or below the top of the brush holder, then the brush is getting close to the service limit and the brushes should be replaced. The brushes must be removed to measure the actual length.



***MOTOR SERVICE LIMITS AND SPECIFICATIONS***

Motor Specification Number	Undercut Depth		Commutator Diameter (min)		Brush Length (min)		Wire Depth (max)	
	mm	inches	mm	inches	mm	inches	mm	inches
L94-4006	0.635	0.025	96.8	3.810	19.05	0.75	-	-
A02-4011	1.0	.04	69.9	2.75	16	0.62	-	-
ER5-4001 XP-2023	1.0	.04	69.9	2.75	16	0.62	-	-
ER5-4002	1.0	.04	69.9	2.75	16	0.62	-	-
BP5-4002	1.0	.04	69.9	2.75	16	0.62	-	-

TAYLOR - DUNN



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- Hardware Torque 9

Transaxle Service, SS-536, SS-546, MX-600



CHECK OIL LEVEL

Fluid type and capacities are listed in the lubrication section in the General Maintenance chapter.

⚠ WARNING

1. Make sure the start 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 battery main positive and negative cables.

6. Park the vehicle on a level surface.
7. Place a drain pan that can hold a minimum of 2-quarts of oil under the transmission level plug.
8. Remove the level plug. When the plug is removed, a small amount of oil may come out. This indicates that the transmission has the correct amount of oil.
9. If no oil comes out, then it may need to have oil added. The capacity is approximately 11-ounces. Add oil through the open level plug until it is overflowing out of the hole.
10. Reinstall the level plug.
11. Reconnect the main positive and negative cables at the batteries, remove blocks from behind the wheels and test drive the vehicle

CHANGE OIL

Fluid type and capacities are listed in the lubrication section in the General Maintenance chapter.

⚠ WARNING

1. Make sure the start 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 battery main positive and negative cables.

6. Park the vehicle on a level surface.
7. Place a drain pan that can hold a minimum of 2-quarts of oil under the transmission.
8. Remove the transmission cover plate to drain the oil.
9. Reinstall the cover plate and add remove the level plug.
10. Add oil through the open level plug until it is overflowing out of the hole (approximately 11-ounces).
11. Reinstall the plug.
12. Reconnect the main positive and negative cables at the batteries, remove blocks from behind the wheels and test drive the vehicle.



Transmission Cover Level Plug



TRANSAXLE ASSEMBLY

Remove

⚠ WARNING

- 1. Make sure the start 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 battery connector from the vehicle.**

⚠ 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 rear of the vehicle and support with jack stands.
7. Remove the wheels. Refer to procedure in "Tires and Wheels" section.
8. Disconnect the motor cables.
9. Disconnect the brake cables.

⚠ WARNING

After the next step, the transaxle will be free from the vehicle. Be sure the transaxle is supported so that it does not touch the ground.

10. Remove the bolts holding the transaxle assembly to the springs (model SS), or frame (model MX).
11. Remove the transaxle from the vehicle.
12. Lower the frame to the ground or leave supported on jack stands.

Install

1. Install the transaxle in reverse order of removal.
 - Install the wheels Refer to procedure in Tire/Wheels section.
 - Tighten the motor terminals per torque listed in the Hardware Torque table at the end of this section.
2. Adjust the brakes. Refer to procedure in Brake section.
3. Reconnect the main positive and negative cables at the batteries, remove blocks from behind the wheels and test drive the vehicle.



AXLES

Remove

⚠ WARNING

1. Make sure the start 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 battery main positive and negative cables.

⚠ 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. Remove the rear wheel. Refer to Replace the Rear Tire/Wheel section for information regarding removing the rear wheel.
7. Remove the axle hub. Refer to Rear Hub/Brake Drum section for information on removing the hub.
8. Remove the outer snap ring from the axle housing.
9. Remove the axle from the transmission assembly.
10. Remove the inner snap ring.
11. Remove the axle seal from the axle housing.
12. Refer to Rear Hub/Brake Drum section for information on installing the hub.
13. Reconnect the main positive and negative at the batteries, remove the blocks from the wheels, and test drive.

Install

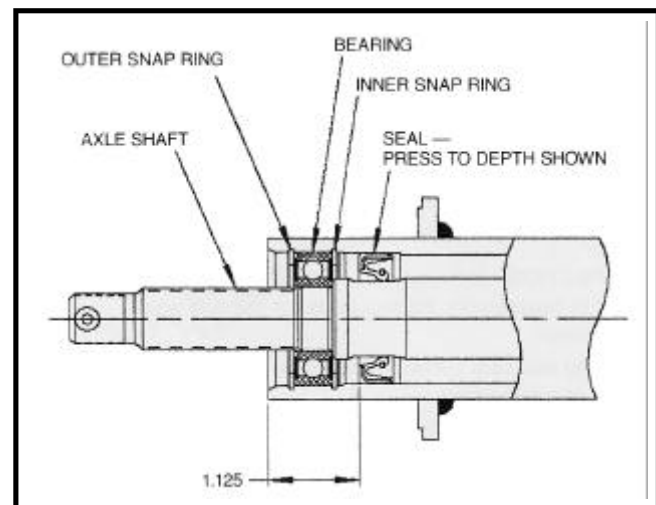
Install in reverse order using a new axle seal.

AXLE BEARINGS

*Note: The axle must be removed from the transmission for this procedure. Refer to **Remove and Install Axle** for information regarding removing the rear axle.*

Remove/Install

1. Remove the hub from the axle shaft. Refer to Rear Hub/Brake Drum for information regarding removing the hub.
2. Press the axle bearing off of the axle shaft and discard.
3. Press a new bearing onto the axle shaft.
4. If the axle is not to be immediately installed into a vehicle, pack the bearing with grease and wrap it in plastic to prevent corrosion.





MOTOR

Remove

NOTE: In some vehicle configurations the transmission assembly will have to be removed to allow clearance to remove the motor. Refer to Transmission section for information on removing the transmission assembly from the vehicle.

⚠ WARNING

1. Make sure the start 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 battery main positive and negative cables.

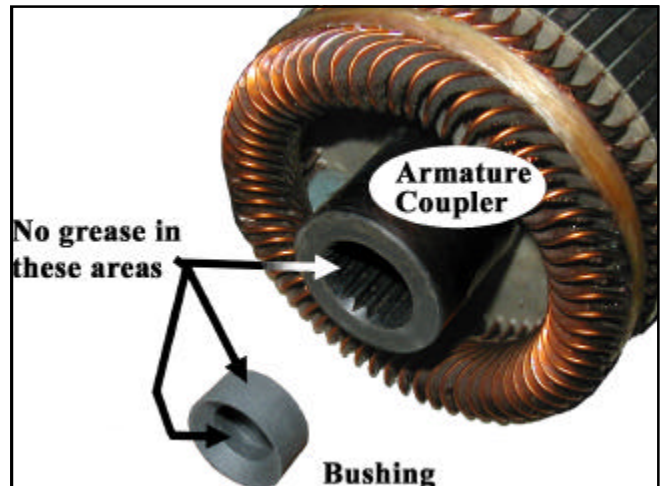
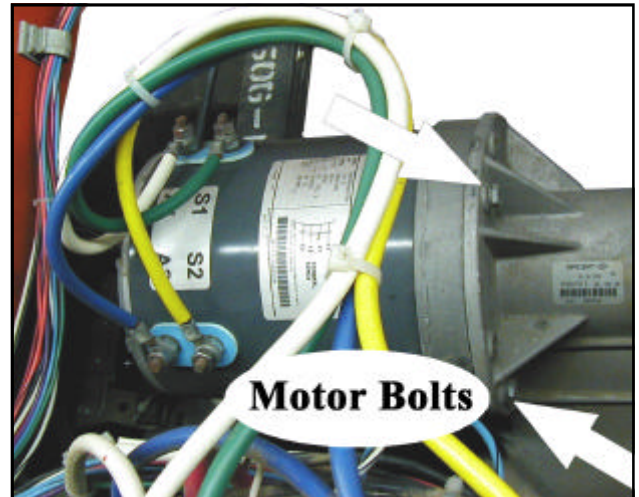
⚠ WARNING

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. Remove the motor wires from the motor.
7. Remove the bolts holding the motor to the transmission housing (see illustration).
8. Slide the motor off of the transmission input shaft.

Install

1. Remove the rubber bushing from inside of the motor armature coupler (see illustration).
2. Thoroughly clean all grease from the transmission input shaft, rubber bushing and the motor armature coupling.
3. Install the rubber bushing back into the motor armature coupling.
4. Lightly grease the transmission input shaft only (see caution).
5. Install the motor in reverse order.
 - Tighten the motor mounting bolts per torque listed in the Hardware Torque table at the end of this section.
 - Tighten the motor terminals per torque listed in the Hardware Torque table at the end of this section.



⚠ CAUTION

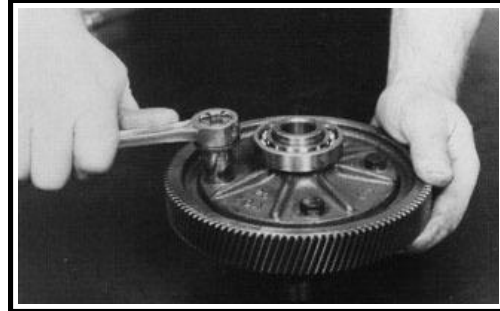
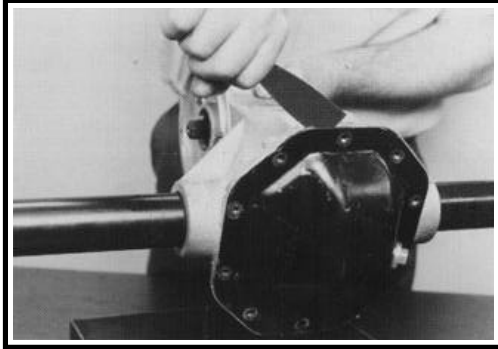
Do not apply grease to the armature coupler, rubber bushing or the end of the transmission input shaft. Grease applied to these areas may result in premature failure of the armature bearing.



DIFFERENTIAL CASE

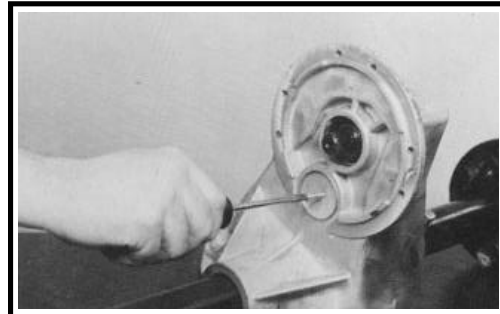
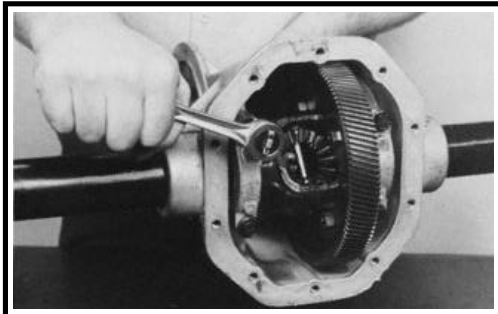
Disassemble

1. Remove the transmission from the vehicle. Refer to **Transmission-Remove** section for information on removing the transmission.
2. Thoroughly clean the transmission assembly before disassembly.
3. Remove the left and right axles from the transmission assembly. Refer to **Rear Axle** section for information on removing the axles.
4. Suspend the differential case over a drain pan that can hold a minimum of 2-quarts of oil.



5. Remove the differential case cover being careful not to bend or damage the case cover flange or the sealing surface of the differential case.

8. Remove the final drive gear from the differential housing.

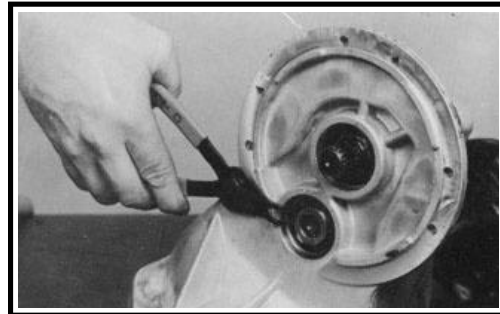
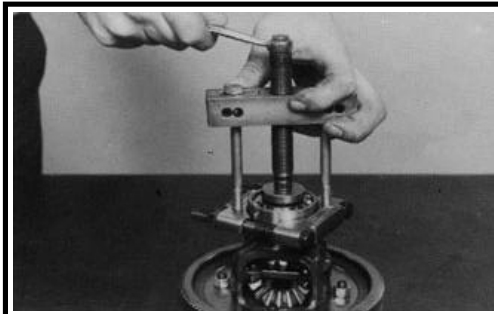


6. Remove the differential bearing caps and remove the differential assembly from the housing.

9. Punch or drill a small hole into the center of both of the intermediate shaft bore plugs.

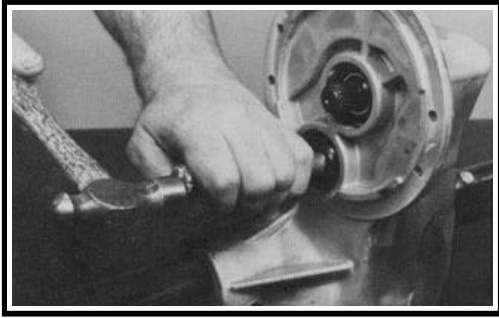
NOTE: The bearing caps are marked for identification. When the transmission is reassembled they must be installed in their original position.

10. Thread a sheet metal screw into each plug until the bore plug is forced out.



7. Remove both bearings from the differential case.

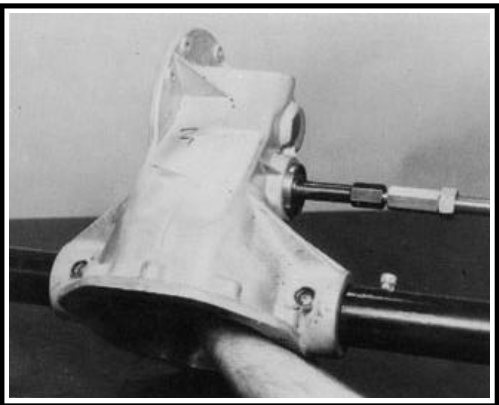
11. Remove both snap rings from the intermediate shaft bore.



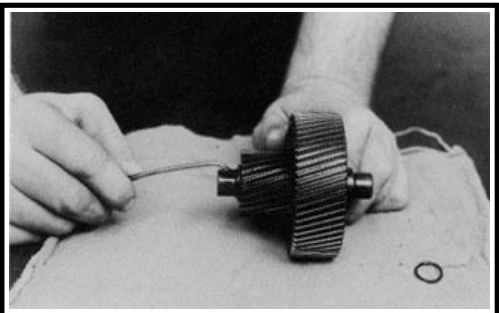
12. Using a soft metal or hard wood dowel, drive the intermediate shaft through the bearing just enough to allow clearance for an ID bearing puller. Do not attempt to drive the shaft out of the opposite end of the transmission.



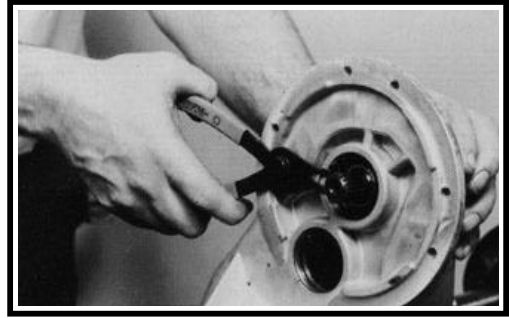
13. Remove the intermediate bearing with an ID bearing puller.



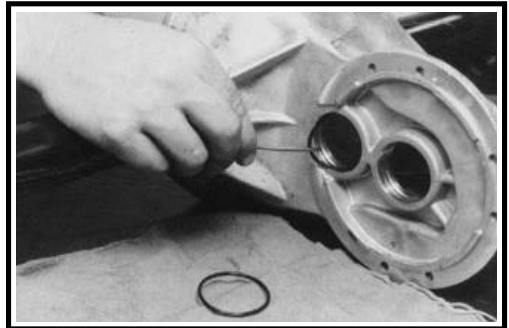
14. While supporting the shaft and gear assembly, repeat steps #12 and #13 for the opposite side bearing and remove the intermediate shaft from the housing.



15. Remove the o-rings from each end of the intermediate shaft.



16. Remove the circlip from the input shaft.
17. Remove the input shaft from the housing.
18. Press the bearings off of the input shaft.



19. Remove the o-rings from both sides of the intermediate shaft bore and the input shaft bore and discard the o-rings.



Maintenance, Service, and Repair

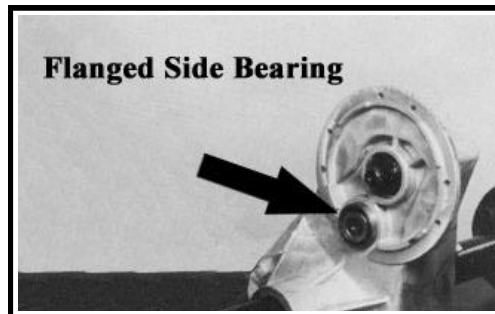
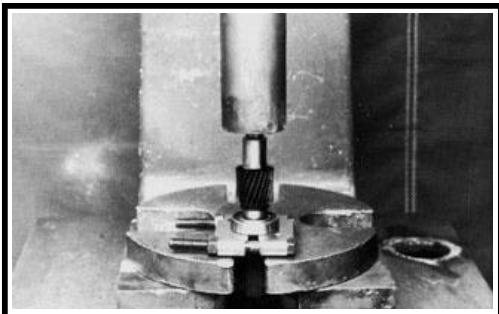
Assemble

Notes: When pressing bearings, do not press against or support the outer race as this will damage the bearing.

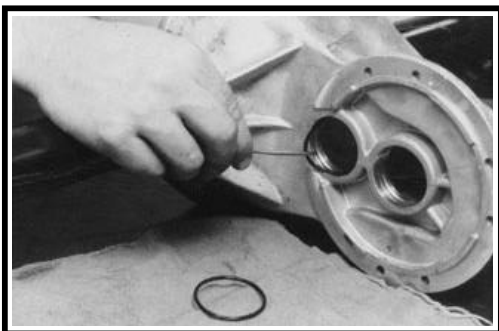
All snap rings should fit tightly into their grooves. If a snap ring is loose, then it must be replaced.

Do not hit any shaft or component with a hard metal hammer or punch.

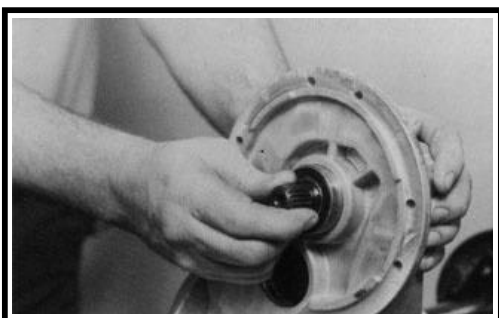
Pre-lube all bearings, seals and o-rings before assembly.



1. Thoroughly clean all components as well as the inside of the housing.
2. Press new bearings onto the input shaft and differential case.



3. Insert new o-rings into both sides of the intermediate shaft bore, the input shaft bore and the intermediate shafts.



4. Install the input shaft into the housing and install the snap ring.
5. Insert the intermediate shaft into the housing and support in place.

6. Insert the flanged side bearing into the bearing bore. Press in just past the snap ring groove and install the snap ring.
7. Repeat the above step for the opposite bearing.

⚠ CAUTION

Use a hard wood dowel the same diameter as the bearing bore to drive the bearing into place. Do not drive against the inner race as this will damage the bearing.

8. Thoroughly clean both sides of the intermediate bore. All contaminants must be removed.
9. Apply Loctite #RC 609 to both sides of the intermediate bore and install new bore plugs. Drive the bore plugs until they are firmly seated against the snap rings.
10. Install the final drive gear onto the differential housing. Tighten the nuts to per torque listed in the Hardware Torque table at the end of this section.
11. Install the differential assembly into the drive housing and install the bearing caps. Tighten the cap bolts per torque listed in the Hardware Torque table at the end of this section.

Note: The bearing caps are marked for identification and must be installed in their original locations.

12. Place a small bead of non-acidic silicone sealant to the bottom flange of the housing.

NOTE: The sealant bead should be on the inside of the cover plate mounting holes.

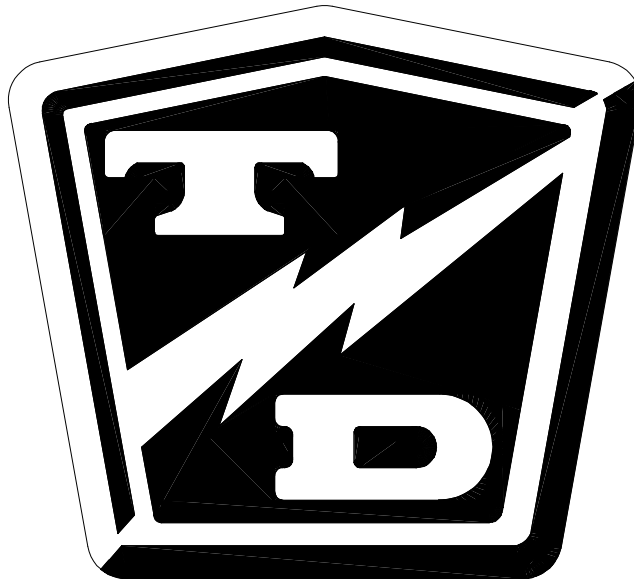
13. Install the cover plate. Tighten the bolts per torque listed in the Hardware Torque table at the end of this section.
14. Install the axles using new axle seals. Refer to **Rear Axle** section for information on installing the axles.
15. Fill with oil.



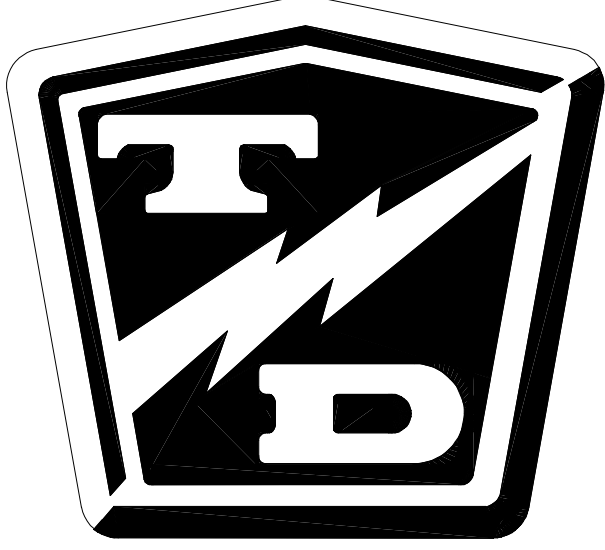
HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Motor terminals	7.5-9.1	10.2-12.4
Motor Mounting Bolts	6-8	8-10.5
Final Drive Gear Nuts	35-45	48-61
Differential Bearing Cap Bolts	35-45	45-61



TAYLOR - DUNN



Chapter - 8b

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Transaxle Service, SS-534



CHECK THE OIL LEVEL

⚠ WARNING

1. Make sure the start 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 battery main positive and negative terminals.
6. Park the vehicle on a level surface.
 7. Place a small oil drain pan under the drive housing.
 8. Remove the drive housing level plug. Refer to the lubrication diagram for the location of the level plug.
 9. A small amount of oil should come out. This indicates the correct oil level.

CHANGE THE OIL

⚠ WARNING

1. Make sure the start 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 battery main positive and negative terminals.
6. Place the drain pan under the drive housing.
 7. Remove the drive housing drain plug and allow all of the oil to drain from the housing and then reinstall the drain plug.
 8. Remove the drive housing fill plug and add 2-quarts of oil.
- NOTE: Refer to the Lubrication Chart for information regarding the type of oil and location of the plugs.*
9. Replace all fill plugs.
- NOTE: Dispose of waste oil in accordance with your local regulations.*
10. Reconnect the main positive and negative at the batteries, remove the blocks from the wheels, and test drive.

ADJUST THE DRIVE BELTS

⚠ WARNING

1. Make sure the start 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 battery main positive and negative terminals.
6. Loosen the jam nut on the motor tensioner.
 7. Using a pull scale, adjust the belts so that the belts deflect approximately 1/4 inch at approximately 10 pounds tension.
 8. Reconnect the main positive and negative at the batteries, remove the blocks from the wheels, and test drive.



TRANSAXLE ASSEMBLY

Remove

⚠ WARNING

1. Make sure the start 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 battery main positive and negative terminals.

⚠ 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. Disconnect the motor terminals.
7. Raise the rear of the vehicle just enough to lift the weight off of the rear wheels, the wheels should still be touching the ground.
8. Remove the lower shock bolt.
9. Disconnect the brake cable.
10. Remove the two swing arm pivot bolts.
11. Raise the frame and remove the transaxle assembly from under the vehicle.
12. Lower the frame to the ground or leave supported on jack stands.

Install

1. Install in reverse order of removal.
 - Use a new cotter pin for the brake cable.
 - Adjust the brake linkage and brake band.
 - Tighten the motor terminals per torque listed in the Hardware Torque table at the end of this section.



AXLES

Remove and Install

⚠ WARNING

1. Make sure the start 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 battery main positive and negative terminals.

⚠ 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 drive wheel off of the ground.
7. Remove the wheel assembly.
8. Place a small oil drain pan under the end of the axle housing.
9. Remove the four axle retaining bolts. Secure the brake body assembly, do not let it hang by the brake hose.
10. Using a slide hammer, remove the axle from the axle housing.
11. Remove the bearing gasket and axle seal from the housing.
12. Install the axle in reverse order using a new gasket and seal.
13. Reconnect the main positive and negative at the batteries, remove the blocks from the wheels, and test drive.

AXLE BEARINGS

Replace the Axle Bearing

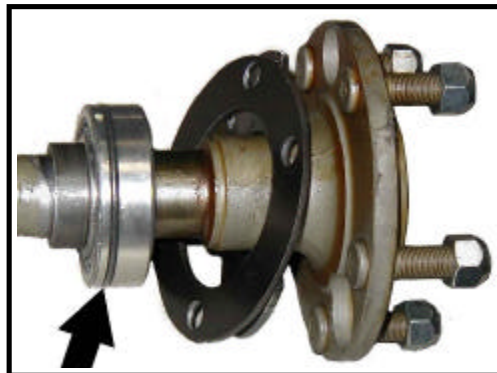
*NOTE: The axle must be removed from the vehicle to replace the axle bearing. Refer to section **Rear Axle: Remove and Install** for information regarding removing the axle.*

NOTE: A 10-ton press is required to replace the axle bearing.

NOTE: The axle bearing will be damaged when it is removed.

1. Place the axle in a press and remove the bearing and bearing retainer.
2. Lightly lubricate the axle shaft.
3. Install a new bearing and bearing retainer and press into place.

NOTE: Some axle configurations have an o-ring around the axle bearing. The bearing should be orientated so that the o-ring is farthest away from the axle hub. See the illustration below.



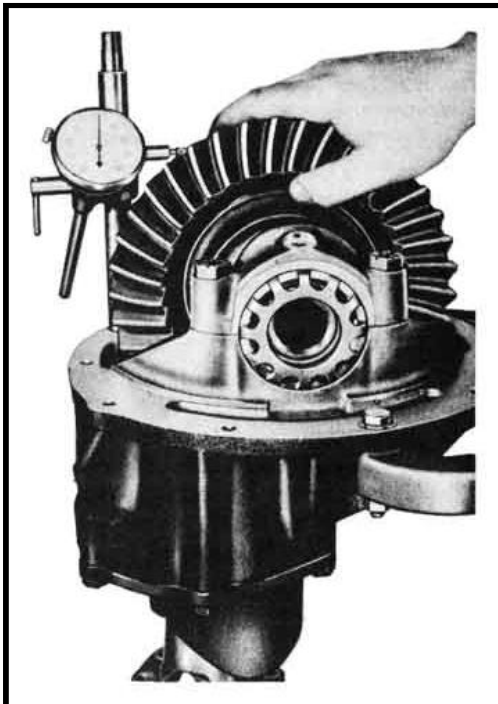


DIFFERENTIAL ASSEMBLY (3RD MEMBER)

Disassemble

NOTE: Bearings and races must be replaced as a set. If any one bearing or race is worn, its mate must also be replaced. It is recommended to replace all bearings and races in the 3rd member as a set.

1. Drain the oil from the differential housing and chain case. Refer to section **Change the Oil** for information regarding draining the oil.
2. Remove the transmission assembly from the vehicle. Refer to **Transmission Assembly: Remove and Install** for information regarding removing the transmission.
3. Remove both rear axle assemblies. Refer to section **Rear Axle: Remove and Install** for information regarding removing the axles.
4. Remove the chain case and backing plate from the 3rd member. Refer to section **Chain Case: Disassemble** for information regarding removing the chain case.
5. Remove the nuts holding the 3rd member to the axle housing and remove the 3rd member from the housing.
6. Install a spacer on the pinion shaft so that the pinion nut can be installed and tightened.



Measuring backlash

7. While rotating the pinion shaft, tighten the pinion nut to 100 foot pounds (142 Nm).
8. Measure and record the ring and pinion gear backlash. This setting will be used during reassembly.

9. Remove the pinion housing and pinion gear from the 3rd member.

NOTE: Do not lose the spacers and shims in the pinion housing or the pinion housing shim(s).

10. If required, remove the rear tapered bearing from the pinion shaft and discard.

NOTE: Do not remove the bearing unless it requires replacement. Removing the rear bearing will damage the bearing. Replacing this bearing will require re-shimming of the pinion shaft.

11. If required, remove the bearing races from the pinion housing.
12. Mark the differential bearing caps and 3rd member housing so that they can be reassembled in their original location. Refer to illustration at end of section.

NOTE: The caps cannot be interchanged or replaced. If the caps are lost or damaged then the entire 3rd member assembly must be replaced.

13. Remove the differential bearing caps, bearing adjusting nuts and races.
14. Remove the differential assembly from the 3rd member.
15. Mark the ring gear and differential housing so that the ring gear can be reinstalled in the same orientation.

16. Remove the bearings from the differential housing and discard.

NOTE: Removing the bearings will damage the bearings. Do not remove the bearings unless they require replacement.

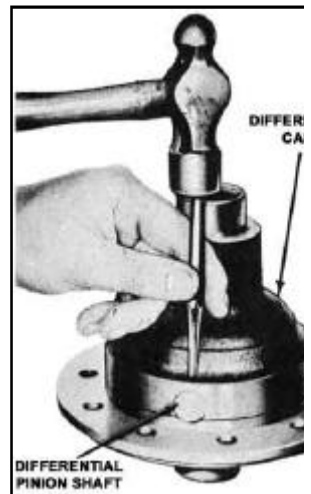
17. Remove the ring gear from the differential housing.

18. Remove the differential shaft locking roll pin.

19. Split the 2-piece differential housing.

20. Drive the differential pinion shaft out of the housing with a brass drift punch.

21. Remove the differential gears, axle gears, and thrust washers.





Maintenance, Service, and Repair

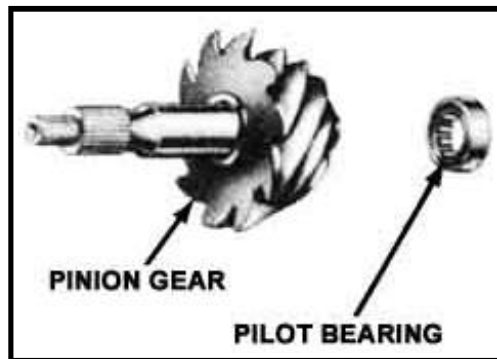
Assemble

NOTE: Thoroughly clean and inspect all parts before reassembly. Apply a small amount of differential oil to all gears and bearings before reassembly.

NOTE: Depending on your vehicle configuration, the rear pinion pilot bearing is not required and may not be installed.

NOTE: If the ring and pinion gear set is to be replaced then the shims for the pinion housing may have to be adjusted. Refer to section **Selecting the Pinion Housing Shim** for information on adjusting the shim.

NOTE: Most of our gear sets are non-hunting or semi-hunting gears. With this type of gear the pinion and ring gears must be aligned correctly. There will be two teeth marked on the ring gear and one tooth marked on the pinion gear. The one tooth on the pinion gear must be installed so that it is between the two teeth on the ring gear. The gear ratios are; 2.50, 2.70, 2.75, 3.25 and 3.00.



Pinion housing

1. If the rear pinion bearing was removed, install a new bearing.
2. Install the bearing races into the pinion housing.
3. Place the pinion gear into the 3rd member.
4. Install the pinion housing onto the 3rd member.
5. Install the pinion bearing spacers, shims and front bearing.
6. Install a spacer on the pinion shaft so that the pinion nut can be installed and tightened.
7. While rotating the pinion shaft, tighten the pinion nut to 100 foot pounds (142 Nm).
8. Check the torque required to rotate the shaft. If the torque is not between 6 -10 inch pounds (0.7 - 1.2 Nm) then the bearings must be re-shimmed. Add or subtract shims as required until the torque is within specifications.

