TAYLOR-DUNN®

The Best Way To Go About Your Business

Huskey I I

Models Inlcuded:
C0-426-48AC

MANUAL MC-425-04

Operation, Troubleshooting and Replacement Parts Manual

Revision: C

Serial number Starting: 167538

TAYLOR-DUNN SERVICE CENTER

For more information about this and other Taylor-Dunn® manuals, please write Taylor-Dunn®:

Taylor-Dunn® Mfg.
2114 W. Ball Road
Anaheim, CA 92804
(Attn: Technical Writer)

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

Contents

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B2-48 With Stake Side Dump Bed Option

SC1-00 Stock Chaser

E4-55 Sit Down Tow Tractor

C4-25 Sit Down Tow Tractor

Introduction

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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 in approved seating locations, 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.

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

This section 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.

Conventions

Symbols and/or words that are used to define warnings, cautions, instructions, or notes found throughout this manual:

⚠WARNING

or,

⚠WARNING

A shaded box with the word "Warning" on its left 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.

⚠CAUTION

The symbol at the left and the bold text contained within a box 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.

HOW TO IDENTIFY YOUR VEHICLE

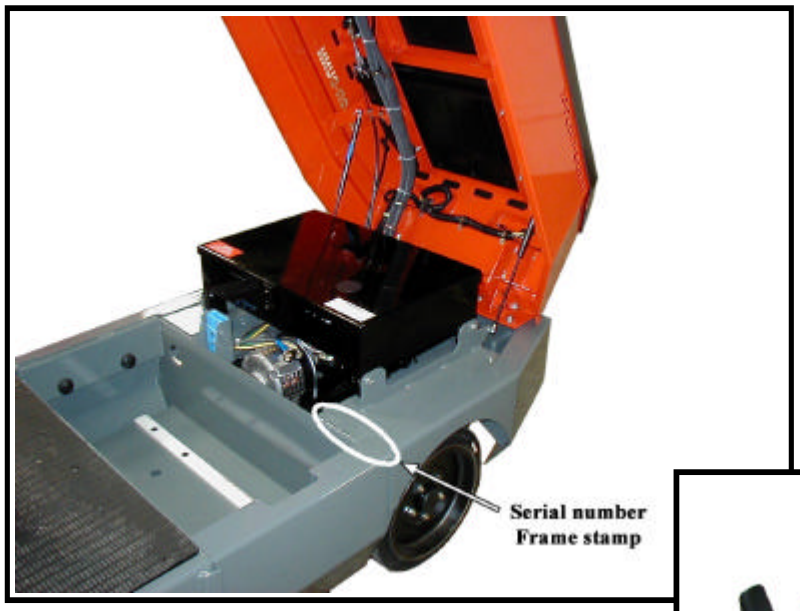
This manual applies to vehicles with the same model and serial numbers listed on the front cover.

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 speed of 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.

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



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
- Hand Parking Brake (optional)
- Electric Motor 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.

TAYLOR - DUNN

Safety Rules and Operating Instructions

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STANDARD SPECIFICATIONS TOW TRACTOR

ITEM	SPECIFICATION
Occupancy	Driver only, no passengers
Dimensions Length includes standard hitch	239 L x 99 W x 137 H Centimeters 94 L x 39 W x 54 H Inches
Turning Radius	189.2 Centimeters (74.5 inches)
Dry Weight (Without Battery)	1,224 kg (2,700 lbs)
Battery Compartment Dimensions (lift out) Battery Compartment Dimensions (side extract)	470 L x 812 W x 610 H Millimeters(18.5 L x 32 W x 24 H inches) 470 L x 812 W x 610 H Millimeters(18.5 L x 32 W x 21.25 H inches)
Battery Specifications: Min/Max Battery Weight Voltage Connector Lead Length Position Cover	 544 kg to 680 kg (1,200 lbs to 1,500 lbs) 48 SB 350 Blue 762 millimeters (30 inches) A No
Maximum Towed Load Draw bar Pull	13,600 kg (30,000 lb) @ 8 kph (5 mph) 13.3kN (3,000 pound) Ultimate, 2.7kN (600 pound) Normal
Electrical System	Solid State AC Speed Control
Transmission	Helical Gear, Oil Bath, Automotive Type Hypoid Differential
Motor, AC 3-Phase	12.7kW (17 hp), intermittent
Maximum Recommended Speed	19.3 kph (12 mph)
Brakes	Four Wheel Hydraulic Disc Assisted by Motor Regenerative Braking Automatically Applied Park Brake
Steering	Automotive Steering 24:1
Tires	4.00 x 8 Soft Solid, Traction Tread
Instrumentation	Combination Display, Key Switch, Horn Button, Forward/Reverse Switch, Headlight Switch, Emergency Stop Switch, Hi-Low/Tow Speed Switch
Lights	Headlight, Tail/Brake/Reverse Light

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 B56.9).

SAFETY RULES AND GUIDELINES

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 while also obeying he following safety rules and guidelines (reference American National Standards Institute Operator Controlled Industrial Tow Tractors ANSI B56.9).

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.

- Do not drive this vehicle unless you are a qualified and trained operator.

⚠WARNING

This vehicle is not designed to be driven on public roads or highways. It is available in maximum designed speeds ranging from 3 to 12 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.

⚠WARNING

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

- Keep all body parts (head, arms', legs') inside the vehicle while it is moving.
- Drive slowly when making a turn especially if the ground is wet or slippery.
- Drive slowly when driving on an incline.
- This vehicle may overturn easily if turned sharply while driven at high speeds, or on an incline.
- Drive only on level surfaces or on surfaces having an incline of no more than 10% (5.6 degrees).
- Do not drive over loose objects, holes, or bumps.
- Observe all traffic regulations and speed limits (see speed warning above).
- Keep to the right under normal conditions.
- Maintain a safe distance from all objects.
- 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.
- Keep a clear view ahead at all times.

⚠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. **If equipped with a hand operated park brake, set the 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 B56.9, 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 B56.9.

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

Key-Switch

A key-switch, located on the right center side of the instrument panel, turns on the vehicle. Rotate the key clockwise to turn the vehicle power on, counterclockwise to turn the vehicle power off.

The key-switch should be in the “OFF” position whenever the operator leaves the vehicle.

This switch is also designed to secure and disable the vehicle. The key can only be removed when the key-switch is in the “OFF” position.

Forward-Off-Reverse Switch

The forward-Off-reverse switch, located on the right side of the instrument panel, determines the direction of travel of the vehicle. Push the top of the switch to engage the forward direction. Push the bottom of the switch to engage the reverse direction.

DO NOT SWITCH from forward to reverse or vice-versa while the vehicle is in motion. Make sure the vehicle is completely stopped before shifting.

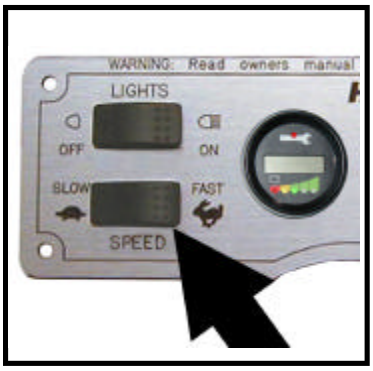
The forward-off-reverse switch should be in the center “OFF” position, with key-switch off whenever the operator leaves the vehicle.

Horn Switch

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

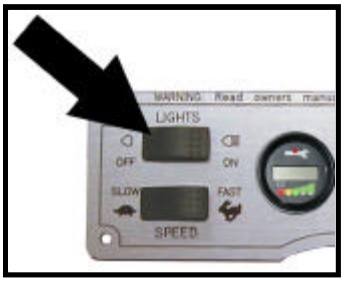
Accessory Switch (Optional)

The accessory switch is located below the left side of the instrument panel , mounted on the frame. Lift the switch lever up to turn on the accessory, down to turn off the accessory. The accessory can be turned on with the key switch in the “OFF” position.



Hi-Low / Tow Switch

The high-low switch is located on the lower left of the instrument panel. Push on the left side of the switch (turtle) for slow speed. Push on the right side of the switch (rabbit) for normal speed.

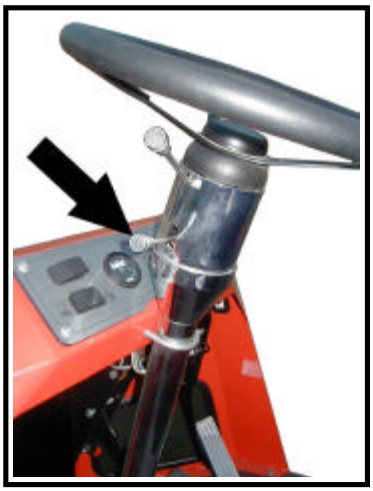


Headlight Switch

The headlight switch is located on the top left of the instrument panel. Push the right side of the switch to turn the lights on. Push the left side of the switch to turn the light off.

Steering

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 counter-clockwise. If equipped with tilt steering, the release lever is located on the lower left of the steering column. Pull the lever up to reposition the steering wheel.



Tilt lever (optional)

Reverse or Motion Alarm (motion alarm optional)

The reverse alarm is located in the electronics compartment mounted in the speed control panel enclosure. The reverse alarm is activated when the Key switch is in the “ON” position and the Forward-Off-Reverse switch is in the reverse position. The alarm makes a repeated audible sound.

The motion alarm is the same alarm that is used for the reverse alarm, only it operates in both the forward and reverse directions.

Tilt steering (optional)

Directional Signals (optional)

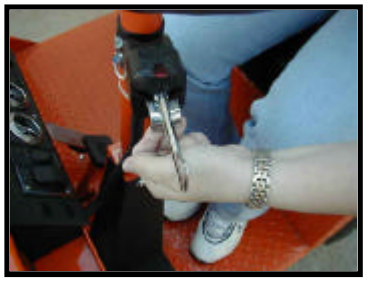
The turn signal lever is located on the left side of the steering column. Push the lever forward to activate the right turn signal and pull the lever back to activate the left turn signal.

Standard steering

Tilt steering (optional)

Hazard Light Switch (optional)

The hazard light switch is located on the left side of the steering column. The switch is a small tab. To activate the hazard lights, pull the tab out. To turn the hazard lights off, push forward or pull back the directional signal lever.



Standard steering

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.

Foot Brake Pedal

The foot brake pedal, is located to the right of the steering column, 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.

Seat Interlock Switch

A switch located under the driver's seat disables the power to the vehicle when the driver leaves the seat. The driver must be seated for the vehicle to operate.

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.

⚠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.

⚠WARNING

Do not get off of the seat while the vehicle is in motion. Getting off of the seat will activate the seat interlock, rapidly slowing the vehicle and applying the park brake. The abrupt slowing of the vehicle may result in severe bodily injury.

Emergency Battery Disconnect/Stop Switch

Emergency Stop Switch

Emergency Stop Switch

Depending on the age of your vehicle, it will be equipped with an Emergency Stop Switch, or an Emergency Battery Disconnect/Stop Switch. Activating this switch will immediately and abruptly stop the vehicle.

To identify the type of switch, refer to the illustrations to the left. To activate the switch, push down on the red knob. Pull up on the red knob to reset the switch.

The **Emergency Battery Disconnect/Stop Switch** disconnects the vehicle battery from the control system, disabling all vehicle functions.

The **Emergency Stop Switch** will stop the vehicle but will still allow some functions to work such as the parking brake bypass switch.

⚠WARNING

Do not depress the Emergency Disconnect Switch while the vehicle is in motion unless the vehicle must be stopped in an emergency. Depressing the switch will immediately apply the park brake, stopping the vehicle. The abrupt stopping of the vehicle may result in severe bodily injury.

Combination Display

The gauge on the dash has many functions. The display will cycle through the functions while the vehicle is in operation. Some functions may not be displayed depending on the current situation of the vehicle.

Hour Meter

Battery Status

Speedometer

Battery Status Indicator-bar graph:

There are five LED's at the bottom of the gauge. Each LED represents an approximate state of charge as listed below:

#5 (far right) LED (green): When on represents 84% to 100% charge remaining.
#4 LED (green): When on represents 68%-84% charge remaining.
#3 LED (green): When on represents 52%-67% charge remaining.
#2 LED (yellow): When on represents 36%-52% charge remaining.
#1 LED (red): When on represents charge 20%-36% remaining. When flashing represents 0%-20% charge remaining.

If the #1 LED is flashing, the vehicle or battery should be immediately removed from service to be recharged. Discharging beyond 20% will damage the battery.

Battery Status Indicator-digital:

Displays total charge remaining in percent. The example to the right indicates that the vehicle has 100% charge remaining (fully charged).

Speedometer:

Indicates the vehicles current rate of travel in miles per hour.

Hour Meter:

Displays total time (whole hours) vehicle has been in operation. Time is accumulated only while the vehicle is moving. The example to the right indicates that the vehicle has been in operation for 2,114 hours.

System Fault Monitor:

The gauge has an alpha numeric display that monitors the system status. If the system detects a fault, an abbreviated fault message will be displayed. Refer to the table below for the abbreviated fault message and description.

Fault Code	Description	Note
CNTL TEMP	Speed controller overheated	3
LOW V	Low battery voltage	
HIGH V	High battery voltage	
CNTL FLT	Speed controller internal fault or wiring fault	1
MOTORTEMP	Motor overheated	3
MOTR FLT	Faulty motor or wiring	1
EB FAULT	Electric brake fault	1
SRO	Operator error	2
STALL	Motor stalled	4

1: Refer repair to a qualified technician.

2: Switches used to operate vehicle may have been selected in the incorrect sequence. Refer to operator instructions in this section.

3: Wait for component to cool. Vehicle may be overloaded.

4: Vehicle overloaded, faulty motor, or possible locked up brakes or transmission. If vehicle is not overloaded, Refer repair to a qualified technician.

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.

⚠WARNING

Do not get off of the seat while the vehicle is in motion. Getting off of the seat will activate the seat interlock, rapidly slowing the vehicle and applying the park brake. The abrupt slowing of the vehicle may result in severe bodily injury.

Starting:

1. Make sure the forward-off-reverse witch is in the center “OFF” position.
2. Hold down the foot brake.
3. Insert the key and turn it to the “ON” position.
4. Wait 1-second then place the forward-off-reverse switch in the desired direction of travel.
5. Release the foot brake.
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.
- Immediately report any accidents or vehicle problems to a 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.

⚠WARNING

Do not turn off the key switch while the vehicle is in motion unless the vehicle must be stopped in an emergency. Turning the key switch off will immediately apply the park brake, stopping the vehicle. The abrupt stopping of the vehicle may result in severe bodily injury.

Loading and Unloading

- Do not carry more than the maximum number of passengers allowed for this vehicle.
- Do not exceed the cargo load capacity.
- Do not load cargo that can fall off.
- Be careful when handling cargo that is longer, wider, or higher than this vehicle, be sure to properly secure all loads.

Parking

Before leaving the vehicle:

- Set the forward-off-reverse switch to the ` "OFF" position.
- Turn the key switch to the "OFF" position and remove the key.
- If equipped with optional hand parking brake, 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

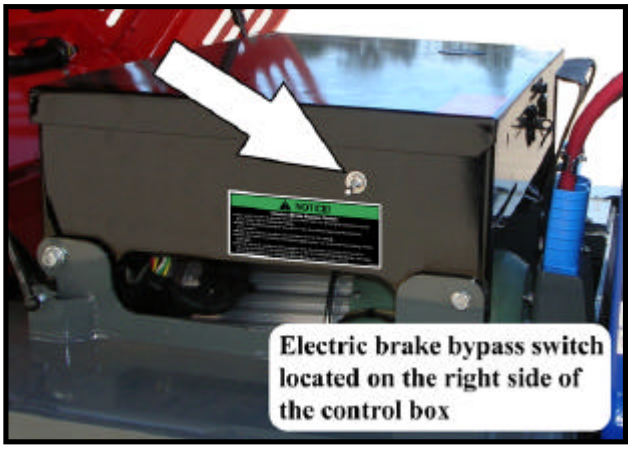
This vehicle is equipped with a standard automatic electric parking brake. The brake is automatically applied when the vehicle is stopped. There is a parking brake bypass switch located on the right side of the control box (see illustration). Place this switch in the UP position to tow the vehicle (see note below). This switch should be in the UP position only while towing the vehicle. the switch should be placed in the DOWN position immediately after the towing is completed. Leaving the switch in the UP position will discharge the battery.

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 m.p.h. or its maximum designed speed, whichever is lower.

If at all possible, this vehicle should be placed on a carrier, rather than towing.

NOTE: The automatic electric brake is powered by the vehicles battery. The brake may not disengage if the battery is severely discharged. A battery must be installed to tow the vehicle.



Adjustable Controller Parameters

A limited number of controller parameters can be adjusted by your dealer. A list of these adjustable parameters and their function is listed below along with their default factory settings.

Acceleration settings

Normal mode:

FwdAC LS: 2.1 Seconds
Time to accelerate to ~15% of full speed.

FwdAc HS: 2.9 Seconds
Time to accelerate to full speed.

RevAc LS: 5.0 Seconds
Time to accelerate to from **FwdAC LS** to full speed.

RevAc HS: 5.0 Seconds
Time to accelerate to full speed.

Tow Mode:

Same function descriptions as Normal mode.

FwdAC LS: 2.1 Seconds
FwdAc HS: 2.9 Seconds
RevAc LS: 5.0 Seconds
RevAc HS: 5.0 Seconds

Decleration settings

Brake Multiplier: 50%
Brake regen multiplier is activated by the brake switch.

Normal Decl HS: 8.0 Seconds
Time to decelerate to 0 when above 20% of full speed.

Normal Decl LS: 8.0 Seconds
Time to decelerate when below 20% of full speed.

Tow Decl function descriptions below are same as normal mode above.

Tow Decl HS: 7.0 Seconds
Tow Decl LS: 7.0 Seconds

Maintenance Meter Function

Service Timer: 0 Hours
Set to 0 (zero) disables function. Set to other than 0 will result in 'Service Due' cut speed when the set time expires.

⚠WARNING

Improper programming may cause unexpected operation of the vehicle and/or damage the electrical components. This could result in severe bodily injury and/or property damage

Speed Limits

Max: 6,250 RPM (motor)
Governed speed (see formula below)

Tow: 62%
Percentage of Max speed when Tow Switch is ON.

Rev: 40%
Percentage of Max speed when in reverse.

Low Batt: 40%
Percentage of Max speed when low battery warning is ON.

Service Due: 25%
Percentage of Max speed when service is due. See maintenance Meter Function.

Battery Characteristics

Full Volts: 2.165 volts per cell
Battery must exceed this voltage to be considered fully charged.

Empty Volts: 1.730 volts per cell
Voltage of a fully discharged battery.

BDI Level for Low Batt Spd: 15%
Low battery warning is ON when battery is discharged below this level.

BDI Reset %: 80%
Battery must be discharged below this value before the BDI will be allowed to reset.

Reset Volts: 2.10 volts per cell
Battery voltage must be above this value to reset the BDI. Modified by the 'BDI Reset %' above).

Discharge Time: 60 Minutes
Estimated battery discharge rate.

Miscellaneous

SRO Min Speed: 3000 RPM
Motor must be below this RPM to change directions with the throttle pedal depressed.

Speed Calculation Formulas:

RPM = (20172 / T_d) * (MPH / 60) * R

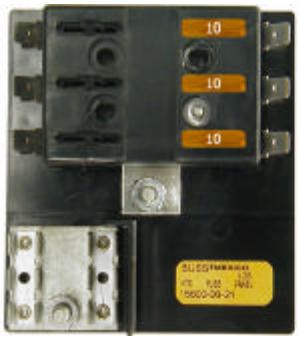
RPM = (31837 / T_d) * (KPH / 60) * R

Where, **RPM** = motor RPM, $\mathbf{T_d}$ = Tire diameter (inches or cm), **MPH** = Miles Per Hour, KPH = Kilometers per hour, **R** = Rear axle ratio

FUSE PANEL

The fuse panel is located under the access cover on the front cowl. In addition, there are main circuit breakers located in the electrical control box located behind the battery compartment.

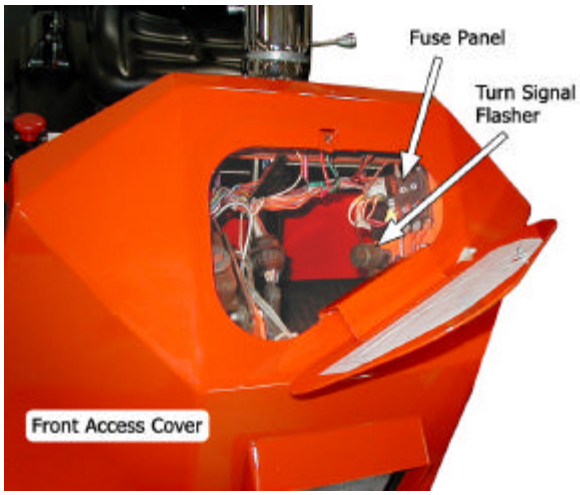
Circuit Breaker Panel



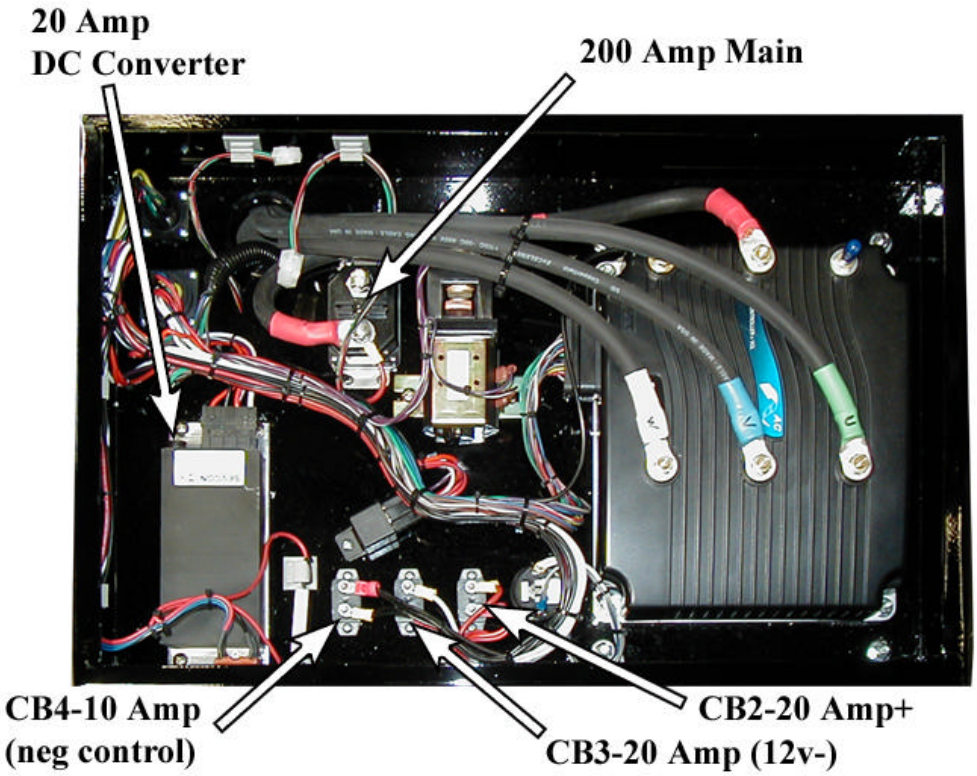
Accessory output

Lights and reverse alarm

Brake lights and horn



Electrical Control Box



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.

⚠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.

⚠CAUTION

Turn the Key switch OFF <u>BEFORE</u> 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).

Operation of the Charger

Refer to the operating instruction supplied with your charger or contact the charger manufacturer 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.

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 lifespan. Only authorized personnel should perform battery maintenance including maintaining the battery electrolyte level. Refer to Section 2-Maintainence, 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.

STORING AND 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.

PERIODIC MAINTENANCE CHECKLIST

Taylor-Dunn
Preventative Maintenance Schedule for GT Drive with AC Motor

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
				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
				Clean and lubricate motor coupler
				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

NOTE: A full page copy of the Periodic Maintenance Checklist is on the Vehicle Documentation CD under the [Misc] sub folder.

Daily 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 (automatic or hand operated), etc.
- Proper operation of all locking devises 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 corrected before the vehicle is returned to service.

⚠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.

TAYLOR - DUNN

General Maintenance

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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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠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.

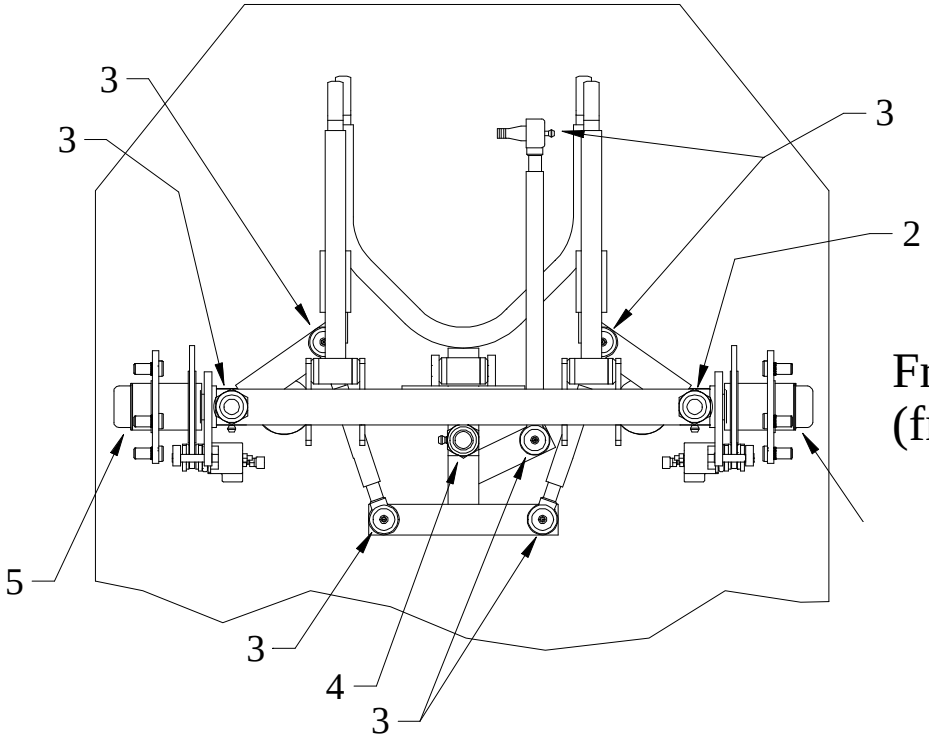
MAINTENANCE SCHEDULE

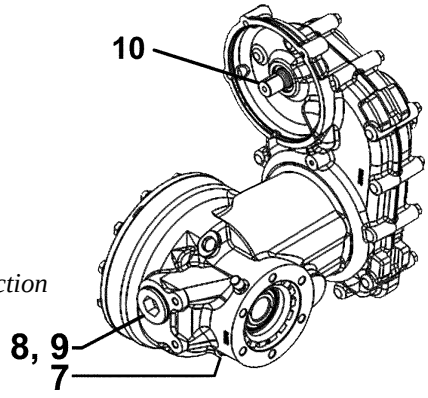
Refer to the maintenance schedules in section Safety Rules and Operating instructions.