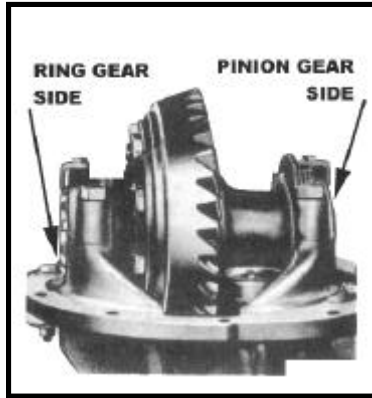
Differential Assembly

9. Reassemble the differential housing in reverse order.
10. Place the ring gear onto the differential housing matching the mark made during disassembly.
11. Install two of the ring gear bolts finger tight to align the gear.
12. Press the ring gear onto the differential housing.
13. Install the ring gear bolts and cross tighten to per torque listed in the Hardware Torque table at the end of this section.
14. If the differential bearings were removed, install new bearings.
15. Place races onto the differential bearings and place the differential assembly onto the 3rd member. Position the assembly so that it is just touching the pinion gear.
16. Install the bearing adjusting nuts making sure that the nuts are not cross threaded. Position the nuts so they are in contact with the bearing races.

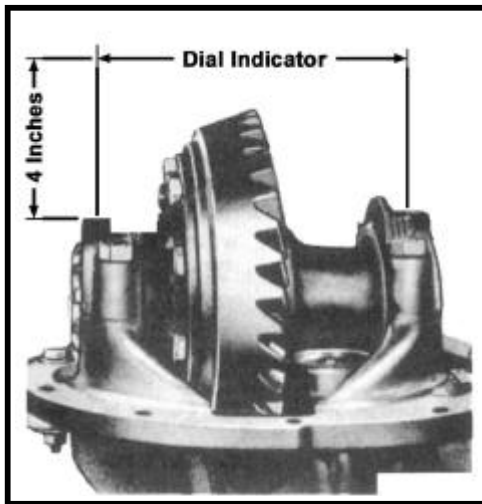


17. Install the bearing caps in their original locations and torque the bolts to 12-15 ft-lbs. making sure that the adjusting nuts still turn freely.

NOTE: In the following procedure, "Left adjusting nut" refers to the nut on the ring gear side of the differential assembly. "Right adjusting nut" refers to the nut on the pinion gear side of the differential assembly.



The differential bearing preload is set by measuring the case spread of the 3rd member housing. As the bearing adjusting nuts are tightened, the two differential bearing caps will be pushed (spread) away from each other. A dial indicator must be used to measure the case spread as the nuts are tightened. Mount the dial indicator so that it is 4 inches above the top of the bearing caps and parallel to the center line of the carrier bearings.



NOTE: Be sure to continually rotate the ring gear while adjusting the bearings. This makes sure that the bearings and races remain seated correctly.

NOTE: One hole on adjusting nut = approximately 0.003" change in backlash. Left and right nuts **MUST** be turned the same amount **AND** in the same direction. The final direction of rotation **MUST** be in the tightening direction, to loosen a nut 1-hole, back off 2-holes and then tighten 1 hole. The ring gear should be rotated any time the nuts are being adjusted.

18. Loosen the right side nut.
19. Tighten the left nut until all backlash is removed from the ring and pinion gear.
20. Tighten the right nut until a case spread of 0.010" is indicated on the dial indicator.

NOTE: If new ring and pinion gears are used, refer to the recommended backlash that is supplied with the gear set

21. Measure the backlash. If the backlash is not within 0.002" of the original measurement taken on disassembly or the recommended setting for new gears, then readjust the bearings as follows:

To increase backlash, loosen the left spanner nut and then tighten the right spanner nut the same amount.

To decrease backlash, loosen the right spanner nut and then tighten the left spanner nut the same amount.

22. Apply gear marking compound on both sides of 7 to 10 teeth on the ring gear.
23. While applying resistance to the pinion shaft, rotate the ring gear back and forth (not full revolutions) until a clear contact pattern is shown. Compare the contact pattern to the illustration on the following page and reshim the pinion housing or adjust the backlash as indicated on the illustration. If the pinion housing is reshimed the backlash must be reset. Go back and repeat ALL procedures in setting the backlash.
24. Tighten the bearing cap bolts per torque listed in the Hardware Torque table at the end of this section and install the spanner nut locks. Tighten the spanner nut lock bolts per torque listed in the Hardware Torque table at the end of this section.



RE-SHIMMING THE PINION HOUSING

The pinion housing shim may require replacement if the ring and pinion gear or pinion housing is replaced.

Pinion housing shims are available from 0.005" to 0.021" in increments of 0.001". Locate the number printed on the flat surface of the pilot bearing shaft of the pinion gear. It should be a number ranging from -5 to +5. This is the amount in 0.001" increments to add to the "standard" shim. For example, if the number on the shaft is '-3' then the standard shim (0.015) plus '-3' equals 0.012. The correct shim would be 0.012".

If you cannot locate the number on the shaft, start with the standard shim and adjust as required per the contact pattern chart below.



Ideal contact pattern
Correct shim
Correct backlash



TOE

Backlash is correct
Add 0.004" shim

TOE



Backlash is correct
Subtract 0.004" shim



Shim is correct
Decrease backlash 0.004"

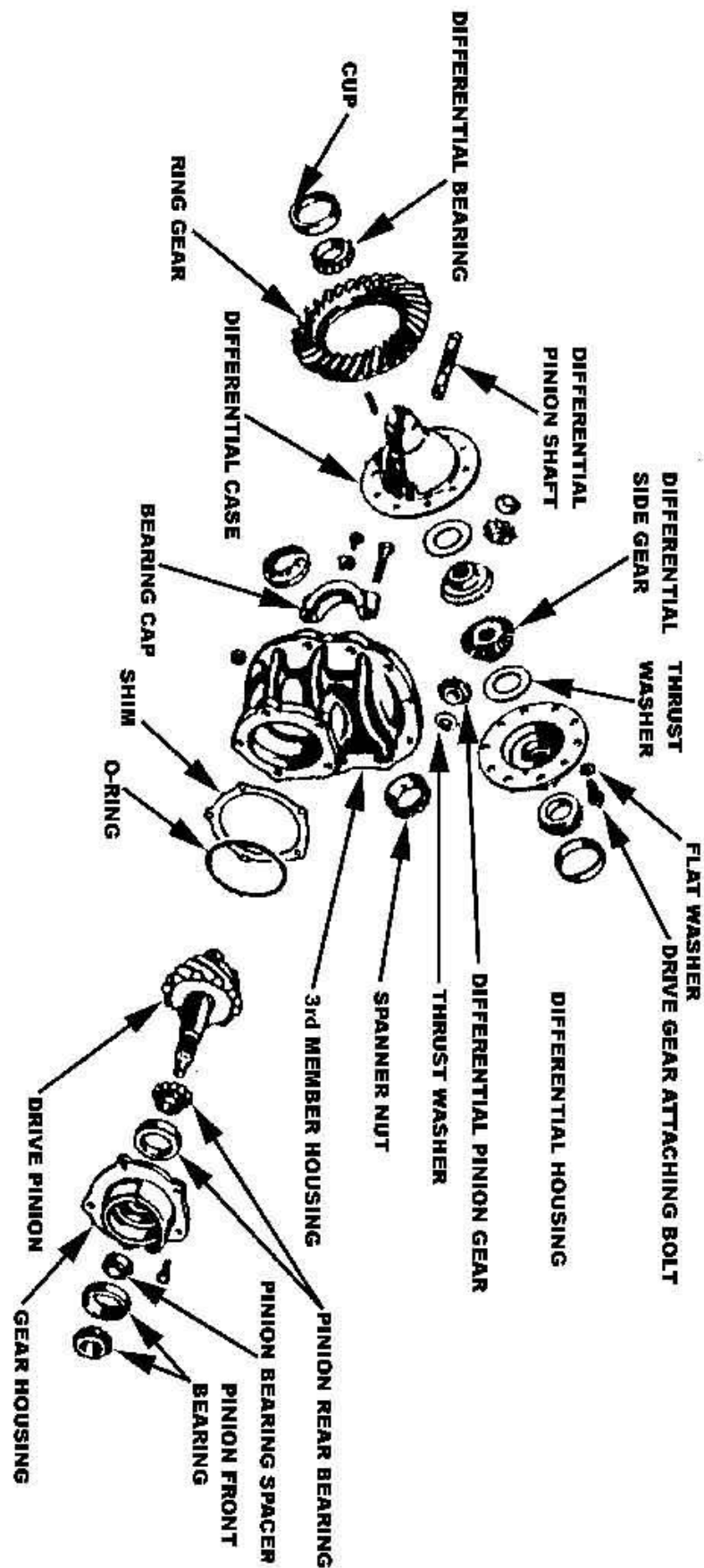


Shim is correct
Increase backlash 0.004"





EXPLODED VIEW

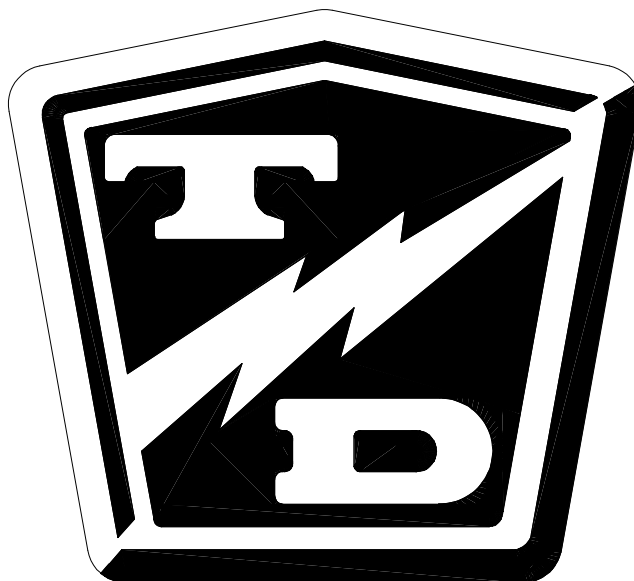




HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Motor Terminals	7.5-9.1	10.2-12.4
Ring Gear Bolts	65-80	93-114
Carrier Bearing Cap Bolts	70-85	100-121
Spanner Nut Lock Bolts	12-25	18-35
Pinion Nut	175	250



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Tires and Wheels



TIRE INFLATION

There are many tire options available with varying tire pressures. Refer to the side wall of your tire for information regarding the tire pressure for your tires.

The illustration below is an example of the side wall information on a tire.

Tire pressures must be checked when the tire is cold.



TIRE INSPECTION

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.

6. Check the tire pressure. Refer to **Tire Inflation** section for information on checking the tire pressure.
7. Inspect the tire tread depth. Minimum recommended tread depth is 1/16-inch. There are a series of tread depth wear indicators around the circumference of the tire. They will appear as 1/2-inch bands across the tread as the tire approaches its wear limit (see illustration below). Replace the tire if any tread depth indicator can be seen or any part of the tread depth is 1/16-inch or less. Refer to **Replace the Tire** section for information regarding replacing the tire.
8. Inspect for uneven tire wear on the front tires. Uneven tire wear could be a result of an improperly inflated tire or a misaligned or damaged front end.

NOTE: Refer to **Tire Inflation** section or **Steering Component Service** section for information on proper tire inflation or front end wheel alignment.

9. Inspect the inner and outer side walls for cracks. If any cracks are seen, then the tire should be replaced. Refer to **Replace the Tire** section for information regarding replacing the tire.

10. Inspect the valve stem for cracks. If any cracks are seen, then the valve stem should be replaced. It is also recommended that the valve stem be replaced whenever the tire is replaced.

NOTE: Refer to **Replace the Tire** section for information regarding replacing the valve stem.

11. Inspect the tread and side walls for debris in the rubber that could lead to a puncture. If any debris is found it should be removed and the tire inspected for a leak.





TIRE/WHEEL ASSEMBLY

Remove/Install-Rear

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.

⚠ 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 to be replaced off of the ground and support with jack stands.
7. Remove the wheel nuts and remove the wheel.
8. Install in reverse order.
9. Cross tighten the wheel nuts in two stages as follows:
 - 1st stage to approximately 20 foot pounds (27 newton meters).
 - 2nd stage to torque listed in the Hardware Torque table at the end of this section.
10. Reconnect the main positive and negative cables at the batteries.
11. Lower the wheel to the ground.
12. Remove the blocks from behind the wheels.
13. Release the parking brake and test drive the vehicle.

Remove/Install-Front

Refer to Front Axle Service for information on removing the front wheel.

⚠ WARNING

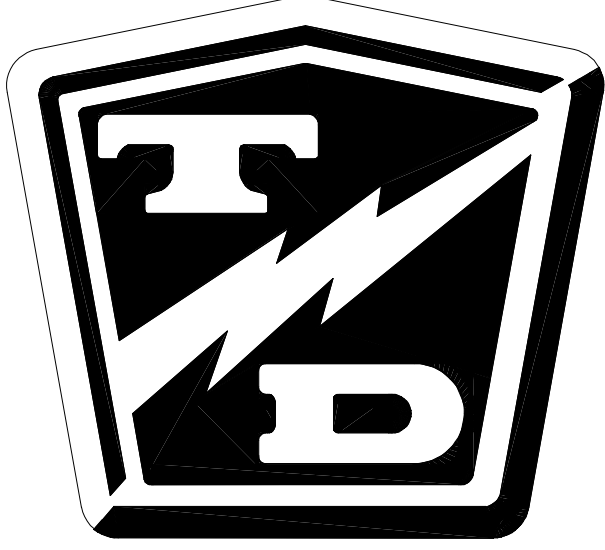
Improper assembly or disassembly of a split rim wheel can result in tire explosion causing severe injury. Refer tire/wheel repair to a qualified tire supplier.

HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Wheel Nut	85	115

TAYLOR - DUNN



Chapter - 10

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⚠ 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.



CLEANING

⚠ 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.

⚠ 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.

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.

6. Dry dirt can be readily blown off with low-pressure air or brushed off.
7. Wetness or wet dirt on the battery indicates battery acid. Using a nonmetallic brush with flexible bristles, wash the battery off with a strong solution of baking soda and hot water (1 lb. of soda to a gallon of water). Continue until all fizzing stops, which indicates that the acid has been neutralized. Then rinse thoroughly with clear water. **DO NOT** get any of the solution into the battery cells.
8. Reconnect the battery, remove the blocks from the wheels and test drive.



TESTING

⚠ 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.

⚠ 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.

Specific Gravity

NOTE: The battery must be fully charged before performing this test.

The specific gravity of a cell is an indication of the actual state of charge of the cell. A fully charged cell should have a reading of 1275 to 1300 (see the illustration to the right). A discharged cell will read 1100. Ideally, all cells in a battery will have the same reading. Any cells in a battery that vary by more than 30-points may be an indication of a bad cell.

Clean the battery. Refer to **Cleaning** section for information on cleaning the battery.

Using part number **77-200-00** hydrometer, check and record the specific gravity of each cell in the battery.

If, after charging, none of the cells exceed a hydrometer reading of 1250 then there may be a fault in the charging system. If the charging system checks OK then the battery is no longer accepting a charge and should be replaced.

*NOTE: Refer to **Charger Troubleshooting** for information on checking the charging system.*

The highest reading will be the cell that is accepting the most charge. This reading will be used to gauge all other cells.

Compare the specific gravity readings to the highest reading, if the difference between any of the cells is more than 30-points, then that battery should be replaced.

NOTE: Individual cells in some industrial batteries can be replaced. Contact the battery manufacturer for more information.



*Typical
Hydrometer
Float*



WATERING

⚠ 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.

⚠ 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.



Battery Filler

⚠ WARNING

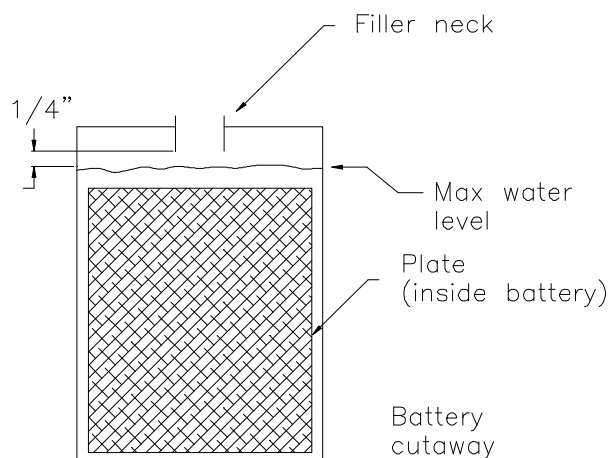
Do not overfill the batteries. Over filling the batteries may cause the batteries to boil over and result in severe bodily injury or property damage.

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.

NOTE: The electrolyte level in a battery rises while charging and will be close to its highest level after the end of a charging cycle. It is recommended to fill the battery at the end of a charging cycle. If the electrolyte is below the top of the battery plates then fill just enough to cover the plates and then top off when the charging cycle is complete.

6. Clean the battery. Refer to **Cleaning** section for information on cleaning the battery.
7. Check the electrolyte level in all battery cells. If low, fill to the correct level with distilled water using part number **77-201-00** battery filler, never add additional battery electrolyte to the batteries.
8. Reconnect the battery, remove the blocks from the wheels and test drive.





CHARGING

Refer to the Operator Section for charging information.

⚠ 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.

STORING

Storage

Thoroughly clean the battery and battery compartment. Refer to **Cleaning** in this section for information regarding cleaning the battery.

Check the electrolyte level and charge the battery. Refer to **Watering** in this section for information regarding checking the electrolyte level.

Store the vehicle or battery (if removed) in a cool, dry, well ventilated area.

If storing for more than one month, the battery should be charged per the table below.

Storage Temperature (F)	Charging Interval (months)
Over 60	1
Between 40 and 60	2
Below 40	6

Returning to Service

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.

6. Thoroughly clean the battery and battery compartment. Refer to **Cleaning** in this section for information regarding cleaning the battery.
7. Check the electrolyte level and charge the battery. Refer to **Watering** in this section for information regarding checking the electrolyte level.
8. Test the battery. Refer to **Testing** section for information on testing the battery.
9. The battery is now ready to be put back into service.



REMOVE/INSTALL

⚠ 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.

Industrial Battery or Lift Out Battery Pack

⚠ WARNING

1. Make sure the start 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 battery connector from the vehicle.
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 illustration), slowly raise the battery out of the vehicle.
 8. Inspect the battery compartment for signs of corrosion.
 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



Individual Batteries

⚠ CAUTION

Individual batteries can weight up to 80 pounds. To avoid injury, use proper lifting techniques or a hoist to remove the battery.

⚠ WARNING

1. Make sure the start 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.

⚠ WARNING

Do not allow the loose battery cables to contact any other parts of the vehicle as this could cause in a short circuit resulting severe bodily injury or damage to the vehicle.

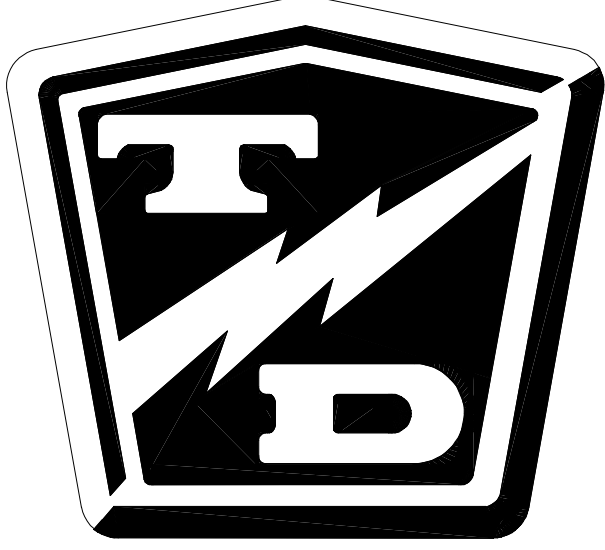
HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Battery Terminal	9	12.2

5. Using an insulated wrench, disconnect the cables from the battery to be removed.
6. Using a lifting strap or hoist, remove the battery from the vehicle.
7. Inspect the battery compartment for corrosion. If there is significant corrosion, all batteries should be removed and the compartment cleaned and painted.
8. Install the battery and torque the battery terminal hardware per torque listed in the Hardware Torque table at the end of this section.

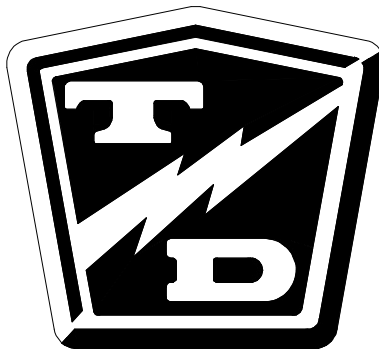
TAYLOR - DUNN



Electrical Troubleshooting

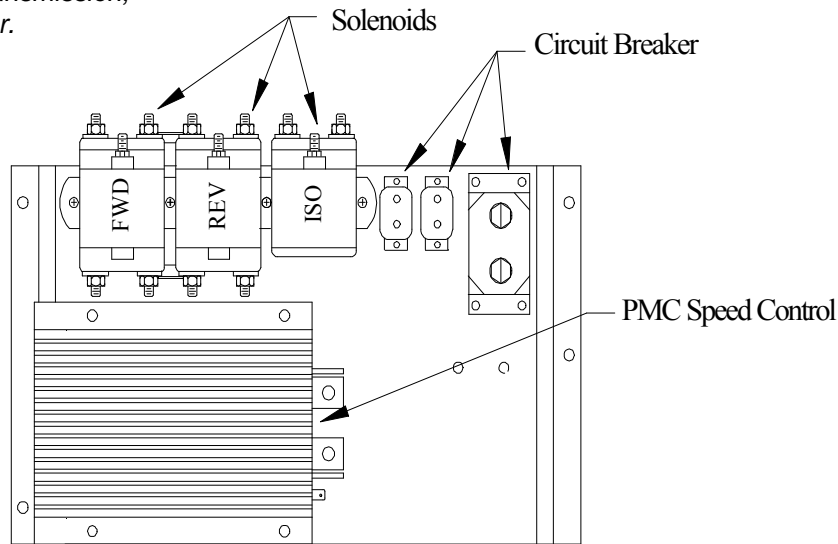
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*Note: Vehicles with Dana H12 transmission,
Forward solenoid is in the center.*



Typical Control Panel

SYMPTOMS:

If your vehicle exhibits any of the following symptoms then skip the main troubleshooting sequence and proceed to **Symptom Troubleshooting** later in this section.

- Runs slow in both directions plus high armature and field current in both directions. NOTE: Armature and field current should be equal.
- Runs slow in both directions plus high armature current in both directions. NOTE: Field current will be very low.
- Runs normal in one direction only plus runs slow or lacks power in the opposite direction with high armature current in the opposite direction or;
- Accelerates slowly and exceeds normal speed in the opposite direction with high armature current only. NOTE: Field current will be very low in the opposite direction.
- Accelerates slowly and exceeds normal speed in both directions plus high armature current. NOTE: Field current will be very low.
- Full speed only.
- Does not run in either direction plus there is noise from motor (hum or whine) with high field current and low armature current.
- Jumps into high speed when direction is selected after depressing the accelerator pedal. Excessive spark when connecting battery
- Does not run or runs very slow with low motor current and high battery current.
- Jumps into high speed when direction is selected after depressing the accelerator pedal.

If your vehicle does not exhibit any of the above symptoms then continue with the main troubleshooting sequence on the following pages.

READ THIS FIRST

Test Equipment Required:

- Digital multimeter (DMM) with diode test function, FLUKE 79 model used in illustrations.
- Shunt or clamp-on DC Ammeter to measure up to 400 amps.
- Test light with a rated voltage equal to or exceeds maximum battery voltage or Taylor-Dunn test light part number #62-027-00 for systems up to 48 volts.
- Throttle Module Analyzer, Taylor-Dunn #62-027-32.
- These tools are available through your local Taylor-Dunn parts distributor.

IMPORTANT NOTES and INSTRUCTIONS

- This troubleshooting guide assumes that the vehicle is wired correctly. It is not intended to diagnose a vehicle that is not wired correctly.
- This troubleshooting guide is not written to be able to locate a problem if there are multiple component failures.
- This troubleshooting guide assumes the batteries are good. Charge and test the batteries before troubleshooting the control system.
- **DO NOT** start in the middle of this troubleshooting guide. Start at the beginning and complete each test in the order that they are written. **DO NOT** skip any test unless instructed to do so. Once a problem is found, stop testing and repair the indicated problem. When the repair is completed it is recommended that the control system be retested before lowering the drive wheels to the ground.
- This troubleshooting guide requires the use of a test light rated at the battery voltage of the truck and the Taylor-Dunn Throttle Module Analyzer. **Troubleshooting CANNOT be completed without these tools.**

⚠ CAUTION

These test procedures must be performed in the order they were written. If the test result is good, then proceed to the next test or go to the next section. Failure to do so may result in incorrect test results.



Definitions:

- “MS-1” = The first switch in the accelerator module.
- “Battery volts” = The voltage at the batteries at the time the test is completed.
- “Pick up” = Energizing a solenoid or contactor.
- “F&R” = Forward and Reverse.
- “ISO” = Isolator.
- “Battery negative” = Main negative battery post.
- “Battery positive” = Main positive battery post.
- “PMC” = Speed control module (black box).
- “HOT terminal” = The side of a switch or solenoid that is connect to the power source.
- “COLD terminal” = The side of a switch or solenoid that power is switched to.

DURING ALL TESTS

⚠ 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 severe bodily injury and/or property damage.

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

⚠ WARNING

Disconnect both of the battery leads during any maintenance or before disconnecting any electrical component or wire. Failure to do so may cause severe bodily injury and/or property damage.

START:

Read all warnings above before continuing.

If the vehicle runs normal in one direction but does not run in the opposite direction then go to the **Solenoids** sequence.

If none of the three solenoids pick up (click) when the accelerator pedal is depressed then go to the **Forward & Reverse Switch** sequence.

Power Output Test

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious 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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

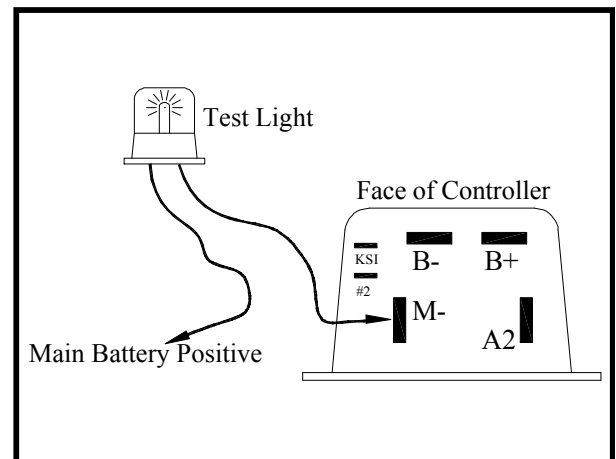
Set the test light voltage to the same voltage as the battery volts.

Connect the test light from the PMC 'M-' Terminal to battery positive.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.

Depress the accelerator pedal fully.

- If the light comes ON then go to the Motor sequence.
- If the light does not come ON then continue with the next test.





Control Wire Inputs

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

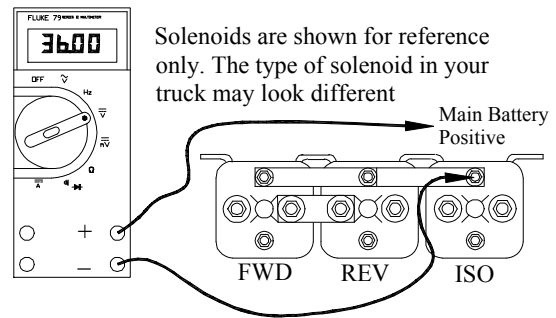
⚠ WARNING

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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

Connect a voltmeter across the Solenoid Negative Buss Bar and battery positive.

- If the voltage is not at battery volts then check the wiring to battery negative and the negative circuit breaker. 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.

The voltage shown is for illustration only. The actual voltage may vary.



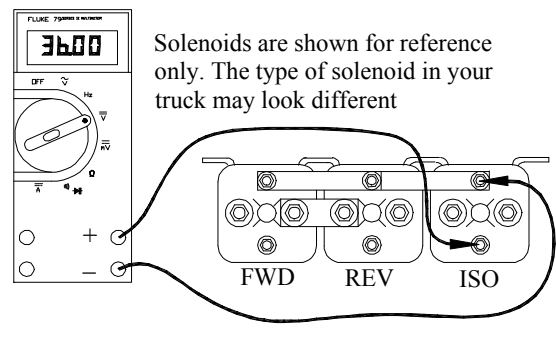
Connect a voltmeter across the ISO solenoid coil terminals.

Close all interlock switches and turn the Key Switch ON.

Depress the accelerator pedal to engage MS-1 only.

- If the voltage is not at battery volts then go to the **Key Switch** sequence.
- If the voltage is at battery volts and the ISO solenoid does not pick up (click) then the ISO solenoid 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.

The voltage shown is for illustration only. The actual voltage may vary.



Note: Vehicles with Dana H12 transmission, Forward solenoid is in the center.

Connect a voltmeter across the PMC #2 terminal and battery negative.

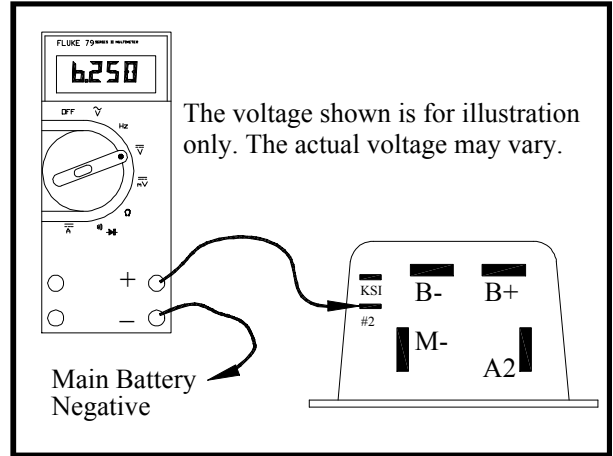
Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.

Depress the accelerator pedal to engage MS-1 only.

- If the voltage is not between 6.0 and 6.5 volts then go to the **Accelerator** sequence.

Depress the pedal fully.

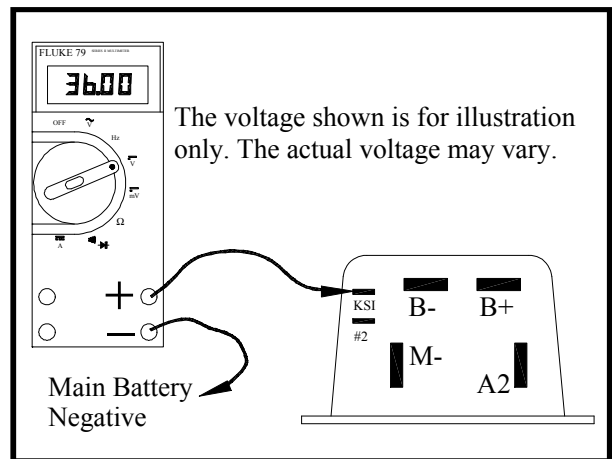
- If the voltage is not between 11.0 and 11.5 volts then go to the **Accelerator** sequence.



Connect voltmeter across the PMC KSI terminal and battery negative.

With the pedal still fully depressed:

- If the voltage is not at battery volts then go to the **Key Switch** sequence.
- If the voltage is at battery volts then continue with the next test.



Power Wire Inputs

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

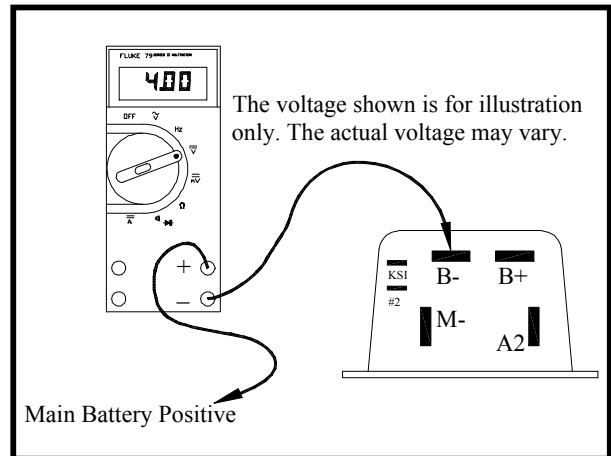
Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

⚠ 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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

Connect a voltmeter to the PMC 'B-' terminal and battery positive.

- If the voltage is not the same as battery volts then there is an open circuit in the wire from 'B-' to the battery. Stop troubleshooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.

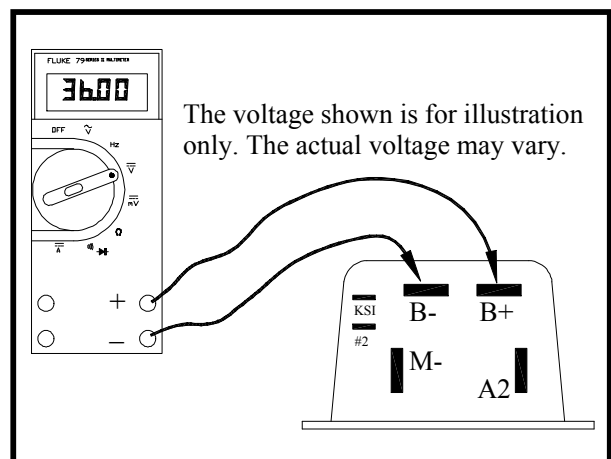


Connect a voltmeter across the PMC 'B-' terminal and the PMC 'B+' terminal.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.

Depress the accelerator pedal to engage MS-1 only.

- If the voltage is not the same as battery volts then go to the **Solenoids** sequence.
- If the voltage is the same as battery volts then the PMC controller 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.



Motor

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

⚠ WARNING

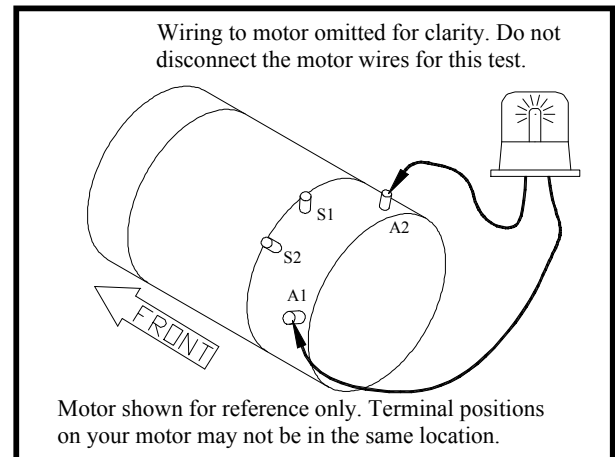
1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

Set the test light voltage to the same voltage as the battery volts.

Connect the test light across the motor 'A1' and 'A2' terminals.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.
Depress the accelerator fully.

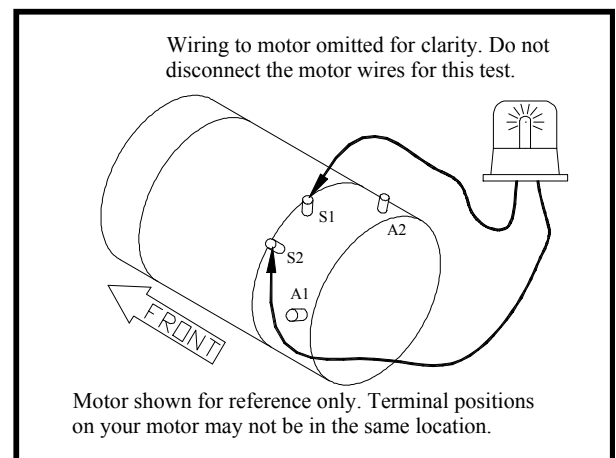
- If the light comes on then the motor armature windings are open and the motor must be repaired or replaced. Stop trouble shooting here and repair the problem. When the repair is completed, completely test the vehicle before lowering the drive wheels to the ground.



Connect the test light across the motor 'S1' and 'S2' terminals.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.
Depress the accelerator fully.

- If the light comes on then the motor field windings are open and the motor must be repaired or 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.
- If the test light did not come on during either test then go to the **F/R Switch** sequence.





Accelerator

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious 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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

With the power switch OFF, connect a throttle module to the analyzer.

Position the power switch to the 6-11 volt range.

All but the power lamp should be OFF. If the FS-1, FS-3 or OV lamp (Over Voltage) are ON, then the module is faulty.

Depress the lever on the module. The FS-1 lamp should be ON with no more than a few degrees of rotation. If the FS-1 lamp does not come on, then the module is faulty (see note2 below).

The voltage on the digital display should vary with the position of the module arm, starting at approximately 6-volts and ending at approximately 11-volts.

If the module is equipped with the FS-3 switch, the FS-3 lamp should come ON when the module arm is rotated to the full speed position. If the lamp does not come ON then the module is faulty.

Note1: Current versions of the throttle module do not have additional switched output (FS-3 fully depressed). additional switched output was only used on PT-II cc systems and Power-Tron 240, 350, or 480 systems that equipped with the Power Plus module.

If the OV lamp comes ON at any time, then the module is

If the Low battery lamp is ON, then the analyzer battery be replaced.

Additional information regarding the analyzer can be found in the instructions provided with the analyzer (D0-110-53)

If the module functions correctly with the analyzer but not on the vehicle it is likely that there is a fault in the vehicle wiring.



NOTE2: Failures of the FS-1 circuit indicate a possible vehicle wiring fault that has resulted in a short circuit across FS-1. BEFORE REPLACING THE MODULE: Confirm that there are no shorts in the vehicle wiring or components. Installing a replacement module in a vehicle with faulty wiring will burn out the new module.

Key Switch

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious 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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

Test all interlock switches and/or interlock relays (if equipped) for continuity. Depending on the model of your vehicle, it may have a seat interlock, Foot interlock, Charger interlock, special order interlock or any combination of the above. Refer to the wire diagram at the end of this section for location of the interlocks.

NOTE: Due to the many different configurations possible for special order interlocks, they will not be included in this text. Refer to the option list for your truck or contact your Taylor-Dunn® Representative for more information.

If you do not know how to test for continuity, refer test to a qualified technician.

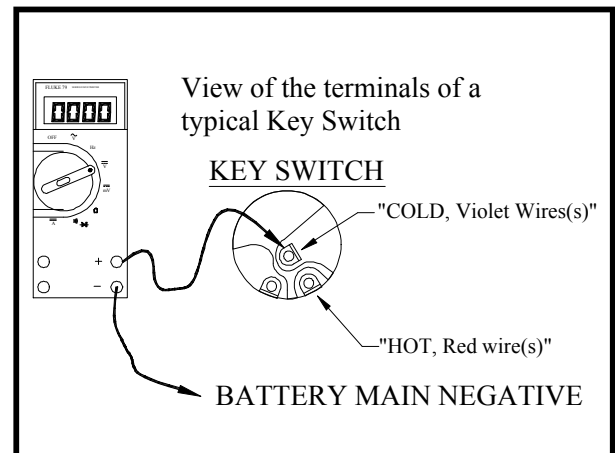
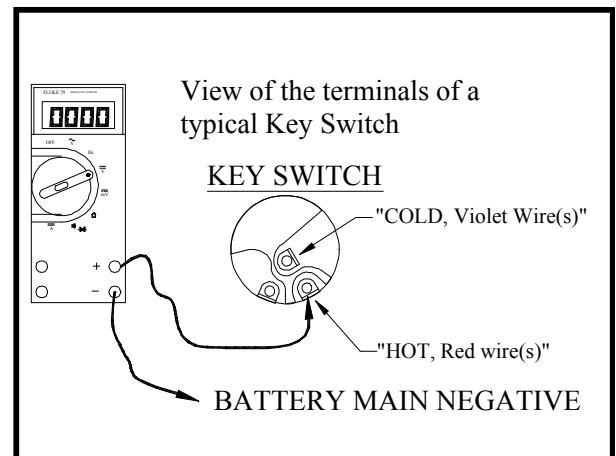
Connect a voltmeter across the HOT terminal of the key switch and battery negative.

- If the voltage is not at battery volts then check the wire between the key switch and battery positive. 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.

Connect a voltmeter across the COLD terminal of the key switch and battery negative.

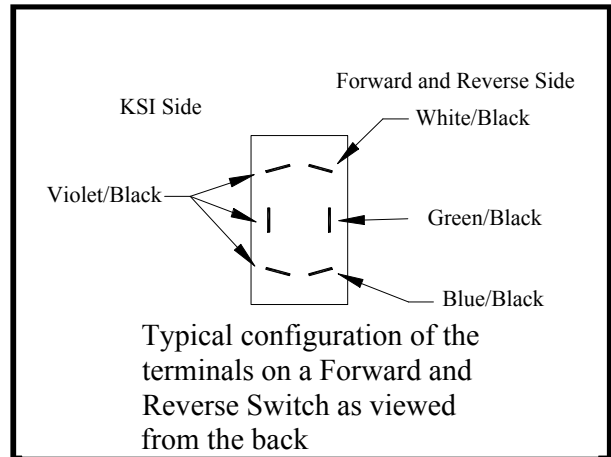
Turn the key switch ON.

- If the voltage is not at battery volts then the key switch 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.
- If the voltage is at battery volts but the previous test at pin #4 in the Accelerator section failed then check the wire from the key switch to pin #4 at the accelerator module. 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.





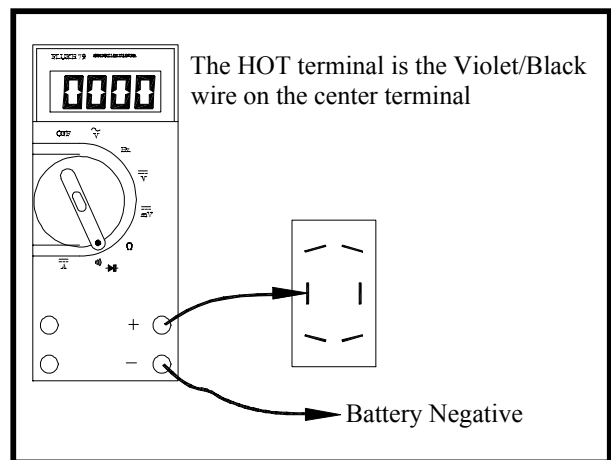
For your reference, shown at the right are the Forward and Reverse switch wire connections for a typical control system.



Connect a voltmeter across the HOT terminal of the KSI side of the F&R switch and battery negative.

Turn the key switch ON.

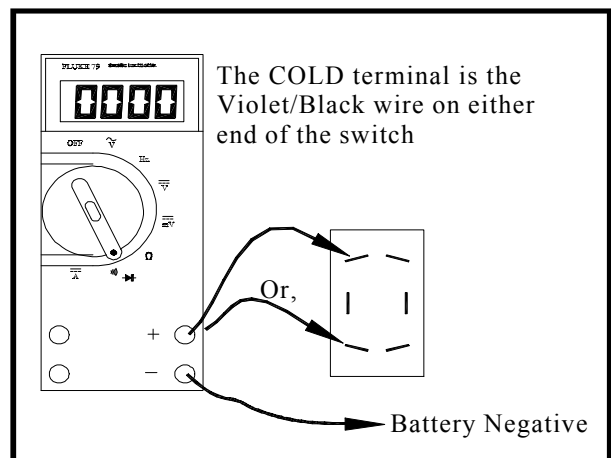
- If the voltage is not at battery volts then go to the **Accelerator** sequence.



Connect a voltmeter across one of the COLD terminals of the KSI side of the F&R switch and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.

- If the voltage is not at battery volts then the F&R switch 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.
- If the voltage is at battery volts and the test at the PMC KSI terminal in the Control Wire Inputs section failed then check the wiring between COLD terminals of the KSI side of the F&R switch and the PMC KSI terminal. 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.



F/R switch

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

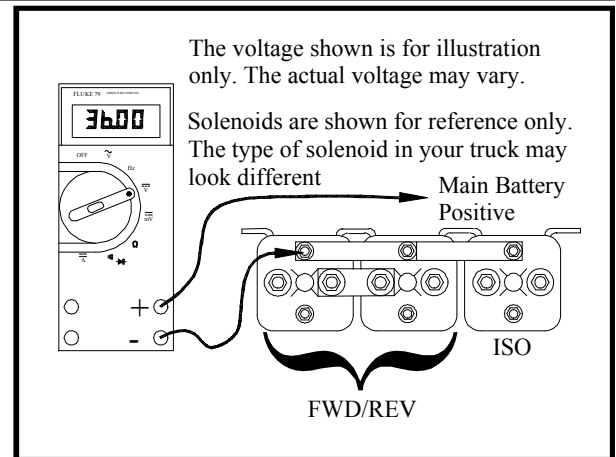
⚠ WARNING

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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

Connect a voltmeter across the Solenoid Negative Buss Bar and battery positive.

NOTE: You may skip this test if it was completed in a previous section

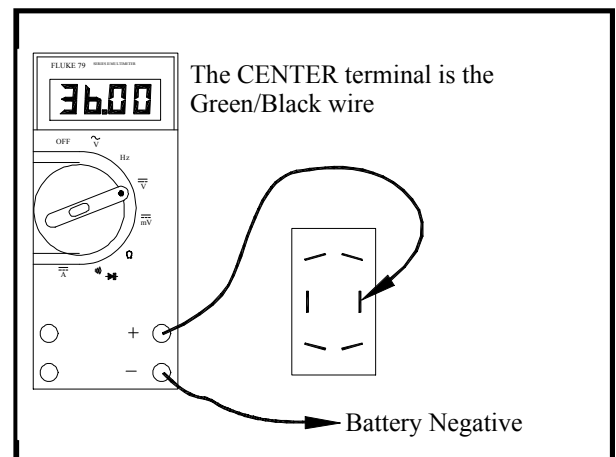
- If the voltage is not at battery volts then check the wiring to battery negative and the negative circuit breaker. Stop trouble shooting here and repair the problem. When the repair is completed, completely retest the vehicle before lowering the drive wheels to the ground.



Connect a voltmeter across the center terminal of the forward and reverse side of the F&R switch and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.
Depress the accelerator pedal fully.

- If the voltage is not at battery volts then go to the Accelerator sequence.



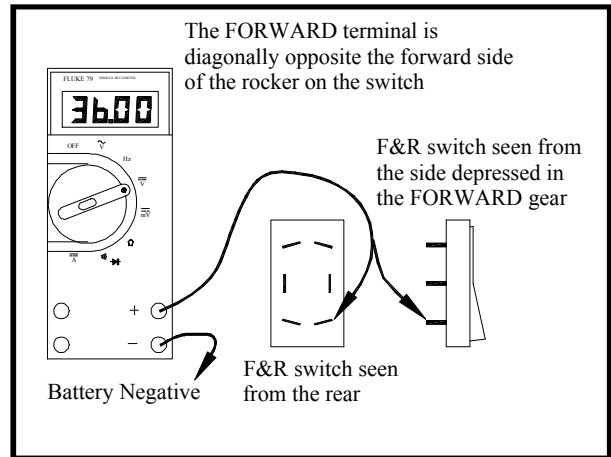


Connect a voltmeter across the forward terminal of the forward and reverse side of the F&R switch and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in forward.

Depress the accelerator pedal fully.

- If the voltage is not at battery volts then the F&R switch 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.

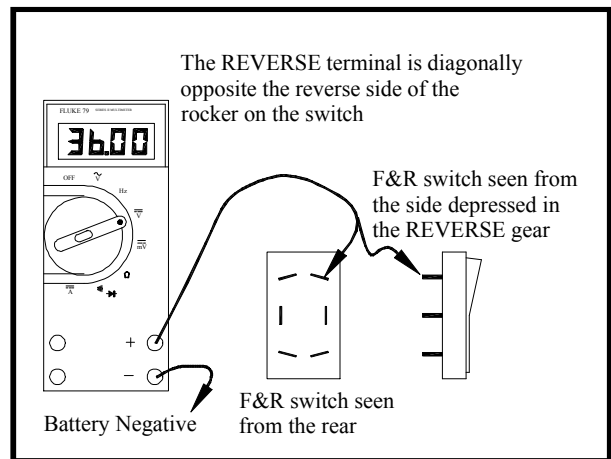


Connect a voltmeter across the reverse terminal of the forward and reverse side of the F&R switch and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in reverse.

Depress the accelerator pedal fully.

- If the voltage is not at battery volts then the F&R switch 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.
- If all tests in this section were good then check the wiring from the F&R switch to the Forward and Reverse solenoids and both the forward and reverse solenoid coils. 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.





Solenoids

⚠ WARNING

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious 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. Set the park brake.
4. Place blocks under the front wheels to prevent vehicle movement.

If the vehicle runs in forward only then skip ahead to the test sequence:

Forward (does not run in reverse).

If the vehicle runs in reverse only then skip ahead to the test sequence:

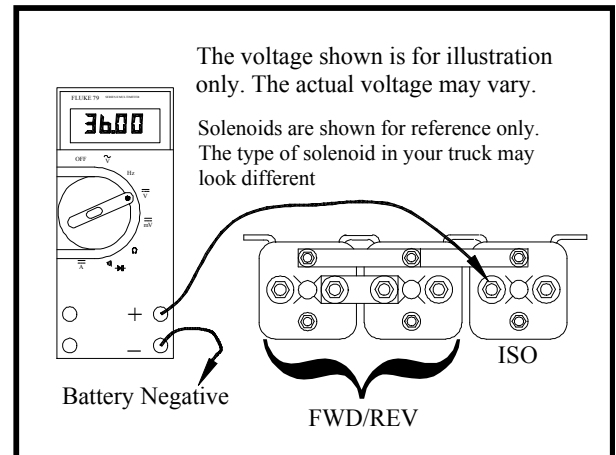
Reverse (does not run in forward).

Connect a voltmeter across the ISO solenoid COLD terminal and battery negative.

Close all interlock switches and turn the Key Switch ON.

Depress the accelerator pedal fully.

- If the voltage is at battery volts then the wire from the ISO solenoid to the PMC is bad. 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.

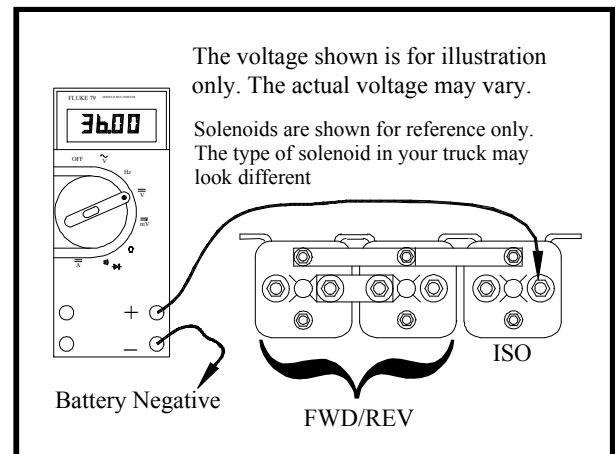


Connect a voltmeter across the ISO solenoid HOT terminal and battery negative.

Close all interlock switches and turn the Key Switch ON.

Depress the accelerator pedal fully.

- If the voltage is at battery volts then the ISO solenoid 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.
- If the voltage is not at battery volts then check the wiring to battery positive and the main circuit breaker. 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.



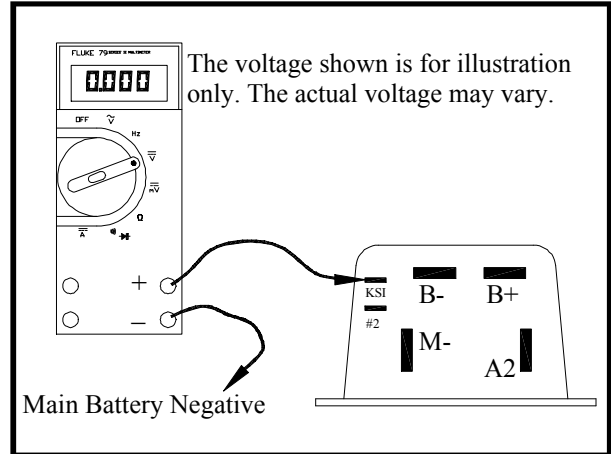


Forward (does not run in reverse)

Connect a voltmeter across the PMC KSI terminal and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in reverse.

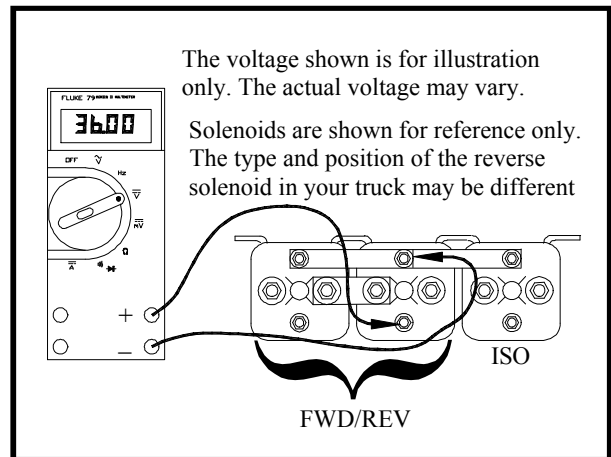
- If the voltage is not at battery volts then go to the **Key Switch** sequence.



Connect a voltmeter across the Reverse Solenoid coil terminals. Refer to your vehicles wiring diagram to identify the position of the reverse solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in reverse. Depress the accelerator pedal fully.

- If the voltage is not at battery volts then go to the **F/R Switch** sequence.

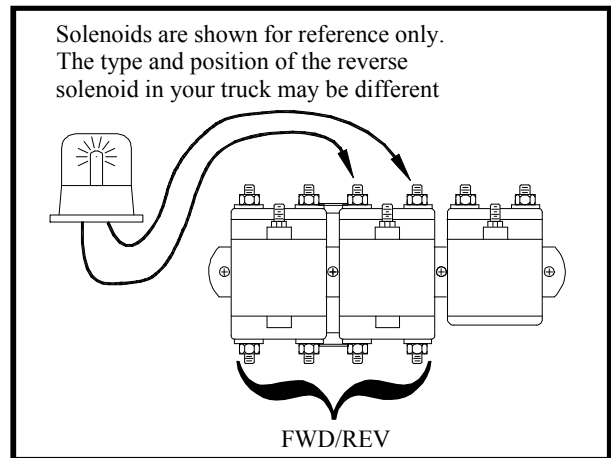


Set the test light voltage to the same voltage as the battery volts.

Connect the test light across the normally open contacts of the reverse solenoid. Refer to your vehicles wiring diagram to identify the position of the reverse solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in reverse. Depress the accelerator pedal fully.

- If the light comes on then the Reverse solenoid 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.

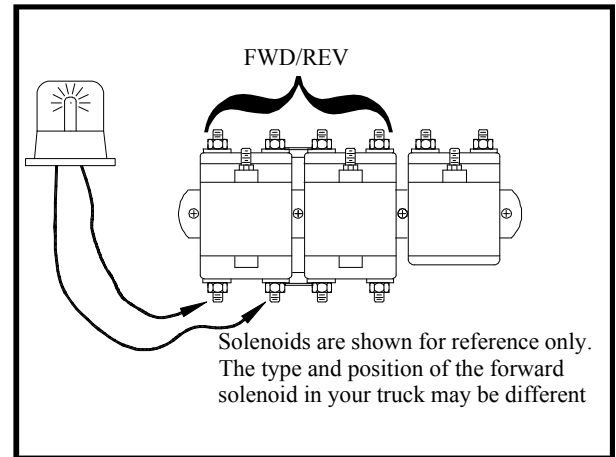


Connect the test light across the Normally Closed contacts of the Forward solenoid. Refer to your vehicles wiring diagram to identify the position of the forward solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Reverse.

Depress the accelerator pedal fully.

- If the light comes on then the Forward solenoid 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.



STOP

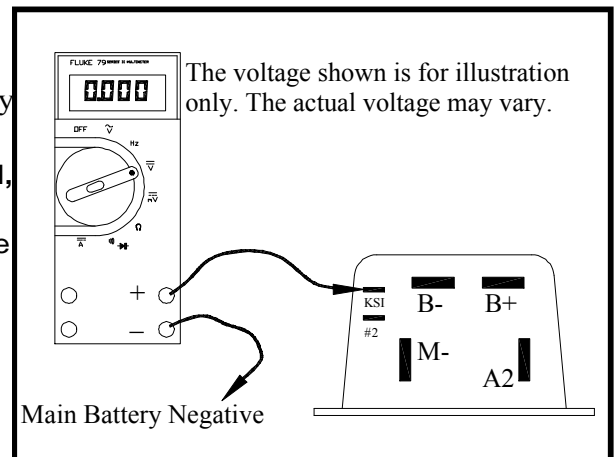
Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.

Reverse (does not run in forward)

Connect a voltmeter across the PMC KSI terminal and battery negative.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in forward.

- If the voltage is not at battery volts then go to the **Key Switch** sequence.

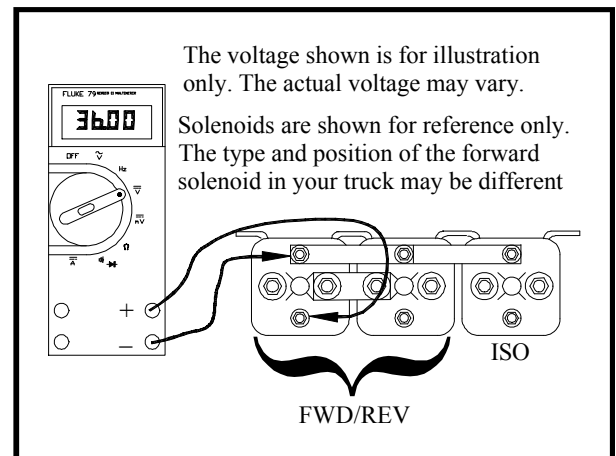


Connect a voltmeter across the Forward Solenoid coil terminals. Refer to your vehicles wiring diagram to identify the position of the forward solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in forward.

Depress the accelerator pedal fully.

- If the voltage is not at battery volts then go to the **F/R Switch** sequence.





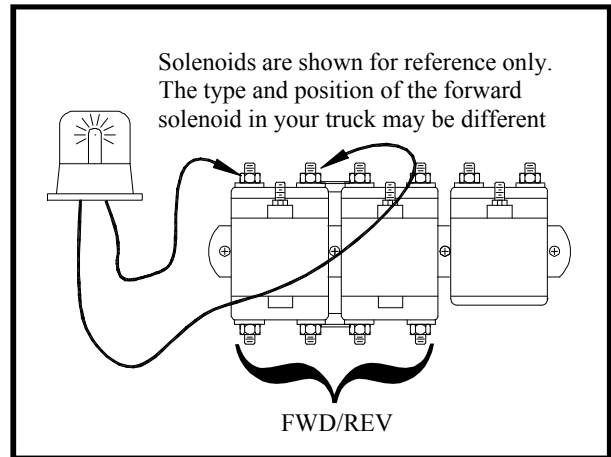
Set the test light voltage to the same voltage as the battery volts.

Connect the test light across the Normally Open contacts of the Forward solenoid. Refer to your vehicles wiring diagram to identify the position of the forward solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in forward.

Depress the accelerator pedal fully.

- If the light comes on then the Forward solenoid 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.



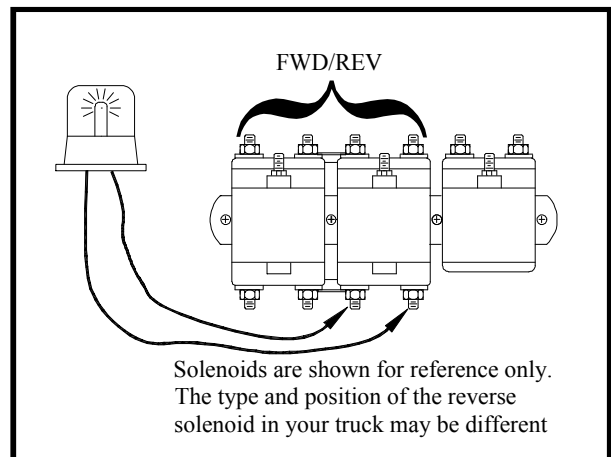
Set the test light voltage to the same voltage as the battery volts.

Connect the test light across the Normally Closed contacts of the Reverse solenoid. Refer to your vehicles wiring diagram to identify the position of the Reverse solenoid.

Close all interlock switches, turn the Key Switch ON, and place the F&R Switch in Forward.

Depress the accelerator pedal fully.

- If the light comes on then the Reverse solenoid 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.



STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.

SYMPTOM TROUBLESHOOTING GUIDE

This section is specific to the symptoms listed below. Each troubleshooting sequence assumes that all listed symptoms are present. Do not use this section unless the truck has all listed symptoms.

SYMPTOMS		GO TO
➤	Runs slow in both directions plus high armature and field current in both directions. NOTE: Armature and field current should be equal.	MOTOR
➤	Runs slow in both directions plus high armature current in both directions. NOTE: Field current will be very low.	SOLENOIDS
➤	Runs normal in one direction only plus runs slow or lacks power in the opposite direction with high armature current in the opposite direction or; Accelerates slowly and exceeds normal speed in the opposite direction with high armature current only. NOTE: Field current will be very low in the opposite direction.	SOLENOIDS
➤	Accelerates slowly and exceeds normal speed in both directions plus high armature current. NOTE: Field current will be very low.	SOLENOIDS
➤	Full speed only.	PMC CONTROL
➤	Does not run in either direction plus there is noise from motor (hum or whine) with high field current and low armature current.	PLUGGING DIODE
➤	Excessive spark when connecting battery	ISO
➤	Does not run or runs very slow with low motor current and high battery current.	FREEWHEEL DIODE
➤	Jumps into high speed when direction is selected after depressing the accelerator pedal.	HPD

Special Troubleshooting Table of Contents

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ISO	27
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MOTOR	32

PMC CONTROL

⚠ 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

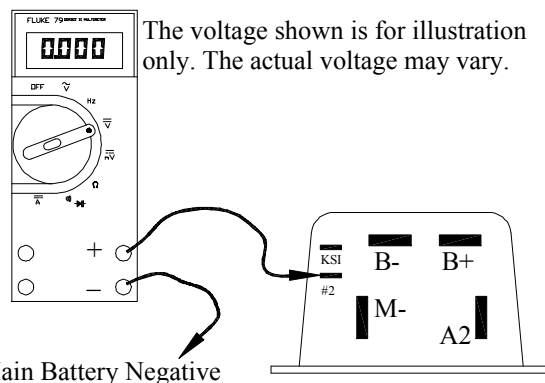
⚠ WARNING

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

Disconnect the wire from the 'M-' terminal on the PMC control and tape it off to prevent electrical contact. Connect a volt meter across the PMC #2 terminal and battery negative.

Turn the key-switch on, close all interlock switches (if equipped), depress the accelerator pedal to engage the first micro switch only (creep speed), then perform the following tests:

- The meter reading should be between 6 and 6.5 volts.
- If the voltage at pin #2 is not 6 to 6.5 volts, then go to the **ACCELERATOR** sequence in the Main Troubleshooting Sequence, otherwise continue with the next test.

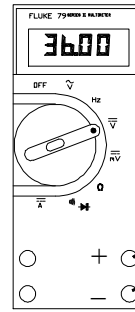




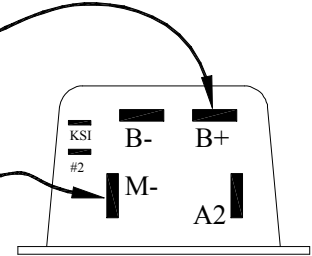
Connect a volt meter across the PMC B+ and PMC M- terminals.

Turn the key-switch on, close all interlock switches (if equipped), depress the accelerator pedal to engage the first micro switch only (creep speed), then perform the following tests:

- The meter reading should not be equal to the battery voltage.
- If you have full battery voltage then the PMC control is shorted 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, otherwise continue with the next test.



The voltage shown is for illustration only. The actual voltage may vary.



If the voltage at pin #2 is correct and the voltage at 'M-' is correct, then there is a short in the harness between the wire connected to the PMC 'M-' and main battery negative. 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.

STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.



PLUGGING DIODE

⚠ 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

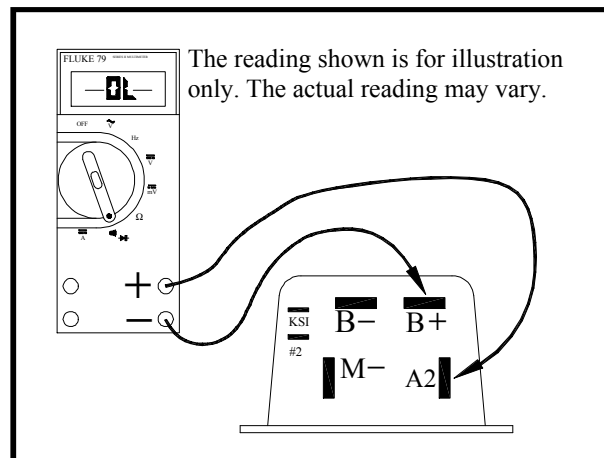
Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

Remove the wires from the 'B+' and 'A2' terminals on the PMC control and perform the following test:

Using the diode test function on the DMM check for the presence of a diode across 'B+' and 'A2' on the PMC control..

If you do not know how to test for a diode, refer test to a qualified technician.

- If the diode is open or shorted, then the PMC control 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.



STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.

FREEWHEEL DIODE

⚠ 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

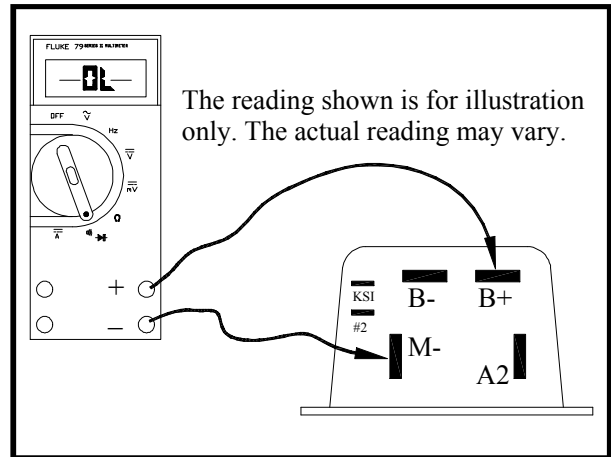
Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

Remove the wires from the 'B+' and 'M-' terminals on the PMC control and perform the following test:

Using the diode test function on the DMM check for the presence of a diode across 'B+' and 'M-' on the PMC control. Refer to Diode Figure 2.