TROUBLESHOOTING GUIDE

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

LUBRICATION CHART





GT Drive, center section

#	Description	Locations	Lubricant Type
1	-	-	-
2	King Pin	2	General Purpose Grease
3	Ball Joints	6	General Purpose Grease
4	Idler Pivot	1	General Purpose Grease
5	Front Wheel Bearings	2	High Temperature Wheel Bearing Grease
6	-	-	-
7	Drive Drain Plug	1	
8	Drive Level Plug	1	
9	Drive Fill Plug	1	SAE 75W90 Synthetic Hypoid Gear Oil
10	Motor Coupler	1	Part Number 94-421-34 Moly Paste

Front Axle Service

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INSPECT THE FRONT WHEEL BEARINGS AND KING PIN

⚠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. If equipped with a hand operated park brake, set the 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.

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

NOTE: If the king pin is loose, then refer to **Replace the King Pins and Bushings** *for information regarding replacing the king pin bushings. There are no adjustments for the king pin or bushings.*

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 battery connector.
11. Remove the blocks from behind the wheels.
12. Test drive the vehicle.

ADJUST FRONT WHEEL BEARINGS

⚠WARNING

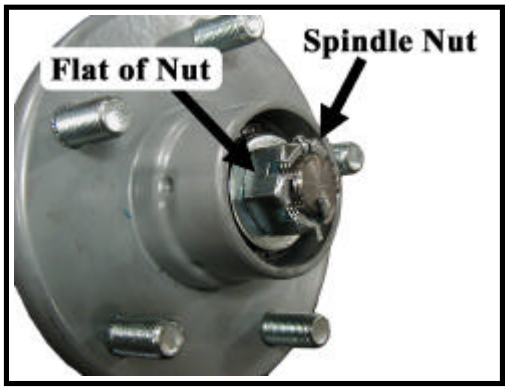
1. **Make sure the key-switch is in the "OFF" position, then remove the key.**
2. **Place the forward-reverse switch in the center "OFF" position.**
3. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect 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 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.*



Hub with Dust Cap Removed

11. Install a new cotter pin.
12. Install the dust cap.
13. Lower the vehicle.
14. Reconnect the main battery connector.
15. Remove the blocks from behind the wheels.
16. Test drive the vehicle.

FRONT AXLE REMOVAL AND INSTALLATION

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

Removal

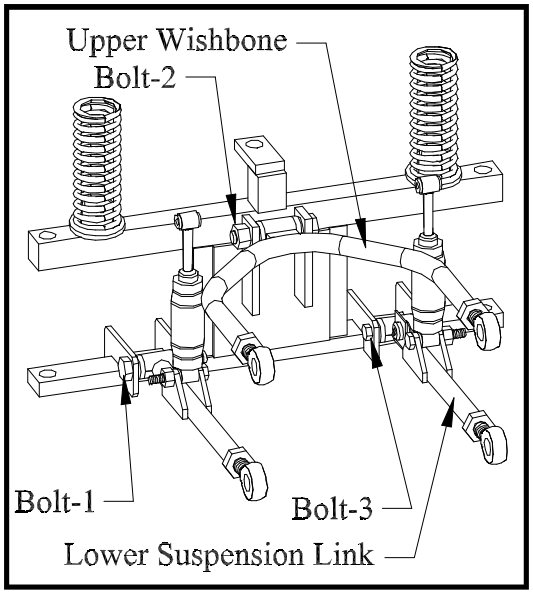
⚠WARNING

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 both front wheels. Refer to ***Tires and Wheels*** section for information regarding removing the front wheels.
8. Tie up or support the front axle so it can not fall out of the vehicle.
9. Disconnect the drag link ball joint or rod end from the steering pivot on the front axle assembly.

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

10. Disconnect the hydraulic brake lines from the brake bodies.
11. Remove the three bolts holding the front axle beam to the upper wishbone and the two lower suspension links and remove the axle from the vehicle.



Viewed from front

Installation

⚠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. If equipped with a hand operated park brake, set the 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. Install the front axle in reverse order of removal.

   NOTE: Use all new cotter pins.

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

   NOTE: Refer to **Tires and Wheels** *section for information regarding removing the front wheels.*

8. Realign the front wheels. Refer to ***Steering Component Service*** section for information regarding realigning the front wheels.
9. If equipped with front brakes, bleed the brakes. Refer to ***Brake Service*** section for information regarding bleeding the brakes.
10. Lower the vehicle.
11. Reconnect the main battery connector.
12. Remove the blocks from behind the wheels.
13. Test drive the vehicle.

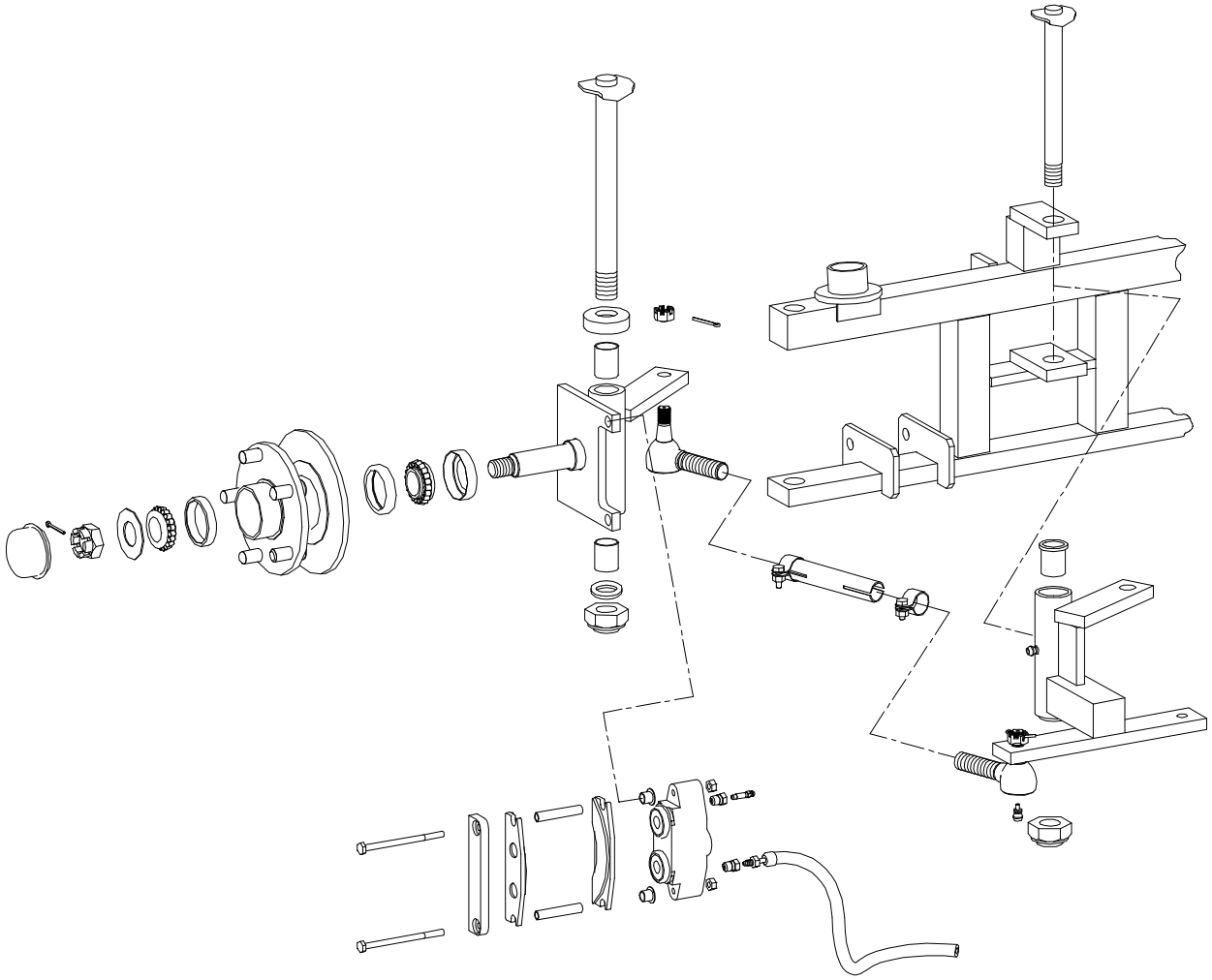
FRONT AXLE DISASSEMBLY

Disassembling and reassembling involves removing and replacing the left and right steering knuckles and king pin bushings. Refer to the following sections for information regarding these procedures:

Replace the Steering Knuckle

Replace the King Pins and Bushings

NOTE: The front axle does not have to be removed unless the axle beam must be replaced. Refer to **Front Axle Removal and Installation** *for information regarding removing the front axle.*



View from rear

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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

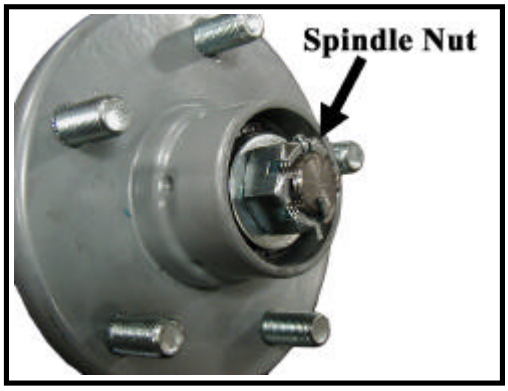
⚠WARNING

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 tire/wheel assembly from the hub. Refer to ***Replace the Steering Knuckle*** for information regarding removing the steering knuckle.
8. Remove the hub dust cap, cotter pin, and spindle nut.
9. Remove the hub from the steering knuckle.

   NOTE: For a front disc brake option you must remove the brake body before removing the hub. Refer to the **Brakes** *section for information regarding the removal of the brake body.*

   NOTE: Catch the outer bearing as it falls out.

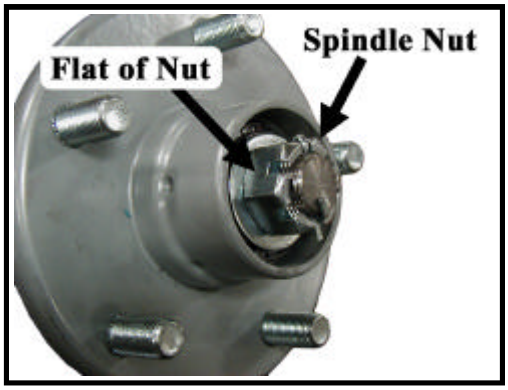


Hub with Dust Cap Removed

10. Thoroughly clean all grease from the inside of the hub and the bearings.
11. Inspect and replace the races and bearings as a set.

    NOTE: It is recommended to replace all four bearings and races in the left and right wheels as a set.

12. Assemble in reverse order, using new grease seals.
    a. Pack inner and outer bearings with grease.
    b. While rotating the hub, tighten the spindle nut to 30 ft-lbs. This seats the bearings.
    c. Back off the spindle nut one flat until the hub turns, but is not loose.
    d. Install a new cotter pin.



Hub with Dust Cap Removed

13. Install the hub dust cap.
14. Reinstall the brake body and the tire/wheel assembly.

    NOTE: Refer to the **Brakes** *section for information regarding the installation of the brake body.*

15. Lower the vehicle.
16. Reconnect the main battery connector.
17. Remove the blocks from behind the wheels.
18. Test drive the vehicle.

REPLACE THE KING PINS AND BUSHINGS

There are different types of king pin bushings depending on the configuration of your vehicle.

- Bronze bushings in the axle beam.
- Bronze bushings in the steering knuckle.
- Metal backed teflon bushings in the axle beam.

NOTE: Bronze bushings must be reamed or broached to the proper diameter after they are pressed into the axle beam or steering knuckle.

Refer to the illustration below for the type of bushing in your vehicle.

⚠WARNING

Failure to correctly broach or ream bronze bushings may result in steering difficulty and loss of control of the vehicle causing severe bodily injury and /or property damage.

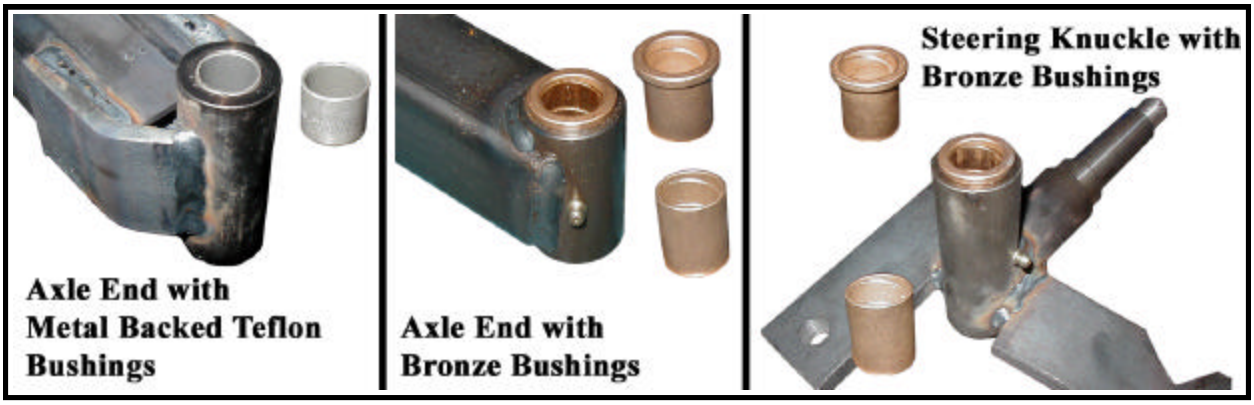
⚠WARNING

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. **If equipped with a hand operated park brake, set the 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 steering knuckle. Refer to ***Replace the Steering Knuckle*** for information regarding removing the steering knuckle.

   NOTE: It is not necessary to remove the tie rod or drag link for this procedure.

8. Press the king pin bushings out from the axle or steering knuckle.
9. Press new bushings into the axle or steering knuckle.
10. Ream or broach bronze bushings to 0.8755 - 0.8765 inches.
11. Inspect the king pin for damage or wear. If any damage or wear is noted then the pin must be replaced.

⚠WARNING **Failure to correctly broach or ream bronze bushings may result in steering difficulty and loss of control of the vehicle causing severe bodily injury and /or property damage.**

12. Reassemble in reverse order.

    *NOTE: Refer to **Replace the Steering Knuckle** for information on installing the steering knuckle.*

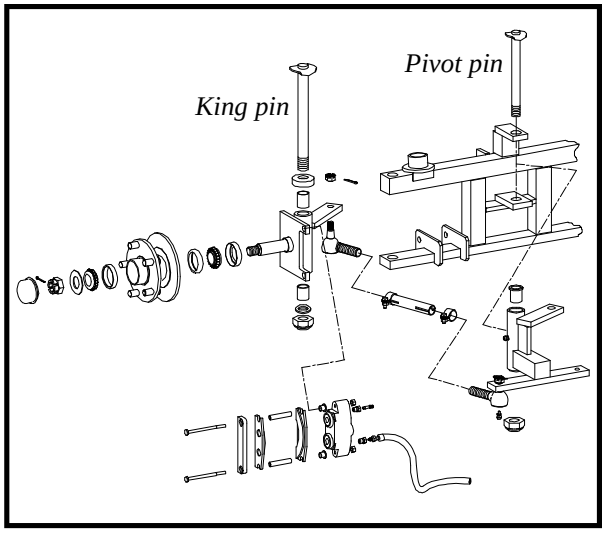
    NOTE: It is recommended that the thrust washers or bearing be replaced whenever replacing the king pin bushings. Refer to the **Replacement Parts** *section for the orientation of the bearing or washers in your vehicle.*

13. Grease the bushings (bronze only).
14. Lower the vehicle.
15. .Reconnect the main battery connector.
16. Remove the blocks from behind the wheels.
17. Test drive the vehicle.

REPLACE THE PIVOT PIN AND BUSHINGS

The procedure to replace the pivot pin is the same as the king pin procedure.

Ream or broach the bronze pivot bushings to 0.878 - 0.880 inches.



REPLACE THE STEERING KNUCKLE

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

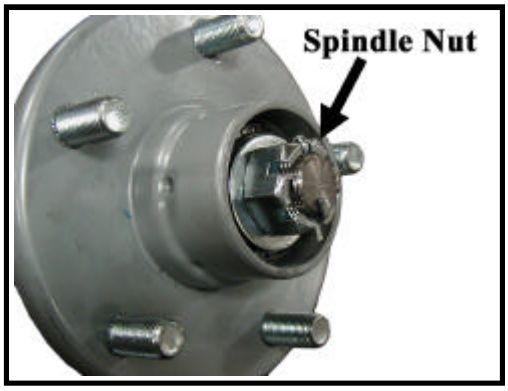
⚠WARNING

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 tire/wheel assembly. Refer to ***Tires and Wheels*** section for information regarding removing the tire/wheel assembly.
8. Remove the hub bearing cap, cotter pin and nut, then remove the hub from the steering knuckle.

   NOTE: For a front disc brake option you must remove the brake body before removing the hub. Refer to the **Brakes** *section for information regarding the removal of the brake body. Do not remove the hydraulic brake line from the brake body. If the brake line is removed then it will be necessary to bleed the brakes.*

   NOTE: Catch the outer bearing as it falls out.



Hub with Dust Cap Removed

9. Remove the drag link and/or tie rod from the steering knuckle. Refer to ***Replace the Ball Joints, Tie Rods, Drag Link*** in this section for information regarding removal of the drag link or tie rod.
10. While supporting the knuckle, remove the king pin and thrust bearing.
11. Remove the knuckle from the axle.
12. Thoroughly clean and/or replace all bearings, nuts, washers, and bushings.

    NOTE: Both the left and right side bushings and thrust bearings should be replaced as a set.

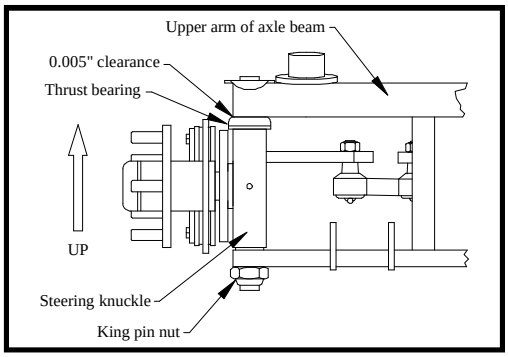
13. Assemble in reverse order.
14. Pack the thrust bearing with grease.
15. Tighten the king pin nut until there is 0.005" clearance between the top of the thrust bearing and the upper arm of the axle beam.

    NOTE: Refer to **Replace Front Wheel Bearings** *for information regarding proper tightening of the spindle nut.*

16. Install new cotter pins.
17. Realign the wheels.

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

18. Lower the vehicle.
19. Reconnect the main battery connector.
20. Remove the blocks from behind the wheels.
21. Test drive the vehicle.



Steering Component Service

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FRONT END ALIGNMENT

Inspection, Axle Centers

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠WARNING

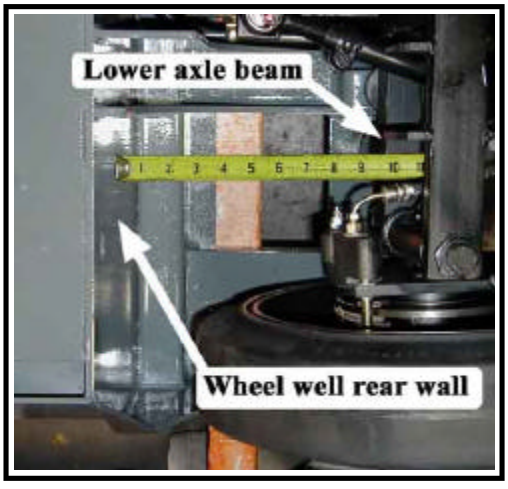
Always use a lifting strap, hoist, and jack stands, of adequate capacity to lift and support the vehicle. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.

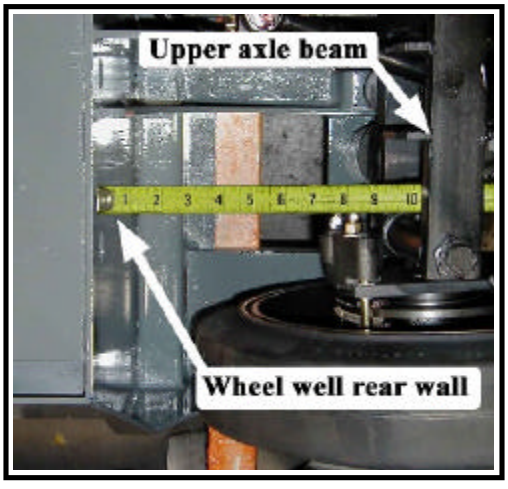
6. Raise the front of the vehicle and support with jack stands.
7. Measure the distances from the rear of the lower axle beam to the rear wall of the wheel well on both sides of the axle beam next to the steering knuckle. Adjust the lower suspension links so that the distance is between 10-1/8 to 10-3/8 inches.

   NOTE: The difference between the left and right measurement should be no more than 1/8 inch.

8. Measure the distances from the rear of the upper axle beam to the rear wall of the wheel well on both sides of the axle beam next to the steering knuckle. Adjust the upper wishbone link so that the distance is 1/2 inch less than the lower measurement.

   NOTE: Do not continue with the front end alignment until the axle centers are properly adjusted.





Center the Wheels

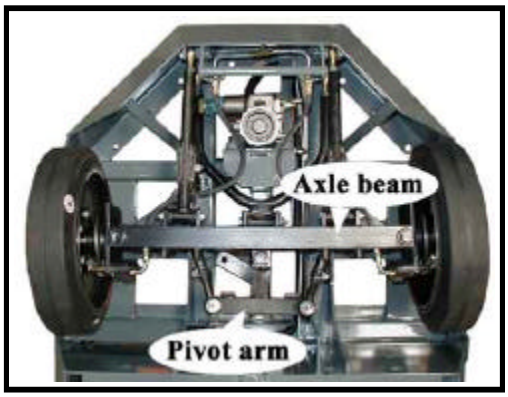
9. Center the steering gear and tie it off so that it cannot rotate.

   NOTE: Refer to **Center the Steering Gear** *section for information regarding centering of the steering gear.*

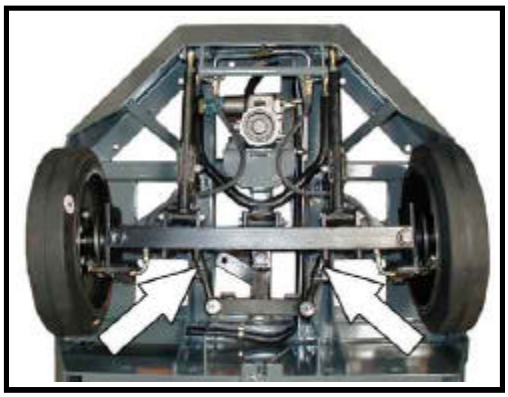
⚠WARNING

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.

10. Loosen the ball joint clamps on the drag link.
11. Adjust the drag link so that the steering pivot arm is parallel with the axle beam.
12. Position the ball joint clamps as shown and tighten to 28-32 ft lbs.



13. Loosen the ball joint clamps on the left and right tie rods.
14. Position a straight edge along the right side of the vehicle and adjust the right side tie rod so that the front wheel is parallel with the rear wheel.



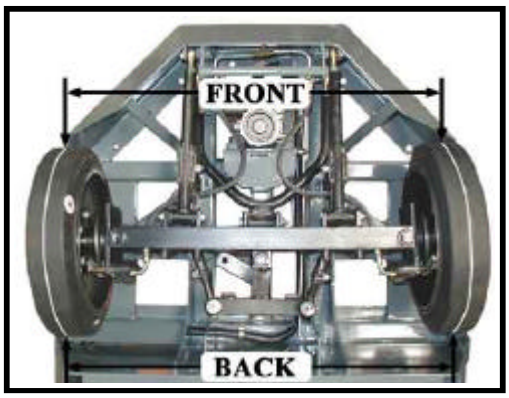
Tie rods

Toe In

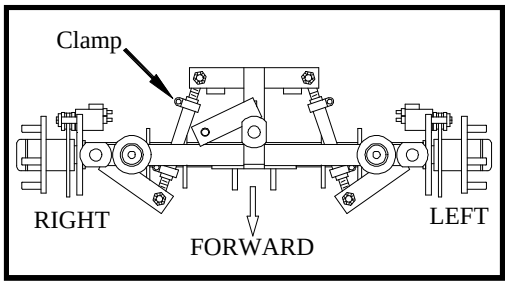
15. Using a piece of chalk, mark a line around the center of both front tires.

    HINT: Hold the chalk on the center of the tire and rotate the tire to mark the line.

16. Measure the distance between the lines at the front of the tires.
17. Measure the distance between the lines at the rear of the tires.



18. Adjust the left side tie rod so that the distance at the front and rear of the tires is the same.
19. Position the ball joint clamps as shown and tighten to 28-32 ft lbs.



⚠WARNING

Clamps positioned so that they contact other components may result in steering failure and loss of control of the vehicle causing severe bodily injury and/or property damage.

20. Untie the steering wheel and reconnect the main battery connector.
21. Rotate the steering wheel from a full left turn to a full right turn and make sure that the ball joint clamps do not contact any other component.
22. Remove the blocks from behind the wheels and test drive the vehicle.

INSPECT BALL JOINTS

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

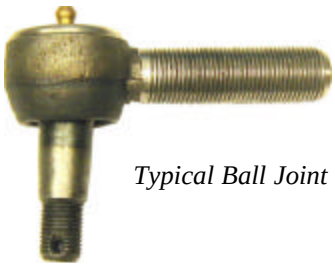
⚠WARNING

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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠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 position may cause loss of control of the vehicle resulting in severe bodily injury and/or property damage.

6. Tie off the front wheels so that they cannot turn.
7. While watching the ball joints, rapidly rotate the steering wheel to the left and right.
8. If the ball joint housing moves up or down then the ball joint is worn out and should be replaced. Refer to section ***Replacing a Ball Joint*** for information regarding replacing ball joints.
9. Untie the front wheels.
10. Reconnect the main battery connector.
11. Remove the blocks from behind the wheels.
12. Test drive the vehicle.



Typical Ball Joint

ADJUST THE STEERING GEAR

NOTE: In some vehicle configurations it may be necessary to remove the steering gear to perform this procedure. Refer to **Replace the Steering Gear** *for information regarding removing the steering gear.*

⚠WARNING

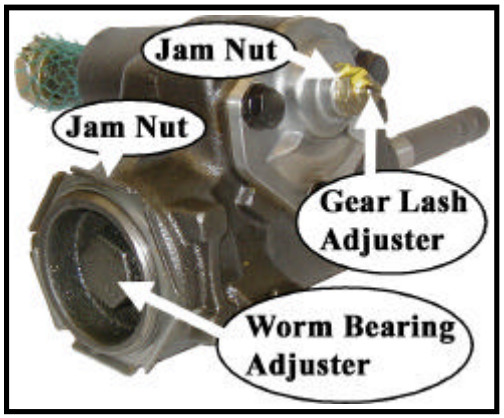
1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. If equipped with a hand operated park brake, set the brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive 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 serious bodily injury.

6. Raise the front of the vehicle and support with jack stands.
7. Disconnect the drag link from the pitman arm.

   NOTE: Refer to **Replace the Ball Joints** *section for information regarding removing the ball joint from the drag link.*



8. Loosen the gear lash jam nut and the worm bearing adjuster jam nut.
9. Unscrew the gear lash adjuster all of the way to the stop.
10. Loosen the worm bearing adjuster and then tighten just enough to remove all end play from the input shaft and then an additional 1/8 turn more.
11. While holding the worm bearing adjuster so that it cannot turn, tighten the worm bearing adjuster jam nut.
12. Find the center position of the steering shaft:
    A. Turn the steering shaft all of the way in one direction.
    B. While counting the rotations, turn the steering shaft all of the way in the opposite direction.
    C. Turn the steering shaft 1/2 the number of turns in the original direction.
13. While rotating the input shaft back and forth through its centered position, adjust the gear lash adjusting screw so that there is a slight drag as the steering gear is rotated through its centered position.
14. While holding the gear lash adjusting screw so that it cannot turn, tighten the gear lash adjusting screw jam nut.
15. Reconnect the main battery connector.
16. Remove the blocks from behind the wheels and test drive the vehicle.

REMOVE THE STEERING COLUMN

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Remove the steering wheel cap.
7. Remove the three screws holding the steering wheel to the adaptor and remove the steering wheel.

⚠CAUTION

The steering wheel adaptor is soft metal. Do not use a hammer to remove the steering wheel adaptor.

8. Remove the adaptor nut and the adaptor. It may require a puller to remove the adaptor from the shaft.
9. Remove the steering column u-bolt holding the column to the frame.
10. Slide the column up off of the steering shaft.
11. Remove the setscrew holding the u-joint to the steering gear input shaft.
12. Pull the steering shaft off of the steering gear input shaft.
13. Install the shaft in reverse order.

    NOTE: Lightly lubricate the upper and lower steering column bushings.

14. Reconnect the main battery connector.
15. Remove the blocks from behind the wheels.
16. Test drive the vehicle.

REPLACE THE STEERING GEAR

⚠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. **If equipped with a hand operated park brake, set the 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 setscrew holding the u-joint to the steering gear input shaft.
8. Remove the pitman arm.

⚠WARNING

Failure to support the steering gear will result in the steering gear falling out of the vehicle and could cause property damage and/or severe bodily injury.

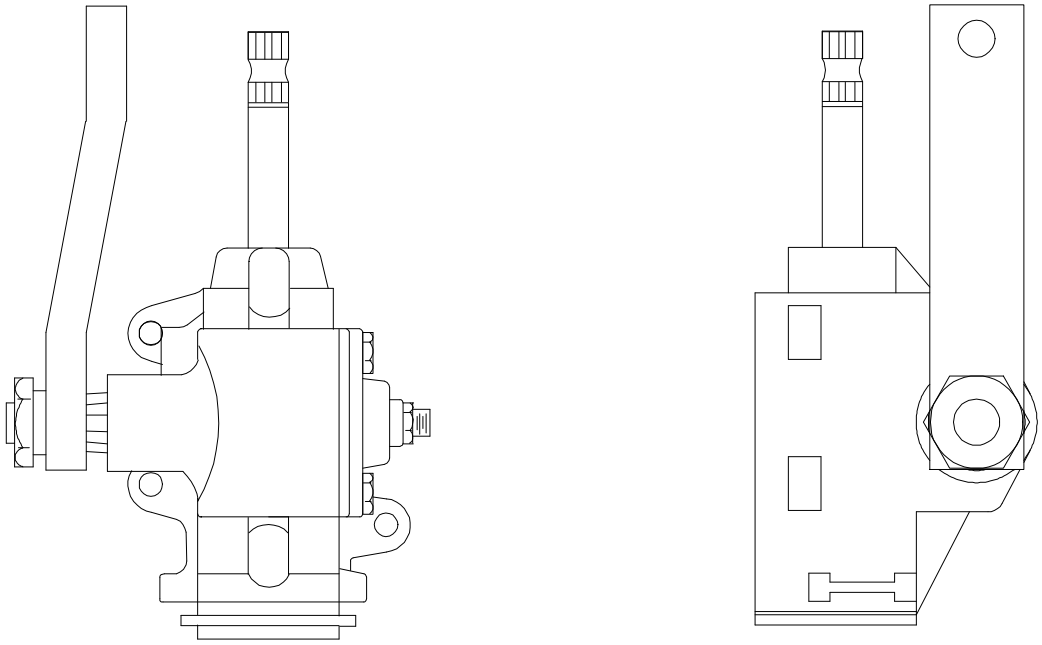
9. Support the steering gear so that it cannot fall out of the vehicle.
10. Remove the bolts holding the steering gear to the vehicle frame and remove the steering gear from the vehicle.
11. Install in reverse order. Torque the pitman arm nut to 75-100 ft-lbs. Apply thread locking compound to the steering shaft allen head screws.
12. Reconnect the main battery connector.
13. Remove the blocks from behind the wheels.
14. Test drive the vehicle.

CENTER THE STEERING GEAR

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

PITMAN SHAFT ALIGNMENT

1. Center the steering gear. Refer to ***Center the Steeing Gear*** for information regarding centering the steering gear.
2. Install the pitman arm parallel with the input shaft orientated as shown in the illustration.



REPLACE THE BALL JOINTS, TIE RODS, AND DRAG LINK

NOTE: If a rod end or ball joint is worn out, we recommend replacing all of the ball joints and/or rod ends as a set.

Replacing a Ball Joint

⚠WARNING

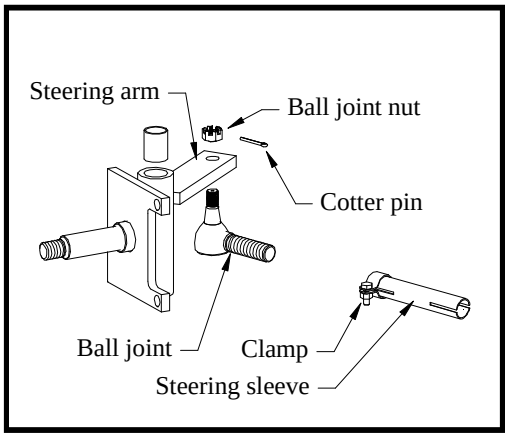
1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. If equipped with a hand operated park brake, set the brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive 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. Loosen the ball joint clamp on the steering sleeve.
8. Remove the cotter pin and ball joint nut.
9. Using a pickle fork, remove the ball joint from the steering arm.
10. Remove the ball joint from the steering sleeve.

    HINT: Count the number of turns required to remove the ball joint from the sleeve. This will make it easier to realign the wheels.



11. Install the new ball joint into the steering sleeve. Screw it into the sleeve the same number of turns counted in the previous step. Do not tighten the ball joint clamp at this time.
12. Install the ball joint into the steering arm. Tighten the ball joint nut to 40-45 ft-lbs. and install a new cotter pin.
13. Realign the front wheels.

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

14. Lower the vehicle.
15. Remove the blocks from the wheels, and test drive.

Replacing the Drag Link

The Drag Link is the linkage that connects the steering gear pitman arm to the steering knuckle. Refer to the illustration on the following page.

⚠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. **If equipped with a hand operated park brake, set the 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.

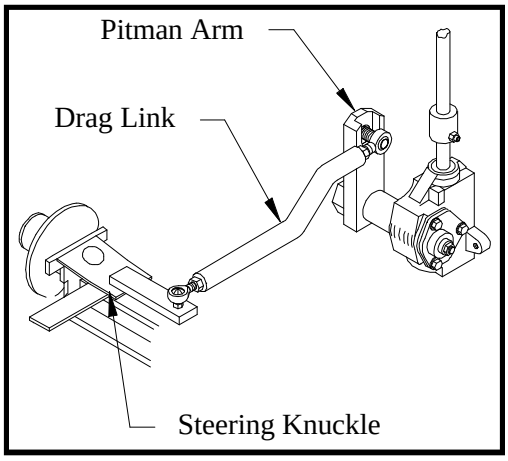
6. Raise the front of the vehicle and support with jack stands.
7. Remove the ball joints or rod ends from the steering knuckle and pitman arm.

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

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

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

11. Lower the vehicle.
12. Reconnect the main battery connector.
13. Remove the blocks from behind the wheels.
14. Test drive the vehicle.



Typical Drag Link

Replacing the Tie Rod

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

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

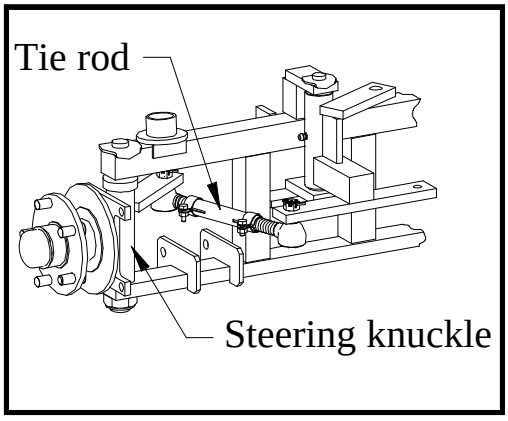
⚠WARNING

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 ball joints or rod ends from the steering knuckles.

   NOTE: Refer to the **Replacing the Ball Joints** *section for information regarding the removal of the ball joints or rod ends.*
8. Remove the tie rod as an assembly.
9. Install in reverse order.
10. Realign the front wheels.

    NOTE: Refer to the **Steering** *section for information regarding realignment of the front wheels.*
11. Lower the vehicle.
12. Reconnect the main battery connector.
13. Remove the blocks from behind the wheels.
14. Test drive the vehicle.



Front Axle Assembly (left side shown)

REPAIR THE STEERING GEAR

Disassembly

NOTE: The steering gear must be removed from the vehicle for this procedure. Refer to **Replace the Steering Gear** *section for information regarding removing the steering gear.*

NOTE: The steering gear is packed with grease. Only perform maintenance on the steering gear in an area that will contain any grease that may spill out of the steering gear when it is disassembled.

Refer to the illustration at the end of this section for a blown up view of the steering gear assembly.

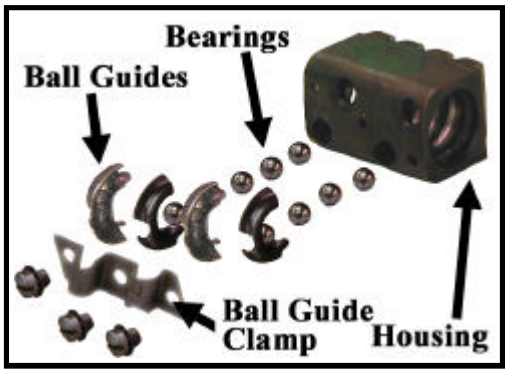
1. Center the steering gear.
   A. Turn the steering shaft all of the way in one direction.
   B. While counting the rotation, turn the steering shaft all of the way in the opposite direction.
   C. Turn the steering shaft 1/2 the number of turns in the original direction.
2. Remove the worm bearing adjuster locking ring and the worm bearing adjuster.

3. Remove the side cover/pitman shaft assembly by removing the three side cover bolts and then pulling the assembly out of the housing.

   NOTE: The side cover/pitman shaft assembly normally does not have to be disassembled.

4. Remove the worm shaft and ball nut assembly from the bottom of the housing.
5. Remove the worm shaft seal.
6. Remove the pitman shaft seal.
7. Remove the upper worm bearing and bearing cup from the housing.

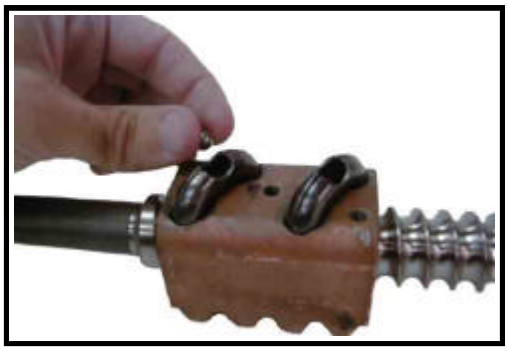
8. The ball nut assembly consists of two sets of ball bearings that recirculate in two channels in the ball nut housing. The bearings may fall out once the bearing guides are removed. Be careful not to lose any of the bearings.
9. Remove the ball guide clamps, ball guides and all of the ball bearings.
10. Remove the ball nut from the worm shaft.
11. Thoroughly clean and inspect all parts for signs of corrosion, damage or wear and replace as required.



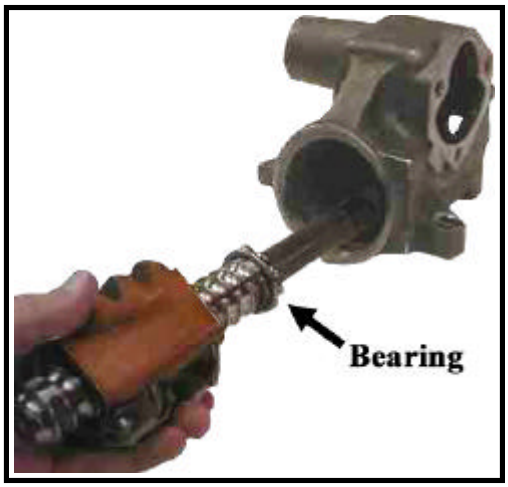
Reassembly

1. Lightly lubricate all parts before reassembly.
2. Install a new worm shaft seal and pitman shaft seal into the housing.
3. Install the upper worm bearing cup.
4. Divide the ball bearing into two equal groups.
5. Position the ball nut onto the worm as shaft as shown in the illustration.
6. Insert the ball guides into the ball nut.
7. Insert each group of bearings into the ball guides.

   NOTE: Do not rotate the worm shaft while installing the bearings. This may cause one or more of the bearings to enter the crossover passage in the ball nut, causing improper operation.
8. Install the ball guide clamp.

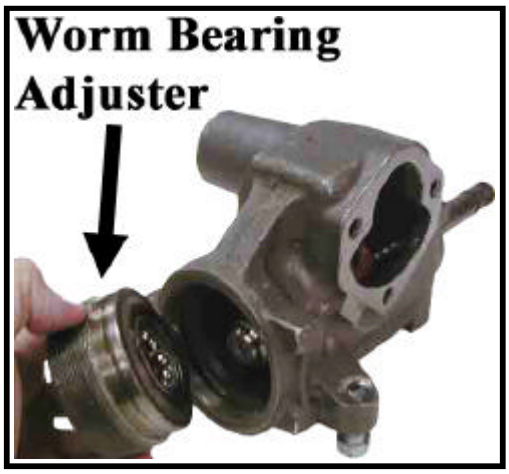


9. Place the upper worm bearing on the worm shaft and install the worm shaft/ball nut assembly into the housing being careful not to damage the worm shaft seal.



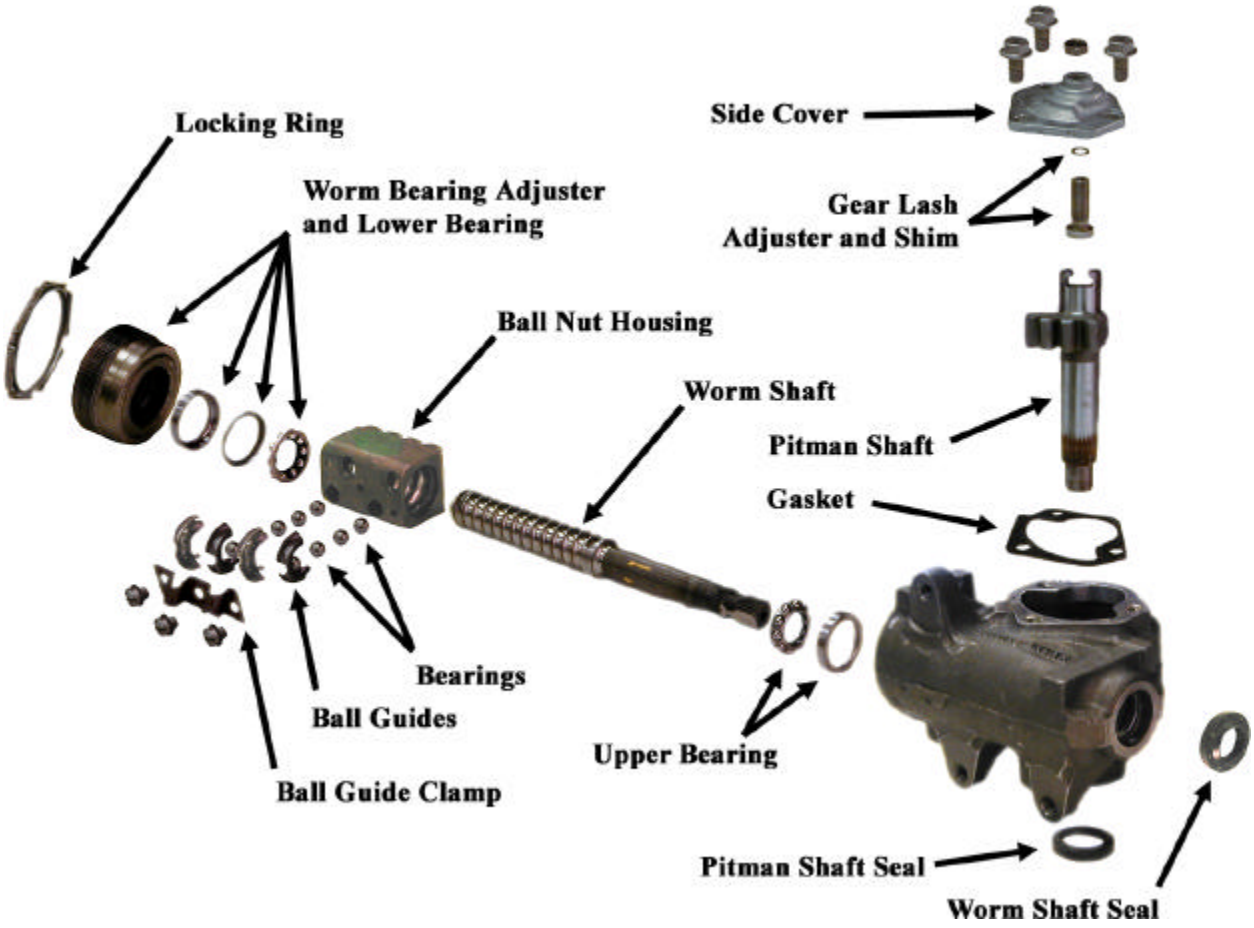
10. Install the assembled worm bearing adjuster into the housing and tighten just enough to remove all play in the worm shaft.
11. Install, but do not tighten the worm bearing adjuster lock nut.
12. Rotate the worm shaft to center the ball nut in the housing.
13. Place a new gasket onto the housing and install the assembled pitman shaft/side cover onto the housing using two of the three mounting bolts.
14. Pack the steering gear with grease through the open side cover bolt hole and then install the bolt.
15. Adjust the steering gear.

    NOTE: Refer to **Adjust the Steering** *gear section for information regarding adjusting the steering gear.*



16. Once the adjustments are completed, make sure that the locking ring and jam nut are tight.

Exploded View of Steering Gear



TAYLOR - DUNN

Brake Service

TABLE OF CONTENTS

INSPECT THE SERVICE BRAKE

Disc Brake Pads

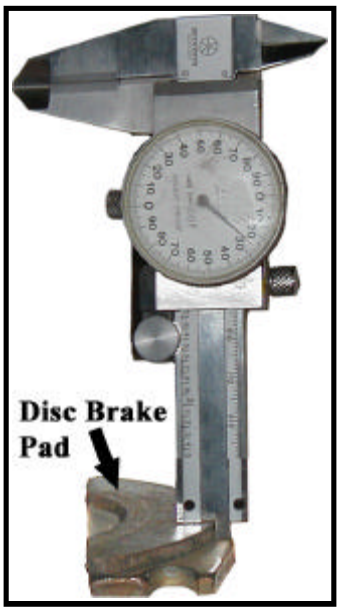
⚠WARNING

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 brake pad must be removed to accurately measure the lining thickness. Refer to **Replace the Front or Rear Brake Pads** *section for information on removing the brake pads.*

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

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



Disc Brake Rotor

⚠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.

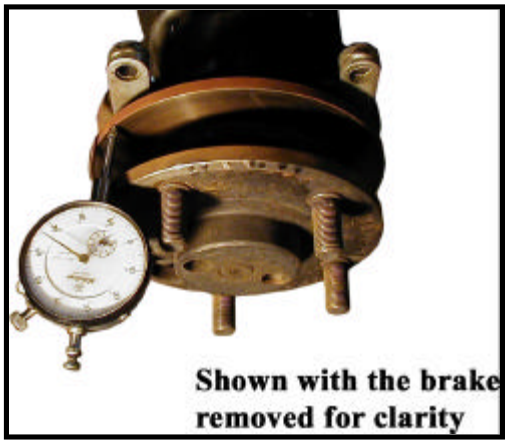
NOTE: The front brake rotor is an integral part of the front hub. If the brake rotor is worn beyond its service limits, then the front hub must be replaced. Refer to **Front Axle Service** *for information on replacing the front hub.*

NOTE: Depending on the rear axle configuration, the rear brake rotor may be an integral part of the rear axle. If the brake rotor is worn beyond its service limits, then the rear axle must be replaced. Refer to **Transmission** *section for information regarding replacing the rear axle*

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

1. Measure the run out of the rotor at its maximum diameter. If the run out exceeds 0.005, then the rotor must be machined. Do not machine the rotor beyond its service limits.

   NOTE: A bent axle or damaged rear axle could cause excessive brake rotor run out.

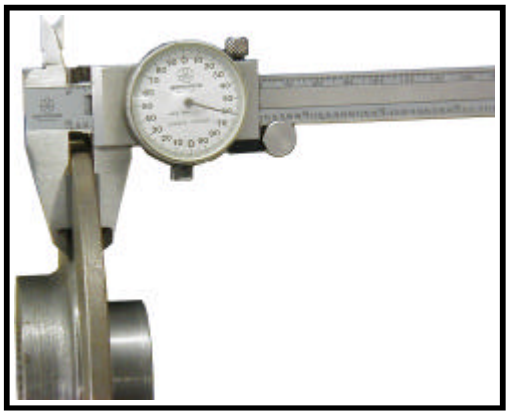


Shown with the brake removed for clarity

2. Measure the thickness of the brake rotor in 3 places. If the brake rotor thickness is less than 0.20-inches, then the rotor must be replaced.

⚠WARNING

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



Rotor removed for clarity. The rotor does not have to be removed for this procedure.

INSPECT THE AUTOMATIC PARKING BRAKE

The parking brake is located inside of the motor and is electromagnetically operated. To inspect operation of the parking brake, disconnect the harness to the parking brake and push the vehicle to confirm that the brake is applied.

The rubber band dust seal should fit snug around the brake. Inspect the seal for any indications of cracking or fatigue.

ADJUST THE AUTOMATIC PARKING BRAKE

The parking brake is electromagnetically operated and is either fully applied or off, there are no adjustments. The brake is OFF when power is applied to the brake.

ADJUST THE SERVICE BRAKES

Two or Four Wheel Hydraulic Disc Brakes

The hydraulic disc brake system is automatically adjusted. A low brake pedal or lack of braking power could be caused by:

- Brake fluid level low in the master cylinder. See ***Check the Master Cylinder Fluid*** section.
- Air in the brake lines. See ***Bleed the Brakes*** section.
- Worn brake pads. See ***Inspect the Service Brake*** section.
- Worn brake rotor. See ***Inspect the Service Brake*** section.
- Binding brake pedal linkage.

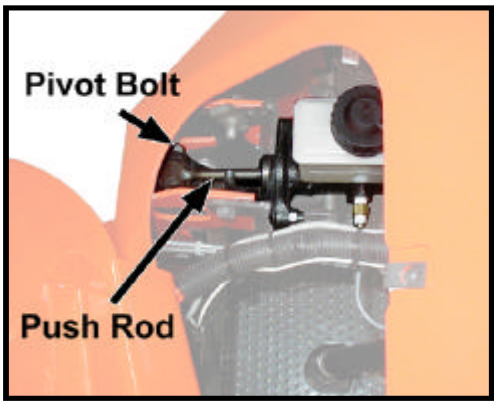
If you are experiencing a low brake pedal or lack of braking power, the entire brake system should be inspected.

ADJUST THE BRAKE LINKAGE

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Tighten the master cylinder push rod pivot bolt so that the push rod may pivot freely with no side play. See the illustration to the right.



7. Tighten the spring mounting bolt and the pedal stop bolt so that one thread shows beyond the locknut. See arrows in the illustraition to the left.

8. Tight the brake pedal pivot bolt so that the brake pedal moves freely with no side play.
9. Reconnect the main battery connector.
10. Remove blocks from behind the wheels.
11. Test drive the vehicle.

CHECK MASTER CYLINDER FLUID

⚠WARNING

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

Get medical attention immediately.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Thoroughly clean the area around the master cylinder cap.
7. Remove the master cylinder cap.
8. If the fluid in the master cylinder is contaminated then the entire brake system must be flushed. Refer to ***Bleed the Brakes*** for information regarding flushing the brake system.
9. Fill with brake fluid from a new sealed container to within 1/4-inch of the top of the master cylinder chamber and reinstall the cap.
10. Reconnect the main battery connector.
11. Remove blocks from behind the wheels.
12. Test drive the vehicle.

⚠WARNING

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

BLEED THE BRAKES

⚠WARNING

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

Get medical attention immediately.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

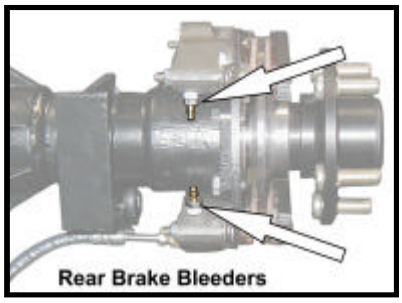
6. Thoroughly clean the area around the master cylinder cap and remove the cap.
7. Add brake fluid from a new sealed container to the master cylinder. Fill to 1/4" from the top of the master cylinder chamber.
8. The master cylinder fluid level will drop as the brakes are bled. Periodically check and fill the master cylinder during this procedure. Do not allow the fluid level in the master cylinder to drop too low as this will allow air into the brake lines.

⚠WARNING

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

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

9. Attach a clear hose to the bleeder valve on the brake cylinder that is to be bled. Route the hose into a clear container for waste brake fluid.
   Note: Serial #'s 167630, 167631, 167752, 167753, and 167754 were equipped with dual rear brake calipers. When bleeding the brake system, all four rear calipers should be bled.