If you do not know how to test for a diode, refer test to a qualified technician.

- If the diode is open or shorted, then the PMC control 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.



STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.



ISO

⚠ 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

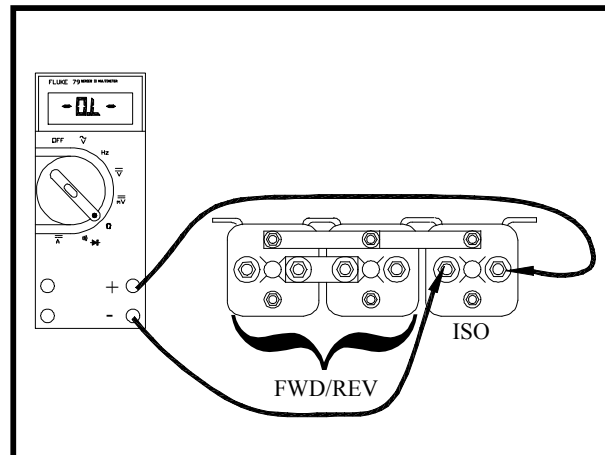
Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

Remove the wires and the resistor from the ISO solenoid and perform the following tests:

Test continuity across the ISO power contacts.

If you do not know how to test for continuity, refer test to a qualified technician.

- This should be an open circuit. If it is not an open circuit then the contactor should 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, other wise continue to the next test.

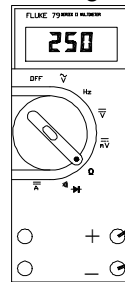




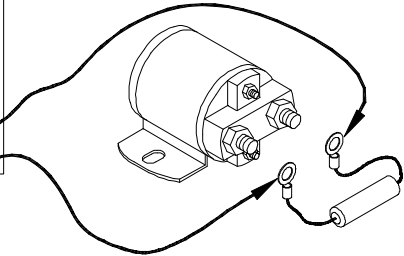
Connect the meter to each end of the resistor that was removed from the ISO solenoid and measure its resistance.

- The meter reading should be 250 Ohms (+/-10%). If it is not 250 ohms (+/-10%), then replace the resistor. 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.

Reading is plus or minus 10%



ISO solenoid is shown for reference only. The type of solenoid in your truck may look different



STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.



SOLENOIDS

There is a very slight possibility that a failure in the motor could cause these symptoms. Perform the tests covered in the MOTOR section first. If the motor is OK, continue with the following tests.

⚠ 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

Remove the wires from the 'S1' and 'S2' terminals on the motor. Remove the wire from the 'M-' terminal on the PMC control. Make sure none of these wires can come into electrical contact with the frame or any other wire.

Reconnect the batteries.

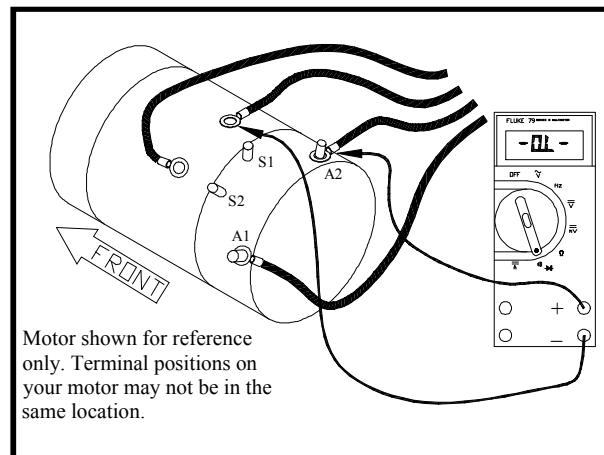
With the key-switch on and the forward and reverse switch in neutral, perform the following tests:

- Check continuity from the motor 'A2' terminal to the wire that was connected to the motor 'S1' terminal. DO NOT make this test to the 'S1' terminal, just the wire. Refer to Solenoid Figure 1.

If you do not know how to test for continuity, refer test to a qualified technician.

- This should be an open circuit, if it reads as a short, then one of the following has occurred:

- A) The reverse solenoid is shorted.
- B) The wire connected to the motor 'S1' terminal is shorted to the wire connected to the motor 'A2' terminal.
- C) The wire connected to the motor 'S1' terminal is shorted to the wire connected to the PMC 'A2' terminal.



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, otherwise continue with the next test.

- Check continuity from the motor 'A2' terminal to the wire that was connected to the motor 'S2' terminal. DO NOT make this test to the 'S2' terminal, just the wire.

If you do not know how to test for continuity, refer test to a qualified technician.

- This should read as an open circuit. If it reads as a short then one of the following has occurred:

- A) The forward solenoid is shorted.
- B) The wire connected to the motor 'S2' terminal is shorted to the wire connected to the motor 'A2' terminal.
- C) The wire connected to the motor 'S2' terminal is shorted to the wire connected to the PMC 'A2' terminal.

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, otherwise continue with the next test.

With the key-switch on and the F&R switch in forward, depress the accelerator pedal and perform the following tests:

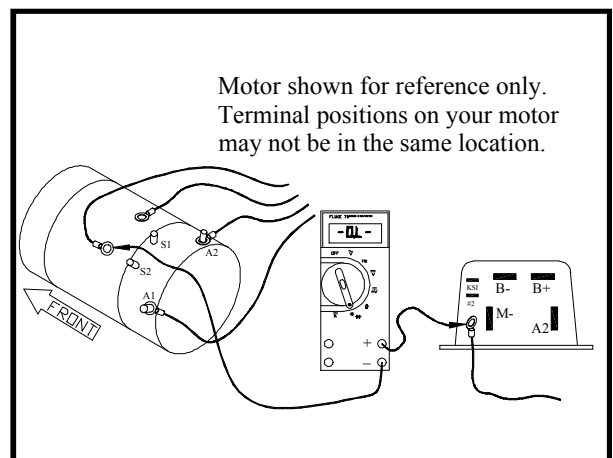
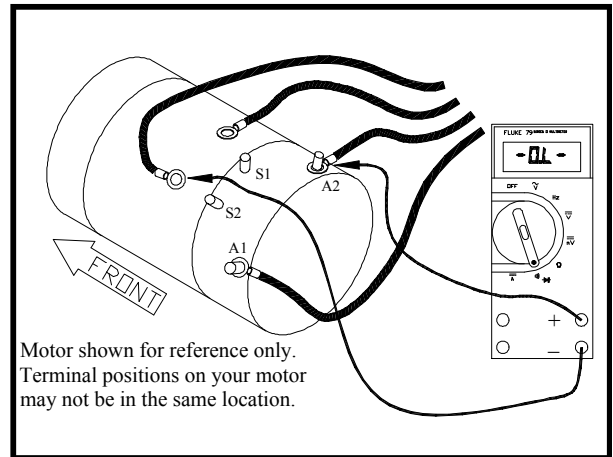
- Check continuity from the wire that was connected to the PMC 'M-' terminal to the wire that was connected to the motor 'S2' terminal.

If you do not know how to test for continuity, refer test to a qualified technician.

- This should read as an open circuit. If it reads as a short, then one of the following has occurred:

- A) The forward solenoid is shorted.
- B) The wire connected to the PMC 'M-' terminal is shorted to the wire connected to the motor 'S2' terminal.

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, otherwise continue with the next test.





With the key-switch on and the F&R switch in reverse, depress the accelerator pedal and perform the following tests:

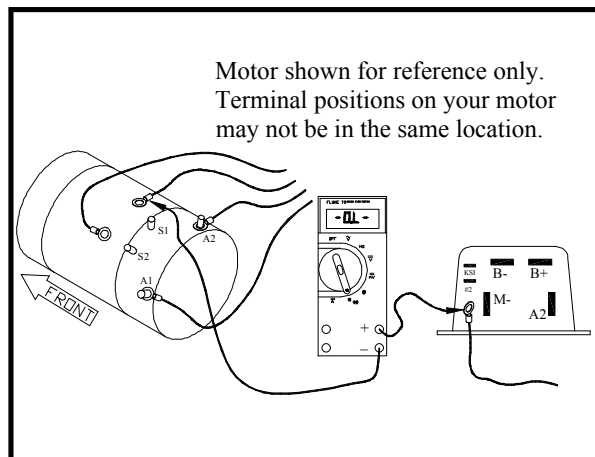
- Check continuity from the wire that was connected to the PMC 'M-' terminal to the wire that was connected to the motor 'S1' terminal.

If you do not know how to test for continuity, refer test to a qualified technician.

- This should read as an open circuit. If it reads as a short, then one of the following has occurred:

- A) The reverse solenoid is shorted.
- B) The wire connected to the PMC 'M-' terminal is shorted to the wire connected to the motor 'S1' terminal.

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



STOP

Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.



MOTOR

High motor current in both the field and the armature, accompanied with a lack of power, would indicate a shorted armature and/or field.

Another symptom that may exist is jumping or stuttering at low speeds and/or the motor will not run unless the armature is manually rotated. If this symptom exists, it indicates that there may be open segments in the armature. Visually inspect the brushes, if they are OK, continue with the testing 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. 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

The rear drive wheels may rotate during some of the following tests. Block the front wheels, raise the rear drive wheels off the ground, and support the vehicle with jack stands. Failure to do so may cause the vehicle to move and cause severe bodily injury and/or property damage.

⚠ WARNING

Rotating rear drive wheels are a potential hazard. Keep hands, arms, legs and loose clothing away from the rear drive wheels while conducting tests. Failure to do so may cause serious bodily injury.

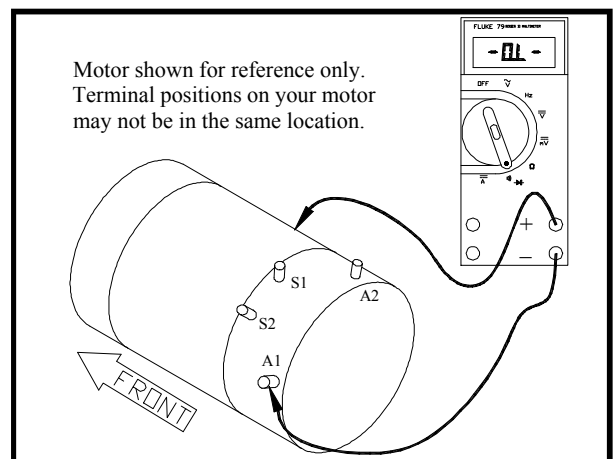
Disconnect the four motor wires and perform the following tests:

Check continuity from 'A1' to the frame of the motor..

If you do not know how to test for continuity, refer test to a qualified technician.

- This should be an open circuit. If there is continuity from 'A1' to the frame of the motor, then the motor armature or armature circuit (brushes) are shorted.

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, otherwise continue with the next test.

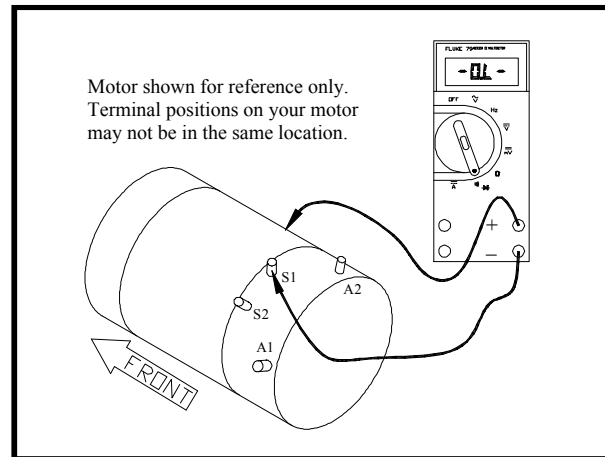




Check continuity from 'S1' to the frame of the motor.

If you do not know how to test for continuity, refer test to a qualified technician.

This should be an open circuit. If there is continuity from 'S1' to the frame of the motor, then the motor field is shorted. 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, otherwise continue to Motor Inspection.

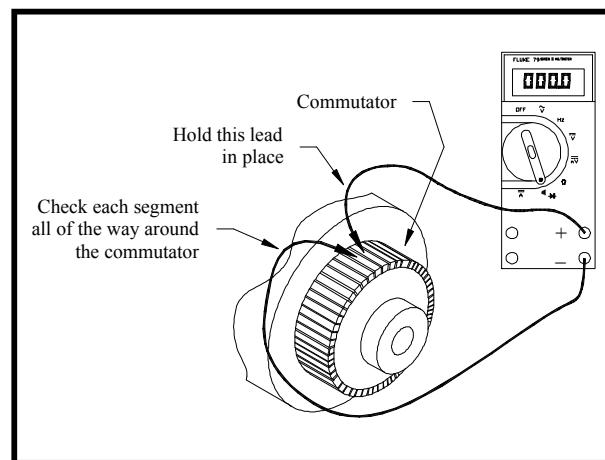


Motor Inspection

1. Remove and disassemble the motor.
2. Visually inspect the inside of the brush end housing. If there are any silver specs of metal around the inside of the housing, it indicates that the armature has overheated and melted the solder around the commutator. The armature is bad and the motor must be replaced. Stop here and repair the problem, otherwise continue with the next test.
3. Visually inspect the armature wires where they loop around at the shaft end of the armature. The insulation should be a light to medium reddish brown color. If the insulation is dark brown to black or the insulation is cracked and peeling, then the armature has been overheated and burnt. The motor must be replaced. Stop here and repair the problem, otherwise continue with the next test.
4. Perform a continuity test around the armature commutator. Place one of the test leads on a single commutator segment. While holding the first test lead on the segment, check the continuity to the other segments around the commutator.

If you do not know how to test for continuity, refer test to a qualified technician.

- There should be continuity on each commutator segment. If an open segment is found, the armature is bad and the motor 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.



STOP

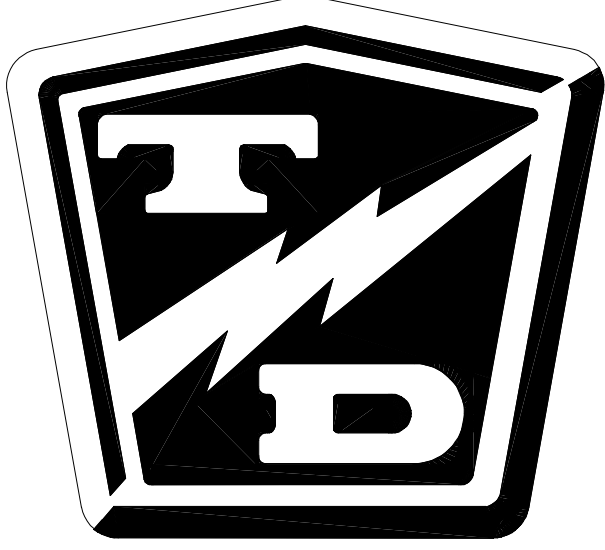
Stop, do not continue. If you reached this point without a solution, then you may have an unanticipated problem or have made an error during testing. It is important to review the trouble shooting steps that have led to this point. The tests may need to be repeated.

HARDWARE TORQUE

If hardware is not listed here, refer to standard torque values in the appendix.

Description	Foot Pounds	Newton Meters
Speed Controller Terminals	7	9.4
Line Contactor Terminals	9.4	12.8

TAYLOR - DUNN



Signet® Charger Troubleshooting

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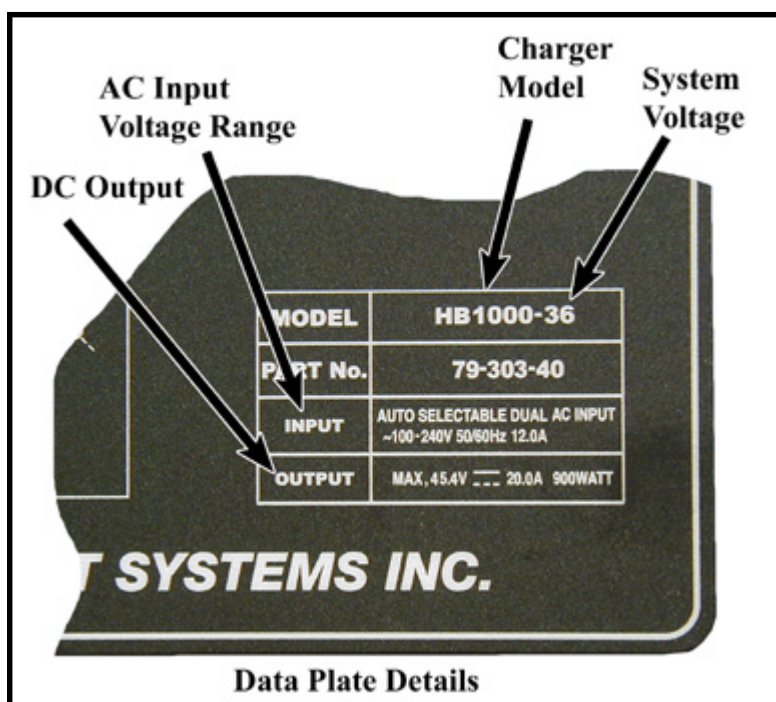
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⚠ CAUTION

Turn the Key switch OFF **BEFORE** disconnecting the batteries. Disconnecting the batteries with the key switch ON may corrupt the controller programming resulting in a fault code 1 (refer to fault table).



OPERATING INSTRUCTIONS AND THEORY OF OPERATION

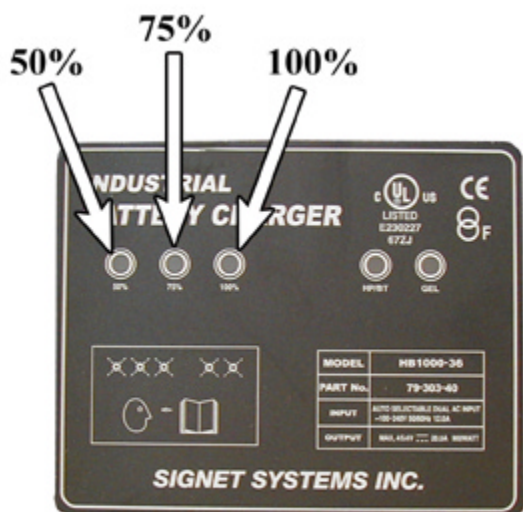


The model HB600W® and HB1000W® chargers are designed as semiautomatic chargers. The charger turns itself on when it is plugged into the wall outlet and turns off when the batteries are fully charged.

Both the HB600W® and HB1000W® are two stage chargers. The first stage is a constant current mode. It Maintains a constant current until the battery reaches a terminal voltage and then switches to the second stage, constant voltage. At the second stage the charger decreases the charger current while holding the batteries at the terminal voltage until the charging cycle is complete.

The charger faceplate has three status LED's that monitor the charging status. Refer to the chart and illustration below for the function of these LED's.

If an error occurs during charging, the charger will beep, and display an error code by flashing the status LED's. Refer to the Status LED error code table later in this section.



Charging Status	Left (50%)	Middle (75%)	Right (100%)
0-50%	FLASHING	OFF	OFF
50%-75%	ON	FLASHING	OFF
75%-100%	ON	ON	FLASHING
Charging Cycle complete	ON	ON	ON
Error, refer to troubleshooting	FLASHING	FLASHING	FLASHING
Charger Time Out	OFF	OFF	FLASHING



HB/PT AND GEL INDICATOR LAMPS

NOTE: Your charger may not be equipped with these lamps.

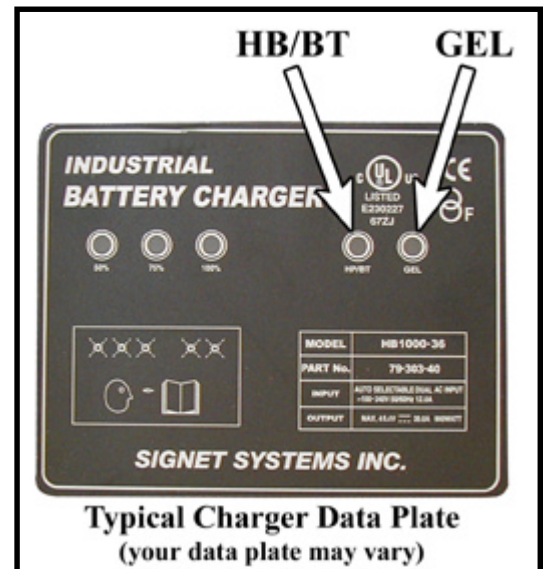
HB/PT Lamp

If the HB/PT lamp is “ON”, then the charger has overheated and has entered a proportionally reduced output. The charging cycle will terminate if the temperature continues to rise. If the charging cycle is terminated, the charger will automatically restart once it has cooled.

The charging cycle is limited to 18-hours. If the HB/PT lamp is flashing, then the charging time has exceeded 18-hours (time is limited to 18-hours). If any of the status lamps are flashing, then the charge cycle did not complete.

GEL lamp

This LED will only be “ON” if the charger is configured for GEL batteries. Using a GEL charger with non-GEL batteries may result in an incomplete charge or long charge times.



CAUTION

GEL batteries must be charged with a charger configured for GEL batteries. Use of any other charger will result in damage to the batteries and premature failure of the batteries.

TESTING THE CHARGING CYCLE

In typical installations, the charger will remain on for up to 12 hours depending on the state of charge of the batteries when the charge cycle was started.

NOTE: Charging time is limited to 18-hours (max). An error occurs if charging time exceeds 18-hours. See table on previous page.

A charger could remain on for longer than 12 hours if:

- The vehicle is equipped with batteries larger than 220 Amp hour capacity.
- The charging cycle is interrupted at any time during the charging cycle.
- Defective batteries causing a fluctuating DC voltage that confuses the charger.
- One or more defective cells in the battery pack.
- A brownout (drop in AC line voltage) during the charging cycle.
- An electrically noisy charging environment.

A charger could turn off in less than 12 hours, but still show symptoms of overcharging if:

- The electrolyte in the batteries is too high (boil over).
- The electrolyte in the batteries is too low (excessive gassing or sulfur smell).

To test the charger to see if it is turning off correctly, monitor the battery voltage and charging current during the charging cycle as indicated below.

Using a digit digital voltmeter and clamp on DC ammeter, monitor the battery voltage and current during the charging cycle. The charging current should remain within 10% of the DC output current (see previous page) until the battery voltage reaches 2.55 volts per cell. When the voltage reaches 2.55 volts per cell, the charging current will drop significantly and slowly taper off (voltage will remain constant). The charger should turn off within 2 to 4 hours after entering the second stage.

TEST EQUIPMENT REQUIRED FOR TROUBLESHOOTING

Digital Multi Meter (DMM), FLUKE 79® model shown at right and in the troubleshooting illustrations.

Clamp on DC ammeter to measure up to 20-Amps.



Important Notes and Instructions

- This troubleshooting guide assumes a familiarity with the use of a digital multimeter including, voltage tests, continuity tests and diode testing. If not familiar with any part of these tests, refer testing to a qualified technician.
- Make sure that the AC electrical socket the charger is plugged into is in good working condition.
- Make sure that the AC voltage at the electrical socket is the same as the AC voltage on the charger nameplate.
- Make sure the batteries are in good condition.
- If the charger exhibits intermittent problems, it must be in the failed mode for troubleshooting.
- Battery volts = Full voltage available at the batteries at the time of the test being performed.
- There are no internally serviceable components in the charger. If the charger has failed then it must be replaced.

⚠ CAUTION

This charger is rated for 115 VAC or 230 VAC operation. When switching from one input voltage to the other, wait until all three status LED's are off. Switching voltage when any of the LED's are on will result in damage to the charger.



STATUS LED ERROR CODE TABLE

There are three status lights (LED's) on the charger name plate. These LED's normally indicate the current operating state of the charger. If all three LED's are flashing, it indicate an error has occurred in the charging cycle. See the table below for an explanation of the error codes:

Note: If only the 100% LED is flashing and all others are OFF then the charger has exceeded its maximum charging time and shut off before the batteries were fully charged.

This could be a result of:

- Defective battery or batteries
- Excessively discharged batteries
- Oversize batteries

Error Code	Description	Action Required
1*	Reverse polarity or open circuit to the batteries	Check wiring for corrosion, loose connections, broken wires and proper connection to the batteries
2	AC line voltage too high or too low	Check the input voltage. It must be within 96-132VAC or 196-266VAC
3	Charger overheated	Wait for charger to cool, the charger will automatically restart. Inspect for dirt or debris on the charger cooling fins and clean as required.
4	Input or Output over current	Charger will automatically correct for this condition and restart

* - In many cases fault 1 will only be displayed for a short amount of time and then the charger will attempt to restart. Typically, the fault will repeat 8-times and then the charger will start the boot up process with the 50% light on. If the charger cannot restart then the fault loop will start again, repeating the fault 1.

This fault could be a result of an open connection between the charger and batteries, an open connection on one or more of the battery cables, or an open connection internal of the charger.

Before replacing the charger, confirm all battery wiring is good.



Typical Charger Data Plate
(your data plate may vary)



TROUBLESHOOTING

To test charger operation:

Connect a DC volt meter to the main battery positive and negative terminals.

Attach a clamp on DC Ammeter to one of the charger DC output wires.

Plug the charger into an AC outlet.

Wait for charger to start (up to 15 seconds), the ammeter should display the DC Amp rating of the charger (plus or minus 10%) indicating that the charger is on (constant current mode).

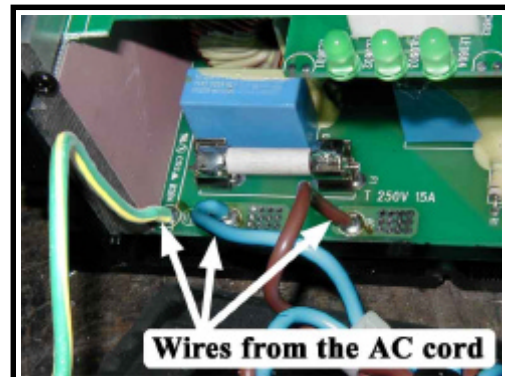
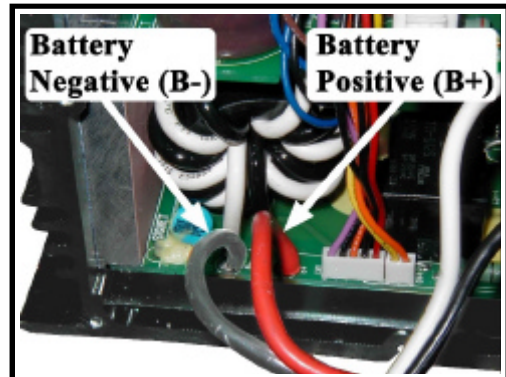
The ammeter should continue to display the DC Amp rating of the charger until the battery voltage equals 2.55 VPC. When the battery voltage equals 2.55 VPC the charger will switch to the constant voltage mode. At this point the charging current will be reduced and will taper off until the batteries are fully charged.

Perform the following if the charger does not turn on:

⚠ 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 charger from the AC source.
6. Remove the charger end cap where the DC wires enter.
7. Test the voltage across the Battery Positive (red) and Battery Negative (black) wires at the lower left of the charger circuit board. This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then the wires to the batteries have been damaged. **Stop here and repair the problem.**
8. Reinstall the charger end cap where the DC wires enter.
9. Remove the charger end cap where the AC wires enter.
10. Test the continuity of all three AC wires from the circuit board to the AC plug. If you find an open circuit in any one of the three wires then the AC cord or plug has been damaged. **Stop here and repair the problem.**
11. Install the charger end cap where the AC wires enter.



If both the AC and DC tests are good then the charger has failed. There are no internally serviceable components in the charger. If the charger has failed then it must be replaced.

Lestronic II® Charger Troubleshooting

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⚠ CAUTION

Turn the Key switch OFF **BEFORE** disconnecting the batteries. Disconnecting the batteries with the key switch ON may corrupt the controller programming resulting in a fault code 1 (refer to fault table).



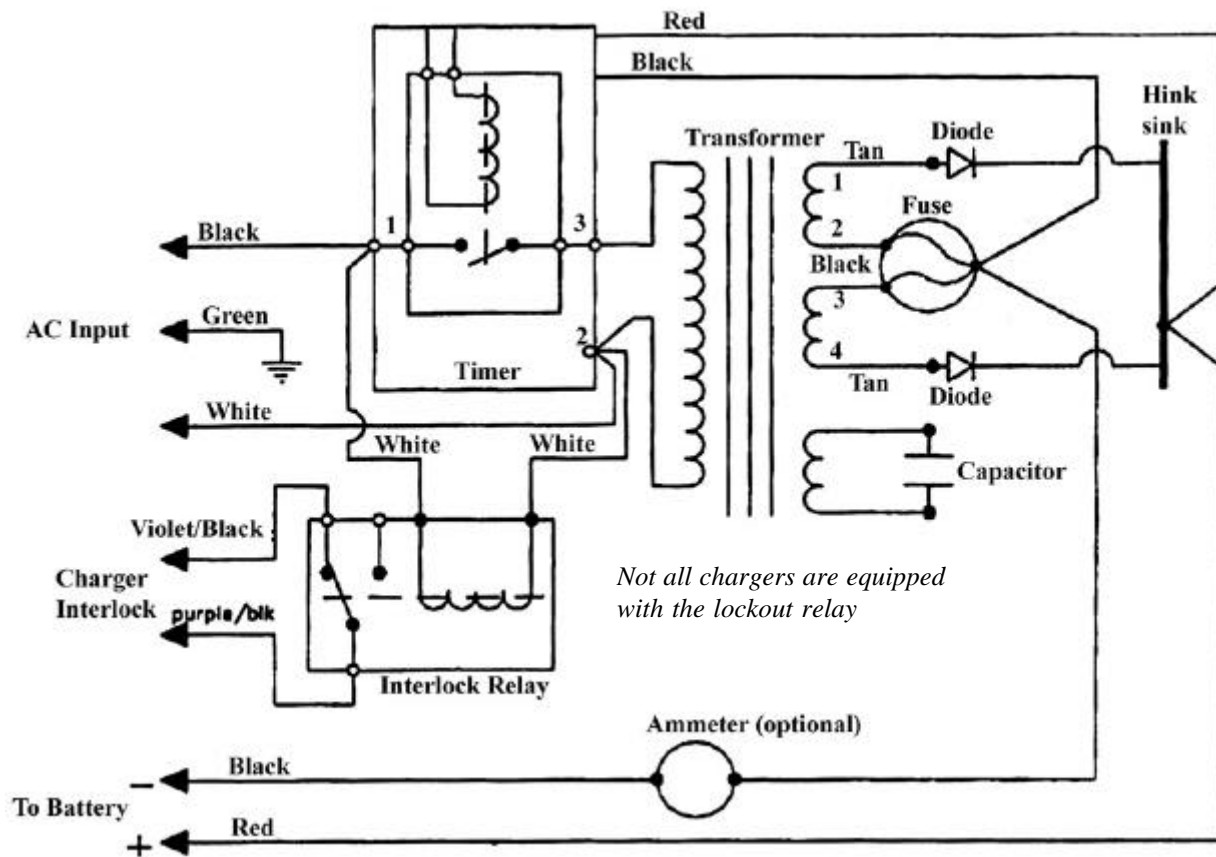


OPERATING INSTRUCTIONS AND THEORY OF OPERATION

The Lestronic II® chargers are designed as semiautomatic chargers. The Lestronic II® charger turns itself on when the “built-in” charger is plugged into the wall outlet, or when the “portable” charger is plugged into the batteries. As the battery charges, the battery voltage rises. The charger periodically checks the battery voltage and compares it to the previous reading. When the battery voltage stops rising a predetermined amount, then the batteries are no longer accepting a charge and the charger shuts off. The charger will not start again unless the AC cord on a “built-in” charger is disconnected from the wall outlet, or the DC plug on a portable charger is disconnected from the batteries.

The charger does not check the current state of charge when it is plugged in, it assumes that the batteries require charging when it is connected. For this reason, it is recommended to discharge the batteries approximately 50% (1175-1200 as indicated on a hydrometer) before connecting the charger. If the charger is connected before the batteries are discharged 50%, the batteries may enter an overcharge state before the charger can sense that the batteries are no longer accepting a charge. This could result in overcharging and damaging the batteries.

The relay that operates the charger is powered by the batteries being charged. If the voltage on the batteries to be charged is less than approximately 65% of the rated charger DC voltage, the relay will not pick up and the charger will not turn on. In this situation, a manual charger would have to be used to bring the battery voltage up so that the Lestronic® charger can sense that they are connected and turn itself on.



Typical Charger Internal Wire Diagram



TESTING THE CHARGING CYCLE

In typical installations, the charger will remain on for up to 12 hours depending on the state of charge of the battery when the charge cycle was started.

A charger could remain on for longer than 12 hours if:

- The charging cycle is interrupted at any time during the charging cycle.
- Defective batteries causing a fluctuating DC voltage that confuses the charger.
- A brownout (drop in AC line voltage) during the charging cycle.
- An electrically noisy charging environment.

A charger could turn off in less than 12 hours, but still show symptoms of overcharging if:

- The batteries were not discharged to 50% before connecting the charger.
- The electrolyte in the batteries is too high (boil over).
- The electrolyte in the batteries is too low (excessive gassing or sulfur smell).