Dual brakes shown

10. Pump the brake pedal a few times and then press and hold light pressure to the brake pedal.
11. Open the bleeder valve on the hydraulic brake body. If equipped with dual rear brakes cylinders, start with the cylinder not connected to the brake hose.
12. Depress the foot pedal to the floor and then close the bleeder valve. Do not release pressure on the brake pedal until the bleeder valve is closed.
13. Slowly release the foot pedal, allowing it to return to its released position.

⚠WARNING

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

NOTE: Check and fill the master cylinder frequently during the bleeding process. Do not allow the fluid level in the master cylinder to drop low enough to allow air to enter the brake lines. If air enters the brake lines during the bleeding process, then you will have to start again from the beginning.

14. Repeat the above steps until you are sure that all of the air is expelled from the brake line. Any air bubbles that can be seen in the clear hose attached to the bleeder is an indication that there is still air in the brake lines.
15. Repeat this process with each of the other wheels (see note above).
    NOTE: When finished, top off the master cylinder with fluid. See **Check Master Cylinder Fluid** *for information on filling the master cylinder.*
16. Reconnect the main battery connector.
17. Remove the blocks from behind the wheels.
18. Test drive the vehicle.

FLUSH THE BRAKE SYSTEM

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Raise the rear wheels off of the ground and support with jack stands.

⚠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.

7. If equipped with front brakes, raise the front wheels off of the ground and support with jack stands.
8. Remove both rear wheels and, if equipped with front brakes, the front wheels. Refer to ***Tires and Wheels*** section for information regarding removing the wheels.
9. Remove the wheel cylinders from each axle. Refer to ***Replace the Wheel Cylinder*** section for information regarding removing the wheel cylinder.
10. Attach a clear hose to the bleeder valve on each of the wheel cylinders and route the hoses into a container for waste brake fluid.
11. Position the wheel cylinders so that the bleeder screw is pointing to the ground and open all bleeder screws.
12. Pump the master cylinder until all fluid has been pumped from the brake lines and all wheel cylinders.
13. Close all bleeder screws.
14. Fill the master cylinder with fluid.
15. Open one of the bleeder screws and pump the master cylinder until all fluid has been pumped from the master cylinder and close the bleeder screw.
16. Repeat the above two steps for each wheel cylinder.
17. Reinstall the wheel cylinders and bleed the brakes. Refer to ***Bleed the Brakes*** for information regarding bleeding the brakes.
18. Install the wheels and lower the vehicle to the ground.
19. Reconnect the main battery connector.
20. Test drive the vehicle.

REPLACE FRONT BRAKE PADS

NOTE: It is recommended that both the left and right brake pads be replaced as a set.

⚠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: Installing new brake pads will raise the brake fluid level in the master cylinder.

⚠WARNING

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

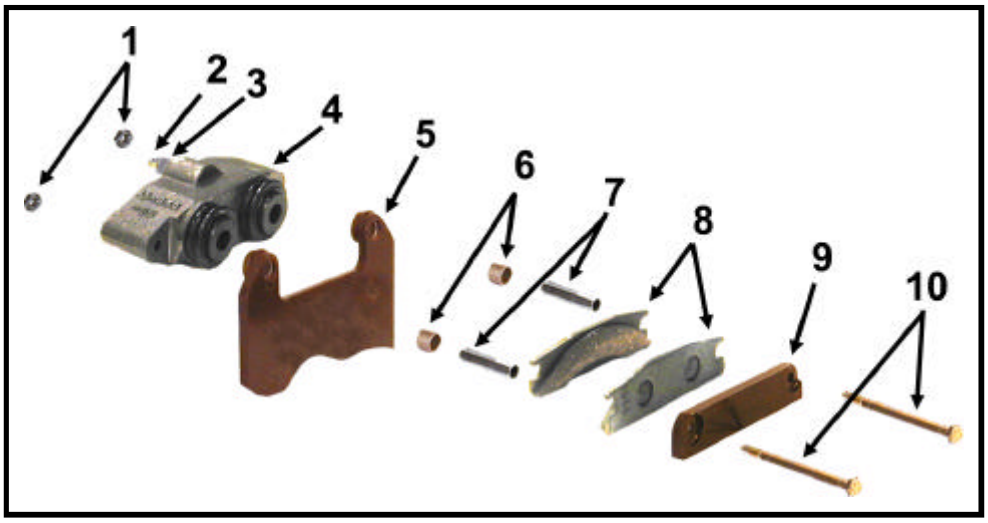
6. Thoroughly clean the area around the master cylinder cap.
7. Remove fluid from the master cylinder until it is 1/2 full.

8. Raise the front of the vehicle and support with jack stands.

⚠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.

9. Remove the tire/wheel assembly. Refer to ***Tires and Wheels*** section for information on removing the tire and wheel assembly.



NOTE: Refer to the illustration above for the following steps.

10. Remove the brake body bolts (10) and discard the lock nuts (1) and brake pads (8).
11. Remove the spacer bushings (6) from the mounting bracket (5) and discard the bushings.
12. Inspect the brake rotor. See ***Inspect the Service Brakes*** section for information regarding inspecting the brake rotor.
13. Inspect the spacers (7) and replace if any wear or damage is found.
14. Install new spacer bushings in the mounting bracket.
15. Install new brake pads in reverse order. Torque the mounting bolts to 11 ft-lbs.
16. Repeat this procedure for the other wheel.
17. Install the tire/wheel assembly and lower the vehicle to the ground.
18. Fill the master cylinder to the proper level. Refer to ***Check Master Cylinder Fluid*** section for information on the proper master cylinder fluid level.
19. Reconnect the main battery connector.
20. Remove the blocks from behind the wheels.
21. Test drive the vehicle.

REPLACE REAR BRAKE PADS

Hydraulic Disc

⚠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: It is recommended that both the left and right brake pads be replaced as a set.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

NOTE: Installing new brake pads will raise the brake fluid level in the master cylinder.

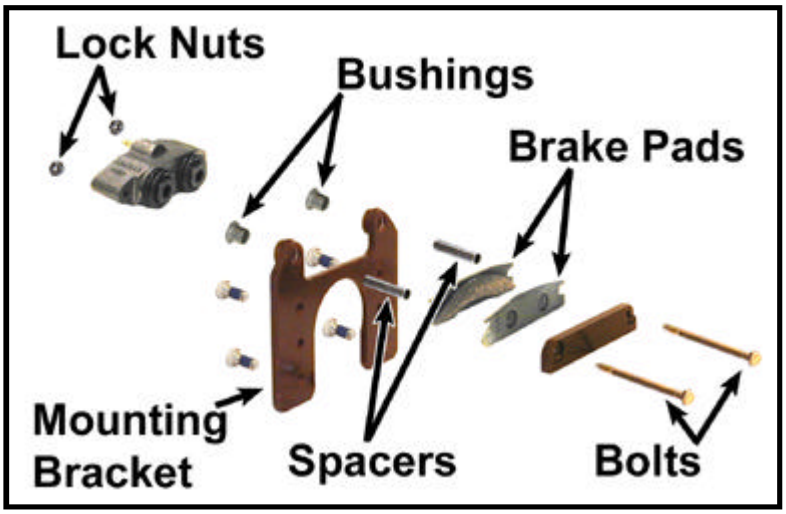
6. Thoroughly clean the area around the master cylinder cap.
7. Remove fluid from the master cylinder until it is 1/2 full.

8. Raise the rear of the vehicle and support with jack stands.

⚠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.

9. Remove the tire/wheel assembly.
   NOTE: Refer to **Tires and Wheels** *section for information on removing the tire and wheel assembly.*
10. Remove the brake body bolts and discard the lock nuts and brake pads.
11. Remove the spacer bushings from the mounting bracket and discard.
12. Inspect the brake rotor. Refer to ***Inspect the Service Brake*** section for information regarding inspecting the brake rotor.
13. Inspect the spacers and replace if any wear or damage is found.
14. Install new spacer bushings in the mounting bracket.
15. Install new brake pads in reverse order. Torque the mounting bolts to 11 ft-lbs.
16. Repeat this procedure for all four rear brake calipers.
17. Install the tire/wheel assembly and lower the vehicle to the ground.
18. Fill the master cylinder to the proper level. Refer to ***Check Master Cylinder Fluid*** section for information regarding the correct master cylinder fluid level.
19. Reconnect the main battery connector.
20. Remove the blocks from behind the wheels.
21. Test drive the vehicle.



Typical Brake Assembly

REPLACE THE WHEEL CYLINDER

⚠WARNING

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠WARNING

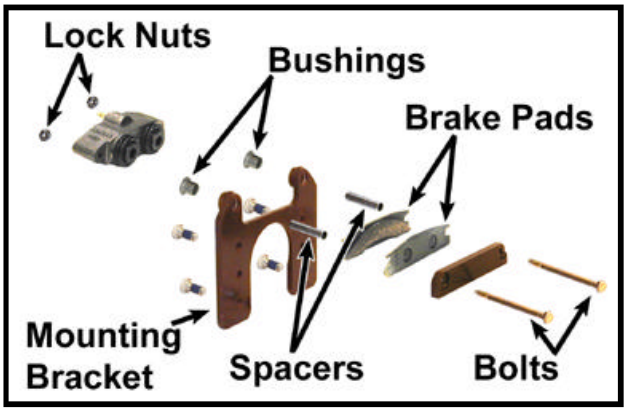
Always use a lifting strap, hoist, and jack stands, of adequate capacity to lift and support the vehicle. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.

6. Raise the wheel off of the ground and support with jack stands.
7. Remove the tire/wheel assembly. Refer to ***Tires and Wheels*** section for information on removing the tire and wheel assembly.

⚠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.

8. Thoroughly clean the area around the brake body.
9. Remove the brake body bolts and discard the lock nuts.
10. Inspect the brake rotor. Refer to ***Inspect the Service Brake*** section for information regarding inspecting the brake rotor.
11. Disconnect the brake hose from the brake body.
12. Install the new brake body assembly in reverse order.
    - Use teflon tape thread sealant on the brake hose fitting.
    - Torque the brake body bolts to 11 ft-lbs.
13. Bleed the brakes. Refer to ***Bleed the Brakes*** section for information regarding bleeding the brakes.
14. Set the park brake.
15. Reconnect the main battery connector.
16. Lower the wheel to the ground.
17. Remove the blocks from behind the wheels.
18. Test drive the vehicle.



REPLACE THE MASTER CYLINDER

⚠WARNING

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

Get medical attention immediately.

⚠WARNING

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

⚠WARNING

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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

NOTE: Most vehicle configurations do not require lifting the vehicle to remove the master cylinder. Lifting the vehicle may not be required.

6. If required, raise the vehicle and support with jack stands.
7. Place a drain pan under the master cylinder.
8. Disconnect the brake line(s) to the master cylinder and pump out the fluid in the master cylinder by depressing the pedal several times.
9. Remove the master cylinder bolts and remove the master cylinder from the vehicle.
10. Install in reverse order.
11. Fill the master cylinder with brake fluid from a sealed container.
12. Pump the brake pedal a short distance of one to two inches until no bubbles are seen coming from the inlet ports inside of the master cylinder chamber.
13. If the vehicle was raised, lower it to the ground.
14. Bleed the brakes. refer to ***Bleed the Brakes*** section for information regarding bleeding the brakes.
15. Reconnect the main battery connector.
16. Remove the blocks from behind the wheels.
17. Test drive the vehicle.

REPAIR THE MASTER CYLINDER

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

1. Remove the master cylinder from the vehicle. See ***Replace the Master Cylinder*** section .
2. Drain all fluid from the master cylinder and discard.
3. Remove the rubber boot.
4. Depress the plunger and remove the plunger spring clip retainer.
5. Pull the plunger and all seals out of the master cylinder bore.
6. Thoroughly clean, inspect and replace parts as required.
7. If any damage is found in the bore of the master cylinder then it must be replaced.
8. Lubricate all parts with clean brake fluid from a sealed container.
9. Reassemble in reverse order.
10. If the master cylinder is not to be immediately installed onto a vehicle, plug the brake line fitting hole to prevent any contaminates from entering the master cylinder.

Throttle Linkage

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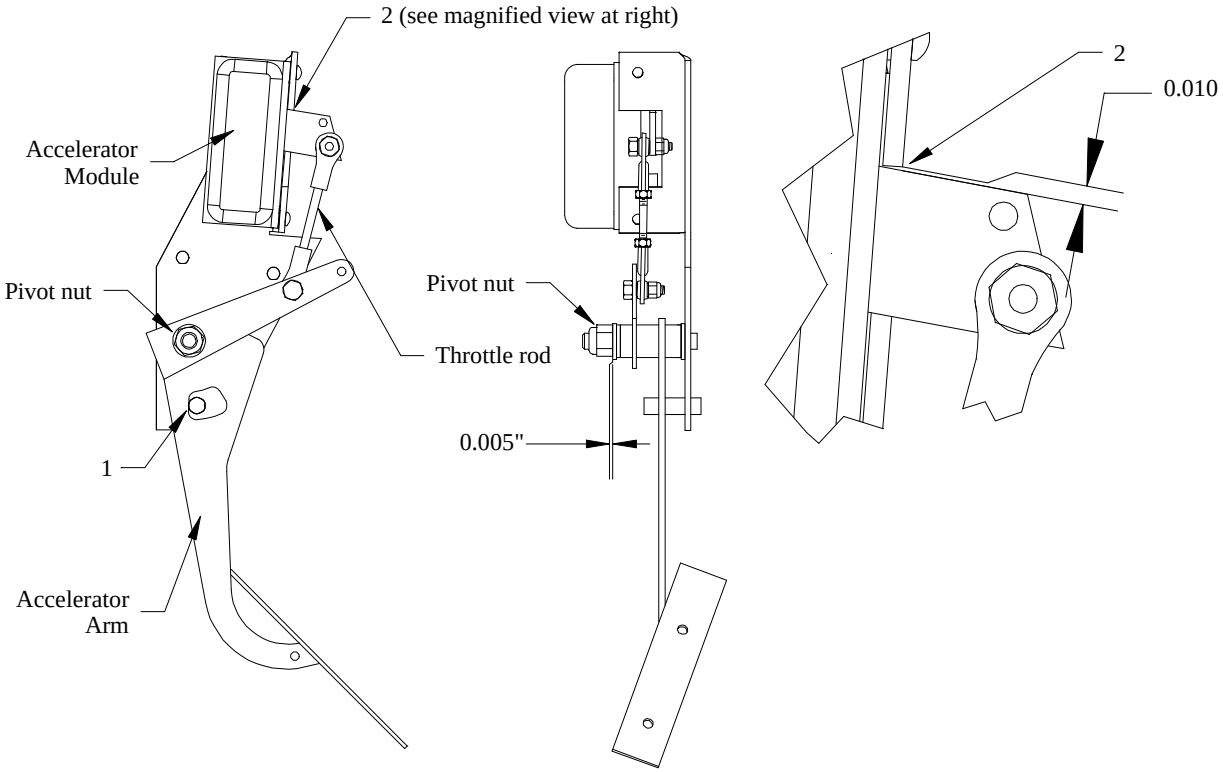
THROTTLE LINKAGE ADJUSTMENTS

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Adjust the accelerator pedal arm pivot nut so that there is 0.005" clearance between the nut and flat washer.
7. Make sure the accelerator pedal arm is in the fully released position. See arrow 1 in the illustration.
8. Adjust the throttle rod so that the accelerator module arm has 0.010" clearance between the arm and the accelerator module bracket. See arrow 2 in the illustration.
9. Reconnect the main battery connector.
10. Remove the blocks from the wheels and test drive the vehicle.



Transmission

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CHECK OIL LEVEL

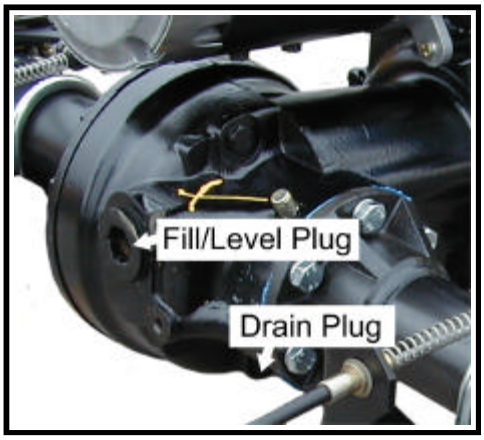
The oil flows freely between the main gear case (3rd member) and the primary reduction gear case. It is only necessary to check the oil level of the 3rd member.

Park the vehicle on a level surface.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

5. Place an oil drain pan underneath the 3rd member.
6. Remove the fill/level plug.
7. The oil level should be very close to the bottom of the level plug opening.
   a. If the oil level is below the bottom of the opening, add oil as required until level with the bottom of the opening. Refer to the ***Lube Chart*** section for information regarding type of oil.
   b. If oil comes out of the opening, allow to drain until level with the bottom of the opening.
8. Replace the fill/level plug.
9. Reconnect the main battery connector.
10. Remove the blocks from the wheels.
11. Test drive the vehicle.

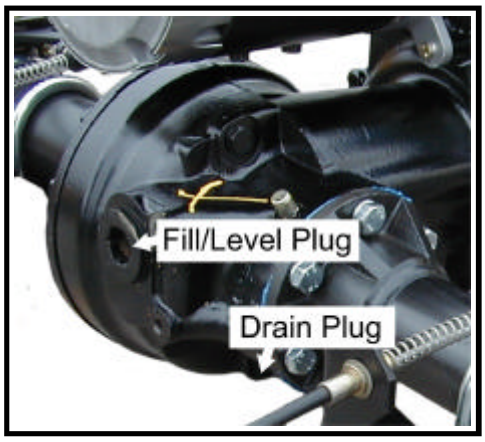


CHANGE OIL

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

5. Raise the rear of the vehicle and support with jack stands.
6. Place a four quart drain pan under the drive assembly.
7. Remove the drain plugs from the differential case and gear case.
8. Once the oil has drained, replace the drain plugs and lower the vehicle to the ground.
9. Remove the fill/level plug and fill the differential up to the bottom of the level plug opening. Refer to the ***Lube Chart*** section for information regarding type of oil.
10. Replace the fill plug.
11. Reconnect the main battery connector.
12. Remove the blocks from the wheels.
13. Test drive the vehicle



MOTOR REMOVAL AND INSTALLATION

NOTE: Some applications will require removing the drive assembly from the vehicle to remove the motor. Refer to **Removing and Installing the Drive Assembly** *for information on removing the drive assembly.*

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

5. Remove the wires from the motor.

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

6. If equipped, remove the motor support bracket u-bolt (only used on larger motors).
7. Remove the motor mounting bolts and slide the motor off of the input shaft.
8. Install the motor in reverse order. Make sure that the motor coupler o-ring is properly installed on the transmission input shaft.

   NOTE: Apply a light coating of part number 94-421-34 moly paste grease to the splines on the transmission input shaft.

9 Reconnect the main battery connector.

10. Remove the blocks from behind the wheels.
11. Test drive the vehicle.

Support bracket u-bolt

Transmission input shaft

REAR HUB OR ROTOR

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

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠WARNING

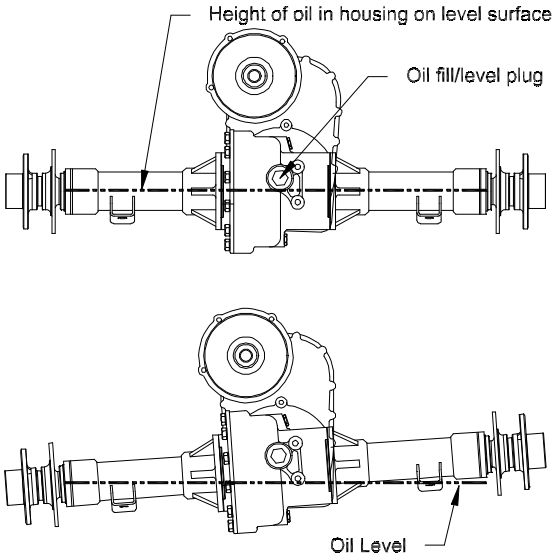
Always use a lifting strap, hoist, and jack stands, of adequate capacity to lift and support the vehicle. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.

5. Raise the wheel off of the ground.
6. Remove the tire/wheel assembly, Refer to ***Tires and Wheels*** section for information regarding removing the tire/wheel assembly.
7. Remove the axle hub bolt and washer and remove the hub from the axle.
8. Remove the outer brake pad. Refer to section ***Brake Service*** for information regarding removing the brake pads.
9. Remove the rotor.
10. Install in reverse order.
    a. Lightly grease the axle splines.
    b. Refer to section ***Brake Service*** for information regarding installing the brake pads.
    c. Torque the axle hub bolt to 275 ft-lbs.
    d. Refer to ***Tires and Wheels*** section for information regarding installing the tire/wheel assembly.
11. Lower the wheel to the ground.
12. Reconnect the main battery connector.
13. Remove the blocks from behind the wheels and test drive the vehicle.

REMOVING AND INSTALLING THE REAR AXLES

The oil level in the housing is above the bottom of the axle flange. To minimize oil spills, raise the side of the vehicle high enough so that the oil level is below the bottom of the axle flange. If both axles are to be removed, you must drain all of the oil from the housing.

NOTE: This procedure does not require that the rear end or drive assembly be removed from the vehicle.



Raise the wheel off of the ground high enough so that the oil level is below the axle housing flange

⚠WARNING

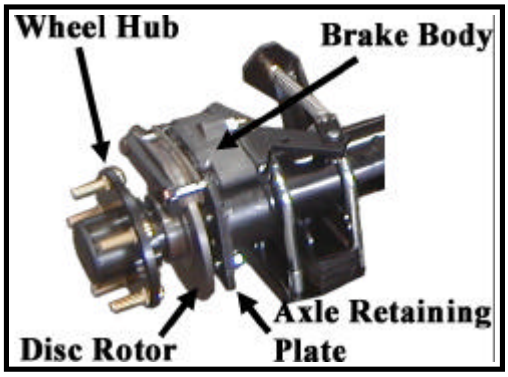
1. **Make sure the key-switch is in the "OFF" position, then remove the key.**
2. **Place the forward-reverse switch in the center "OFF" position.**
3. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect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

5. If required, drain the oil from the 3rd member.

⚠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 tire and wheel assembly. Refer to section ***Tires and Wheels*** for information regarding removing the tire and wheel assembly.
   a. If the axle shaft, hub or bearing is to be replaced then remove the hub bolt, wheel hub and disc rotor at this time.
8. Remove the four bolts attached to the axle retaining plate.



9. Remove the axle retaining plate and brake body assembly as one unit.
10. Secure the brake body assembly, do not let it hang by the brake hose.
11. Pull the axle out of the housing.
12. Inspect all bearings for roughness or play, replace as needed.
13. Install in reverse order, lubricate the o-ring.

    NOTE: Be sure not to damage the o-ring.
14. Use new bolts for the axle retaining plate.

⚠WARNING

The axle retaining plate bolts have a pre-applied thread locking compound. They are intended for one time use only. If removed they must be replaced. Reusing the original bolts could cause loss of brakes resulting in severe bodily injury and/or property damage.

Refer to section Rear Brakes in Illustrated Parts for the part number of the bolt.

15. If the wheel hub was removed, install the hub and rotor. Torque the hub bolt to 275 ft-lbs.
16. Fill with oil to the level of the fill plug threads. Refer to ***Changing the Differential Oil.***
17. Lower the vehicle.
18. Reconnect the main battery connector.
19. Remove the blocks from behind the wheels.
20. Test drive the vehicle.

TRANSMISSION ASSEMBLY

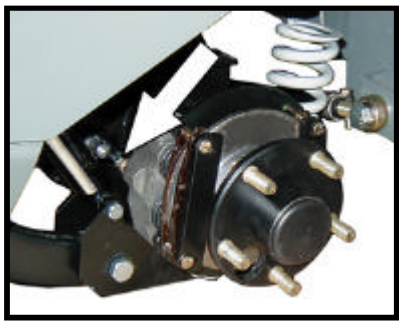
Remove and Install

⚠WARNING

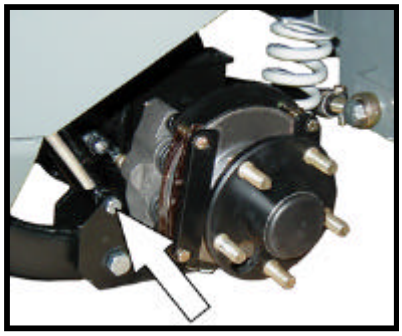
1. Make sure the key-switch is in the "OFF" position, then remove the key.
2. Place the forward-reverse switch in the center "OFF" position.
3. If equipped with a hand operated park brake, set the brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive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

5. Disconnect the main motor cables and unplug the encoder and electric brake cables.
6. If equipped with a hand park brake, disconnect the park brake cables from the brake arm and the swing arm mount.
7. Disconnect brake hoses from the brake calipers.

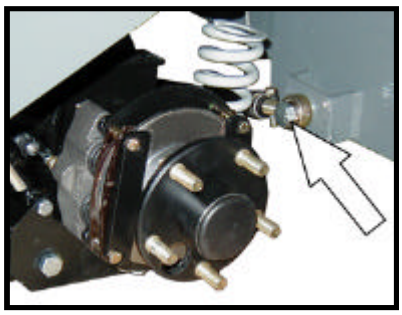
NOTE: Illustrations show the dual brake body drive. This procedure is the same for the single brake body drive. The single brake body would be located at the top of the axle.



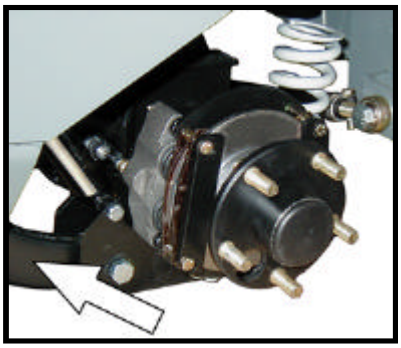
8. Remove the lower shock bolts.



9. Remove the bolt holding the panard bar to the frame.



10. Remove the nuts from the bolts holding the suspension links to the frame. Do not remove the bolts at this time.



⚠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.

11. Raise the rear of the vehicle just high enough to remove the pressure on the rear springs.

    NOTE: Do not raise the vehicle so high to where the rear wheels come off of the ground.

12. Remove the suspension link bolts from the frame.
13. Raise the rear of the vehicle high enough to roll the transmission out from under the frame.

    Note: The transmission will have to be placed on a dolly due to the electric brake locking the rear axles.

14. Lower the frame onto jack stands or the ground.
15. Install the transmission assembly in reverse order of removal.
    a. Bleed the brake system. Refer to section ***Brake Service*** for information regarding bleeding the brakes.
16. Reconnect the main battery connector.
17. Remove the blocks from behind the wheels.
18. Test drive the vehicle.