To test the charger to see if it is turning off correctly, monitor the battery voltage and the electrolyte specific gravity during the charging cycle as indicated below.

Specific Gravity

Using a hydrometer take the specific gravity reading of several cells, at 1 hour intervals while charging. If the specific gravity of the electrolyte does not rise for three consecutive readings and the charger does not shut off, then the charger is running too long.

Battery Voltage

Using an accurate 5-1/2 digit digital voltmeter, monitor the battery voltage during the charging cycle. Take readings every 30 minutes. If the battery voltage does not increase 0.012 volts in two consecutive readings, then the charger is running too long.



TEST EQUIPMENT REQUIRED FOR TROUBLESHOOTING

Digital Multi Meter (DMM) with diode and capacitor test function, FLUKE 79® model shown at right and in the troubleshooting illustrations.



Important Notes and Instructions

- This troubleshooting guide assumes a familiarity with the use of a digital multimeter including, voltage tests, continuity tests and diode testing. If not familiar with any part of these tests, refer testing to a qualified technician.
- Make sure that the AC electrical socket the charger is plugged into is in good working condition.
- Make sure that the AC voltage at the electrical socket is the same as the AC voltage on the charger nameplate.
- Make sure the batteries are in good condition and no less than 80% discharged as per hydrometer reading.
- The battery voltage must be above approximately 65% of the chargers rated DC voltage. If the batteries are below approximately 65% of the chargers rated DC voltage, the charger will not turn on.
- If the charger exhibits intermittent problems, it must be in the failed mode for troubleshooting.
- Battery volts = Full voltage available at the batteries at the time of the test being performed.
- This test procedure must be performed in the order it was written. If starting in the middle or skipping sections when not instructed to do so, the proper results will not occur. If the test result is good, then proceed to the next test or go to the next section if instructed to do so.

During All Tests

WARNING

The charger cabinet must remain electrically grounded. Disconnect both of the battery leads and unplug the charger from the AC source before disconnecting any electrical component or wire. Failure to do so may result in serious bodily injury.

TROUBLESHOOTING FOR BUILT-IN CHARGER

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 charger from the AC source.

Locate the charger harness connectors where the charger harness is connected to the vehicle's control harness. There will be two 10 gauge and two 14 gauge wires.

Slide the insulators off the connectors on the two 10 gauge wires and perform the following tests:

CAUTION

Make sure that these two wires do not come into electrical contact with any other object.

6. Test the voltage from the red wire to the main battery negative. This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then this wire is broken or has a bad connection. **Stop here and repair the problem.**
7. Test the voltage from the red 10 gauge wire (+) to the other 10 gauge wire (white or black depending on model). This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then the white (or black) wire is broken or has a bad connection. **Stop here and repair the problem.**

Slide the insulators back onto the connectors on the two 10 gauge wires.

Slide the insulators off the connectors on the two 14 gauge wires.

WARNING

High Voltage. Do not touch the 14-gauge wires and make sure these two wires do not come into electrical contact with any other object. Failure to do so may result in serious bodily injury.

Re-Connect the charger to the AC source.

8. Test the voltage across the two 14 gauge wires. This voltage should be the same as the voltage at the AC receptacle (rated voltage of the charger). If the voltage is less than the rated AC voltage of the charger then the 14 gauge white or black wire(s) is broken or has a bad connection between the charger connectors and the AC plug. **Stop here and repair the problem.**



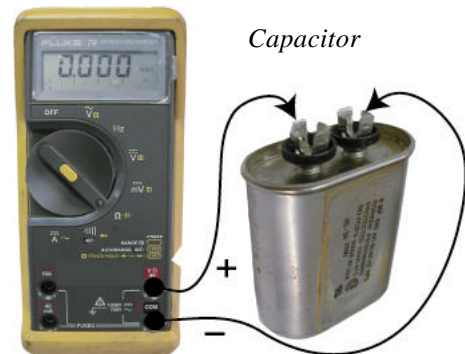
- Disconnect the charger from the AC source.
- Disconnect the batteries.
- Disconnect the charger from the vehicle's harness.
- Remove the charger from the vehicle.

WARNING

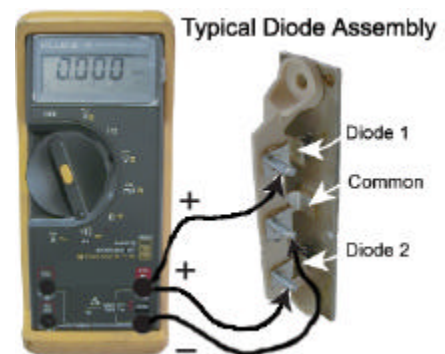
HIGH VOLTAGE may be stored in the capacitor. Discharge the capacitor before continuing. Connect a 2k ohm resistor across the capacitor terminals for 10 seconds. Do not touch the capacitor terminals with your hands. The resistor should be held with a pair of insulated pliers. Failure to do so may cause serious bodily injury

Remove the charger cover and perform the following tests:

1. Inspect the internal wiring of the charger and repair as required.
2. Check the continuity of both fuse links and replace if bad.
3. Disconnect one transformer lead from the capacitor. Test the capacitor using the capacitor test function of the meter. It is a 6 microfarad capacitor. If the capacitor is bad, it must be replaced. **Stop here and repair the problem.**



4. Reconnect the transformer lead to the capacitor and disconnect one transformer lead from one of the diodes. Test each of the diodes using the diode test function of your meter. If either one of the diodes are bad, replace the diode assembly. **Stop here and repair the problem.**
5. Reconnect the lead to the diode.
6. Reconnect the charger to the vehicle's harness and slide the wiring insulators back into place. Connect the charger to the AC source and perform the following tests:



WARNING

High Voltage inside the charger. Do not touch any internal components while the charger is plugged in. Failure to do so may result in serious bodily injury.



- Test the voltage from the fuse assembly (-) to the diode block (+). This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then the wires from the harness connectors to the charger are bad. **Stop here and repair the problem.**



- Test the voltage across the white and black wires that are connected to the timer board. This voltage should be the same as the rated AC voltage of the charger. If the voltage is less than the rated AC voltage of the charger, then the wires from the harness connectors to the charger are bad. **Stop here and repair the problem.**
- If the timer relay does not pickup (click) when the AC source is connected, then the timer control circuit or the relay is bad (refer to Timer Relay Test). **Stop here and repair the problem.**
- Test the AC voltage across the transformer primary circuit. The transformer primary consists of the two solid wires with the brown fiber insulator that are connected to the timer board. This voltage should be the same as the rated AC voltage of the charger. If the voltage is less than the rated AC voltage of the charger, then the timer relay is bad. **Stop here and repair the problem.**
- Test the AC voltage across the transformer low voltage secondary circuit. The transformer low voltage secondary circuit can be tested at the two solid wires with the brown fiber insulator that are connected to the anodes on the two diodes. The voltage here will vary depending on the state of charge in the batteries. The voltage should be between 208% and 250% of the rated DC voltage of the charger. If the voltage is not between 208% and 250% of the rated DC voltage of the charger, the transformer is bad and must be replaced. **Stop here and repair the problem.**





TROUBLESHOOTING FOR PORTABLE CHARGER

Disconnect the charger from the AC outlet and the batteries.

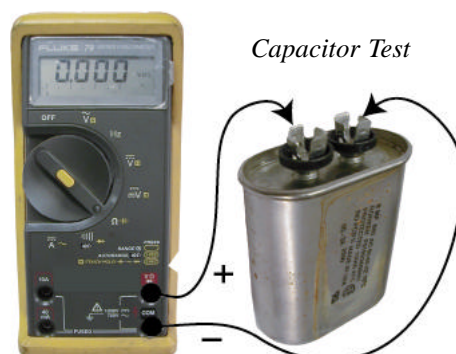
1. Test the voltage from the positive terminal on the vehicles DC receptacle to main battery negative. This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage then this wire is broken or has a bad connection. **Stop here and repair the problem.**
2. Test the voltage from the positive terminal on the DC receptacle to the negative terminal on the DC receptacle. This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then the wire on the negative terminal of the DC receptacle is broken or has a bad connection. **Stop here and repair the problem.**

Remove the charger cover and perform the following tests:

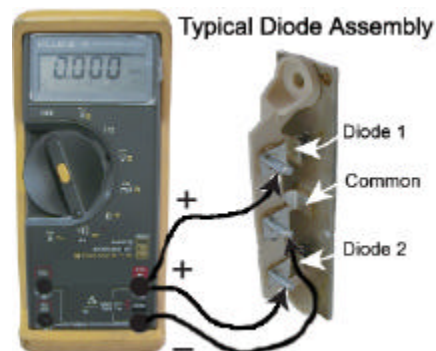
WARNING

HIGH VOLTAGE may be stored in the capacitor. Discharge the capacitor before continuing. Connect a 2k ohm resistor across the capacitor terminals for 10 seconds. Do not touch the capacitor terminals with your hands. The resistor should be held with a pair of insulated pliers. Failure to do so may cause serious bodily injury

1. Inspect the internal wiring of the charger and repair as required.
2. Check the continuity of both fuse links and replace if bad.
3. Disconnect one lead from the capacitor. Test the capacitor using the capacitor test function on the meter. If the capacitor is bad, it must be replaced. **Stop here and repair the problem.**



4. Reconnect the lead to the capacitor and disconnect one transformer lead from one of the diodes. Test each of the diodes using the diode test function on the meter. If either one of the diodes are bad, replace the diode assembly. **Stop here and repair the problem.**






5. Reconnect the lead to the diode.
6. Connect the charger to the AC source. Insert the DC charger plug into the DC receptacle and perform the following tests:

WARNING

High Voltage inside the charger. Do not touch any internal components while the charger is plugged in. Failure to do so may result in serious bodily injury.

- Test the voltage from the fuse assembly (-) to the diode block (+). This voltage should be equal to the battery voltage. If the voltage is less than the battery voltage, then the DC cord is bad. **Stop here and repair the problem.**
 - Test the voltage across the white and black wires that are connected to the timer board. This voltage should be the same as the rated AC voltage of the charger. If the voltage is less than the rated AC voltage of the charger then the AC cord is bad. **Stop here and repair the problem.**
 - If the timer relay does not pickup (click) within 5 seconds of connecting the DC charger plug, then the timer control circuit or the relay is bad (refer to Timer Relay Test). **Stop here and repair the problem.**
 - Test the AC voltage across the transformer primary circuit. This voltage should be the same as the rated AC voltage of the charger. If it is less than the rated AC voltage of the charger, then the timer relay is bad. **Stop here and repair the problem.**
- 
- Transformer Secondary Circuit*
- Test the AC voltage across the transformer secondary circuit. The voltage here will vary depending on the state of charge in the batteries. The voltage should be between 208% and 250% of the rated DC voltage of the charger. If the voltage is not between 208% and 250% of the charge's rated DC voltage, the transformer is bad and must be replaced. **Stop here and repair the problem.**

TESTING THE TIMER RELAY

Test 1:

1. Connect the batteries to the charger.
 2. Plug the charger into the AC source.
 3. Wait 5 seconds, then test the voltage at the timer relay coil terminals.
NOTE: This voltage should be close to the battery volts.
- If the voltage is close to the battery volts, then skip to test 2.
 - If the voltage is not close to the battery volts, then the timer control circuit has failed and the timer must be replaced.

Test 2:

1. Disconnect the batteries.
2. Unplug the charger from the AC source.
3. Discharge the capacitor (see warning on previous page).



4. Disconnect the wires from the contact terminals on the timer relay.
 5. Reconnect the batteries.
 6. Wait 5 seconds, then test the continuity across the timer relay contact terminals.
- If this is a closed circuit, then the timer start up circuit is functioning normally.
 - If there is an open circuit, then the timer relay has failed and the relay must be replaced.

TESTING THE INTERLOCK RELAY

Operation

The Interlock Relay disables the vehicle from running whenever the charger is connected to a working AC power source. When the charger is plugged in, the relay contacts open and break the Key Switch connection to the speed controller. The Interlock Relay is available for built-in chargers only. Not all built-in chargers are equipped with this relay. To identify chargers that are equipped with the Interlock Relay:

Inspect the charger wire harness where it enters the charger cabinet for two Violet/Black wires. If these wires are present then the charger is equipped with the Interlock Relay.

Testing

⚠ 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. Disconnect the charger from the AC power source.
 7. Disconnect the two Violet/Black wires at the charger harness knife connectors.
 8. Set the DMM to check for continuity and connect the DMM leads to the wires going into the charger.
 - The DMM should indicate a closed circuit. If the DMM indicates an open circuit, then the relay or the wires to the relay have failed. **Stop here and repair the problem.**
 9. Connect the charger to a working AC power source.
 - The charger should turn on. If the charger does not turn on then there may be a problem with the AC power source or the AC wiring to the charger. Refer to the beginning of this section for charger troubleshooting. DO NOT continue until you have confirmed that the AC power source is working.
 - The DMM should indicate an open circuit. If it still indicates a closed circuit, then the relay or the wires to the relay have failed. **Stop here and repair the problem.**
- If the DMM indicates an open circuit then the interlock relay is functioning normally.

Chapter - 12

The vehicle wiring diagrams are too large to be legible when printed at this size. A full size diagram (22 x 16) is included on the CD in PDF format. You can access the diagram from a button on the CD menu.

The diagram file names are:

SCH-00031: Models SS-534, SS-536, SS-546

SCH-00032: Moldes MX-600

Charger AC Cords:

If you are not familiar with standard AC power wiring, then refer repair to a qualified licensed electrician.

WARNING

Charger AC power source is High Voltage. Only personnel qualified for work high voltage AC power lines should repair the charger AC power cord. Improper repair or incorrect wiring may result in an electrical shock hazard causing severe bodily injury or electrocution.

Depending on the charging system, two different color codes are used for the AC power source.

United States Standard 120 Volt:

White - Neutral

Black - Hot

Green - Ground

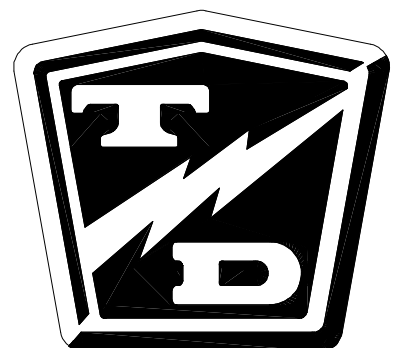
European Standard:

Blue - Neutral

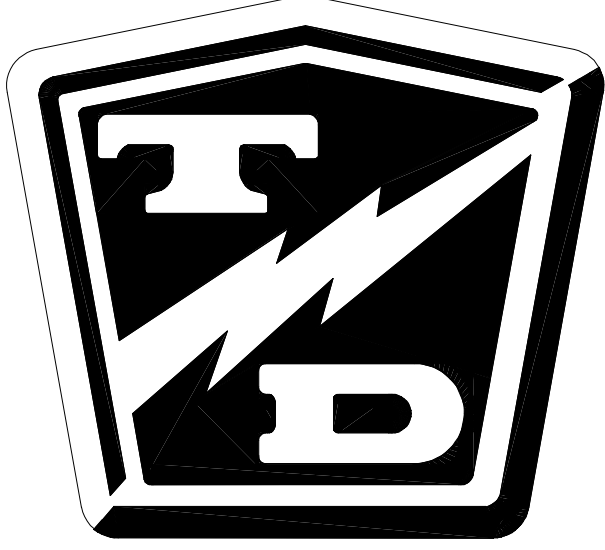
Brown - Hot

Green/Yellow - Ground

Wire Diagrams



TAYLOR - DUNN

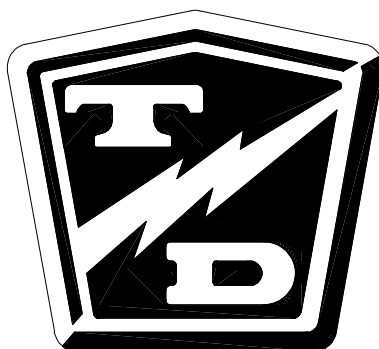


Chapter - 13

Illustrated Parts

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Identifying Your vehicle

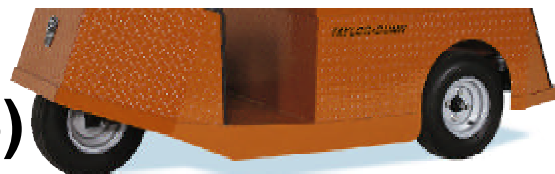
Whenever necessary the model of the vehicle is identified with the parts that are specific to that model. If a model identification is not specified in the diagram heading or within the parts table, then the part can be used in all models.

Model #'s

SS-025-34 (SS-534)



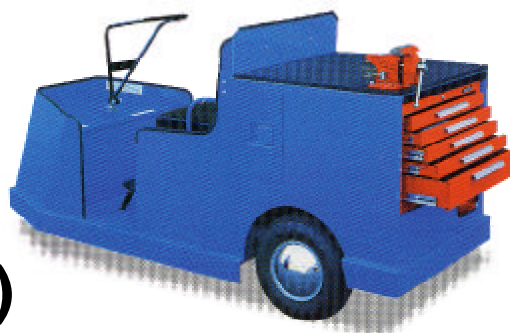
SS-025-36 (SS-536)



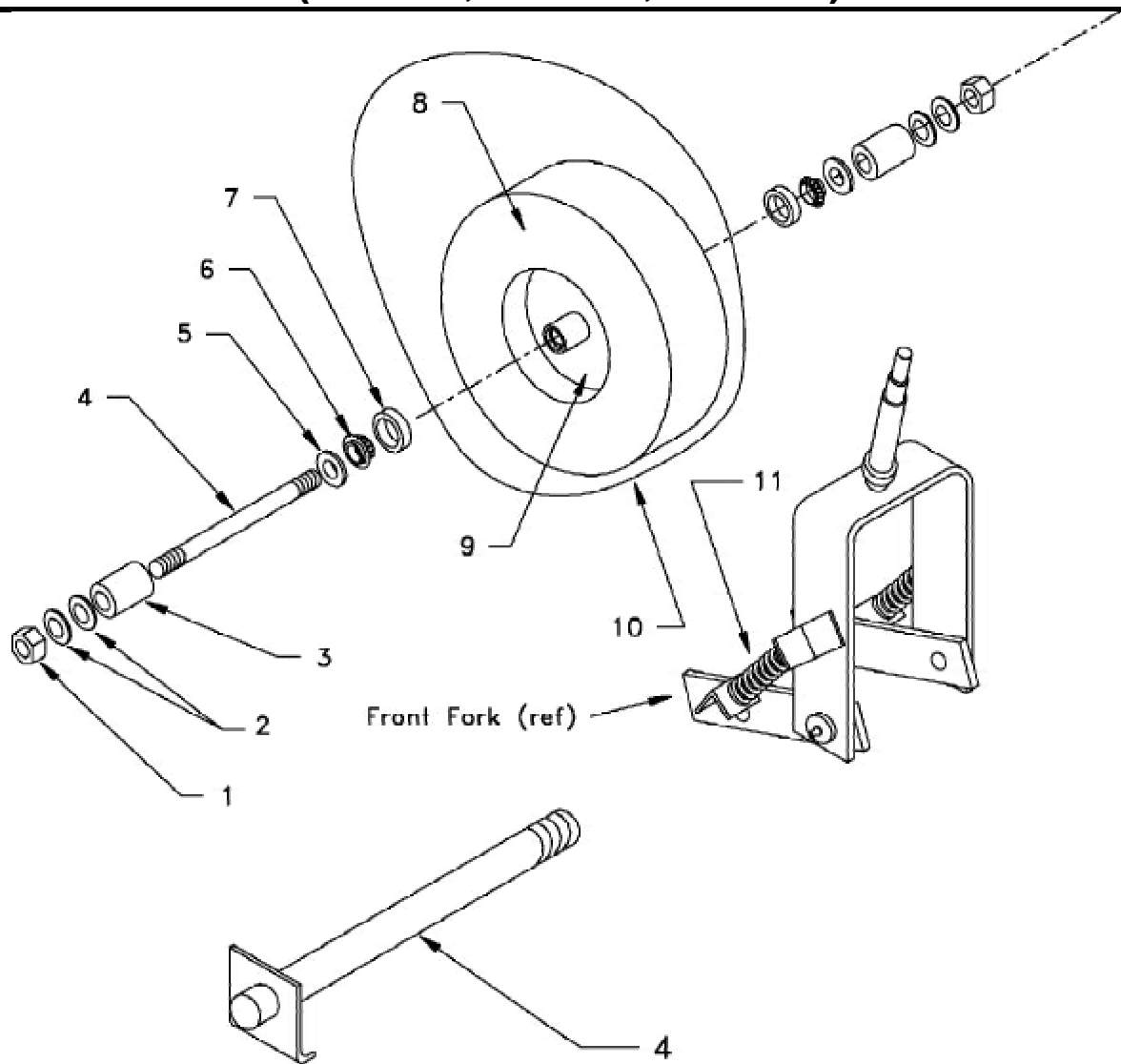
SS-025-46 (SS-546)



MX-026-00 (MX-600)



Axle Assembly, Front (SS-534, SS-536, MX-600)

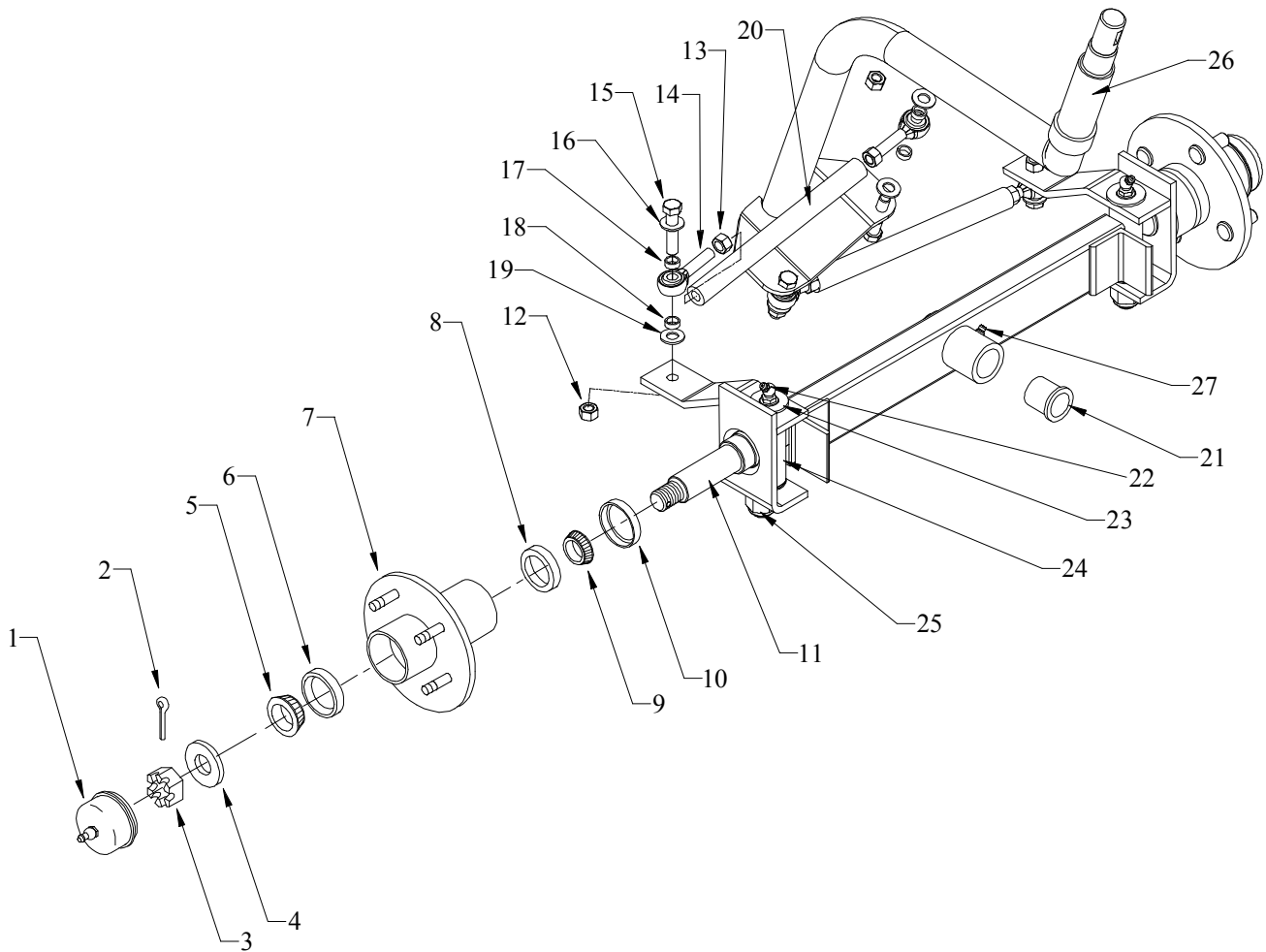


Axle Assembly, Front (SS-534, SS-536, MX-600)

Item No.	Part No.	Description	Qty
1	88-229-81	3/4" NC Locknut	2
2	88-228-61	3/4" NC Washer	2
3	16-206-00	Spacer	2
4	15-010-00	Front Axle(Threaded each end)	1
	15-010-10	Front Axle(Single Ended)	1
5	45-308-00	Oil Seal	2
6	80-015-00	Tapered Roller Bearing	2
7	80-105-00	Bearing Race	2
8	See Tire and Wheel		
9	See Tire and Wheel		
10	See Tire and Wheel		
11	85-140-10	Spring	1



Axle Assembly and Steering, Front SS-546



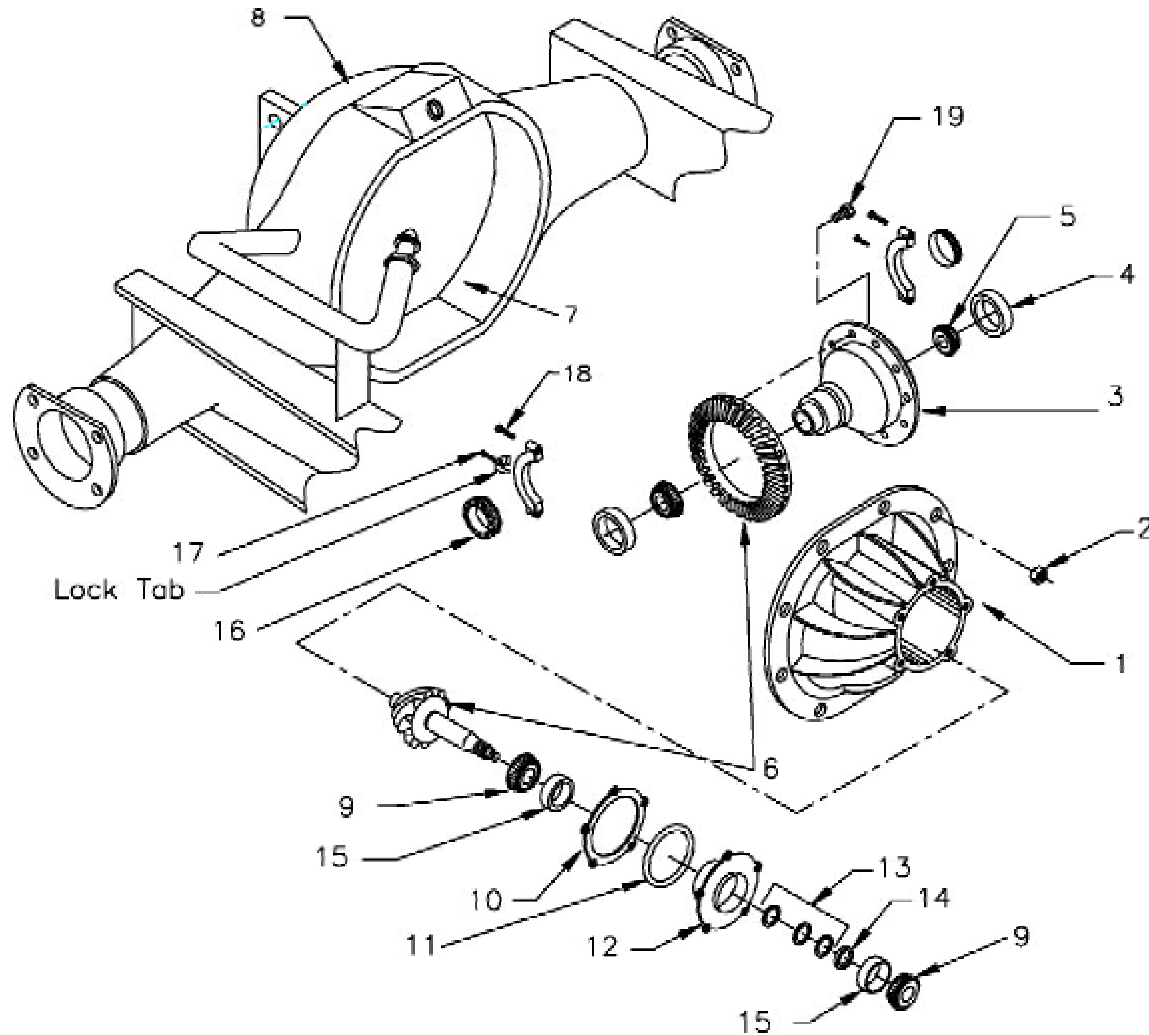
Axle Assembly and Steering, Front SS-546

Item No.	Part No.	Description	Qty
1	92-104-00	Bearing cap	2
2	88-527-14	Cotter pin	2
3	88-239-85	Castle nut	2
4	88-228-61	3/4 SAE Flat washer	2
5	80-017-00	Bearing	1
6	80-103-00	Race	1
7	12-124-15	Hub	2
8	80-103-00	Race	1
9	80-017-00	Bearing	1
10	45-338-00	Seal	2
11	00-546-06	Left steering yoke	1
	00-546-07	Right steering yoke	1
12	88-109-81	3/8NC Lock nut	4
13	97-202-50	3/8NF nut, left thread	2
	88-199-80	3/8NF Hex nut	2
14	86-519-11	Rod end, left thread	2
	86-519-10	Rod end, right thread	2
15	88-108-15	3/8 x 1-3/4 Hex bolt	4
16	88-106-61	3/8 SAE Flat washer	4
17	16-506-00	Upper spacer	4
18	16-506-00	Lower spacer	4
19	88-108-61	3/8 SAE Flat washer	4
20	01-546-16	Tie rod	2
21	32-200-00	Bushing	2
22	87-073-00	Grease fitting	2
23	21-020-15	King pin	2
24	32-240-55	King pin bushings (inside axle)	4
	97-180-55	Thrust washer	4
25	88-189-81	5/8NC Lock nut	2
26	00-546-02	Steering arm	1
27	87-071-00	Grease fitting	1



Illustrated Parts

Axle Assembly, 3rd Member, SS-534



SS534 3RD MEM 31 Parts.DWG

Axle Assembly, Belt Drive, SS-534

Item No.	Part No.	Description	Qty
-	30-114-00	Motor pulley, 2.25" dia	-
-	30-115-00	Motor pulley, 2.75" dia	-
-	30-116-00	Drive pulley, 8" dia	-
-	30-117-00	Drive pulley, 11" dia	-
--	30-601-00	Drive belt (8" pulley)	2
-	30-613-00	Drive belt (11" pulley)	2

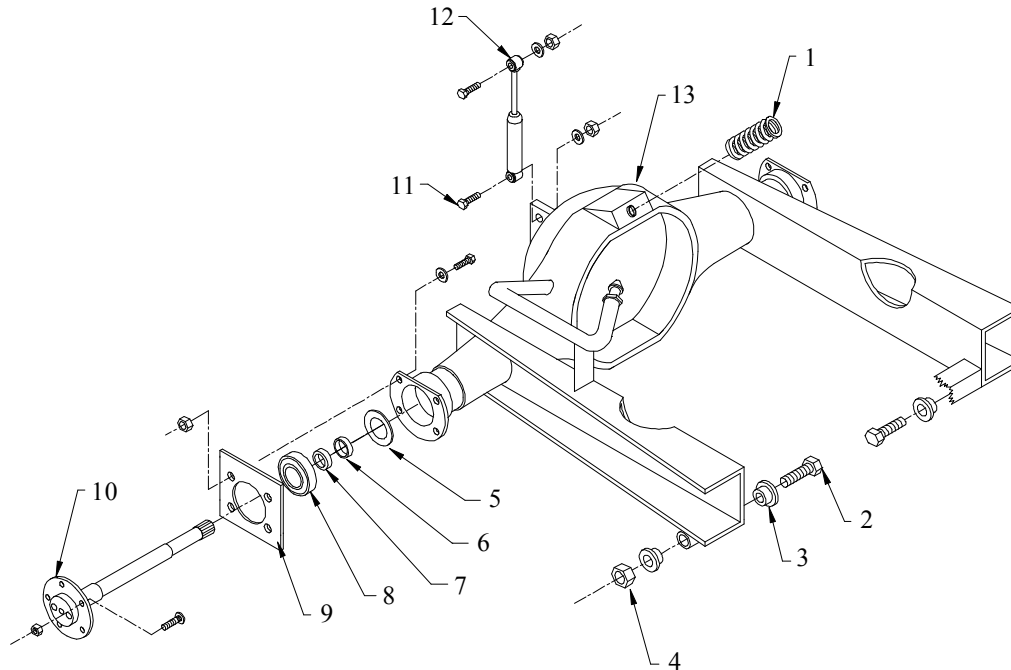
Axle Assembly, 3rd Member, SS-534

Item No.	Part No.	Description	Qty
1*	41-709-00	3rd member Housing (1.628 ID Carrier Bearing)	1
	41-710-00	3rd member Housing (1.784 ID Carrier Bearing)	1
2	88-119-80	3/8" NF Nut	14
3*	41-712-00	Differential Assembly (1.628 ID Carrier Bearing)	1
	41-713-00	Differential Assembly (1.784 ID Carrier Bearing)	1
4*	80-127-00	Carrier Bearing Race, (For 1.628 ID Carrier Bearing)	2
	80-128-00	Carrier Bearing Race, (For 1.784 ID Carrier Bearing)	2
5*	80-511-00	Carrier Bearing (1.628 ID Carrier Bearing)	2
	80-512-00	Carrier Bearing (1.784 ID Carrier Bearing)	2
6	31-235-00	Ring and Pinion Gear Set (2.69-2.75)	1
7	41-997-00	Oil Plug	3
8	41-296-00	Rear End Housing	1
9	80-554-00	Pinion Bearing	2
10	41-711-00	Pinion Housing Shim	1
11	80-702-00	O-Ring	1
12	44-340-90	Pinion Housing Shim	1
13	16-419-00	.002 Shim (Add Shims As Needed)	-
	16-420-00	.010 Shim (Add Shims As Needed)	-
	16-411-00	.005 Shim (Add Shims As Needed)	-
14	16-415-00	Spacer	1
15	80-125-00	Pinion Bearing Race	2
16*	41-707-00	Differential Bearing Adjuster Nut (For 80-511-00)	2
	41-707-50	Differential Bearing Adjuster Nut (For 80-512-00)	2
17	88-080-04	5/16" X 3/8" NC Hex Bolt	2
18	88-140-16	1/2" X 2" Hex Bolt	2
19	96-243-00	7/16" X 7/8" Hex Bolt (Locking Head)	10
Not Shown	45-339-00	Oil Seal, Pinion Shaft	1
	41-701-00	Roll Pin, Spider Gear Shaft	1

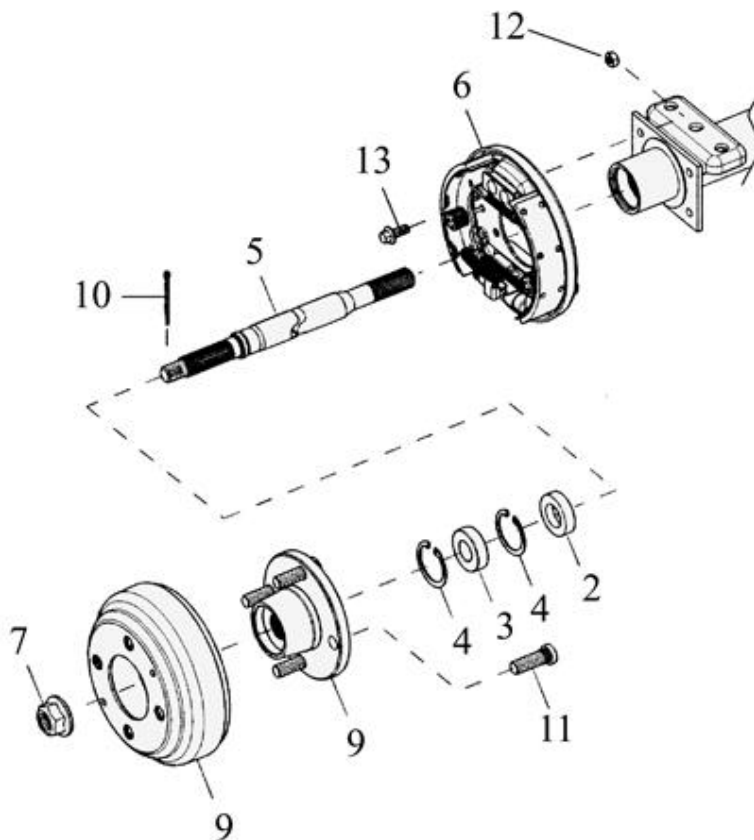
* Note: Two different types of 3rd member assemblies are used on these vehicles. It is not possible to determine which type was used without measuring specific components.