DISASSEMBLY AND REASSEMBLY OF THE PRIMARY REDUCTION GEAR CASE

⚠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. If equipped with a hand operated park brake, set the brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

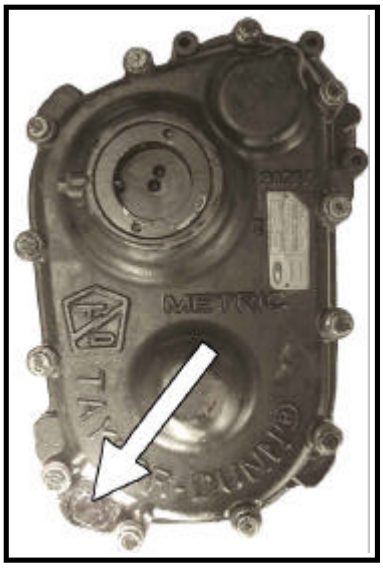
⚠WARNING

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.

5. Raise the rear of the vehicle and support with jack stands.
6. Place a drain pan under the gear case that is capable of holding four quarts of oil and drain the oil from the front gear case.
7. If required, remove the drive assembly from the vehicle

   NOTE: Refer to **Removing and Installing the Drive Assembly** *for information on removing the drive from the vehicle.*
8. Remove the motor only if the entire drive is to be disassembled.

   NOTE: Refer to **Motor Removal and Installation** *for information on removing the motor.*

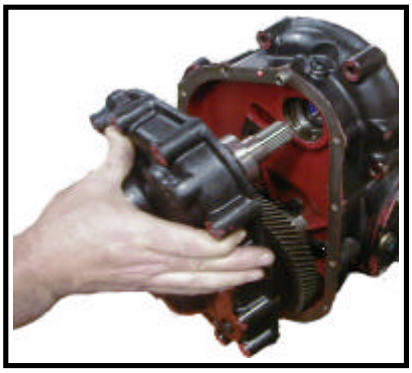


Oil Drain Plug

9. Remove the cover retaining bolts.
10. Remove the cover plate from the differential and let the remaining oil drain from the housing.

⚠CAUTION

Be careful not to damage the sealing surfaces on the housings. Damage to the sealing surface may lead to an oil leak resulting in damage to the internal parts of the drive.



11. Remove the circlip from the idler gear.

12. Remove the input shaft/bearing assembly and idler gear/bearing assembly from the gear case cover at the same time.

13. Remove the pinion nut from the output gear and remove the output gear from the pinion shaft.

    NOTE: If necessary, remove the seal from the input shaft bore at this time.

14. Mark the gear case position in relation to the 3rd member housing so that it will be reassembled in the same position.
15. Remove the six retaining bolts holding the gear case to the 3rd member housing.

    NOTE: Make note of the angle of the gear case.

16. Remove the gear case housing from the 3rd member housing.
17. Inspect all parts for signs of wear or damage.

⚠CAUTION **Lubricate all parts with gear oil before installation. Failure to pre-lube the parts may result in premature failure.**

18. Assemble the gear case in reverse order.

    NOTE: Torque the drain plug to 21-25 foot-pounds.

    NOTE: Torque the gear case to 3rd member retaining bolts to 18-20 foot-pounds.

    NOTE: Torque the pinion nut to 154-169 foot-pounds.

    NOTE: Apply gasket sealer (#94-430-05) to the front flange on the 3rd member and gear case cover.

    NOTE: Pack the motor seal with non-acetic based grease.

19. Fill the differential with oil.

    NOTE: Refer to **Changing the Differential Oil** *for information on filling the drive with oil.*

20. Lower the vehicle.
21. Reconnect the main battery connector.
22. Remove the blocks from behind the wheels.
23. Test drive the vehicle.

DISASSEMBLING THE 3RD MEMBER

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

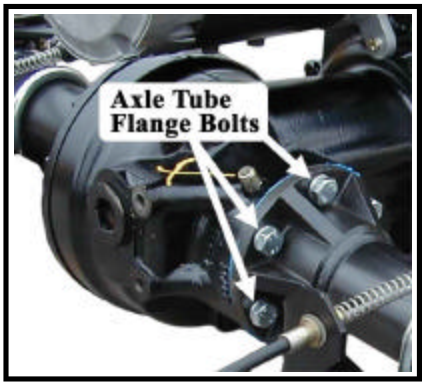
⚠WARNING

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.

5. Raise the rear of the vehicle and support with jack stands.
6. Remove the complete drive from the vehicle.

   NOTE: Refer to **Removing and Installing the Drive Assembly** *for information on removing the drive from the vehicle.*

7. Place a drain pan under the gear case that is capable of holding four quarts of oil and drain the oil from the front gear case and 3rd member.
8. Place the 3rd member on an appropriate stand.
9. Remove the axle shafts and tubes as an assembly from the 3rd member by removing the six axle tube flange bolts on each axle tube.



10. Remove the primary reduction gear case. Refer to ***Disassembly and reassembly of the Primary Reduction Gear Case*** for information on removing the gear case.
11. Remove the 12 side plate bolts, then remove the side plate.

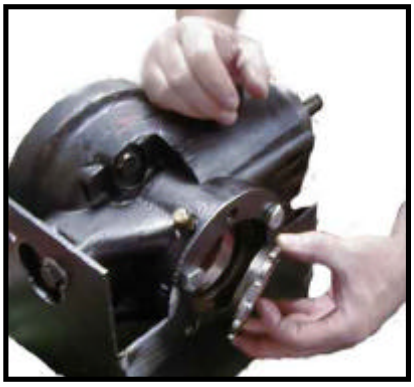
12. Remove the carrier bearing adjusting nut roll pin and adjusting nut from the side plate.

13. Turn the side plate over and remove the carrier bearing race from the side plate.

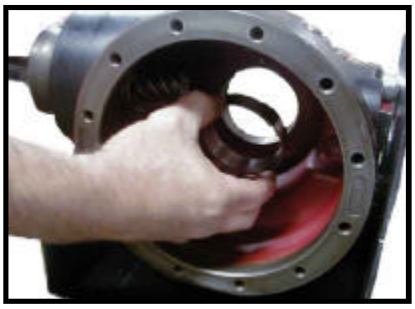
14. Remove the differential assembly from the 3rd member housing.

15. Remove the carrier bearing adjusting nut roll pin from the 3rd member housing, then remove the carrier adjusting nut.

Roll Pin



16. Remove the carrier bearing race from the 3rd member housing.



17. Remove the front bearing from the input shaft.

    NOTE: The input shaft may have to be driven out to perform this procedure.

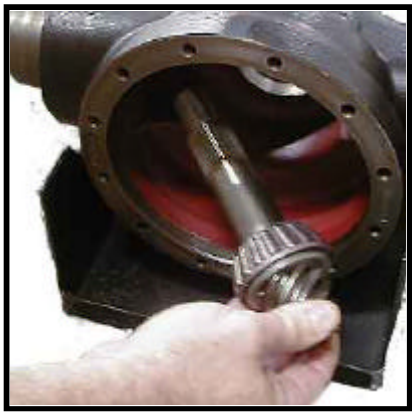
18. Remove the input shaft's shims and spacer.

19 Remove the pinion shaft from the 3rd member.

20. Remove the front and rear pinion bearing races.

21. Inspect all parts for signs of wear or damage.

22. Thoroughly clean all parts.



ASSEMBLING THE 3RD MEMBER

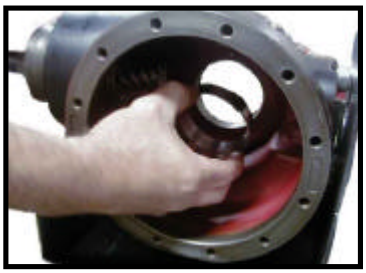
1. Temporarily install the pinion gear (hand tighten only).
2. Install the carrier bearing race ring nuts into the housing and cover.

Cover

Housing

3. Install the carrier bearing races into the housing and cover.

Cover



Housing

4. Place the differential assembly into the housing.
5. Tighten the housing carrier bearing race ring nut so that the ring gear is not in binding against the pinion gear.
6. Remove the differential assembly.

   NOTE: Do not allow the ring nut to rotate.

7. Remove the pinion gear and then reinstall the differential assembly.

8. Install the cover onto the housing using 4-bolts in a cross pattern and torque to 45-50 ft-lbs.
9. Pre set the carrier bearing preload by tightening the housing carrier bearing race ring nut until it requires 1.5 to 3.3 ft-lbs to rotate the differential assembly.

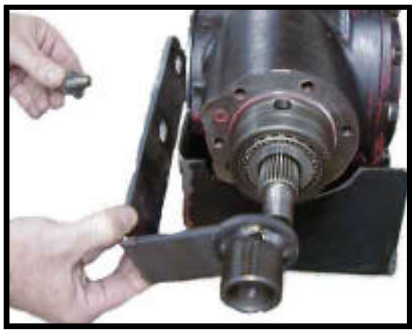
   NOTE: Rotate the carrier assembly whenever adjusting the ring nuts.

10. Mark the position of each carrier bearing ring nut in relation to the drive housing and cover and then remove the differential assembly, do not allow the ring nuts to rotate.
11. Install the pinion gear. Re-shim if required.

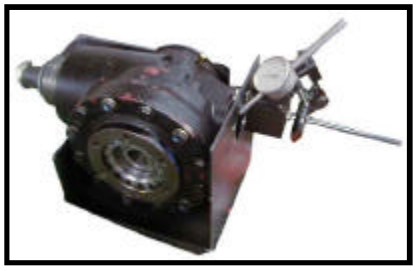
⚠CAUTION

If the ring and pinion gears or bearings are replaced then the pinion gear must be re-shimmed. Improper pinion gear shims will result in drive noise and premature failure. Refer to Pinion Gear Shimming Instructions.

12. Install the pinion gear holding tool (96-500-42) and tighten the pinion nut enough to keep the pinion gear from rotating.
13. Install the differential assembly.
14. Install the cover and all of the cover bolts. Torque to 45-50 ft-lbs.



15. Check the gear lash between the ring and pinion gears. The gear lash should be .005 to .007 inches.
16. Adjust the gear lash if needed by tightening or loosening the carrier bearing race ring nuts. The two ring nuts must be turned equally in opposite directions.



NOTE: To move the ring gear closer to the pinion: Loosen the <u>housing</u> carrier bearing race ring nuts and tighten the <u>cover</u> carrier bearing race ring nut equally.

NOTE: To move the ring gear away from the pinion: Loosen the <u>cover</u> carrier bearing race ring nut and tighten the <u>housing</u> carrier race ring nut equally.

⚠CAUTION

The two ring nuts must be turned the same amount in opposite directions. This allows the carrier assembly to be positioned with the proper gear lash without upsetting the bearing preload. If the ring nuts are not turned the same amount, then the bearing preload will no longer be correct and will result in drive noise and premature failure.

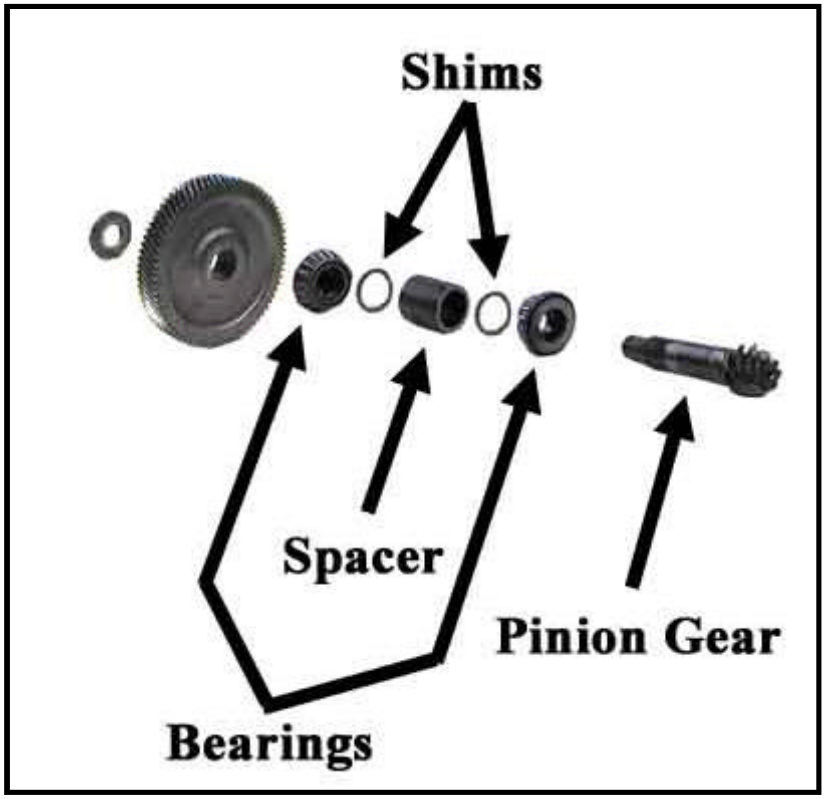
17. Install the locking roll pins into the housing and cover to lock the ring nuts in place.
18. Remove the pinion gear holding tool.
19. Install the primary reduction gear case, axles and housings, motor, and install the complete drive onto the vehicle.
20. Fill the drive with oil. Refer to the ***Lube Chart*** section for information regarding type of oil. Refer to ***Change Oil*** section for information regarding the proper oil level..
21. Lower the vehicle.
22. Reconnect the main battery connector.
23. Remove the blocks from behind the wheels.
24. Test drive the vehicle.

Pinion Bearing Preload

NOTE: The pinion gear depth must be set before the preload. Refer to **Setting the Pinion Gear Depth**.

1. Install the pinion gear, spacer, and shims into the housing.
2. Install the outer pinion bearing.
3. Install the main gear onto the pinion shaft and torque the pinion nut to 154-169 ft lbs.
4. Measure the torque required to rotate the pinion shaft in the housing.
5. The torque required to rotate the pinion shaft should be between 1.1 and 2.9 ft-lbs. If the torque is not within specifications then add or subtract from the total shim thickness and repeat this procedure until the proper preload is obtained.

   NOTE: Add shims to decrease torque.



PINION GEAR SHIMMING INSTRUCTIONS

NOTE: This procedure is required only when replacing the front or rear pinion bearings and races or the ring and pinion gears.

NOTE: To perform this procedure, all parts must be clean and the bearings lightly lubricated.

Setting the Pinion Gear Depth

This formula is used to calculate the amount of shims that are required:

C - B - A + (DV) = Pinion Shim (mm) where,

DV = The number on the face of the pinion gear.

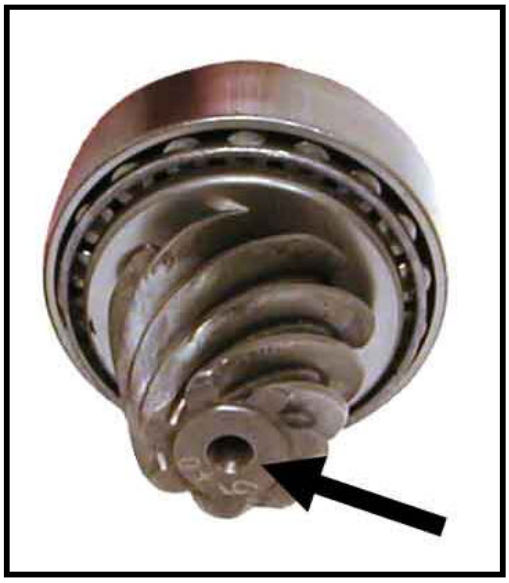
A = The distance in millimeters from the face of the pinion gear to the top of the inner pinion bearing race (see below)

B = 54.

C = The number on the edge of the differential side plate closest to the input shaft (see next page).

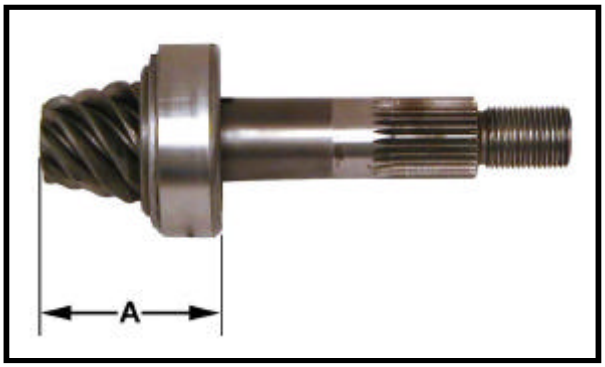
D = The number on the edge of the differential side plate farthest from the input shaft (see next page).

E = The distance in millimeters from the rear of the drive housing to the face of the pinion gear (see next page).

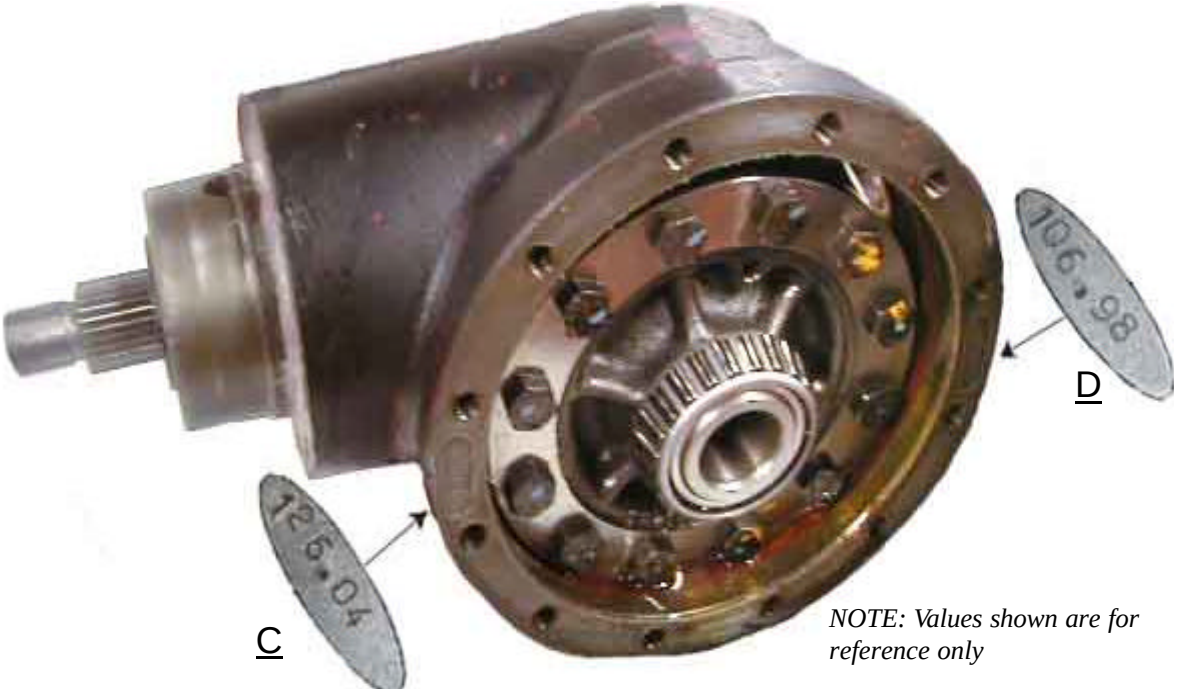


Face of pinion gear

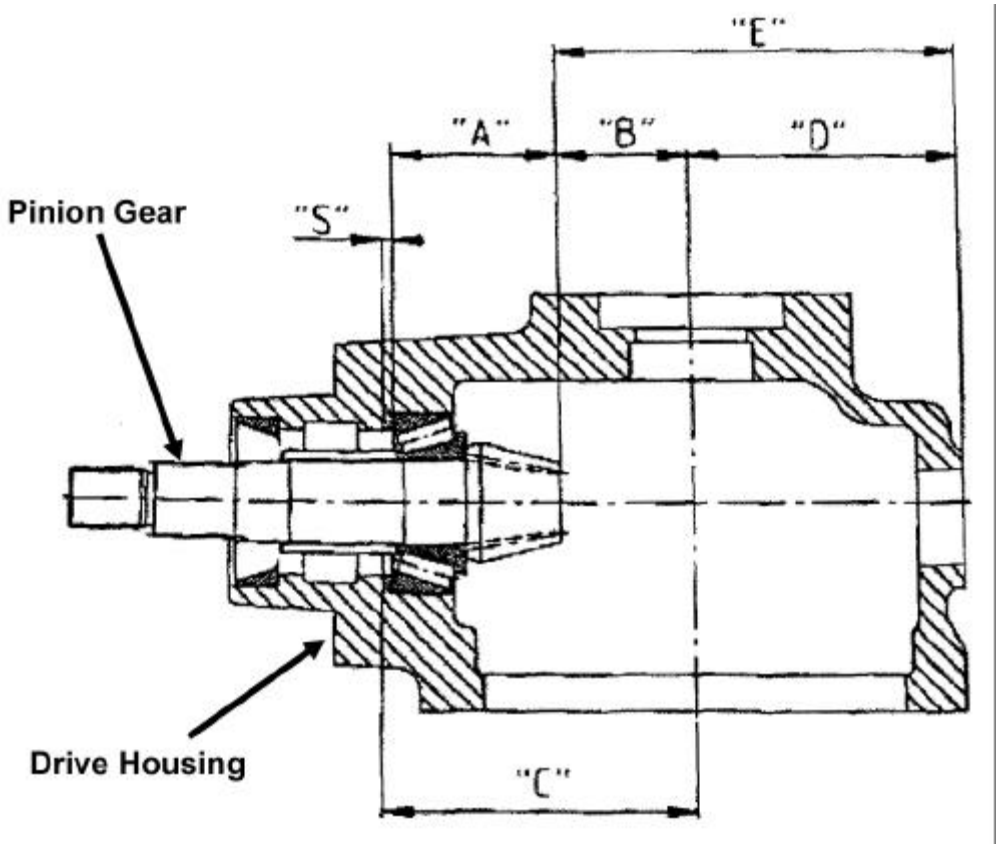
Once a shim has been selected and the pinion gear is installed, confirm that: **E - D = B + (DV)**



Number on face of pinion gear



NOTE: Values shown are for reference only



TAYLOR - DUNN

Suspension

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REPLACE THE REAR SPRINGS

If a spring has failed or is fatigued, then it is recommended that both springs are replaced as a set.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Remove the upper shock mounting bolt from the rear shocks.

⚠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.

7. Raise the rear wheels off of the ground just enough so that the springs can be removed and support with jack stands.
8. Remove the springs.
9. Install new springs in reverse order.
10. Reconnect the main battery connector.
11. Remove the blocks from behind the wheels.
12. Test drive the vehicle.

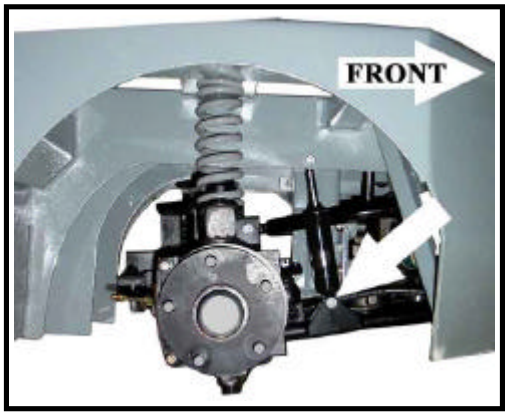
REPLACE THE FRONT SPRINGS

If a spring has failed or is fatigued, then it is recommended that both springs are replaced as a set.

⚠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. If equipped with a hand operated park brake, set the brake.
4. Place blocks under the front wheels to prevent vehicle movement.
5. Disconnect the main positive and negative cables at the batteries.

6. Remove the lower shock mounting bolt from the front shocks.



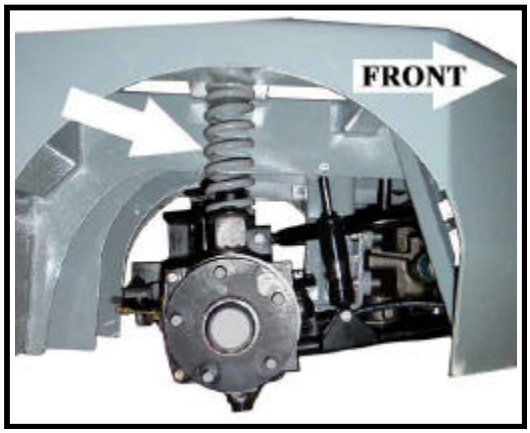
Lower shock bolt. Wheel removed for illustration only.

⚠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.

7. Raise the front wheels off of the ground just enough so that the springs can be removed and support with jack stands.

8. Remove the springs.
9. Install new springs in reverse order.
10. Reconnect the main battery connector.
11. Remove the blocks from behind the wheels.
12. Test drive the vehicle



Front spring

REPLACE THE SHOCKS

Front or Rear

It is recommended to replace all four front shock as a set.

NOTE: On some vehicles it may be required to remove the wheel to gain access to the shock mounting bolts. Refer to **Tires and Wheels** *section for information regarding removing the wheels.*

⚠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. **If equipped with a hand operated park brake, set the 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

6. Some vehicles may require that the wheels be lifted off of the ground and supported with jack stands to replace the shocks.
7. Remove the upper and lower shock bolts.
8. Remove the shock from the vehicle.

NOTE: If the shock that was removed is to be reinstalled:

A. Inspect the shaft where it enters the shock body for any signs of leakage. If any sign of leakage is seen, then the shock must be replaced.

B. Inspect the upper and lower shock bushings. If any signs of damage or wear are seen, then the shock must be replaced.

9. Install the shock in reverse order.
10. Lower the vehicle.
11. Reconnect the main battery connector.
12. Remove the blocks from behind the wheels.
13. Test drive the vehicle.

Tires and Wheels

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TIRE INSPECTION (PNEUMATIC TIRES)

⚠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. If equipped with a hand operated park brake, set the brake.

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

5. Disconnect the main positive and negative cables at the batteries.

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 INSPECTION (SOFT SOLID TIRES)

⚠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. If equipped with a hand operated park brake, set the brake.

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

5. Disconnect the main positive and negative cables at the batteries.

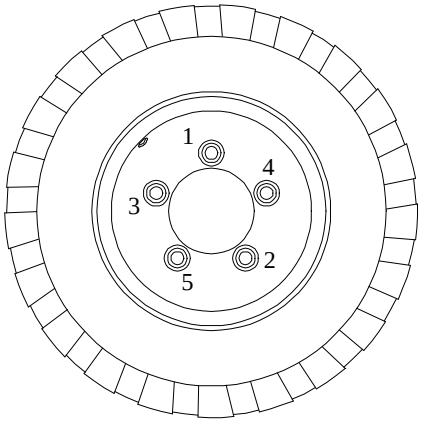
6. Inspect the tread depth.
7. Tires are worn and should be replaced when the tread depth is 1/16" (1.5 mm) or less.
8. Reconnect the main battery connector.
9. Remove the blocks from behind the wheels.
10. Test drive the vehicle.

REPLACE THE REAR TIRE/WHEEL ASSEMBLY

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

6. Raise the wheel to be replaced off of the ground and support with jack stands.
7. Remove the 5 wheel nuts and remove the wheel.
8. Install in reverse order.
9. Following the pattern shown below, cross tighten the wheel nuts in two stages as follows:
   1st stage to approximately 20 ft-lbs.
   2nd stage to 80-90 ft-lbs.
10. Reconnect the main battery connector.
11. Lower the wheel to the ground.
12. Remove the blocks from behind the wheels.
13. Test drive the vehicle.