Axle Assembly, Rear Axles SS-534



Axle Assembly, Rear Axles SS-536, SS-546, MX-600



Axle Assembly, Rear SS-534

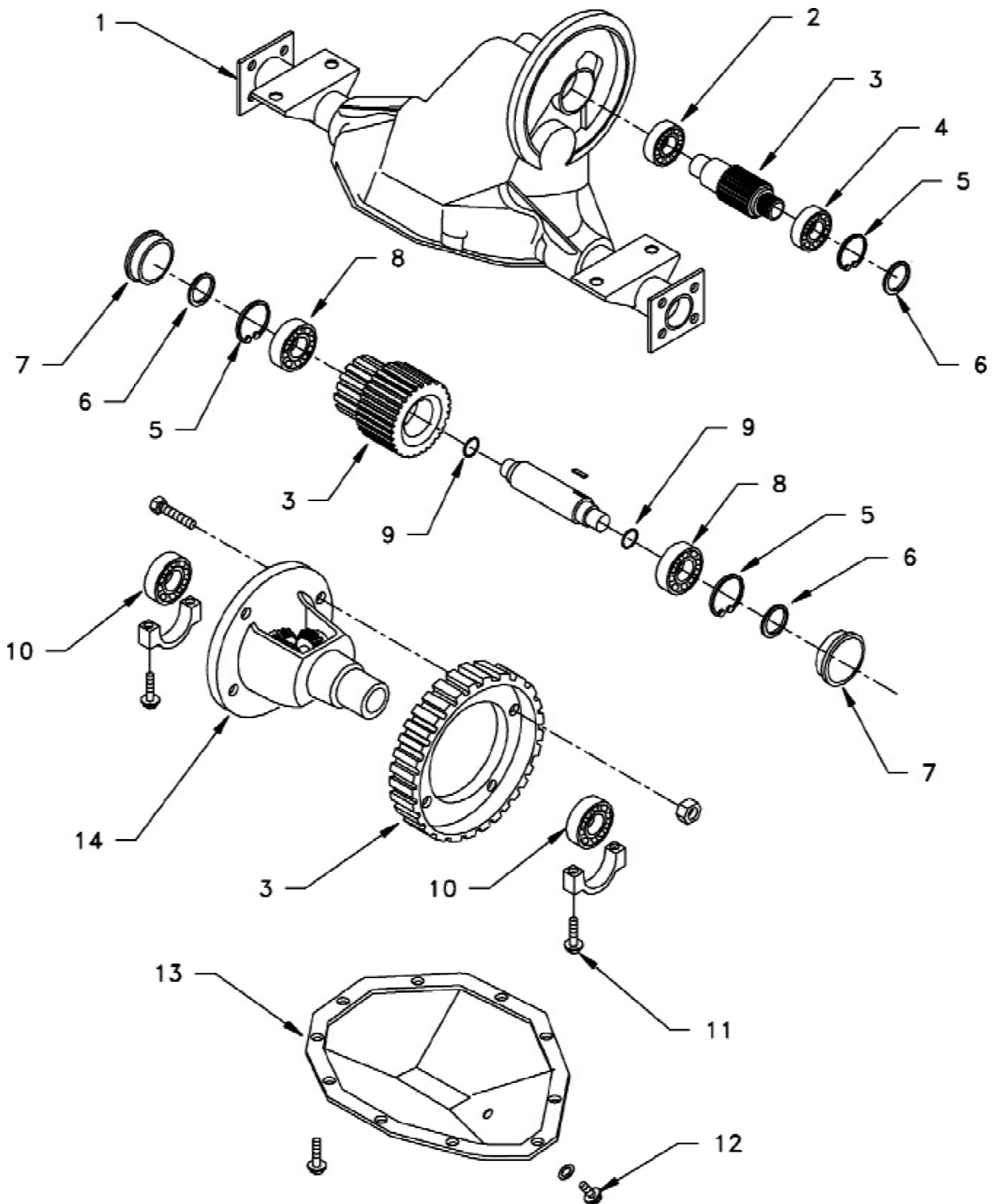
Item No.	Part No.	Description	Qty
1	85-140-00	2-7/16" X 6-1/4" Spring	1
2	96-240-00	1/2" X 4" Bolt	2
3	98-601-00	Rubber Grommet, 1/2" ID	4
4	88-149-81	1/2"NC Locknut	2
5	45-045-00	Rear Axle Bearing Gasket	2
6	45-301-00	Oil Seal	2
7	32-515-00	Bearing Retainer Ring	2
8	80-503-00	Bearing for Rear Axle	2
9	32-514-00	Rear Axle Retaining Plate	2
10	41-166-11	Right Side Axle w/ Bearing and Retainer Plate	1
	41-165-11	Left Side Axle w/ Bearing and Retainer Plate	1
11	88-180-18	5/8"NC X 2-1/2" Hex Head Bolt	2
12	86-602-00	Shock Absorber	1
13	41-296-00	Housing	1

Axle Assembly, Rear SS-536, SS-546, MX-600

Item No.	Part No.	Description	Qty
1	41-281-10	Differential Assy	1
2	45-303-20	Seal	2
3	80-480-20	Axle Bearing	2
4	88-840-13	Internal Snap Ring	4
5	41-126-99	Right Axle Shaft	1
	41-126-98	Left Axle Shaft	1
6	See Brakes	Right Brake	1
	See Brakes	Left Brake	1
7	88-199-85	Slotted Hex Nut	2
8	88-188-61	5/8" SAE Washer	2
9	41-518-01	Brake drum	2
	41-518-02	Hub	
10	88-527-11	1/8" X 1" Cotter Pin	2
11	66-610-28	Wheel Stud	4
12	*		
13	*		



Axle Assembly, Transaxle, SS-536, SS-546, MX-600



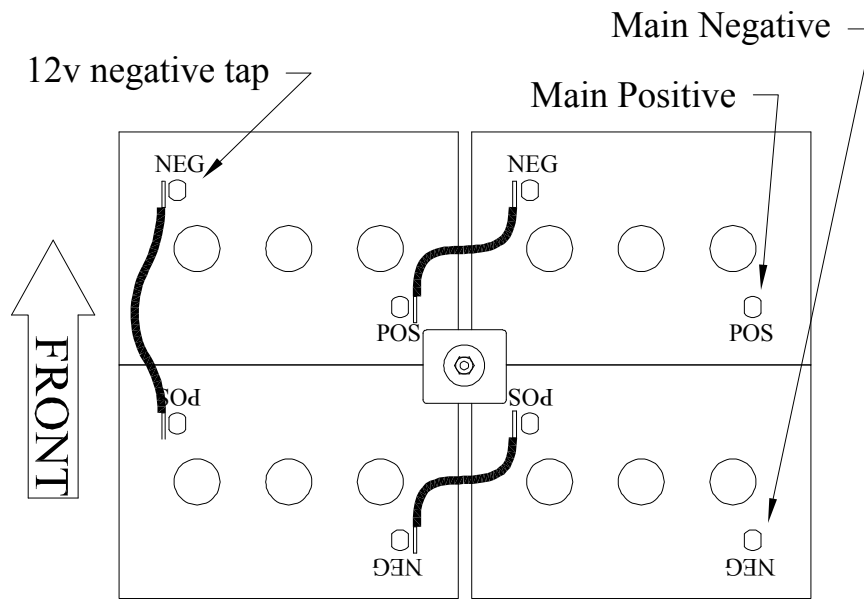


Axle Assembly, Transaxle, SS-536, SS-546, MX-600

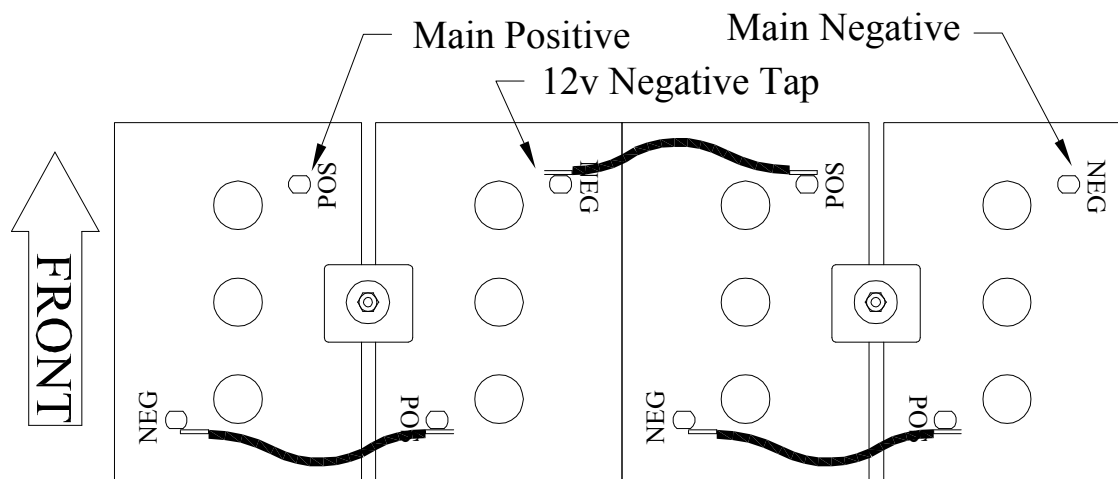
Item No.	Part No.	Description	Qty
1	41-280-10	Differential Housing Assy	1
2	80-480-10	Pinion Bearing	2
3	31-265-00	Gear Set	1
4	80-480-15	Shaft Bearing	1
5	88-840-12	Snap Ring	3
6	80-715-10	O-Ring	3
7	41-973-00	Cup Plug	2
8	80-480-01	Bearing	2
9	80-715-00	O-Ring	2
10	80-408-00	Carrier Bearing	2
11	96-330-10	Bearing Cap Bolt	4
12	41-127-94	Fill Plug	1
13	41-127-64	Carrier Cover	1
14	41-716-00	Differential Case Assy	1



Batteries



SS-534 / SS-536 / SS-546



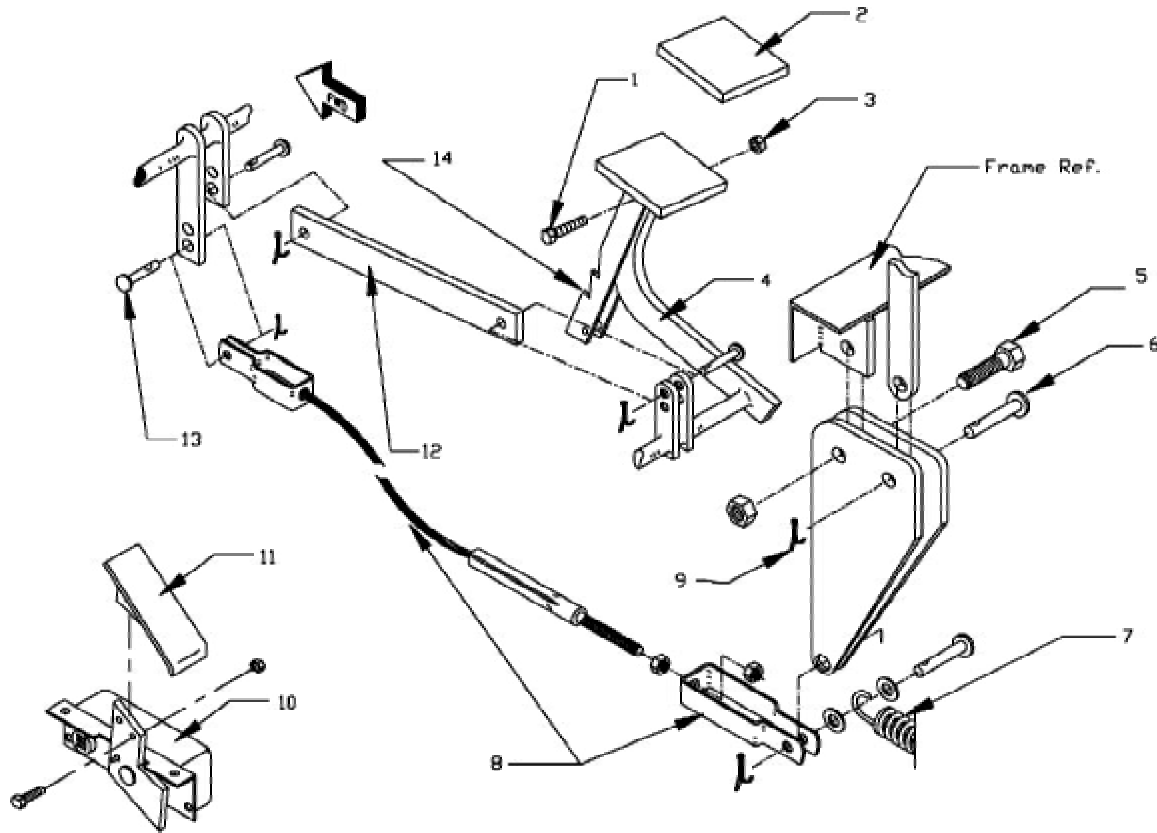
MX-600

Batteries			
Item No.	Part No.	Description	Qty
-	77-051-00	Battery, 160AH, Gell**	
-	77-044-10	Battery, 195AH, Maintanance free**	
-	77-042-00	Battery, 217AH, T-105	
-	77-042-80	Battery, 217AH, T-105 Moist Charge	
-	77-042-50	Battery, 217AH, TD-217	
-	77-044-00	Battery, 230AH, T-125	
-	77-047-00	Battery, 244AH, T-145	
-	77-047-80	Battery, 244AH, Moist Charge	
-	77-047-50	Battery, 250AH, TD-250	
-	77-048-00	Battery, 250AH, J-250	
-	77-048-80	Battery, 250AH, Moist Charge	
-	50-250-00	Battery retainer	
-	50-243-10	Battery Rod	
-	88-088-66	Washer, 1/4, Tin/Lead plated	
-	88-069-81	1/4 Lock nut	
-	88-081-12	5/16 Stainless Steel Bolt	
-	88-089-80	5/16 Stainless Steel Nut	
-	75-231-00	Cable, Battery	

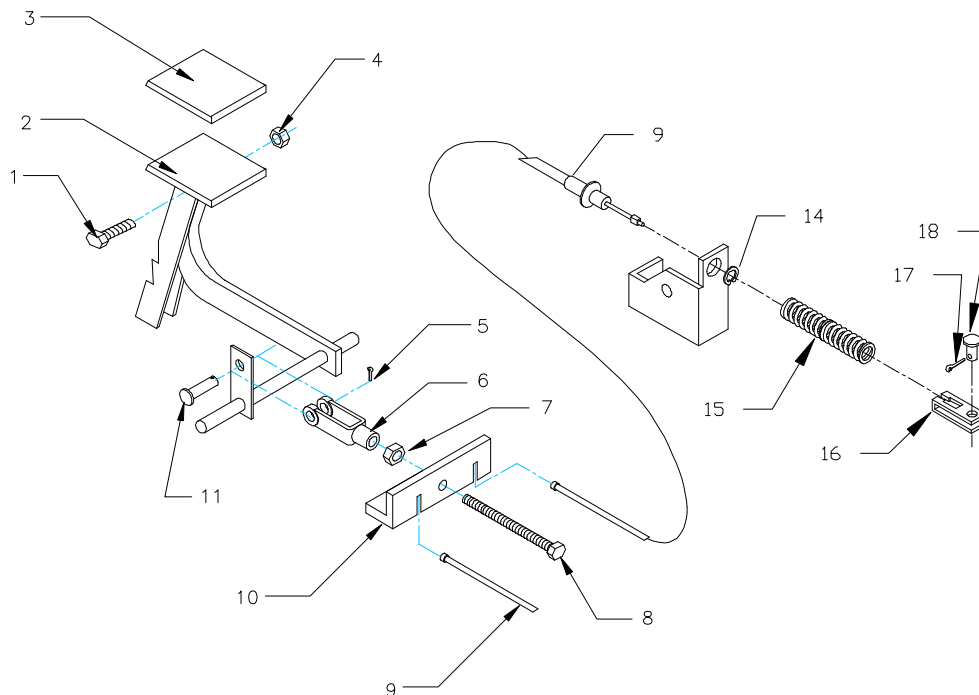
** - Requires special charger



Brakes, Brake Pedal Linkage, SS-534



Brakes, Brake Pedal Linkage, SS-534, SS-536, MX-600



Brake Pedal Linkage, SS-534

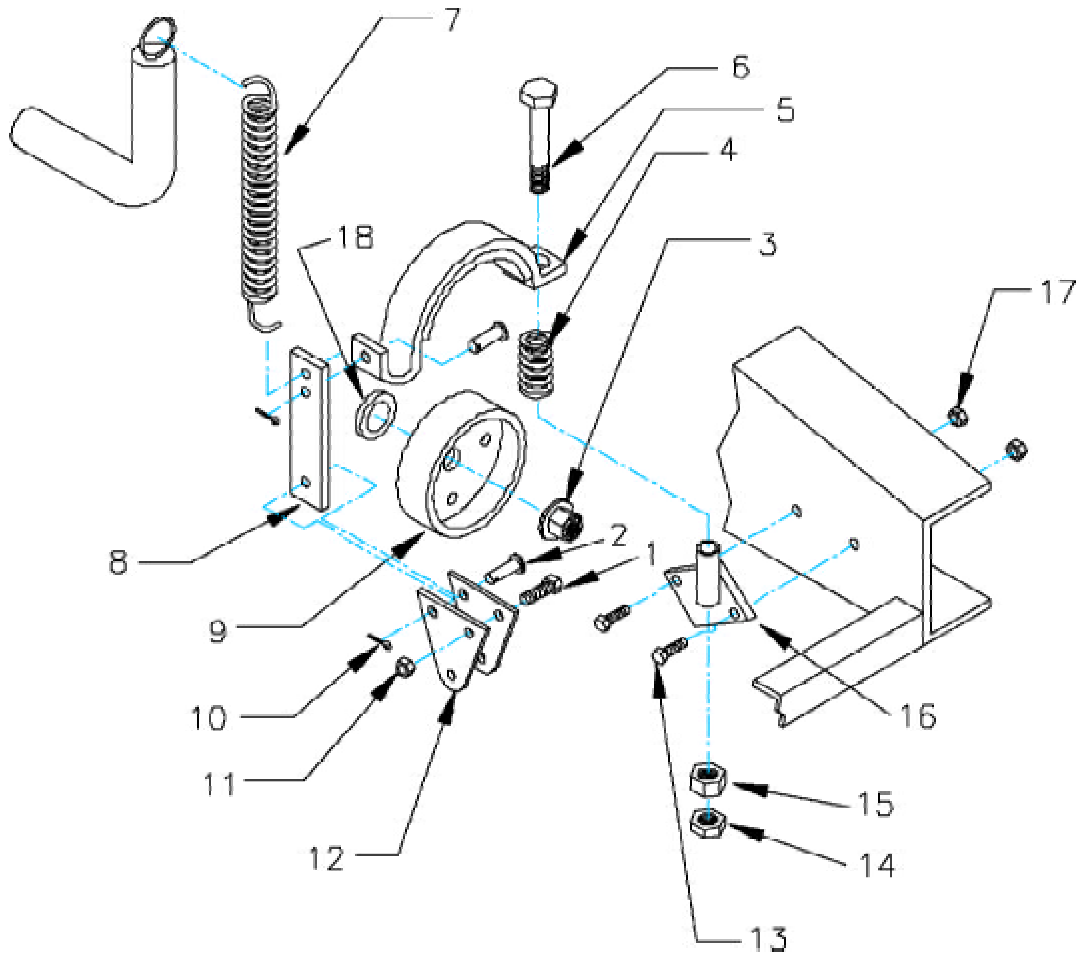
Item No.	Part No.	Description	Qty
1	88-140-14	1/2" NC X 1-1/2" Hex Head Cap Screw	1
2	98-200-00	Brake Pedal Pad, Rubber	1
3	88-089-81	1/2" NC Locknut	2
4	01-534-67	Brake Arm Weldment	1
5	88-140-14	1/2" NC X 1-1/2" Hex Head Cap Screw	1
6	96-772-00	3/8" X 1" Clevis Pin	3
7	85-295-00	Return Spring	1
8	96-813-00	28-1/4" to 31-1/4" Brake Cable Assy	1
9	88-517-11	3/32" X 1" Cotter Pin	7
10	62-033-00	Accelerator Module	1
11	98-254-10	Accelerator Pedal	1
12	50-432-00	Brake Pedal Connecting Link	1
13	96-771-00	3/8" X 3/4" Clevis Pin	1
14	51-508-00	Brake Pedal, w/P.Brake Locks	1

Brakes, Brake Pedal Linkage, SS-534, SS-536, MX-600

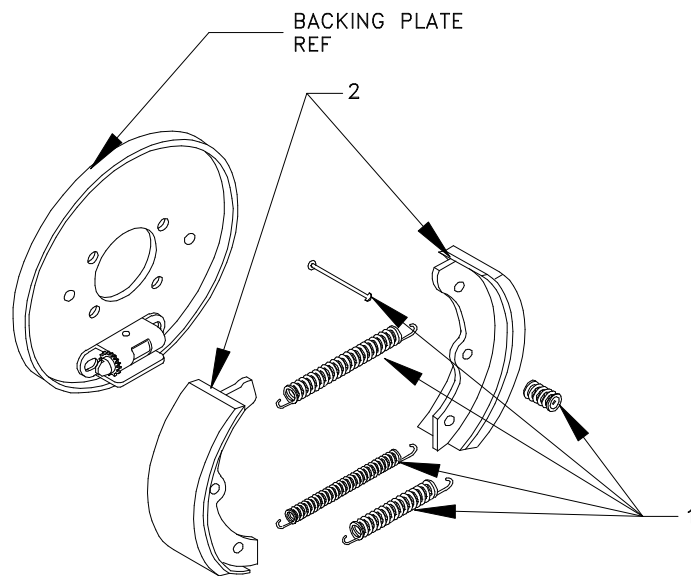
Item No.	Part No.	Description	Qty
1	88-140-13	1/2" X 1/4" NC Bolt	1
2	02-536-09	Pedal Lock	1
3	98-200-00	Pedal Pad	1
4	88-149-81	1/2" NC Locknut	1
5	88-527-11	1/8" X 1" Cotter Pin	1
6	96-762-00	Clevis	1
7	88-119-81	3/8" NF Jam nut	1
8	88-111-20	3/8" X 3" NF Bolt	1
9	96-826-12	Park Brake Cable Assy	2
10	02-536-06	Brake Equalizer	1
11	96-772-00	3/8" X 1" Clevis Pin	1
12	62-033-00	Accelerator Module	1
13	98-254-10	Accelerator Pedal	1
14	88-847-08	E-clip	2
15	85-125-00	Spring	2
16	96-754-00	Clevis	2
17	88-517-11	Cotter pin	2
18	96-773-00	Clevis pin	2



Brakes, Rear Axle, SS-534



Brakes, Rear Axle, SS-536, SS-546, MX-600



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Brakes, Rear Axle, SS-534

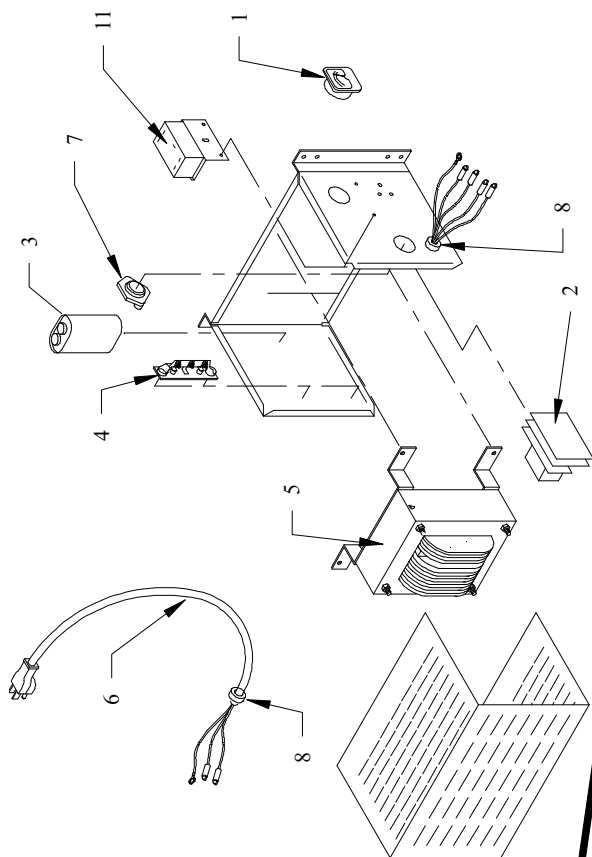
Item No.	Part No.	Description	Qty
1	88-100-11	3/8" NC X 1-3/4" hex Head Cap Screw	1
2	96-771-00	3/8" X 3/4" Clevis Pin	2
3	97-250-00	3/4"-20 Extra Fine Pinion Nut	1
4	85-060-20	5/8" OD X 2-1/2" Compression Spring	1
5	41-660-60	Brake Half Band	1
6	96-245-10	1/2" NC X 5" hex Head Cap Screw	1
7	85-270-00	1-1/4" OD X 4-3/8" Extension Spring	1
8	50-661-00	Brake Lever Bar	1
9	41-532-00	Brake Drum	1
10	88-517-11	3/32" X 1" Cotter Pin	2
11	88-089-81	5/16"NC Locknut	4
12	50-662-00	Brake Lever	1
13	88-080-11	5/16" NC X 1" Hex Head Cap Screw	2
14	88-159-82	1/2"NF Jam Nut	1
15	88-159-84	1/2"-20 NF Locknut	1
16	41-380-10	Brake Mounting Bracket	1
17	88-089-81	5/16" NC Locknut	2
18	45-339-00	Pinion Seal	1

Brakes, Rear Axle, SS-536, SS-546. MX-600

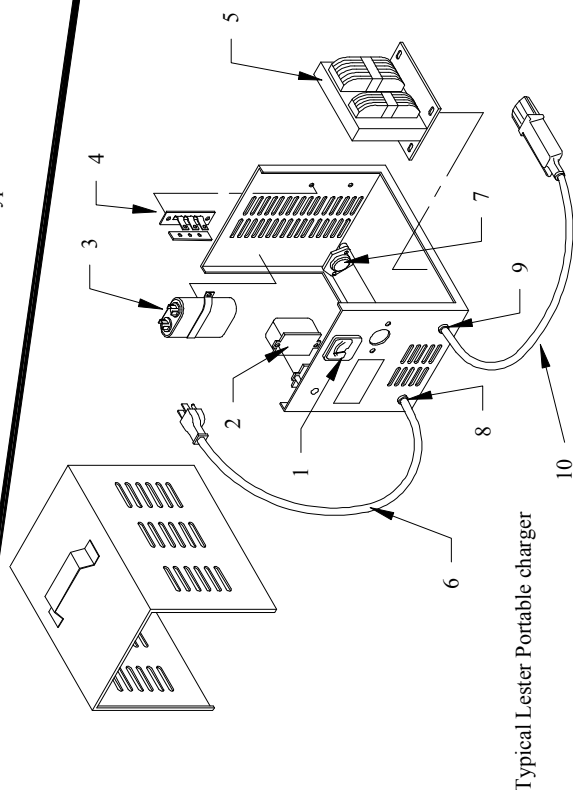
Item No.	Part No.	Description	Qty
1	85-344-60	Spring Kit	1
2	41-634-00	Brake Shoes (Shows 1 Set)	2
	41-344-98	Complete Brake Assembly, Left	1
	41-344-99	Complete BRake Assembly, Right	1



Charger, Battery



Typical Lester Built In charger



Typical Lester Portable charger



Built In Charger, Signet Model HBS
No internally serviceable components

Signet Chargers

Model and Type	Part Number
24 volt HB, Flooded Battery	79-302-20
24 volt HBS Flooded Battery	*
24 volt HB Gel Battery	*
24 volt HBS Gel Battery	*

* - Not available at time of printing

NOTE: There are no user serviceable components inside the charger

NOTE: The charger AC cord is an integral part of the charger. When replacing the charger, do not cut and splice the AC cord. **Cutting the AC cord will void the charger warranty.**

NOTE: The Signet model HBS series charger replaces all previous Signet models.

NOTE: The harness connectors and AC plug are not included with the charger.