REPLACE THE TIRE

NOTE: To replace the tire, the tire/wheel assembly must be removed from the vehicle. Refer to **Replace the Tire/Wheel** *section for information on removing the tire/wheel assembly.*

Replacing the Soft Solid tire may require a press to remove or install the tire.

1. Remove the bolts around the perimiter of the wheel.
2. Separtate the two halves of the split rim from the tire.
3. Install in reverse order.

TIRE INFLATION

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

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 to the right is an example of the side wall information on a tire.

Tire pressures must be checked when the tire is cold.

TAYLOR - DUNN

Battery Service

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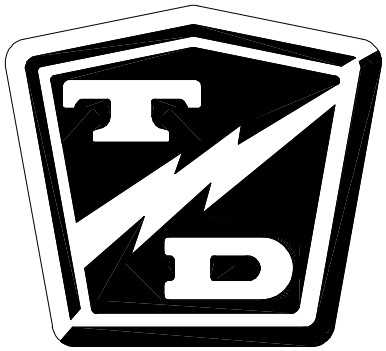


CLEANING

⚠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.

⚠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.

⚠WARNING

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.

⚠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 key-switch is in the "OFF" position, then remove the key.**
2. **Place the forward-reverse switch in the center "OFF" position.**
3. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

5. Dry dirt can be readily blown off with low-pressure air or brushed off.
6. 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.
7. Reconnect the main battery connector., remove the blocks from the wheels and test drive.

TESTING

Specific Gravity

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

⚠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.

⚠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.

⚠WARNING

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.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

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.

Typical Hydrometer Float

WATERING

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.

⚠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.

⚠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.

⚠WARNING

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.

⚠WARNING

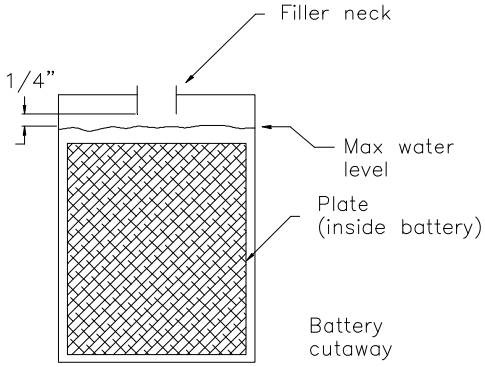
1. **Make sure the key-switch is in the "OFF" position, then remove the key.**
2. **Place the forward-reverse switch in the center "OFF" position.**
3. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect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

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

⚠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.

6. 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.
7. Reconnect the main battery connector.



CHARGING

Refer to ***Charging Your Vehicle*** in section ***Safety Rules and Operating Instructions***.

REMOVING

⚠WARNING

Explosive mixtures of Hydrogen gas are present within battery cells at all times. Do not work with or charge battery in an area where open flames (including gas furnace or water heater pilots), sparks, cigarettes, or any other sources of combustion are present. Always provide ample ventilation in rooms where batteries are being charged. Failure to do so may result in severe property damage and or serious

⚠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 serious bodily injury.

⚠WARNING

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.

⚠WARNING

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2. **Place the forward-reverse switch in the center "OFF" position.**
3. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠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.

5. Thoroughly clean the battery and battery compartment. Refer to ***Cleaning*** in this section for information regarding cleaning the batteries.
6. Using a hoist or forklift equipped with a proper battery lifting device (see next page), slowly raise the battery out of the vehicle.
7. Inspect the battery compartment for signs of corrosion.
8. If minimal signs of corrosion are seen, then the damaged paint should be stripped off and the entire battery compartment cleaned and repainted.
9. 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.

10. Inspect the battery cables and terminals. If any of the cables or terminals show signs of corrosion, then they must be repaired or replaced.
11. Install the battery in reverse order.
12. Remove the blocks from the wheels and test drive.

Typical battery lifting beam

Typical forklift attachment to use with the lifting beam

STORAGE AND RETURNING TO SERVICE

⚠CAUTION

If the battery is removed from the vehicle, do not place it directly on the ground, concrete or solid metal surface. It is recommended to store the battery on a wooden pallet or equivalent. Storing on the ground, concrete or solid metal surface will cause the batteryto discharge and may result in premature failure of the battery.

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 ar right:

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

Returning to Service

⚠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 property damage and or serious

⚠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 serious bodily injury.

⚠WARNING

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.

⚠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. **If equipped with a hand operated park brake, set the brake.**
4. **Place blocks under the front wheels to prevent vehicle movement.**
5. **Disconnect the main positive and negative cables at the batteries.**

⚠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.

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

Control System Diagnostics

TABLE OF CONTENTS

Rev A

Test Equipment Required:

- User Level Maintenance Handset # 62-027-64

For the handset operation instructions, refer to the instructions included with the handset.

Important Notes and Instructions

- Troubleshooting this vehicle requires proficiency in the use of standard test equipment such as Volt meters, Ammeters, Ohm meters, etc.
  Troubleshooting this vehicle requires proficiency in testing relating to the continuity of switches, connectors, wiring, etc.
  If the technician working on this vehicle is not proficient in any of the above, diagnostics should be referred to a qualified technician..
- Make sure the batteries are in good condition and fully charged before performing any tests.
- If the vehicle exhibits intermittent problems, it must be in the failed mode for troubleshooting. If it is running normally when the testing is done then the problem will not be identified.

DURING ALL TESTS or REPAIRS.

⚠WARNING

Turn the Key switch OFF then 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.

⚠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.

Use lifting and support devices with a minimum capacity of twice the gross weight of your vehicle. Failure to use lifting and support devices of recommended load capacity may result in severe bodily injury.

⚠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.

Status LED Code Table

The status LED's on the speed controller can be used to give you an idea of where the problem may be. During normal operation (no faults) the yellow LED will be flashing steady.

When the controller senses a fault the two LED's can be used to determine the fault code. The fault code will be a two digit code. The red LED signifies which digit and the yellow LED signifies the fault code. For example: When the red LED flashes once, the yellow LED will be flashing the first digit. When the red LED flashes twice, the yellow LED will be flashing the second digit. The fault code will repeat until the fault is corrected.

Typical location of Status LED's

Code	Handset Display *Effect of Fault*	Possible Cause	Note
12	`Controller Overcurent` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake.*	1. External short in motor wiring. 2. Defective controller. 3. Faulty wiring.	
13	`Current Sensor Fault` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake.*	1. Short or leakage to frame from motor windings or wiring. 2. Controller defective	
14	`Precharge Failed` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake.*	1. External load attached to controller B+ terminal.	*Possible non-factory installed device*
15	`Controller Severe Undertemp` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake;* *Shutdown throttle;* *Full Brake.*	1. Vehicle operated in temperatures below -40ºC.	
16	`Controller Severe Overtemp` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake;* *Shutdown throttle;* *Full Brake.*	1. Vehicle operated in extreme high ambient temperatures. 2. Vehicle overloaded. 3. Controller not properly mounted.	*Controller overheated (+95ºC)*
17	`Severe Undervoltage` *Reduced drive torque.*	1. Blown circuit breaker. 2. Battery failure while in operation.	
18	`Severe Overvoltage` *Shutdown of main contactor;* *Shutdown of motor;* *Shutdown of EM brake;* *Shutdown throttle;* *Full Brake.*	1. Blown circuit breaker during regen. 2. Battery failure during regen.	
21	`Controller Undertemp Cutback` *Reduced motor torque.*	1. Controller operated in temperatures below -25ºC	*Controller output is reduced below -25ºC*
22	`Controller Overtemp Cutback` *Reduced drive and brake torque.*	1. Vehicle operated in extreme high ambient temperatures. 2. Vehicle overloaded. 3. Controller not properly mounted.	*Controller overheated (+85ºC)*
23	`Undervoltage Cutback` *Reduced drive torque.*	1. Batteries discharged. 2. Battery failure.	

Code	Handset Display *Effect of Fault*	Possible Cause	Note
24	Overvoltage Cutback *Reduced brake torque.*	1. Battery failure. 2. High voltage generated during normal regen.	
25	+5-volt Supply Failure *None.*	1. Faulty motor encoder. 2. Faulty wiring	*+5-volt supply at Pin - 26 is too low*
26	Digital Out 6 Overcurrent *Digital output 6 will not turn on*	1. Load on output #6 exceeded 0.015 Amps.	*Not used – If fault occurs then check controller connector for contamination*
27	Digital Out 7 Overcurrent *Digital output 7 will not turn on*	1. Load on output #7 exceeded 0.015 Amps.	*Not used – If fault occurs then check controller connector for contamination*
28	Motor Temp Hot Cutback *Reduced drive torque.*	1. Vehicle operated in extreme high ambient temperatures. 2. Vehicle overloaded.	*Motor overheated*
29	Motor Temp Sensor Fault *MaxSpeed reduced, Limited Operating Strategy (LOS) and motor temperature cutback disabled.*	1. Motor temperature sensor fault. 2. Wiring Fault.	
31	Main Open/Short *Shutdown Driver 1;* *Shutdown of motor;* *Shutdown of EM brake.*	1. Faulty main contactor coil. 2. Faulty wiring.	
32	EM Brake Open/Short *Shutdown Driver 2;* *Shutdown Throttle;* *Full brake.*	3. Faulty motor brake. 4. Faulty wiring.	
33	Coil3 Driver Open/Short *Shutdown driver 3.*	1. See note.	*Not used – If fault occurs then check controller connector for contamination*
35	PD Open/Short *Shutdown PD*	1. See note.	*Not used – If fault occurs then check controller connector for contamination*
36	Encoder Fault *Control mode changed to , Limited Operating Strategy (LOS)*	1. Faulty motor encoder. 2. Faulty wiring.	
37	Motor Open *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake.*	1. Open motor windings. 2. Faulty wiring.	
38	Main Contactor Welded *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake*	1. Main contactor welded. 2. Motor phase 'U' open circuit. 3. Short to B+ controller terminal. 4. Faulty wiring.	
39	Main Contactor Did Not Close *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake*	1. Faulty main contactor. 2. Faulty wiring. 3. B+ Circuit breaker blown.	
41	Throttle Wiper High *Shutdown throttle.*	1. Faulty throttle module. 2. Faulty wiring.	*Voltage from throttle module too high*
42	Throttle Wiper Low *Shutdown throttle.*	1. Faulty throttle module. 2. Faulty wiring.	*Voltage from throttle module too low*
43	Brake Wiper high *Full brake.*	1. See note, voltage too high on pin-17.	*Not used – If fault occurs then check controller connector for contamination*

Code	Handset Display *Effect of fault*	Possible Cause	Note
44	Brake Wiper Low *Full brake.*	1. See note, voltage too low on pin-17	*Not used – If fault occurs then check controller connector for contamination*
45	Pot Low Overcurrent *Shutdown throttle;* *Full brake.*	1. Current into pin-18 exceeded 0.010A	*Not used – If fault occurs then check controller connector for contamination.*
46	EEPROM Failure *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake;* *Shutdown Throttle;* *Shutdown interlock* *Shutdown Driver 1;* *Shutdown Driver 2;* *Shutdown Driver 3* *Shutdown Driver 4;* *Shutdown PD;* *Full brake.*	1. Controller parameters corrupted.	*Controller must be returned to factory for reprogramming.*
47	HPD/Sequencing Fault *Shutdown throttle.*	1. Startup switches not operated in the correct order. 2. Faulty wiring or switches.	*Refer to operator section for correct startup sequence.*
49	Parameter Change Fault *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake.*	1. May occur when adjusting parameters.	*Cycle key switch to clear fault.*
68	VCL Runtime Error *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake;* *Shutdown Throttle;* *Shutdown interlock* *Shutdown Driver 1;* *Shutdown Driver 2;* *Shutdown Driver 3* *Shutdown Driver 4;* *Shutdown PD;* *Full brake.*	1. Controller parameters corrupted.	*Controller must be returned to factory for reprogramming.*
69	External Supply Out of Range *None.*	1. Faulty wiring. 2. Faulty motor encoder. 3. Faulty dash display.	*Excessive combined current into pin-26 and pin-25.*
71	OS General *Shutdown main contactor;* *Shutdown motor;* *Shutdown EM bake;* *Shutdown Throttle;* *Shutdown interlock* *Shutdown Driver 1;* *Shutdown Driver 2;* *Shutdown Driver 3* *Shutdown Driver 4;* *Shutdown PD;* *Full brake.*	1. Internal controller fault.	*If cycle key switch does not clear fault, controller may have failed.*
72	PDO Timeout *Shutdown interlock;* *CAN NMT State set to Pre-operational*	1. Internal controller fault.	*Cycle key switch to clear fault.*
73	Stall Detect *Control mode changed to LOS.*	1. Stalled motor. 2. Faulty motor encoder. 3. Faulty wiring to encoder. 4. Encoder power supply fault.	*Encoder power supply is provided by pin-26 from controller.*

TAYLOR - DUNN

Industrial Charger Troubleshooting

The charger supplied with this vehicle is either specified or provided by the end user.

Refer to the documentation supplied with the charger or contact the charger manufacturer for more information.

TAYLOR - DUNN

Illustrated Parts

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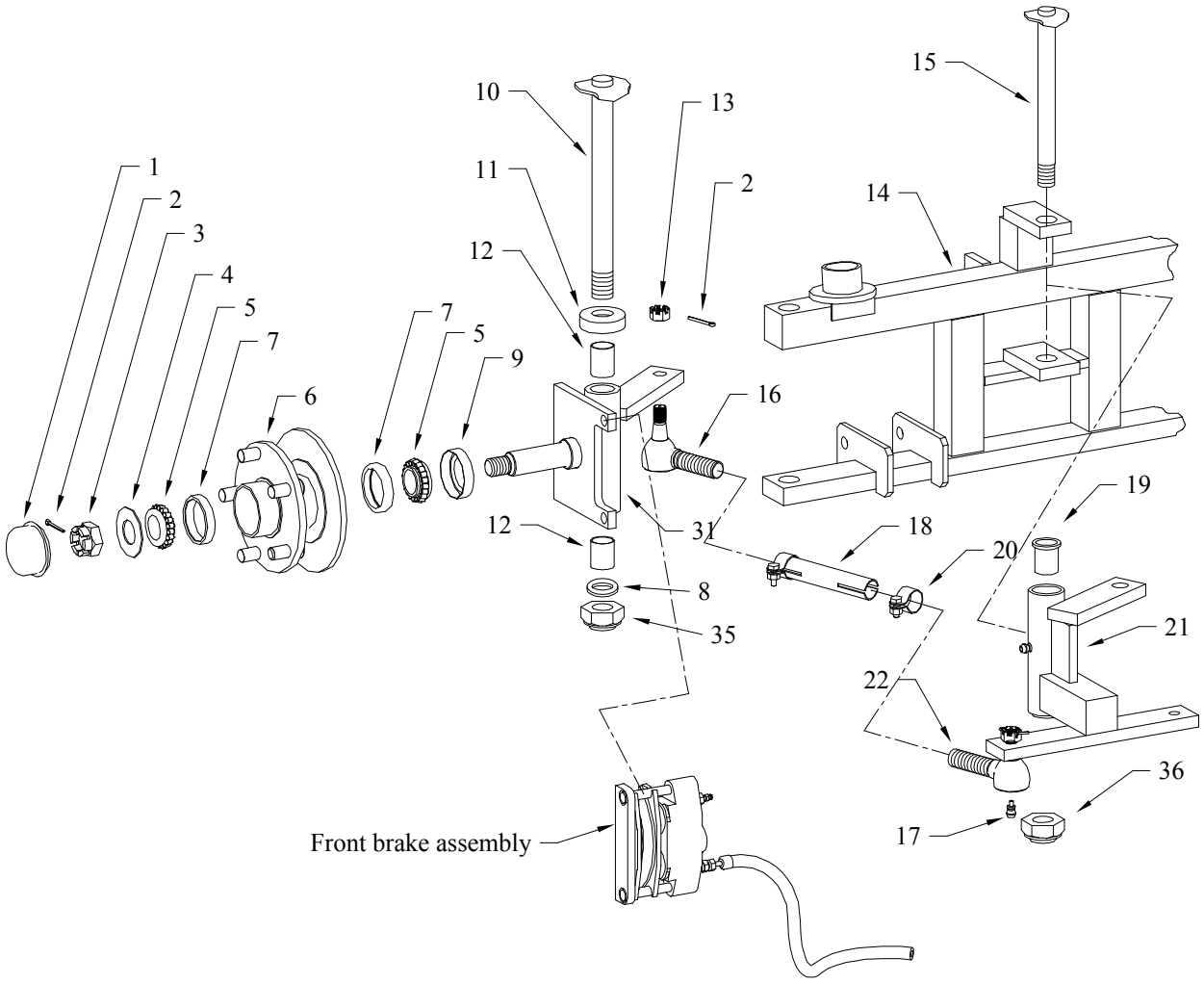
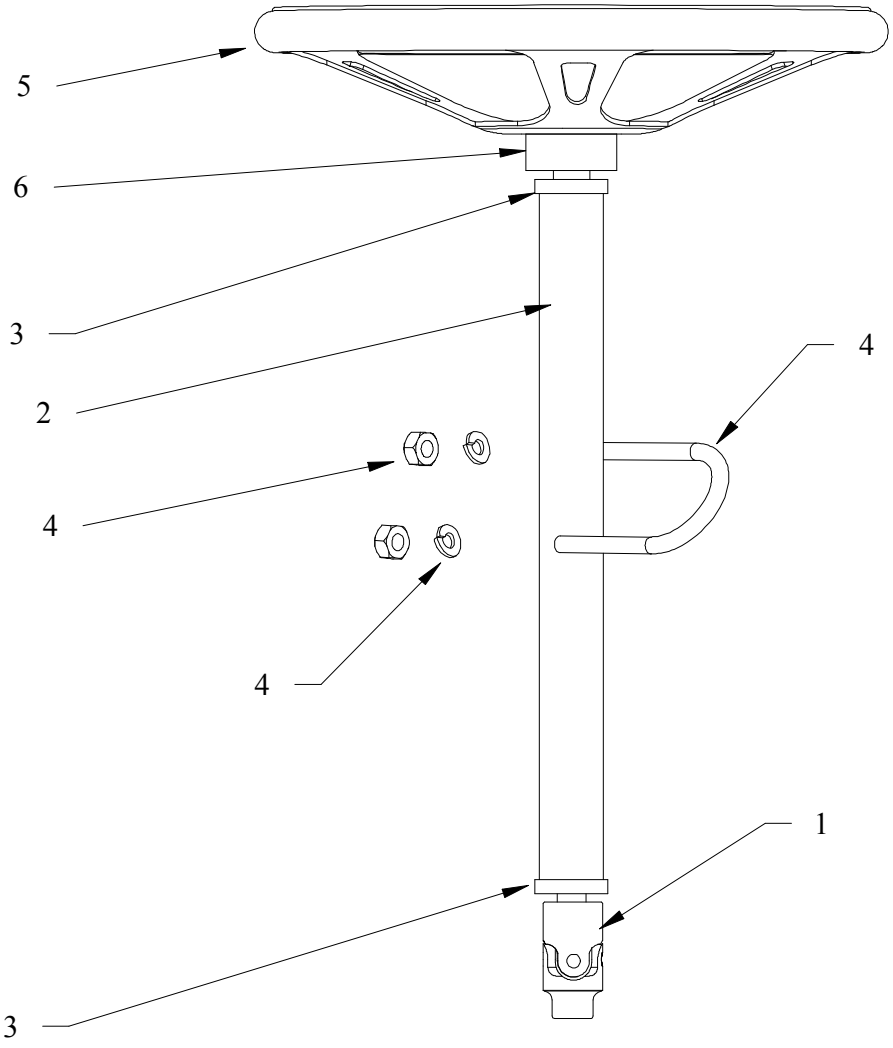
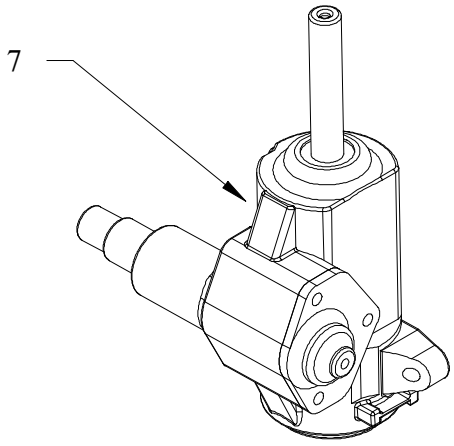
Front Axle, Steering



Front Axle, Steering			
ITEM #	PART #	DESCRIPTION	QTY
1	92-104-01	Bearing cap	2
2	88-527-14	Cotter pin	8
3	88-239-85	3/4 NF Hex slotted nut	2
4	88-228-61	3/4 SAE Flat washer	2
5	80-017-00	Bearing	4
6	12-158-11	Wheel hub	2
7	80-103-00	Race	4
8	88-268-61	7/8 Flat washer	2
9	45-338-00	Grease seal	2
10	21-015-15	King pin	2
11	80-309-00	Thrust bearing	2
12	32-204-10	Bushing	4
13	88-159-85	1/2 NF Hex slotted nut	4
14	15-425-10	Axle beam	1
15	21-015-20	Pivot pin	1
16	86-501-98	Ball joint, left hand thread	3
17	87-074-00	Grease fiting	6
18	18-020-30	Steeing link	2
19	32-200-00	Bushing	2
20	86-510-00	Ball joint clamp	6
21	14-425-07	Steering pivot	1
22	86-501-99	Ball joint, right hand thread	3
23	-	-	-
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-
31	14-425-05	Steering knuckle, left	1
	14-425-06	Steering knuckle, right	1
32	See brake lines	1/8 pipe - 3/16 tube adaptor	2
33	99-588-01	Bleeder adaptor	2
34	99-588-00	Bleeder	2
35, 36	88-289-81	7/8 NF Thin pattern lock nut	2
Not Shown	41-886-00	1/8 pipe plug used on #29	2
	18-035-00	Drag link	1

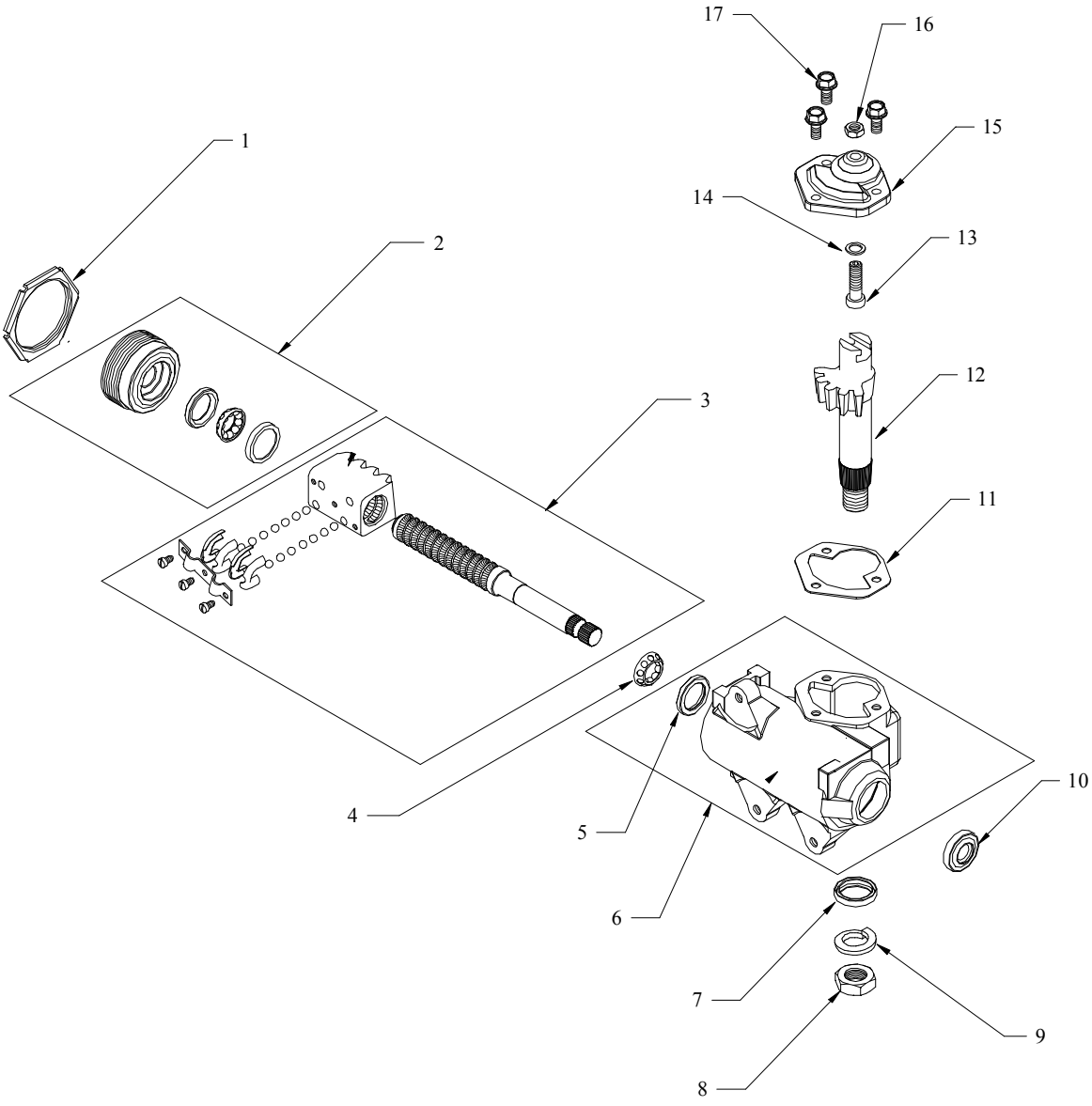
Steering Column and Linkage





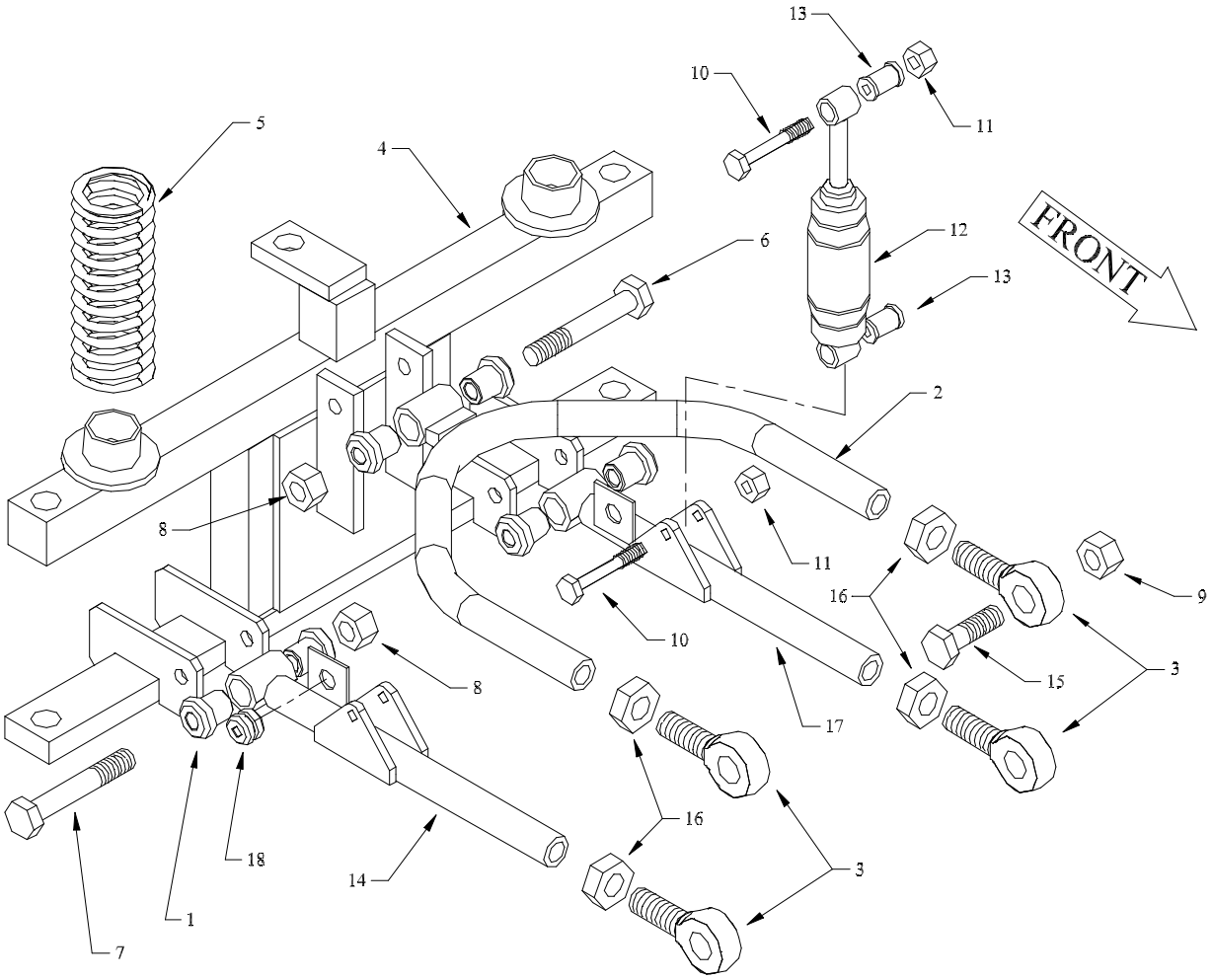
Steering Column			
ITEM #	PART #	DESCRIPTION	QTY
1	18-426-00	Steering shaft	1
2	18-426-05	Steering column tube	1
3	80-400-10	Bearing	2
4	96-123-45	U-bolt (includes nuts)	1
5	19-005-17	Steering wheel	1
6	19-005-02	Adaptor, Steering wheel (includes shaft nut, steering wheel bolts and cap)	1
7	18-308-21	Steering gear	1
Not Shown	18-108-00	Pitman arm	1
	88-120-15	7/16NC x 1-1/2 Hax bolt, grade 5 (steering gear mounting)	3
	88-279-82	7/8NF Thin pattern nut (pitman arm)	1
	88-262-62	7/8 Split lock nut (pitman arm nut)	1