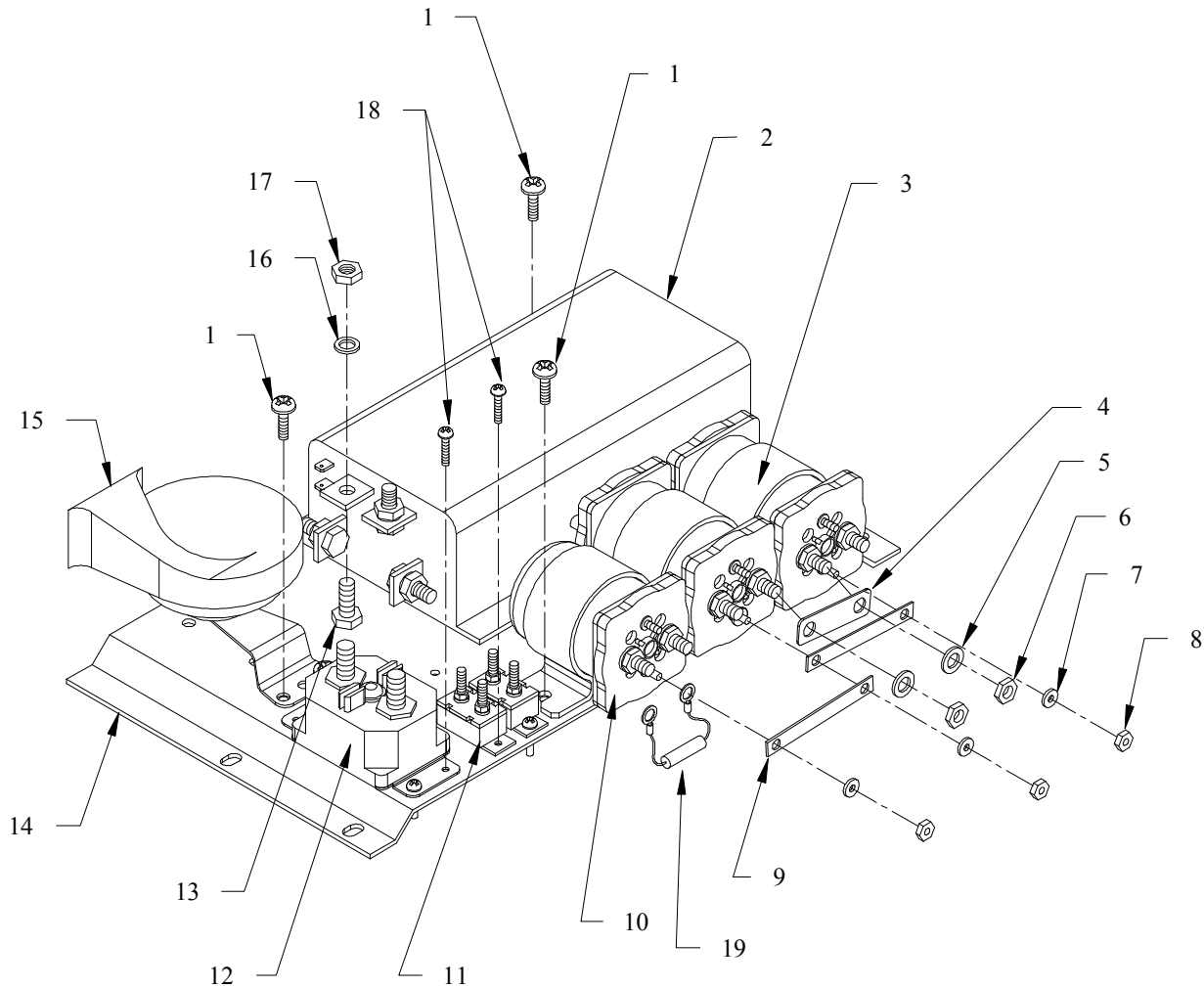
QTY	PART #	DESCRIPTION
2	75-318-20	Butt splice
2	75-320-51	Knife connector
1	76-200-00	AC plug, 115v domestic



LESTER CHARGERS												
ITEM #	DESCRIPTION	Charger Model # Charger Part #										
		14400-31 79-302-50	7105-01 79-300-50	12750 79-300-55E	13110 79-301-10	9513-31 79-302-10	13760 79-302-15	22730 79-303-05				
	Charger Type	24LC40-8ET	24LC25-8ET	24LC25-8ET	24LC25-8ET	24LC40-8ET	24LC40-8ET	24LC25-8ET				
	AC Voltage/Hz/Amps	230/50/7	230/50/4	230/50/4	115/60/9	115/60/13	115/60/13	115/60/8				
	DC Voltage/Amps	24/40	24/25	24/25	24/25	24/40	24/40	24/25				
	Style	Portable	Portable	Built-In	Portable	Portable	Built-In	Built-In				
1	Ammeter	79-852-00	79-851-10	-	79-851-10	79-852-00	-	-				
2	Timer Assembly	S/O	79-805-64	79-805-70	79-805-64	79-805-64	79-805-66	79-805-66				
	Relay for #2	79-808-10	79-808-10	79-808-10	79-808-10	79-808-10	79-808-10	79-808-10				
3	Capacitor	79-902-00	79-902-00	79-902-00	79-902-00	79-902-00	79-902-00	79-902-00				
4	Diode Ass embly	S/O	79-749-13	79-749-13	S/O	79-749-13	79-749-13	79-749-13				
5	Transformer	S/O	S/O	79-644-08	S/O	S/O	S/O	S/O				
6	AC Cord	S/O	S/O	-	S/O	79-575-10	-	-				
7	Fuse Assembly	79-831-10	79-831-00	79-831-00	79-831-00	79-831-10	79-831-10	79-831-10				
8	Strain Relief	S/O	79-532-00	79-530-00	79-532-00	79-531-00	79-531-00	79-531-00				
9	Strain Relief	S/O	79-530-00	-	79-530-00	79-530-00	-	-				
10	DC Cord	79-567-10	79-566-10	-	79-566-10	S/O	-	-				
11	Interlock Relay Assy.	-	-	79-306-23	-	-	-	79-809-60				
-	Replacement AC Plug	-	-	-	76-200-00	76-200-00	76-200-00	76-200-00				



Control System, Motor Speed Control



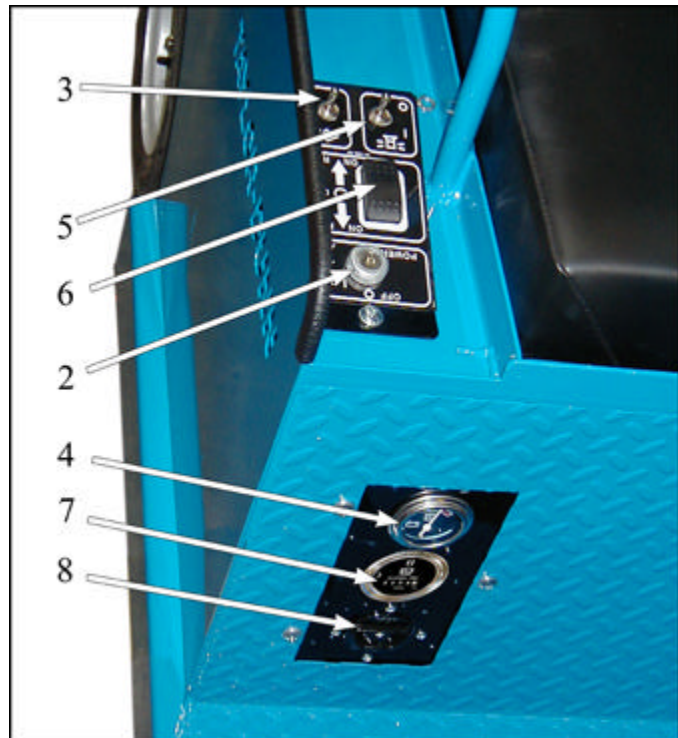
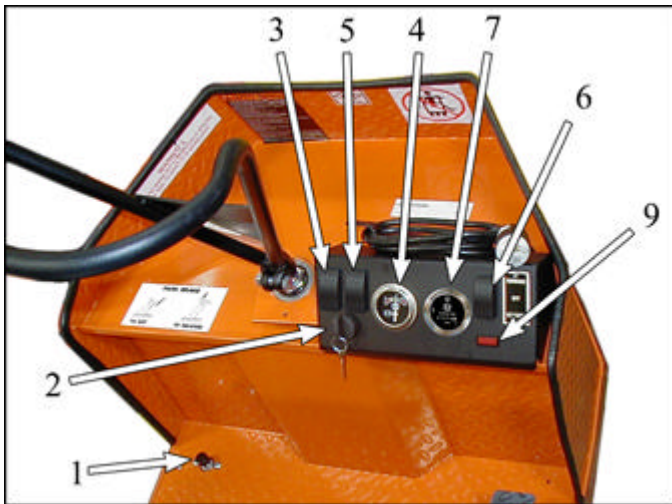
***-Torque motor speed control power terminals to 85 inch pounds.

Speed Control Panel			
Item No.	Part No.	Description	Qty
1	88-838-06	#14 X 1/2" Pan Head Screw	4
2	62-204-00	PMC Controller	1
3	72-501-43	Forward/Reverse Solenoid	2
4	61-838-41	5/8" X 1-1/2" Bus Bar	2
5	88-088-62	5/16" Lockwasher	10
6	88-099-91	5/16" Nut	10
7	88-048-62	#10 Lockwasher	6
8	88-049-80	10-32 Nut	6
9	61-838-42	3/8" X 2-5/8" Bus Bar	2
10	72-501-42	ISO Solenoid	1
11	79-840-00	10-Amp Circuit Breaker	2
12	79-844-00	135-Amp Auto Reset Circuit Breaker	1
13	88-080-11	5/16" X 1" Hex Head Cap Screw	4
14	01-534-89	Control Panel Mount (SS5-34 & SS5-36)	1
	00-300-03	Control Panel Mount (MX-600)	1
15	73-004-20	12V Horn	1
16	88-088-62	5/16" Lockwasher	4
17	88-089-80	5/16" Hex Nut	4
18	88-818-06	#8 X 1/2" Pan Head Screw	7
19	78-305-50	Resistor	1
Not Shown	75-148-43	Control Panel Harness (MX-600)	1
	75-148-25	Control Panel Harness(SS5-34 & SS5-36)	1
	75-149-25	Power Harness (All)	1
	62-033-48	Throttle module	1



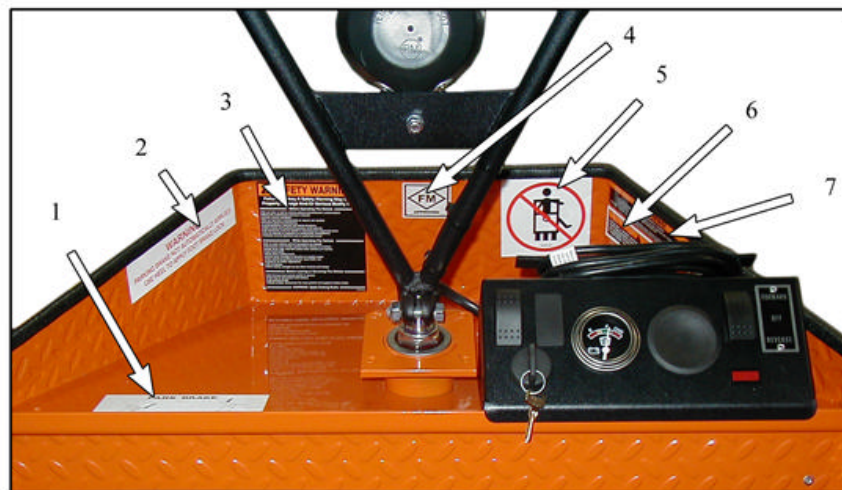
Control System, Instrument Panel

Instrument Panel			
Item No.	Part No.	Description	Qty
1	71-122-20	Horn Switch	1
2	71-120-10	Start Switch	1
3	71-039-11	Light Switch, SS models	1
	71-100-00	Light Switch, MX model	1
4	74--009-10	Battery Status Gauge	1
5	71-039-11	Auxiliary Switch, SS models	1
	71-100-00	Auxiliary Switch, MX model	1
6	71-039-02	Forward, Reverse Switch	1
7	74-000-00	Hour meter	1
8	76-013-00	Charger Receptacle	1
9	72-028-20	Power Light	1
-	00-536-04	Console, SS models	1
-	00-300-04	Console, MX model	1

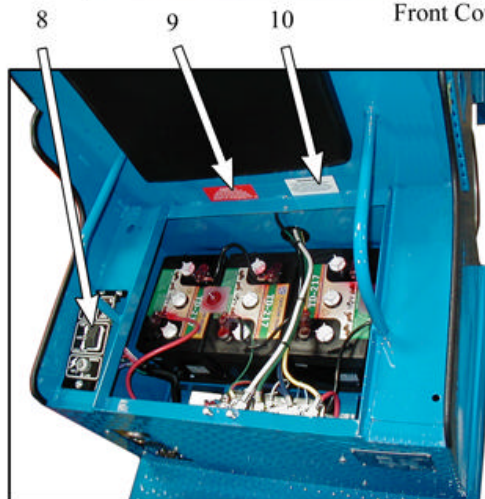


Decals

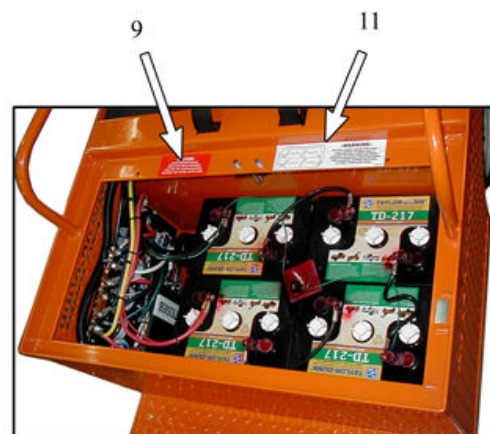
Item No.	Part No.	Description	Qty
1	94-384-00	How to apply park brake	1
2	94-309-50	Park Brake Warning	1
3	94-313-20	Safety warning	1
4	94-333-00	FM	1
5	94-301-43	Arms and Legs (3-wheel)	1
	94-301-42	Arms and Legs (4-wheel)	1
6	94-384-01	Not a Motor Vehicle	1
7	94-384-14	When Leaving Vehicle	1
8	94-386-03	Console (MX-600 only)	1
9	94-319-00	Battery Disconnect	1
10	94-313-00		
11	94-385-00	Battery wiring	1
Not Shown	94-386-02	"MX-600" (small)	
	94-386-04	"MX-600 (large)	
	94-386-01	Roll over warning (MX-600 only)	
	94-386-00	Caution, Tools and Equipment (MX-600 only)	



Front Cowl, All Models



MX-600



SS-536, SS-546



Electrical, Miscellaneous

Item No.	Part No.	Description	Qty
	62-033-48	Throttle Module	1
	72-005-00	Heallight assembly	1
	72-072-00	Bulb, headlight	
	71-102-10	Interlock switch, Seat	1
	02-610-18	Mount, Interlock switch	1
	96-773-00	Spring, Interloc switch	2
	85-030-00	Clevis pin, interlock switch	2
	88-527-11	Cotter pin	2

Frame and Body, Deckboards

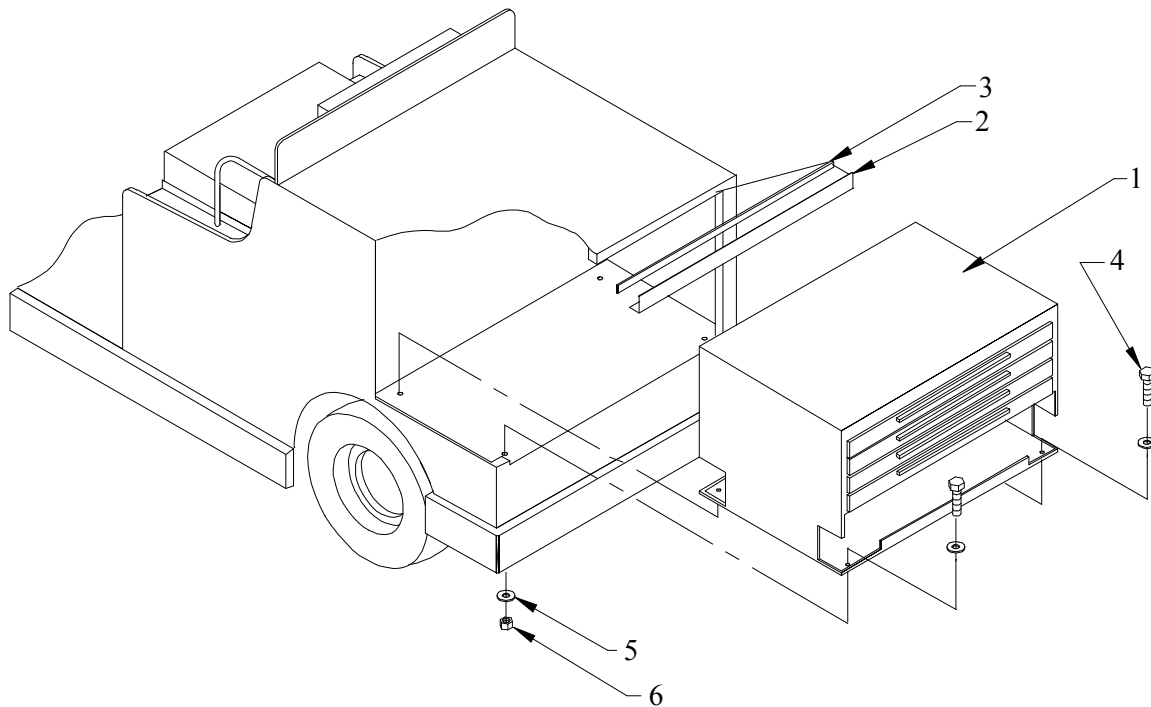
Item No.	Part No.	Description	Qty
	90-408-10	Deck, SS-536, SS-546	
	90-409-00	Deck, SS-534	
	94-025-51	Deck Trim, SS-534	
	50-112-00	Deck Prop Rod, SS-534	1
	88-587-90	Retainer, Prop Rod	1
	91-809-00	Mount, Prop Rod	1
	90-408-20	Deck, MX-600	
	97-840-00	Vice, MX-600	
	00-300-01	Vise Mount Plate	1
	88-100-15	3/8"NC X 1-3/4" Hex Head Bolt	3
	88-108-62	3/8" Lockwasher	3
	00-300-08	Deck Cover, Steel, MX-600 (optional)	

Frame and Body, Seat Cushions

Item No.	Part No.	Description	Qty
	93-004-00	Seat back, SS-536, SS-546	1
	90-144-00	Seat Back, SS-534 (optional)	1
	90-144-00	Seat Back, MX-600	1
	93-005-00	Seat Cushion, SS-536, SS-546	1
	90-166-00	Seat Cushion, SS-534	1
	96-006-00	Seat Cushion, MX-600	1
	90-109-50	**Seat Frame, Back, Fold down SS-534 (optional)	1
	90-109-50	**Seat Frame, Mount, Fold down SS-534 (optional)	1
	90-090-00	Rear Step, SS-534	
	02-536-11	Seat Frame, fold down, SS-536, SS-546	1
	02-534-25	Hip Restraints, SS-534	2

** - Fold down seat frame requires installation of the rear step.

Frame and Body, Toolbox, MX-600



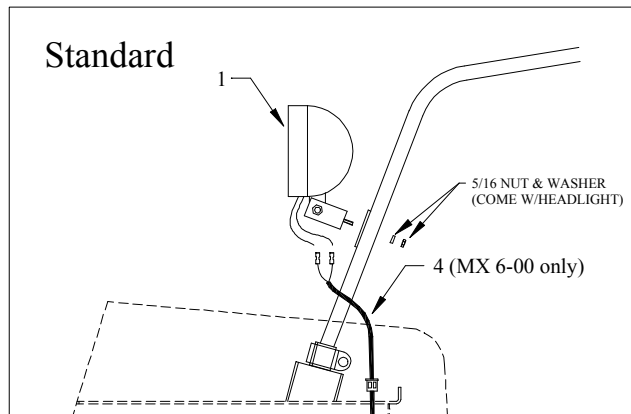
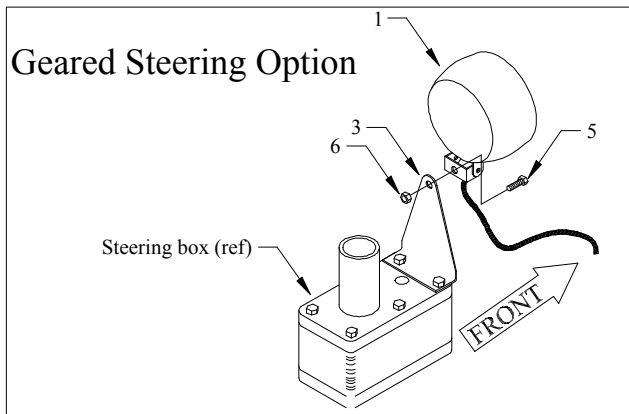
Item No.	Part No.	Description	Qty
1	91-340-25	Tool Chest	1
2	00-300-02	Trim	1
3	94-400-32	Double Sided Tape	3 ft
4	88-140-11	1/2"NC X 1" Hex Head Bolt	4
5	88-148-61	1/2" SAE Washer	8
6	88-159-84	1/2"NC Locknut	4
Not Shown	91-340-21	Tool Box Lock	1
	91-340-26	Keys for Toolbox Locks	1
	00-300-08	Steel Deck Cover	1

Frame and Body, Misc Body Trim

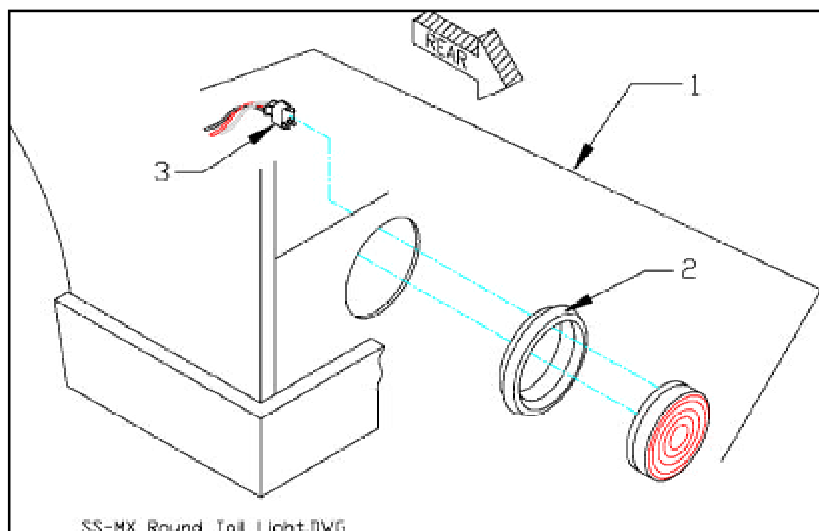
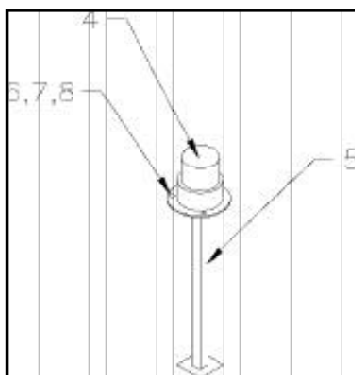
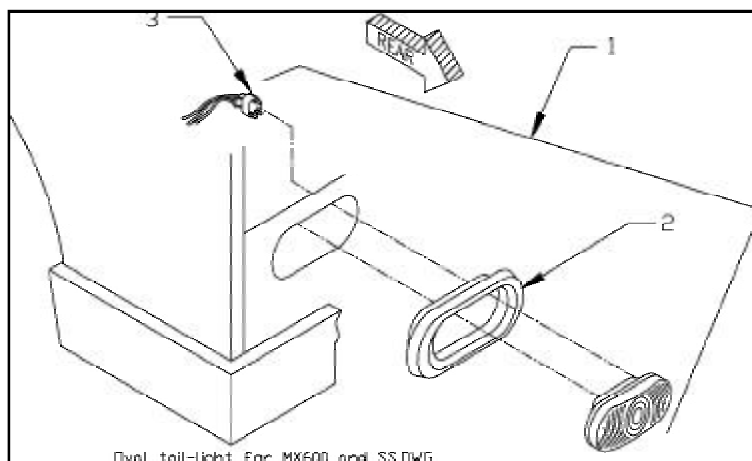
Frame and Body			
Item No.	Part No.	Description	Qty
	94-035-01	Plastic Cowl Trim sold by the foot	
	94-201-00	T/D Emblem	
	98-2554-10	Throttle Pedal	



Lights, Headlights



Lights, Taillights, Strobelight





Headlights

Item No.	Part No.	Description	Qty
1	72-005-00	Heallight	1
2	71-039-11	Switch, SS 5-34, SS 5-36, SS 5-46	1
	71-100-00	Switch, MX 6-00	1
3	71-505-05	Mount, geared steering option	1
4	75-166-35	Harness, MX 6-00	1
5	88-100-09	3/8NC x 3/4 Hex bolt	1
6	88-109-87	3/8NC KEPS nut	1

Taillights

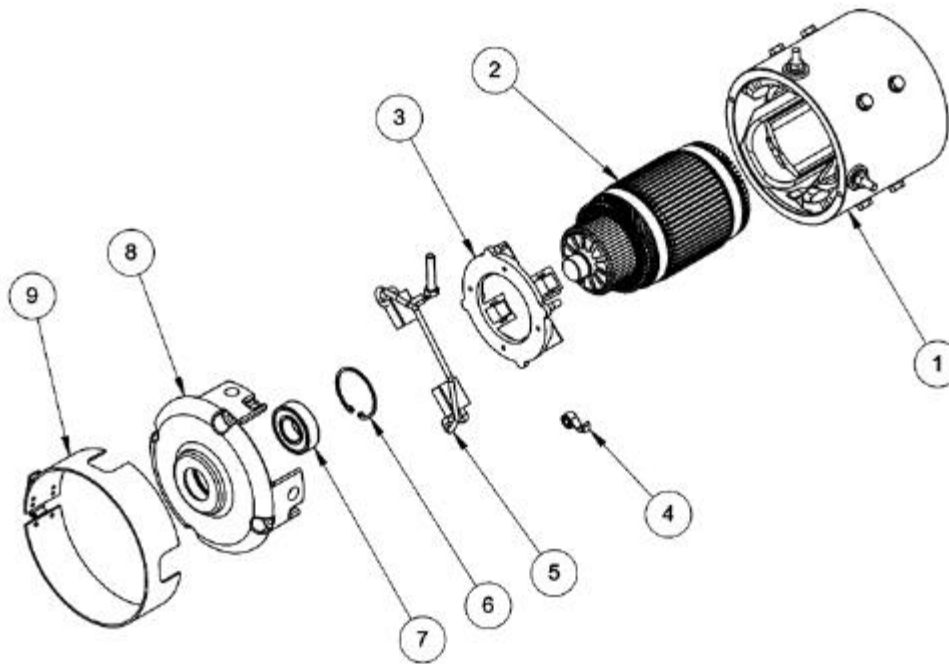
Item No.	Part No.	Description	Qty
1	72-022-00	4" Round Stop & Tail Light Assy	2
	72-025-00	Oval Stop & Tail Light Assy Complete	2
2	72-022-51	Round Rubber Grommet	2
	72-025-51	Oval Raubber Grommet	2
3	72-022-52	Pig Tail (For Both Stop & Tail Lights)	2
4	72-023-20	Strobe Light, 12-48 Vdc, Amber	1
5	72-023-32	Pole for Strobe Light (MX-600 Only)	1
6	88-025-06	8-32 X 1/2" Truss Head Machine Screw	3
7	88-028-62	#8 Lockwasher	3
8	88-029-80	8-32 Hex Nut	3
Not Shown	75-106-13	Wire Harness (For Strobe Light)	1
	98-603-00	3/8" ID Rubber Grommet (For Harness)	1
	72-023-21	Flash Tube for Strobe Light	1

NOTE: 72-022-00 4-inch Round Light is installed on the SS5-34 and the 72-025-00 Oval Light is installed on the SS5-36 and MX-600.

NOTE: All strobe light information is for the MX-600 at the time of printing no strobe light information was available. However the part number 72-023-21 is the flash tube for all strobe lights.



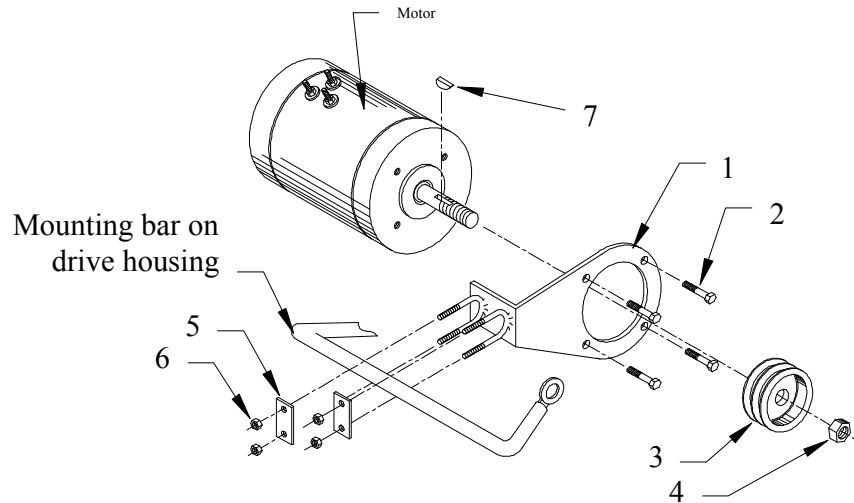
Motor



Motor

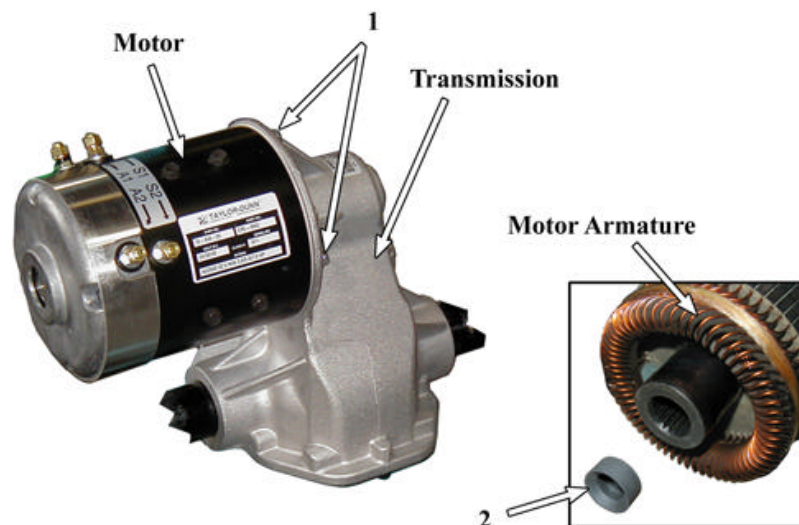
Item No.	Part No.	Description	Qty
1	*	Field assembly	1
2	*	Armature	1
3	70-180-00	Brush holder	1
4	80-412-20	Brush spring	4
5	70-109-00	Brush pair	2
6	70-417-00	Bearing retainer	1
7	80-212-00	Bearing, rear	1
	80-212-00	Bearing, front (SS-534)	1
8	*	End cap	1
9	*	Brush cover	1

Motor Mount, SS-534



Motor Mount, SS-534			
Item No.	Part No.	Description	Qty
1	00-380-96	Motor mount	1
2	88-100-11	Bolt	4
3	See belt drive	Pulley	1
4	30-117-00	Nut	1
5	70-422-00	Strap, motor mount	2
6	88-109-87	Nut	4
7	97-100-00	Woodruff key	1

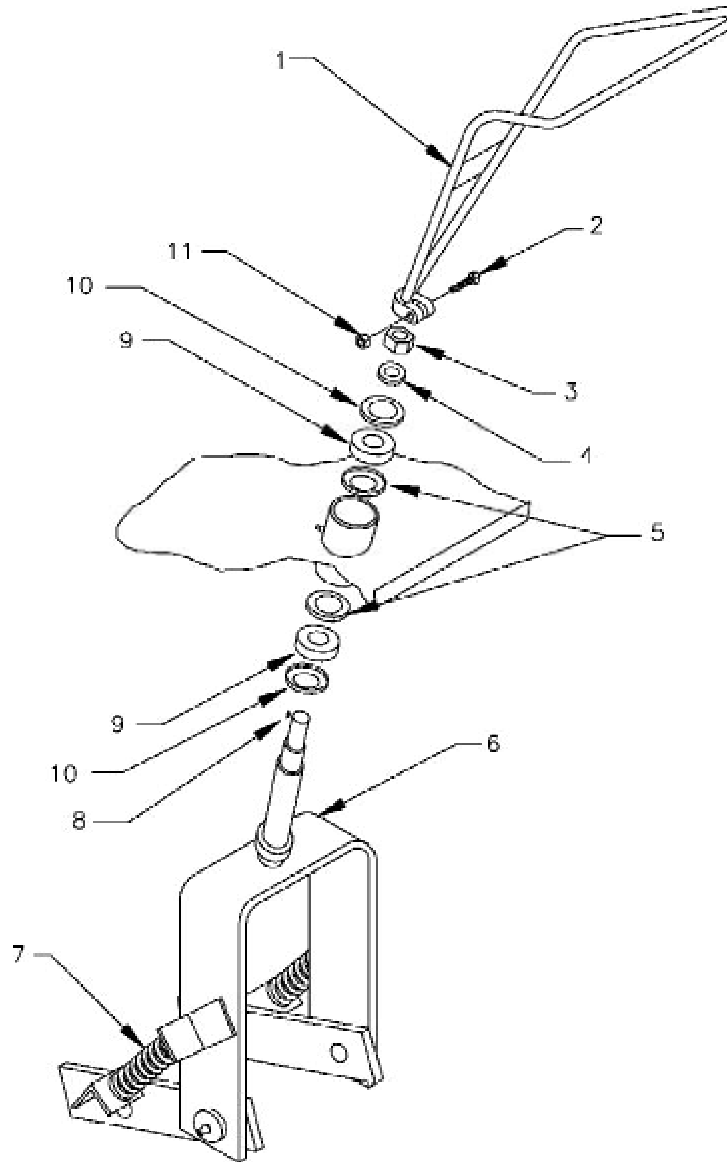
Motor Mount, SS-563, SS-546, MX-600



Motor Mount, SS-536-SS-546, MX-600			
Item No.	Part No.	Description	Qty
1	88-060-12	Bolt	3
	88-068-62	Lock washer	3
2	70-049-06	Spacer	1 ...