Steering Gear



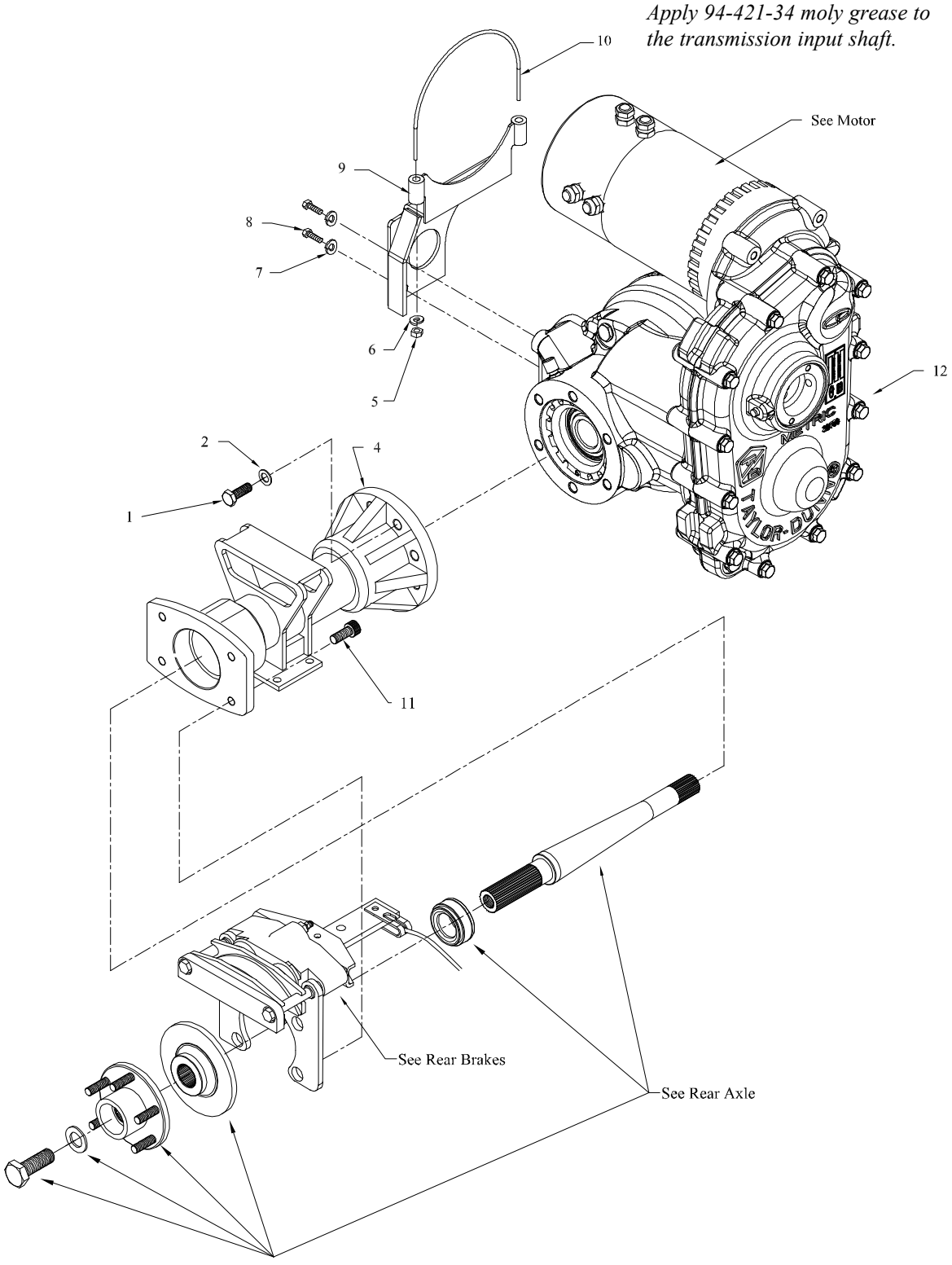
Steering Gear (18-308-21)			
ITEM #	PART #	DESCRIPTION	QTY
1	18-308-70	Locknut	1
2	18-308-71	Adjuster assembly	1
3	18-308-72	Worm assenbly	1
4	18-308-23	Upper worm bearing	1
5	18-308-22	Upper worm bearing race	1
6	18-308-77	Housing	1
7	18-308-78	Seal, pitman shaft	1
8	18-308-80	Nut, pitman shaft	1
9	18-308-81	Lock washer	1
10	18-308-79	Seal, input shaft	1
11	18-308-82	Gasket	1
12	18-308-76	Pitman shaft	1
13	18-308-75	Gear lash adjuster	1
14	18-308-85	Shim kit	1
15	18-308-84	Side cover	1
16	18-308-86	Jam nut	1
17	18-308-83	Bolt, side cover	3

Front Suspension



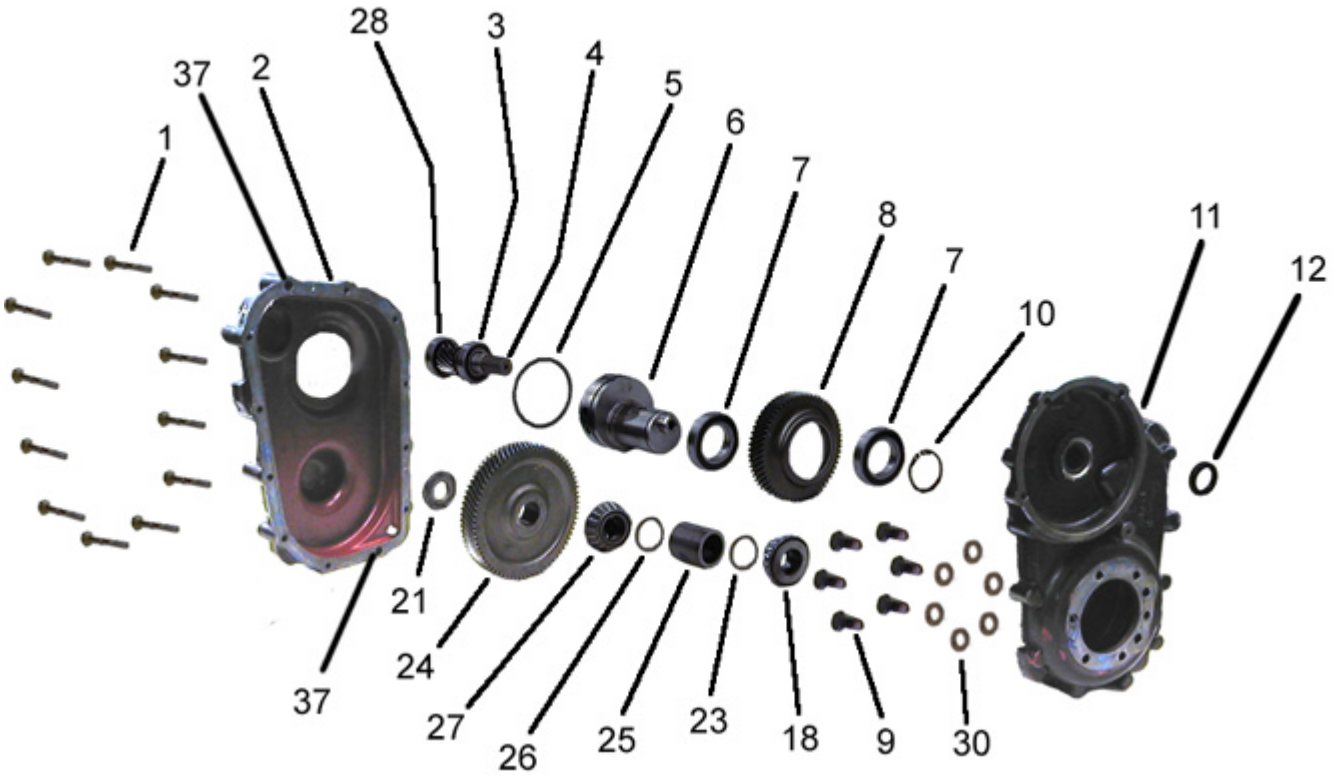
Front Suspension			
ITEM #	PART #	DESCRIPTION	QTY
1	32-214-50	Bushing	6
2	00-425-00	Wishbone link	1
3	86-521-99	Rod end	4
4	See Front Axle	Axle beam	1
5	85-142-00	Spring	2
6	96-240-00	1/2 NC x 4 Hex bolt	1
7	88-140-22	1/2 NC x 3-1/2 Hex bolt	2
8	88-149-81	1/2 NC Lock nut	3
9	88-189-82	5/8 NC Then pattern lock nut	4
10	88-101-16	3/8 NC x 2 Hex bolt, grade 5	4
11	88-109-81	3/8 NC Hex lock nut	4
12	86-007-00	Shock	2
13	32-207-10	Bushing	4
14	00-425-15	Right side lower link	1
15	88-180-18	5/8 x 2-1/2 NC Hex bolt	4
16	88-199-82	5/8 NF Thin pattern hex nut	4
17	00-425-01	Left side lower link	1
18	98-607-10	Grommet	2
Not Shown	98-753-15	Rubber bump stop	2

Transmission Assembly



Transmission Assembly			
ITEM #	PART #	DESCRIPTION	QTY
1	89-113-30	12 x 1.75 x 30mm Hex bolt, class 8.8	12
2	89-113-60	12mm Split lock washer	12
3	-	-	-
4	41-291-80	Axle tube, left	1
	41-291-87	Axle tube, right	1
5	88-099-80	5/16 NF Hex nut	2
6	88-088-62	5/16 Split lock washer	2
7	88-128-62	7/16 Split lock washer	2
8	89-111-27	10 x 1.5 x 30mm Hex bolt	2
9	70-456-03	Rear motor support bracket	1
10	96-114-12	U-bolt	1
11	96-327-10	Hex socket bolt	8
12	44-440-83	Transmission center section assembly with 24:1 gears (no motor)	1
	44-440-84	Transmission center section assembly with 30:1 gears (no motor)	1
Not Shown	80-714-05	O-ring, motor coupler	1
	89-060-11	Motor mounting bolt, M6 X 1.0 X 50 HEX HEAD BOLT	3

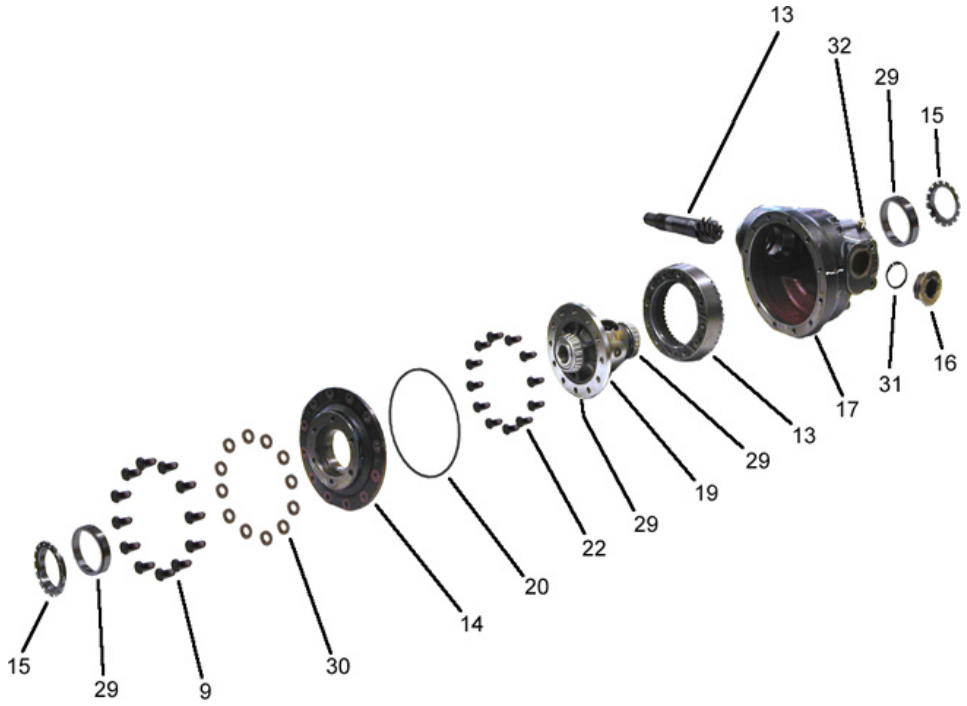
Transmission Gear Case



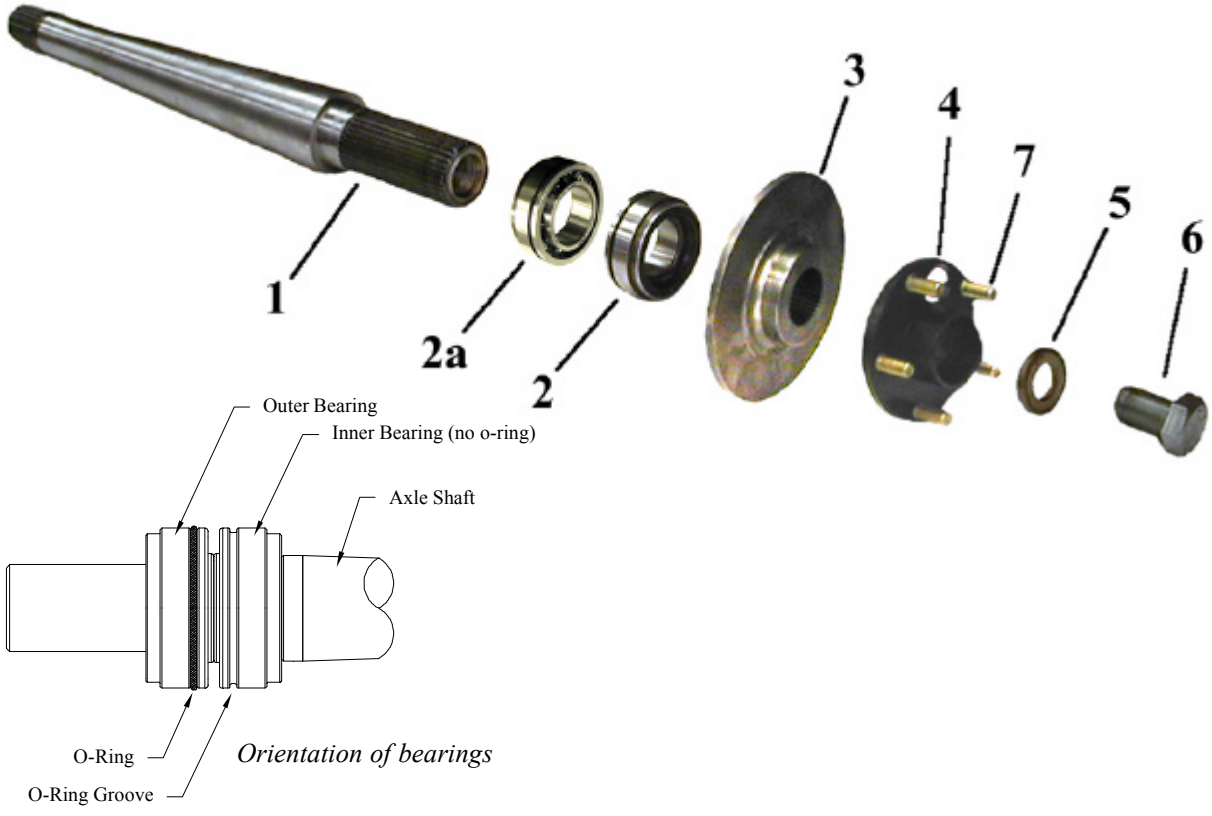
Note 1: Spacer 23 is available in increments of .05mm starting at 3.9mm. 3.9mm spacer is part number GT-3287213. Add 10 to the part number for every 0.05mm over 3.9. For example, if 4.55mm is needed: 4.55-3.9 = .65mm over, 0.65/.05 = 13, 13*10 = 130. Part number for 4.5mm spacer is 3287213+130 = 3287343.

Transmission Gear Case			
ITEM #	PART #	DESCRIPTION	QTY
1	GT-71682	M8 x 60 bolt	12
2	GT-3287563	Gear case cover	1
3	GT-71259	Bearing	1
4	GT-3287523	Input shaft, 24:1 (optional)	1
	GT-3287513	Input shaft, 30:1	1
5	GT-71982	O-ring	1
6	GT-3287503	Eccentric shaft	1
7	GT-72005	Bearing	2
8	GT-3287493	Idler gear	1
9	GT-70302	M10 x 30 Bolt	6
10	GT-71715	Snap ring	1
11	GT-3287553	Gear case housing	1
12	GT-72019	Seal	1
18	GT-71979	Bearing	1
21	GT-3273633	Pinion nut	1
23	See Note 1, previous page	Spacer	1
24	GT-3287463	Output gear, 24:1 (optional)	1
	GT-3287453	Output gear, 30:1	1
25	GT-328	Spacer, 46.100mm	1
	GT-328	Spacer, 46.100mm	0 or 1
	GT-328	Spacer, 46.125mm	0 or 1
	GT-328	Spacer, 46.150mm	0 or 1
	GT-328	Spacer, 46.175mm	0 or 1
26	GT-3287903	Shim, 0.100mm	0 or 1
	GT-3287883	Shim, 0.400mm	0 or 1
	GT-3287893	Shim, 0.500mm	0 or 1
	GT-3287853	Shim, 0.600mm	0 or 1
	GT-3287863	Shim, 0.700mm	0 or 1
	GT-3287873	Shim, 0.800mm	0 or 1
27	GT-71068	Bearing	1
28	GT-72022	Bearing	1
30	GT-70299	10mm Washer	6
37	GT-3252633	Dowel pin	2

Transmission Differential Case



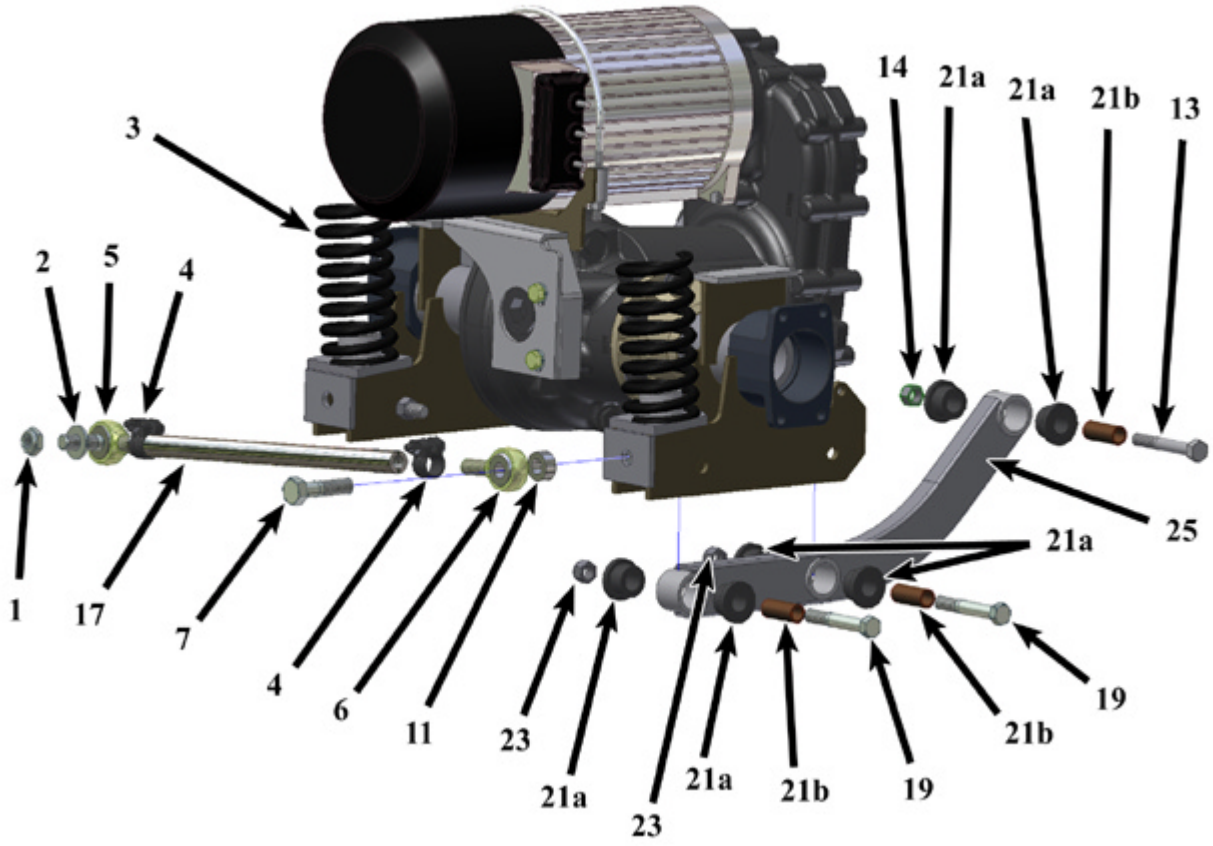
Rear Axle



Transmission Differential Case			
ITEM #	PART #	DESCRIPTION	QTY
9	GT-70302	M10 x 30 Bolt	12
13	GT-3287183	Ring and pinion gear set	1
14	GT-3297193	Differential case cover	1
15	GT-3287133	Adjusting ring	2
16	GT-70417	Fill/Level plug	1
17	GT-3287113	Differential housing	1
19	GT-3287143	Differential case	1
20	GT-72013	O-ring	1
22	GT-71896	M10 x 25 Bolt	12
29	GT-71978	Bearing and race	2
30	GT-70299	10mm Washer	12
31	GT-71881	Seal	1
32	GT-70052	Vent	1

Rear Axle			
ITEM #	PART #	DESCRIPTION	QTY
1	41-154-35	Axle shaft	2
2	80-505-20	Bearing, outer	2
2a	80-505-30	Bearing, inner	2
3	41-490-11	Disc brake rotor	2
4	41-172-21	Hub	2
5	88-268-63	Flat washer	2
6	88-268-30	7/8-14 x 1.5 Bolt, grade 5	2
7	96-329-10	Wheel stud	10
Not shown	92-104-10	Hub cover	2