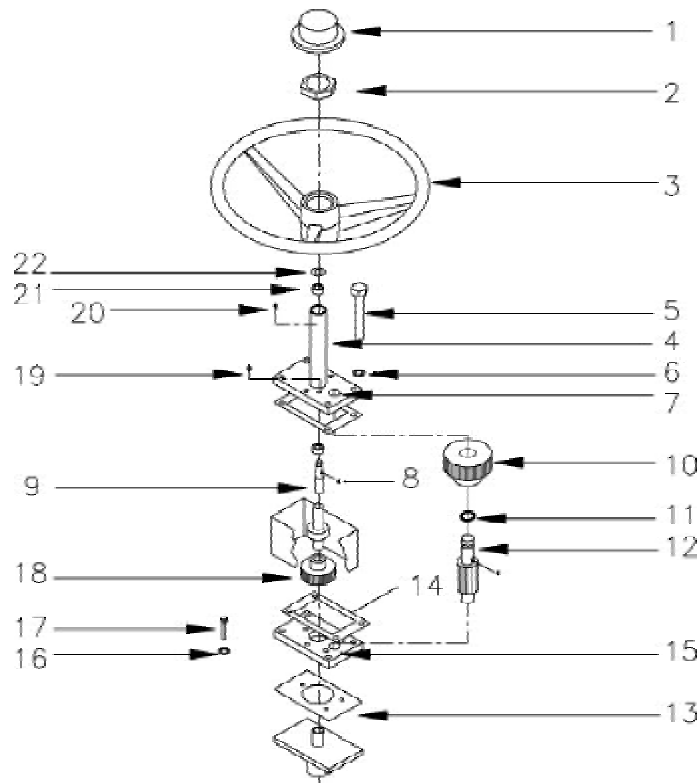
Steering Linkage, Tiller



Steering Linkage, Tiller

Item No.	Part No.	Description	Qty
1	19-101-20	Steering Tiller	1
2	88-140-14	1/2" X 1-1/2" NC Bolt	1
3	97-230-00	1-1/4" NF X 9/16" Locknut	1
4	16-409-00	Spacer	1
5	80-102-00	Bearing Race	2
6	14-079-20 14-079-45	Front Fork with Springs, Model SS Front Fork with Springs, Model MX	1 1
7	85-140-10	Spring	2
8	97-100-00	Woodruff Key	1
9	80-011-10	1-1/4" Tapered Roller Bearing	2
10	45-307-00	Oil Seal, 1-1/2"ID	2
11	88-149-81	1/2" Locknut	1

Steering Linkage, Geared, SS-534

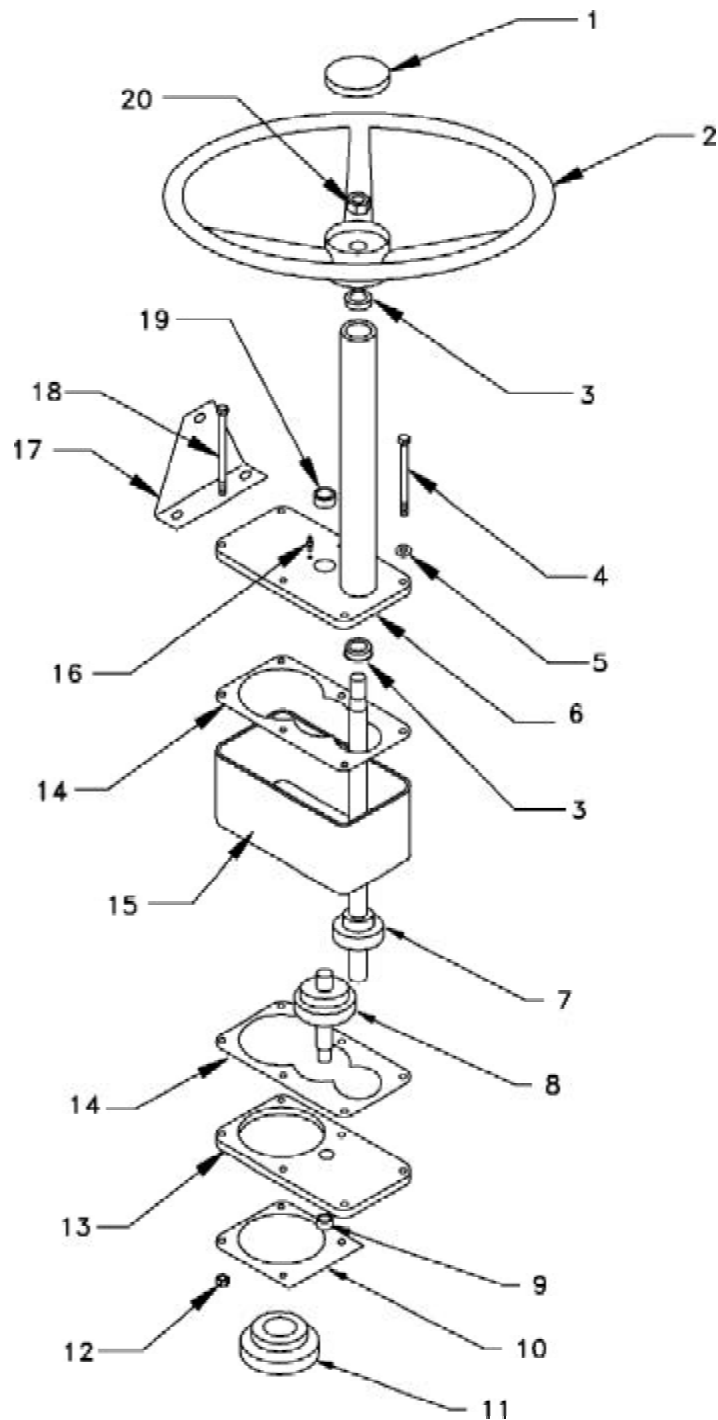


Steering Linkage

Item No.	Part No.	Description	Qty
1	95-915-20	Cap, Black Plastic	1
2	88-199-82	5/8" Jam Nut	1
3	19-007-20	Steering Wheel	1
4	18-309-00	Gear Box Only, (With Bolts, Bushings, and Zerk Fittings.)	1
5	88-068-25	1/4" X 4-1/2" NC HEX Hd Cap Screw	6
6	88-068-62	1/4" Lockwasher	6
7	32-203-00	3/4" ID X 7/8" OD X 1/2" Long Bronze Bushing	1
8	97-100-00	3/16" Woodruff Key	1
9	20-031-00	Steering Shaft with Gear	1
10	31-253-00	36-Tooth, Spur Gear, .750 bore	1
11	80-706-00	3/4" OD O-Ring	1
12	31-255-00	7-Tooth Stem Pinion	1
13	45-003-00	4" X 4-1/2" OD Gasket	1
14	45-004-00	4" X 6" OD Gasket	2
15	32-207-00	3/8" ID X 5/8" OD X 1/2" Long Bronze Bushing	1
16	88-088-62	5/16" Lockwasher	3
17	88-088-11	5/16" X 1" HEX Hd Cap Screw	3
18	31-254-00	36-Tooth Spur Gear, .875 bore	1
19	87-074-00	1/4"-28NF Zerk Fitting	1
20	87-071-00	3/16" Zerk Fitting	1
21	80-400-10	3/4" ID Ball Bearing	2
22	16-405-00	3/4" ID X 1-1/4" OD Spacer	1



Steering Linkage, Geared, SS-536, SS-546, MX-600

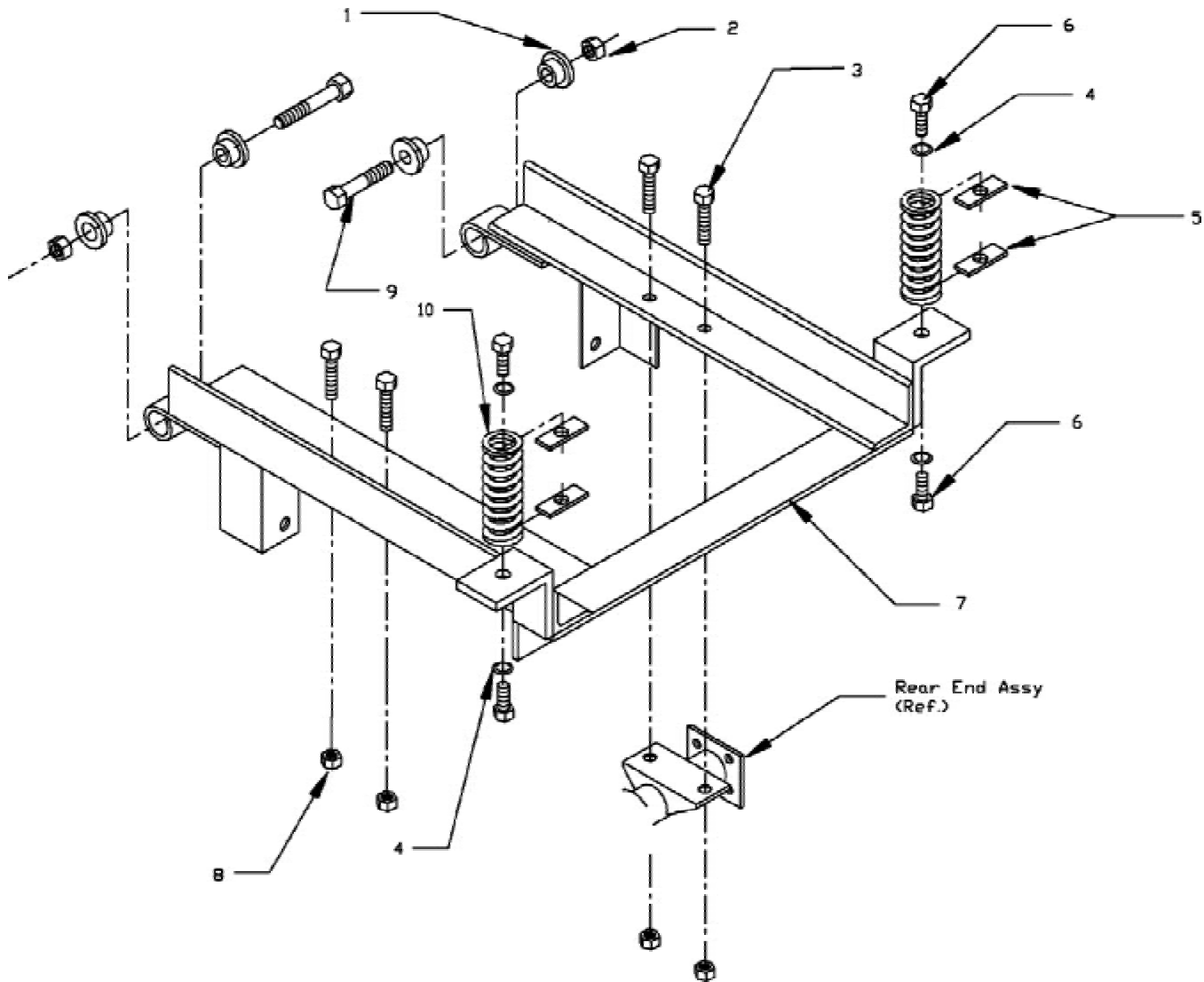


Steering Linkage, Geared, SS-536, SS-546. MX-600

Item No.	Part No.	Description	Qty
1	19-011-25	Cover	1
2	19-011-20	Steering Wheel	1
3	80-400-10	3/4"ID Bearing	2
4	88-060-22	1/4" X 3-1/2" NC Hex Bolt	2
5	88-068-82	1/4" Lockwasher	6
6	18-309-13	Plate and Sleeve, Weldment	1
7	20-031-20	Steering Shaft and Gear	1
8	31-255-10	Stem and Gear, Weldment	1
9	32-207-00	3/8" ID X 5/8" OD Bronze Bushing	1
10	45-003-10	Mounting Plate Gasket	1
11	31-254-00	36 Tooth, Spear Gear	1
12	88-069-81	1/4" Locknut	4
13	18-309-11	Bottom Plate	1
14	45-004-10	Gear Box Gasket	1
15	18-309-12	Gear Box Case	1
16	87-071-00	3/16" Zerk Fitting	1
17	71-505-05	Head Light mounting Bracket	1
18	88-060-25	1/4" X 4-1/2"NC HEX Bolt	4
19	32-203-00	3/4"ID X 7/8"OD Bronze Bushing	1
20	88-199-82	5/8" NF Jam Nut	1

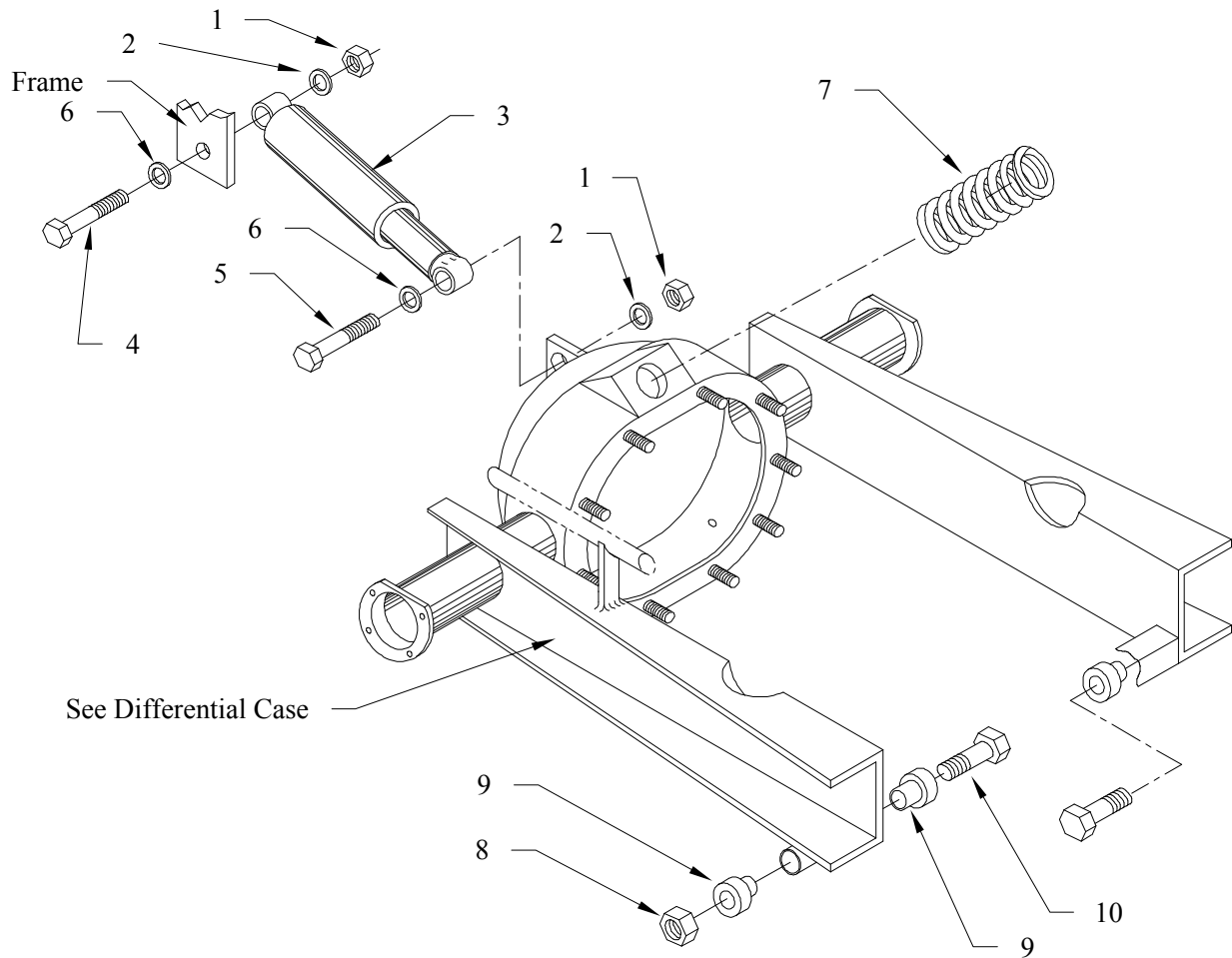


Suspension, Rear, SS-536, SS-546



Item No.	Part No.	Description	Qty
1	98-601-00	Rubber Grommet, 1/2" ID	4
2	88-149-81	1/2" Locknut	2
3	88-100-15	1/2" X 1-3/4" Bolt	4
4	88-108-62	3/8" Lockwasher	4
5	85-141-00	Spring Clip	4
6	88-100-11	3/8" NC X 1" Bolt	4
7	00-536-01	Drive Frame	1
8	88-149-81	1/2" Locknut	4
9	96-240-00	1/2" X 4" Bolt	2
10	85-140-00	Spring	2

Suspension, Rear, SS-534



Item No.	Part No.	Description	Qty
1	88-189-81	Nut	2
2	88-188-61	Washer	1
3	86-602-00	Shock	1
4	88-180-18	Bolt, 5/8	1
5	88-180-18	Bolt, 5/8	1
6	88-188-61	Washer	1
7	85-140-00	Spring	1
8	88-149-81	Nut	2
9	98-601-00	Bushing	4
10	96-240-00	Bolt	2



Wheels and Tires

4-Hole 5-Hole	Part No.	Description
All tire/wheel sizes are 4.80 x 8 unless otherwise specified		
	10-075-00	Tire, Pneumatic, Load Range B
	10-076-00	Tire, Pneumatic, Load Range C
	10-074-00	Tire, Man-Toter, Rib
	10-074-10	Tire, Man-Toter, Rib, Non-Marking
	*	Tire, Man-Toter, Lug
*	12-012-00	Wheel, tubeless
	13-001-00	Wheel with Center Hub (front only), includes bearing and seals
*	12-042-00	Wheel, Split Rim
*	12-043-20	Wheel, Split Rim
	13-576-10	Tire/Wheel assembly, Front w/center hub, Pneumatic, Load Range B
*	13-734-00	Tire/Wheel assembly, Pneumatic, Load Range B
*	13-734-12	Tire/Wheel assembly, Pneumatic, Load Range B
*	13-734-10	Tire/Wheel assembly, Foam Filled
*	13-734-26	Tire/Wheel assembly, Foam Filled
*	13-734-40	Tire/Wheel assembly, Man-Toter, Rib
*	13-734-45	Tire/Wheel assembly, Man-Toter, Lug
*	13-734-50	Tire/Wheel assembly, Man-Toter
*	13-734-41	Tire/Wheel assembly, Man-Toter, Non-marking, Rib
*	13-734-51	Tire/Wheel assembly, Man-Toter, Non-marking, Rib
*	13-734-11	Tire/Wheel assembly, Pneumatic, Split Rim Load Range B
*	13-739-10	Tire/Wheel assembly, Pneumatic, Split Rim Load Range C
*	13-734-25	Tire/Wheel assembly, Pneumatic, Split Rim Load Range B
	11-030-00	Tube
	13-989-00	Valve Stem
	97-236-00	Wheel Nut
	12-120-00	Center Hub, for Bolt on Wheel, includes bearings and seals

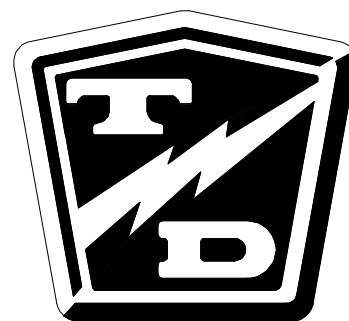
SS-534 is equipped with 5-hole wheels

SS-536, SS-546, and MX-600 is equipped with 4-hole wheels

Appendixes

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APPENDIX A: SPECIAL TOOLS

Note: This is a listing of all tools available. Not all tools would be required for all vehicles. Refer to the Maintenance, Repair, and Troubleshooting sections for information on tools required.



62-027-32: Throttle Module Analyzer
Tests the throttle module in or out of the vehicle



75-089-00: Throttle Module Test Harness
Used in conjunction with a volt meter to test the throttle module. The module must be installed in a working control system.
Note: Part # 62-027-31 includes instructions



41-532-50: Chain Case Centering Tool
Used to center the chain case cover on all vehicles equipped with the Power Traction primary reduction and a pinion brake or speed sensor. Includes instructions.



43-201-50: Pinion Seal Installation Tool
Used to install the pinion seal on all vehicles equipped with the Power Traction primary reduction and a pinion brake or speed sensor.



62-027-00: Test Light
Used for testing electrical circuits. Switchable for 12, 24, 36, 48 volt systems.
Required to complete troubleshooting provided in the vehicle service manuals.



62-027-61 and -62: Sevcon System Handset
Diagnostics and adjustments (-62 only) of the Sevcon Power Pak and Micro Pak control systems.



62-027-64 and -65: Curtis AC System Handset
Diagnostics and adjustments (-65 only) of the Curtis AC control system.



96-500-43: PMT/C Meter Reset Module
Required to reset the PMT/C maintenance meter (special order option).

APPENDIX A: SPECIAL TOOLS



75-442-55: Pin Removing Tool

Removes pins from Molex Mini-Fit harness connectors.



41-350-13: Disc Brake Boot Installation Tool

Assists in installing the rubber boot onto the disc brake piston.



70-440-55: Pin Removing Tool

Removes pin from Amp circular harness connectors.



77-200-00: Hydrometer

Used for testing battery electrolyte. Illustration is of a typical hydrometer, actual hydrometer type may vary.



72-201-00: Battery Filler

Used to safely add water to batteries. Equipped with splash guard and auto-shutoff when cell is full.

Illustration Not Available

96-500-40: Fork Collar Weld jig

Used to properly align the front fork collar when replacing the collar in the frame. SS-536 and MX-600 only.



Molex # 11-300-02: Pin Removing Tool

Removes 0.062 diameter pins from Molex rectangular harness connectors. Not available from Taylor-Dunn. Purchase from any local electronics distributor.



Molex # 11-300-06: Pin Removing Tool

Removes 0.093 diameter pins from Molex rectangular harness connectors. Not available from Taylor-Dunn. Purchase from any local electronics distributor.



APPENDIX B: SUGGESTED TORQUE LIMITS FOR STANDARD HARDWARE

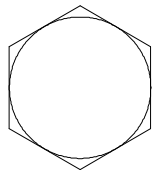
HARDWARE IDENTIFICATION

Standard Head Markings

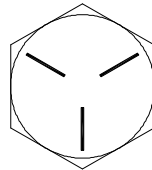
NOTE: Torque value used should be for lowest grade of hardware used. If a grade 2 nut is used on a grade 8 bolt, use grade 2 torque value.

NOTE: Torque values specified are for clean dry threads.

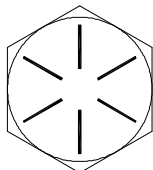
Hex Bolts



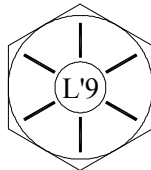
S.A.E. Grade 2



S.A.E. Grade 5



S.A.E. Grade 8



L'9

The grade of a metric bolt is cast directly on the head. Below is an example of a 10.9. the location and style of the text will vary.



Other Bolts



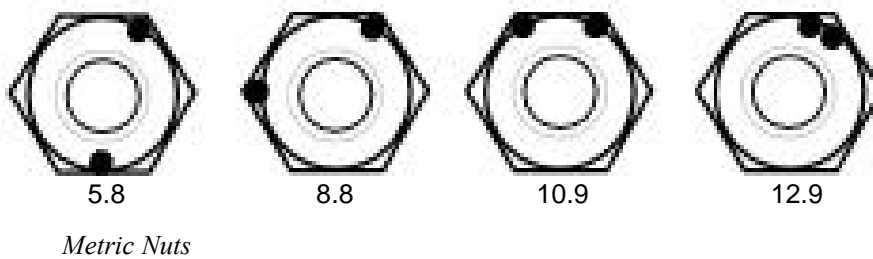
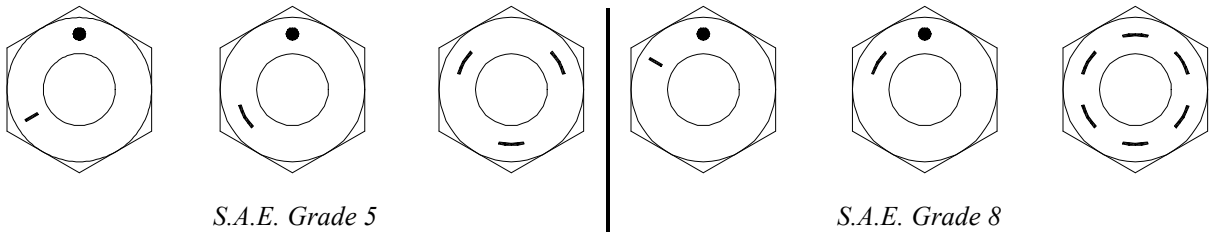
Truss Head, grade 2



*Carriage Bolt, grade 2
(unless marked as above)*

Hex Nuts

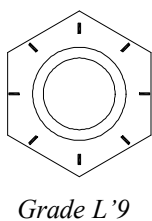
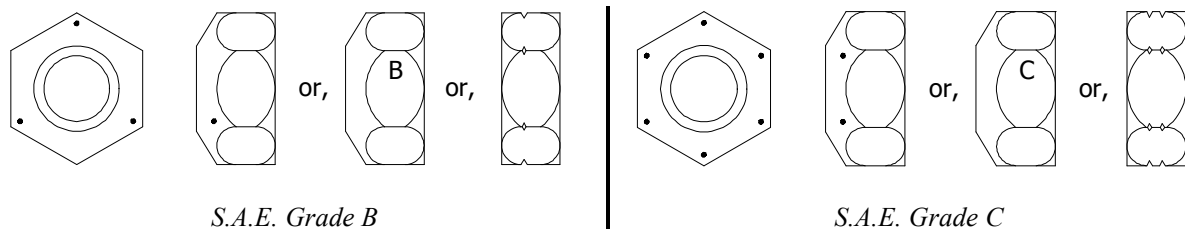
Nuts with no markings are to be treated as S.A.E. Grade 2



Hex Lock Nuts (stover)

Lock nuts use a letter to indicate the grade of the nut. Grade A' locknuts would be the equivalent of Grade '2' hex nuts, Grade 'B' as Grade '5' and Grade 'C' as Grade '8'.

NOTE: Nuts with no markings are to be treated as S.A.E. Grade A



Other Nuts

Other nuts used by Taylor-Dunn® should be treated as S.A.E. grade A



Appendixes

Generic Torque Values

All torque values are for clean dry zinc plated threads in noncritical steel assemblies of the same hardness specification. Reduce torque approximately 10-15% for lubricated threads.

Refer to the service section assembly procedure for critical torque values.

Imperial (inch), Foot Pounds						Imperial (inch), Newton Meters					
Dia.	Pitch	Grade, SAE				Dia.	Pitch	Grade, SAE			
		2	5	8	L9			2	5	8	L9
#4	40	*	*	*	*	#4	40	*	*	*	*
#6	32	*	*	*	*	#6	32	*	*	*	*
#8	32	*	*	*	*	#8	32	*	*	*	*
#10	32	*	*	*	*	#10	32	*	*	*	*
#12	32	*	*	*	*	#12	32	*	*	*	*
1/4	20	5.5	8.5	12.5	11	1/4	20	7.4	11.5	16.9	14.9
	28	6.5	10.5				28	8.8	14.2		
5/16	18	12.0	17.5	24.5	22	5/16	18	16.2	23.7	33.2	29.8
	24	12.5	19.0	*	*		24	16.9	25.8	*	*
3/8	16	20	30	43	40	3/8	16	27.1	41	58	54
	24	22.5	33	50	45		24	30.5	45	68	61
7/16	14	27	50	70	65	7/16	14	37	68	95	88
	20	36	55	77	70		20	49	75	104	95
1/2	13	49	75	106	95	1/2	13	66	102	144	129
	20	55	85	120	110		20	75	115	163	149
9/16	12	70	109	153	140	9/16	12	95	148	614	190
	18	78	121	171	160		18	106	164	232	217
5/8	11	97	150	212	195	5/8	11	132	203	287	264
	18	110	170	240	225		18	149	230	325	305
3/4	10	172	275	376	350	3/4	10	233	373	510	475
	16	192	297	420	390		16	260	403	569	529
7/8	9	278	429	593	565	7/8	9	377	582	804	766
	14	306	473	818	625		14	415	641	1109	847
1	8	416	644	909	850	1	8	564	873	1232	1152
	14	466	721	1018	930		14	632	978	1380	1261
1-1/8	7	590	794	1287	1700	1-1/8	7	800	1076	1744	2304
	12	662	891	1444	1850		12	897	1208	2364	2508
1-1/4	7	832	1120	1817	2950	1-1/4	7	1128	1518	2463	4000
	12	922	1241	2012	3330		12	1250	1682	2727	4514

Conversion Formulas:

Foot Pounds = Newton Meters x 0.737562149

Newton meters = Foot Pounds x 1.355817948

All torque values are for clean dry zinc plated threads in noncritical steel assemblies of the same hardness specification. Reduce torque approximately 10-15% for lubricated threads.

Refer to the service section assembly procedure for critical torque values.

Metric, Newton Meters						Metric, Foot Pounds					
Dia.	Pitch	4.6	Grade, N-m			Dia.	Pitch	4.6	Grade, N-m		
			8.8	10.9	12.9				8.8	10.9	12.9
3	0.50	0.51	*	*	*	3	0.50	0.38	*	*	*
4	0.70	0.95	3.1	*	*	4	0.70	0.7	2.3	*	*
5	0.80	2.28	6.1	*	*	5	0.80	1.7	4.5	*	*
6	1.00	3.92	10.4	15.5	*	6	1.00	2.9	7.7	11.4	*
8	1.00	*	27.0	*	*	8	1.00	*	19.9	*	*
	1.25	9.48	25.0	37.0	*		1.25	7	18.4	27.3	*
10	1.00	*	57.0	*	*	10	1.00	*	42	*	*
	1.25	*	54.0	*	*		1.25	*	40	*	*
	1.50	19.1	51.0	75.0	*		1.50	14.1	38	55	*
12	1.25	*	96.0	*	*	12	1.25	*	71	*	*
	1.50	*	92.0	*	*		1.50	*	68	*	*
	1.75	32.6	87.0	160	*		1.75	24	64	118	*
14	1.50	*	150	*	*	14	1.50	*	111	*	*
	2.00	51.9	140	205	*		2.00	38	103	151	*
16	1.50	*	*	*	*	16	1.50	*	*	*	*
	2.00	79.9	215	310	*		2.00	60	158	229	*
18	1.50	*	*	*	*	18	1.50	*	*	*	*
	2.00	*	*	*	*		2.00	*	*	*	*
	2.50	110	300	*	*		2.50	81	221	*	*
20	1.50	*	*	*	*	20	1.50	*	*	*	*
	2.00	*	*	*	*		2.00	*	*	*	*
	2.50	156	430	*	*		2.50	115	317	*	*
22	1.50	*	*	*	*	22	1.50	*	*	*	*
	2.00	*	*	*	*		2.00	*	*	*	*
	2.50	211	580	*	*		2.50	156	428	*	*
24	2.00	*	*	*	*	24	2.00	*	*	*	*
	3.00	270	740	*	*		3.00	199	524	*	*
27	3.00	*	*	*	*	27	3.00	*	*	*	*
	3.00	398	*	*	*		3.00	293	*	*	*
30	2.00	*	*	*	*	30	2.00	*	*	*	*
	3.50	540	*	*	*		3.50	398	*	*	*



APPENDIX C: BRAKE LINING HANDLING PRECAUTIONS

⚠ WARNING

Taylor-Dunn does not currently supply asbestos fiber-brake pads/shoes with any vehicle. However, there is the possibility that the original brake pads/shoes were replaced with aftermarket pads/shoes containing asbestos. Since this possibility does exist, the brake pads/shoes should be handled as if they do contain asbestos.

Never use compressed air or dry brush to clean the brake assemblies. Use an OSHA approved vacuum cleaner or any alternate method approved by OSHA to minimize the hazard caused by airborne asbestos fibers and brake dust.

Do not grind, sand, break, or chisel the brake pads/shoes, as this will cause unnecessary dust, possibly releasing asbestos fibers in the air.

Always wear protective clothing and a respirator when working on the brake pads/shoes or their associated components.

Inhaled asbestos fibers have been found to cause cancer and respiratory diseases.

Do not drive the vehicle if any worn or broken part is detected in any part of the brake system. The cause of the damage must be repaired immediately.