Rear Suspension

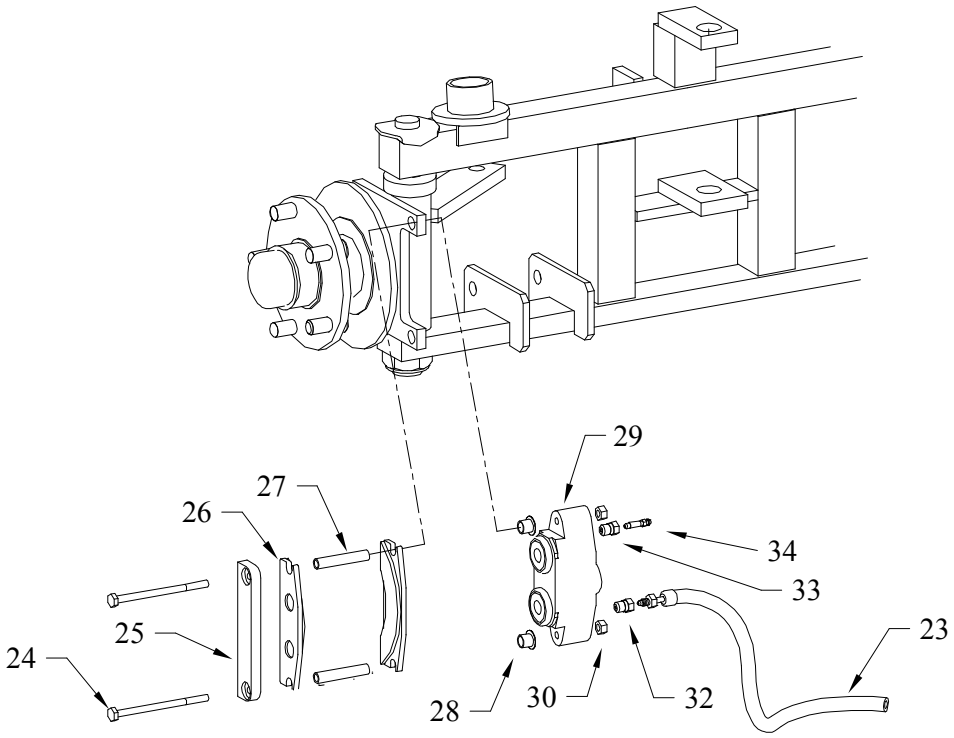


Rear Suspension			
ITEM #	PART #	DESCRIPTION	QTY
1	88-189-82	5/8NC Thin pattern lock nut	2
2	88-188-61	5/8 SAE Flat washer	1
3	85-142-00	Spring	2
4	86-510-00	Ball joint clamp	2
5	86-521-98	Rod end (left)	1
6	86-521-99	Rod end (right)	1
7	88-180-18	5/8NC x 1-3/4 Hex bolt	2
8	-	-	-
9	4GT-5761-73BB	Complete drive assembly (30:1)	1
	*	Complete drive assembly (24:1)	1
10	-	-	-
11	17-108-00	Spacer	1
12	-	-	-
13	88-160-27	9/16 X 4" NC HEX HEAD, GR 5	2
14	88-169-81	9/16NC Lock nut	2
15	-	-	-
16	-	-	-
17	41-402-10	Panard bar	1
18	-	-	-
19	88-160-24	9/16 X 3-1/4 NC HEX HEAD, GR 5	4
20	88-188-61	5/8 SAE flat washer	8
21	32-249-01	Bushing, rubber	12
	32-249-02	Sleeve, steel	6
22	-	-	-
23	88-169-81	9/16 NC HEX HD LOCK NUT	4
24	-	-	-
25	00-426-04	Suspension link	2
Not Shown	98-753-15	Rubber bump stop	2
	86-007-00	Shock	2
	88-100-15	3/8NC x 1-3/4 Hex bolt (shock bolt)	4
	32-207-10	Bushing, shock	4
	88-109-81	3/8NC Lock nut (shock bolt)	4

* - Not Available at Time of Printing

Front Brakes

Serial numbers 167630, 167631, 167752, 167753, 167754 only



Front Brakes

Serial number 167538 and all after serial number 167755

Illustration not Available

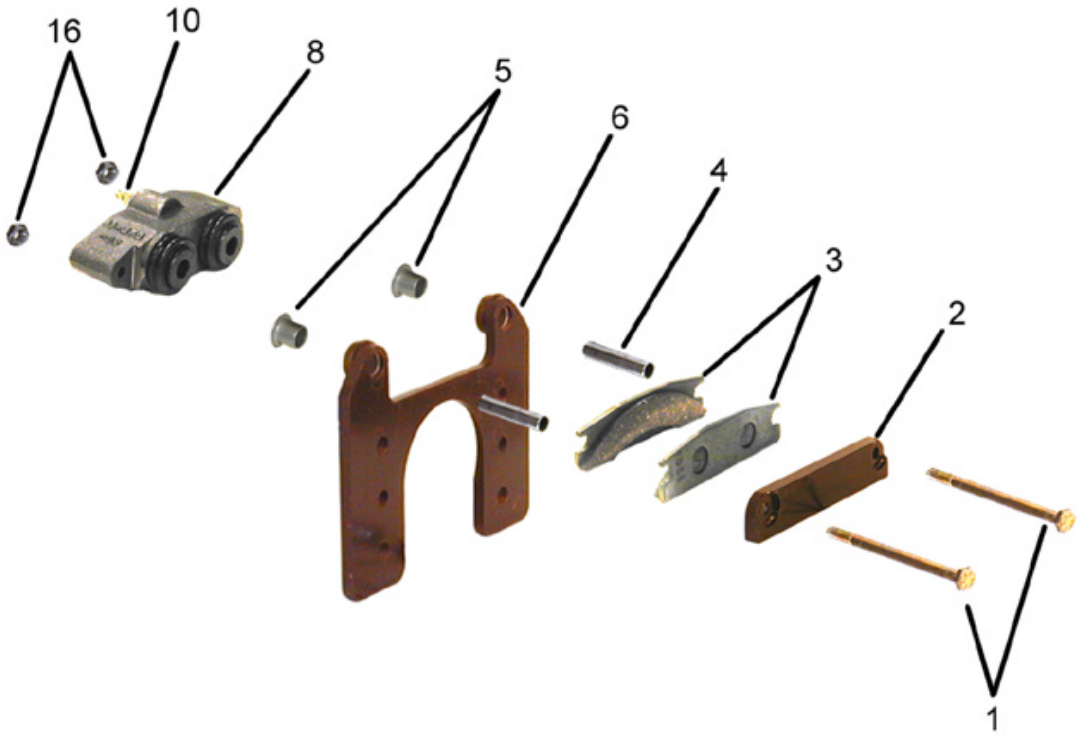
Front Brakes, Serial numbers 167630, 167631, 167752, 167753, 167754 only			
ITEM #	PART #	DESCRIPTION	QTY
23	See brake lines	Brake hose	2
24	88-067-21	bolt, grade 8	4
25	41-350-51	Secondary plate	2
26	41-348-70	Brake pad	4
27	41-348-57	Spacer	4
28	32-240-41	bushing	4
29	41-350-30	Brake body assembly	2
30	88-069-82	nut, grade 8	4
31	-	-	-
32	See brake lines	Adaptor	2
33	99-588-01	Adaptor	2
34	99-588-00	Bleeder	2

For vehicles manufactured after 6/24/2008, refer to supplement M7-001-40 for information regarding Front and Rear brake caliper assemblies and components. The supplement is included on the vehicle documentation CD delivered with the vehicle.

Front Brakes, Serial number 167538 and all after serial number 167755			
ITEM #	PART #	DESCRIPTION	QTY
1	41-351-30	Complete caliper assembly (left, no internal servicable parts)	1
	41-351-30	Complete caliper assembly (right, no internal servicable parts))	1
2	*	Bleeder valve	2
	*	Bleeder adaptor	2
3	-	-	-
4	-	-	-
5	*	Brake pad	4
6	*	Brake body assembly	2
7	*	Bushing	4
8	*	Spacer	4
9	*	Bolt	4
	*	Nut	4

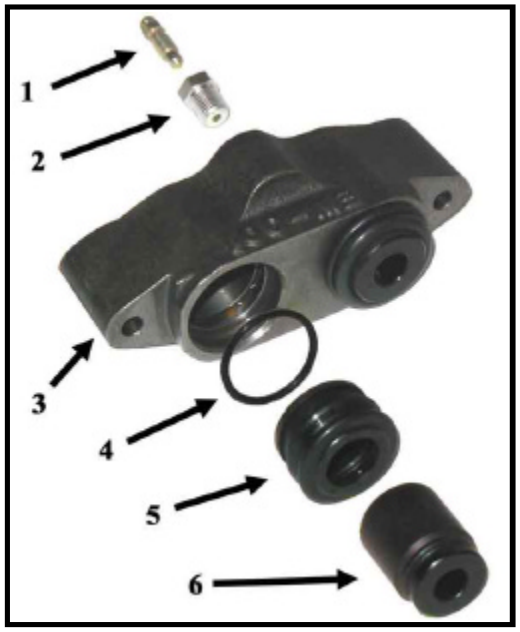
Rear Brakes

Serial numbers 167630, 167631, 167752, 167753, 167754 only



Brake Body Assembly (front or rear)

Serial numbers 167630, 167631, 167752, 167753, 167754 only

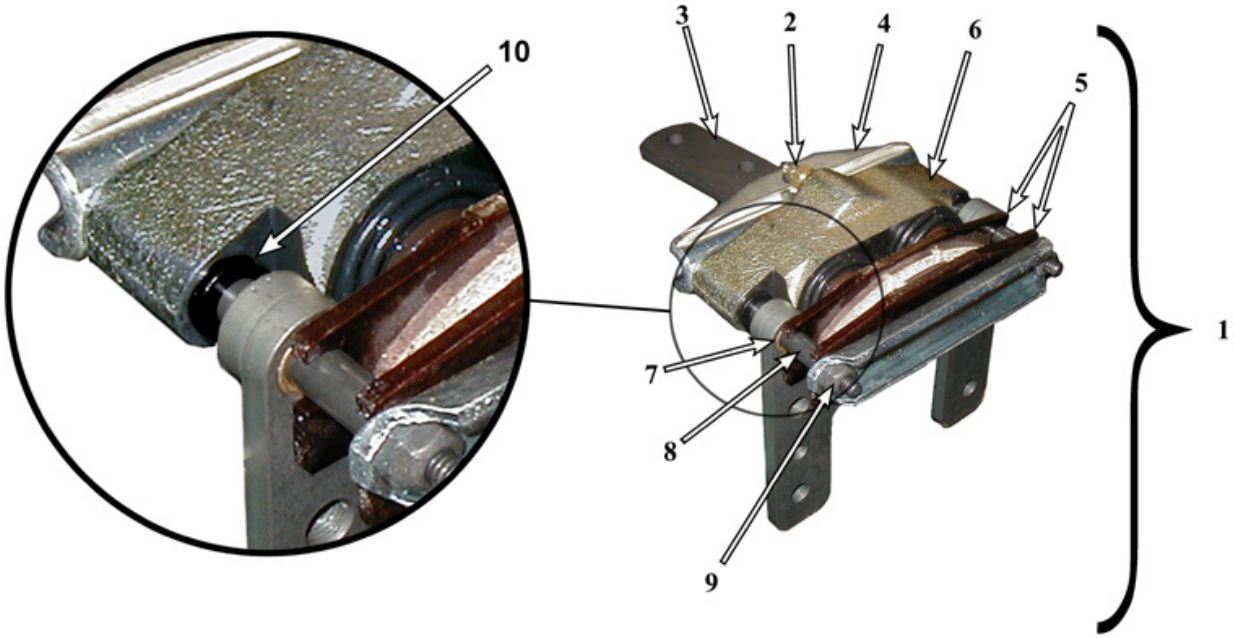


Rear Brakes, Serial numbers 167630, 167631, 167752, 167753, 167754 only			
ITEM #	PART #	DESCRIPTION	QTY
1	88-067-21	1/4 NC x 3-3/4 Hex bolt, grade 8	8
2	41-350-51	Secondary plate	4
3	41-348-70	Brake pad	8
4	41-348-57	Spacer	8
5	32-240-41	Bushing	8
6	41-350-28	Mounting bracket (single brake)*	4
	41-350-34	Mounting bracket (double brake)*	4
7	-	-	-
8	See below	Brake body assembly	4
9	-	-	-
10	See Brake Body Assembly	Bleeder	-

Brake Body, Serial numbers 167630, 167631, 167752, 167753, 167754 only			
ITEM #	PART #	DESCRIPTION	QTY
1	99-588-00	Bleeder screw	4
2	99-588-01	Bleeder adapter	4
3	41-350-42	Brake body	4
4	80-713-00	O-ring	8
5	41-350-09	Boot	8
6	41-350-10	Piston	8

Rear Brakes

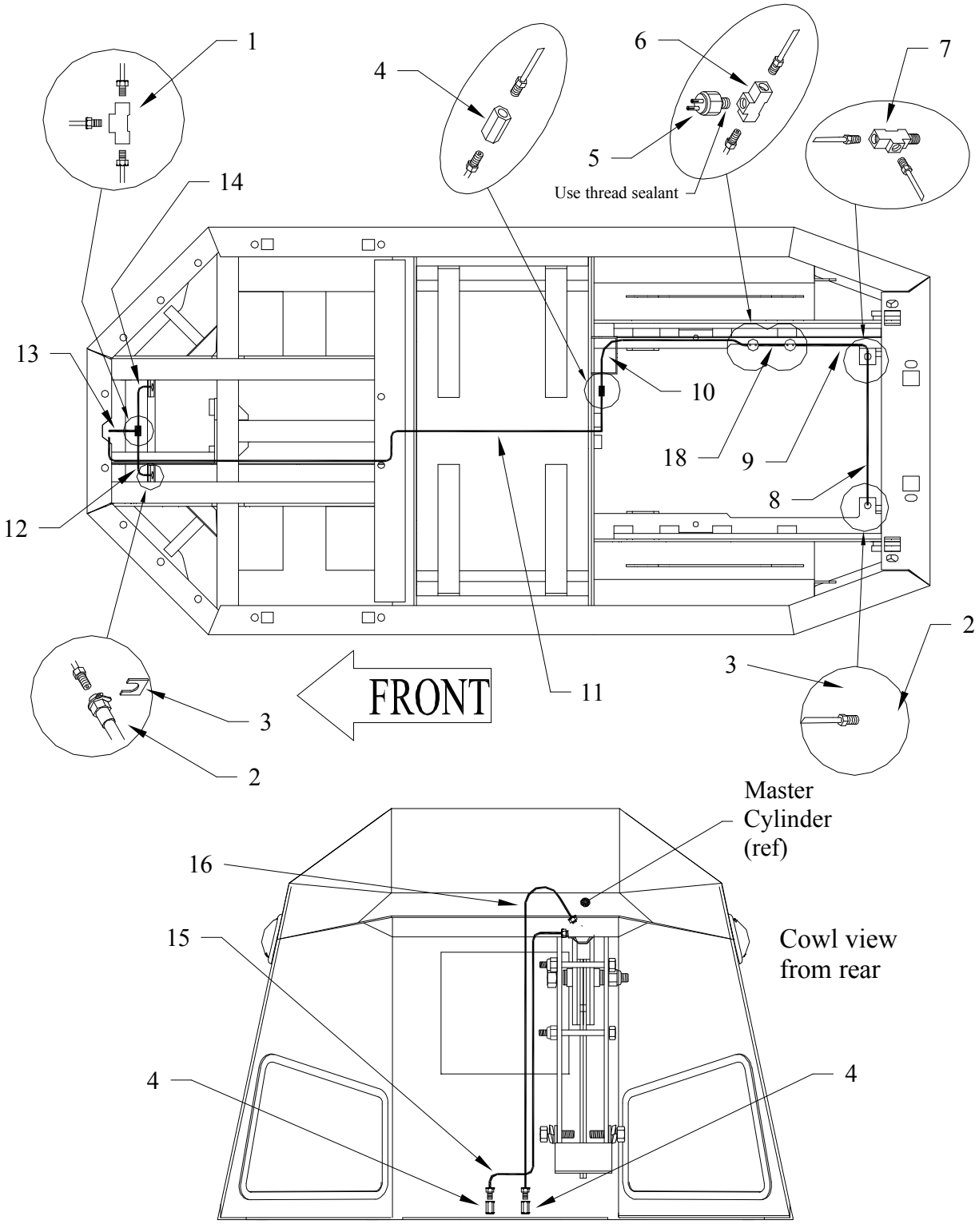
Serial number 167538 and all after serial number 167755



Rear Brakes, Serial number 167538 and all after serial number 167755			
ITEM #	PART #	DESCRIPTION	QTY
1	41-351-78	Complete caliper assembly (left)	1
	41-351-79	Complete caliper assembly (right)	1
2	99-588-00	Bleeder valve	2
	99-588-01	Bleeder adaptor	2
3	*	Park brake arm (optional)	2
4	*	Park brake bracket (optional)	2
5	41-348-70	Brake pad	4
6	*	Brake body assembly	2
7	32-204-30	Bushing	4
8	41-348-57	Spacer	4
9	*	Bolt	4
	88-069-82	Nut	4
10	*	Washer	4
Not Shown	*	Park Brake Bushing	2
	41-350-56	Park Brake pin	2

* - Not Available at Time of Printing

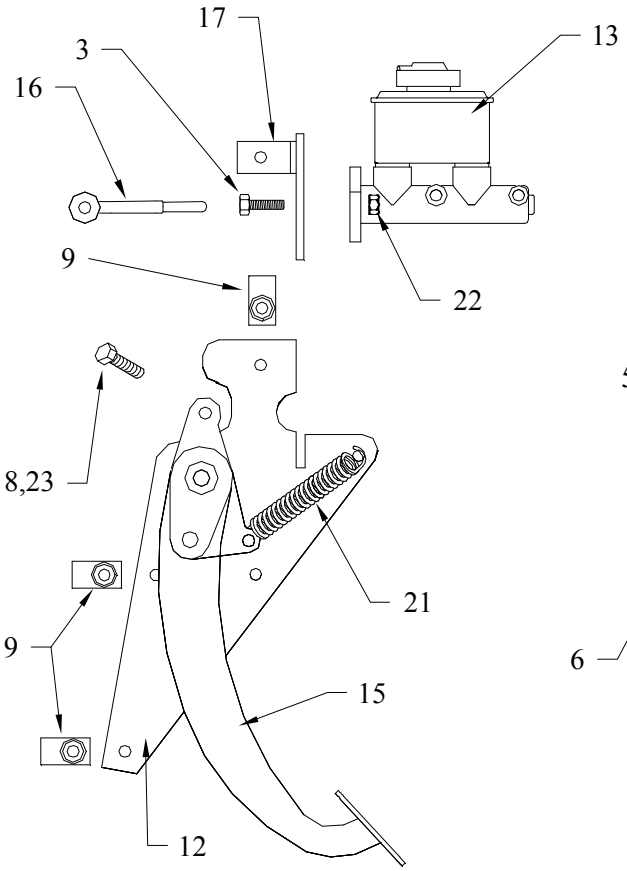
Brake Lines


1
4
6
7
5
Use thread sealant
14
13
10
18
9
8
12
2
3
FRONT
11
3
2
Master
Cylinder
(ref)
16
15
Cowl view
from rear
4
4

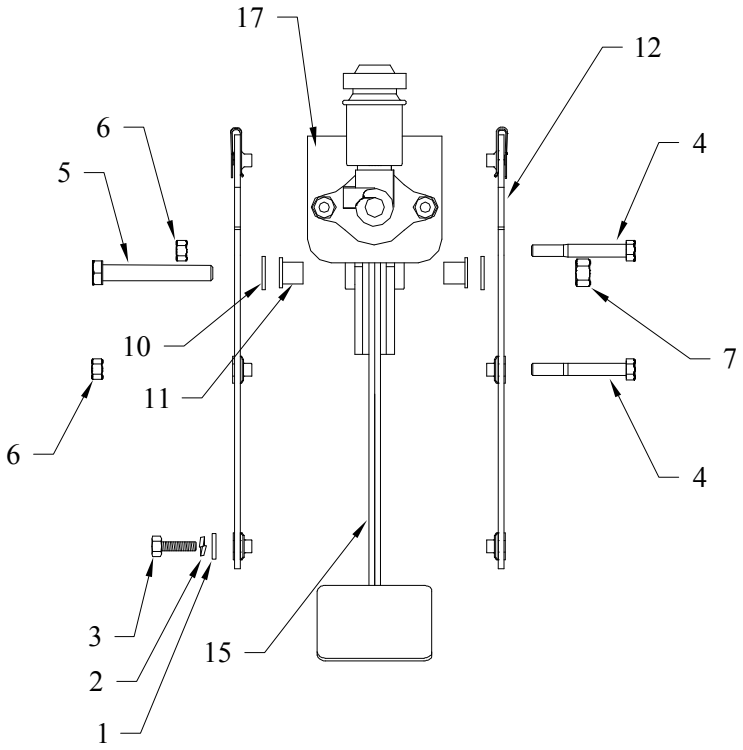
Brake Lines			
ITEM #	PART #	DESCRIPTION	QTY
1	99-564-00	T-fitting	2
2	99-580-10	Brake hose	4
3	99-576-00	Brake hose clip	4
4	99-575-00	Coupler	3
5a	71-110-00	Brake light switch	1
5b		Brake regen switch	1
6	99-591-00	Brake light switch/regen switch adaptor	2
7	99-559-00	T-fitting	1
8	99-604-66	Brake line	1
9	99-600-58	Brake line	1
10	99-605-26	Brake line	1
11	99-609-26	Brake line	1
12	99-600-57	Brake line	1
13	99-604-65	Brake line	1
14	99-600-56	Brake line	1
15	99-605-28	Brale line	1
16	99-605-27	Brake line	1
17	See Brake Linkage (foot brake)	Master cylinder	
18	99-600-58	Brake line	1
Not shown	99-575-32	Adapter, 3/16 tube to 10mm flare), used on master cylinder	2
	99-575-10	Brake hose adaptor, 3/16 tube to 1/8 pipe, used on wheel cylinders	4 or 6*
	99-600-62	*Brake line, for dual rear cylinders. Connects front cylinder to rear cylinder	2*

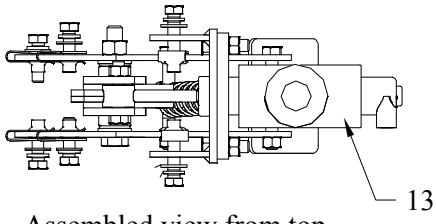
** - Serial numbers 167630, 167631, 167752, 167753, 167754 were equipped with dual rear brake calipers.*

Brake linkage (foot brake)

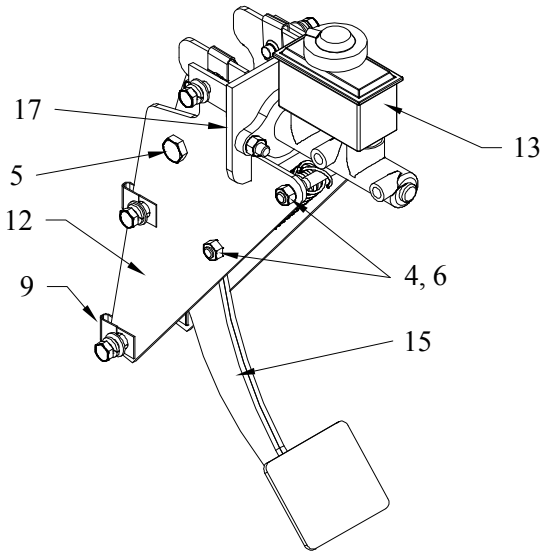


Left side plate removed for clarity



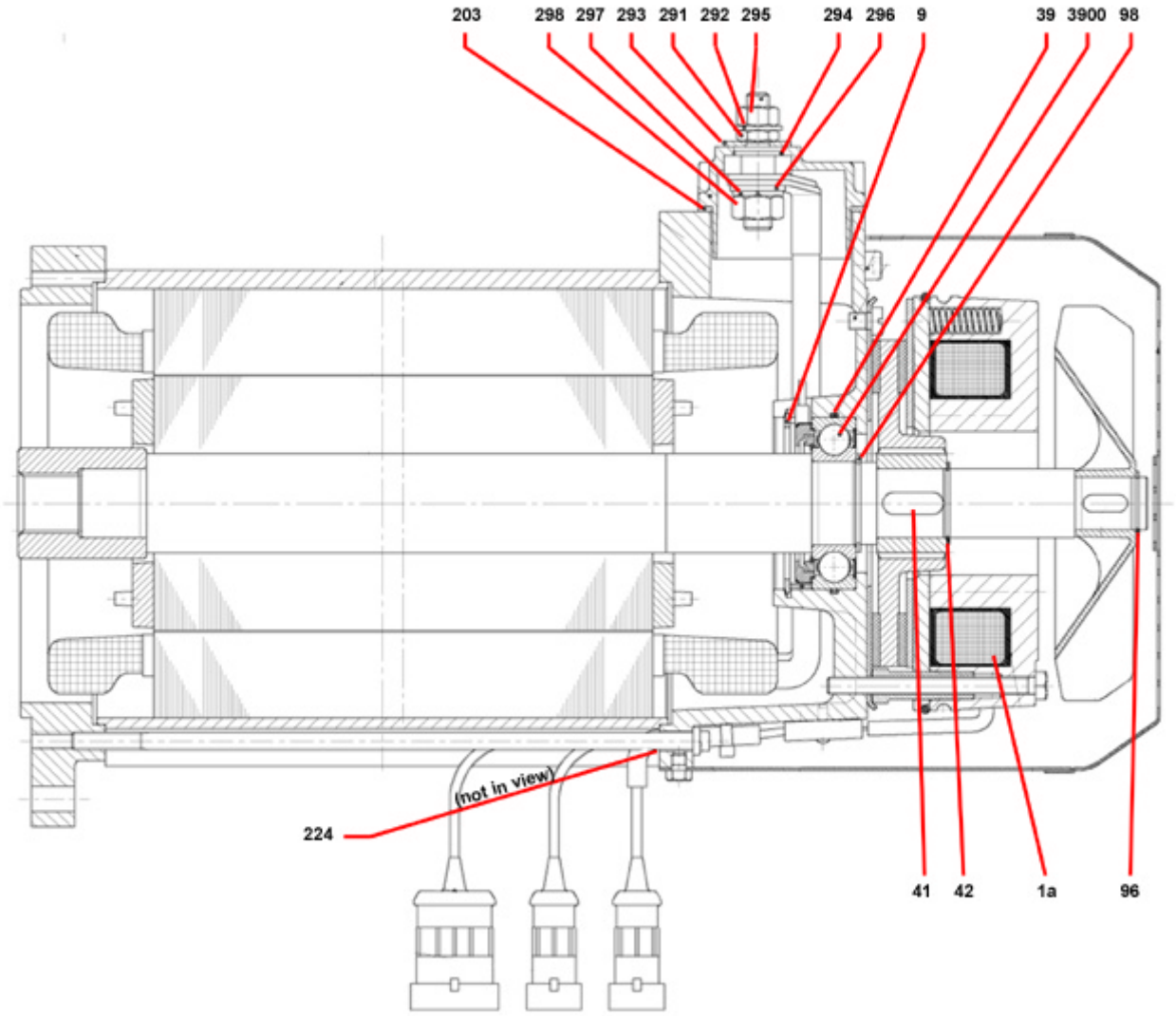


Assembled view from top



Brake Linkage			
ITEM #	PART #	DESCRIPTION	QTY
1	88-108-61	3/8 SAE Flat washer	6
2	88-108-62	3/8 Split lock washer	6
3	88-101-13	3/8NC x 1-1/4 Hex bolt, Grade 5	8
4	88-101-21	3/8NC x 3 Hex bolt, Grade 5	2
5	88-140-22	1/2NC x 3 Hex bolt	1
6	88-109-81	3/8NC Hex lock nut	2
7	88-149-81	1/2NC Hex lock nut	1
8	88-100-15	3/8NC x 1-3/4 Hex bolt	1
9	97-211-30	Blind nut	6
10	88-148-61	1/2 SAE Flat washer	2
11	32-215-00	Bushing	2
12	41-426-00	Mounting plate	2
13	99-511-20	Master cylinder	1
14	-	-	-
15	41-426-11	Brake pedal	1
16	00-426-06	Push rod	1
17	00-426-05	Master cylinder mounting bracket	1
18	-	-	-
19	-	-	-
20	-	-	-
21	85-250-00	Spring	1
22	-	-	-
23	88-109-81	3/8 NC Lock nut	1

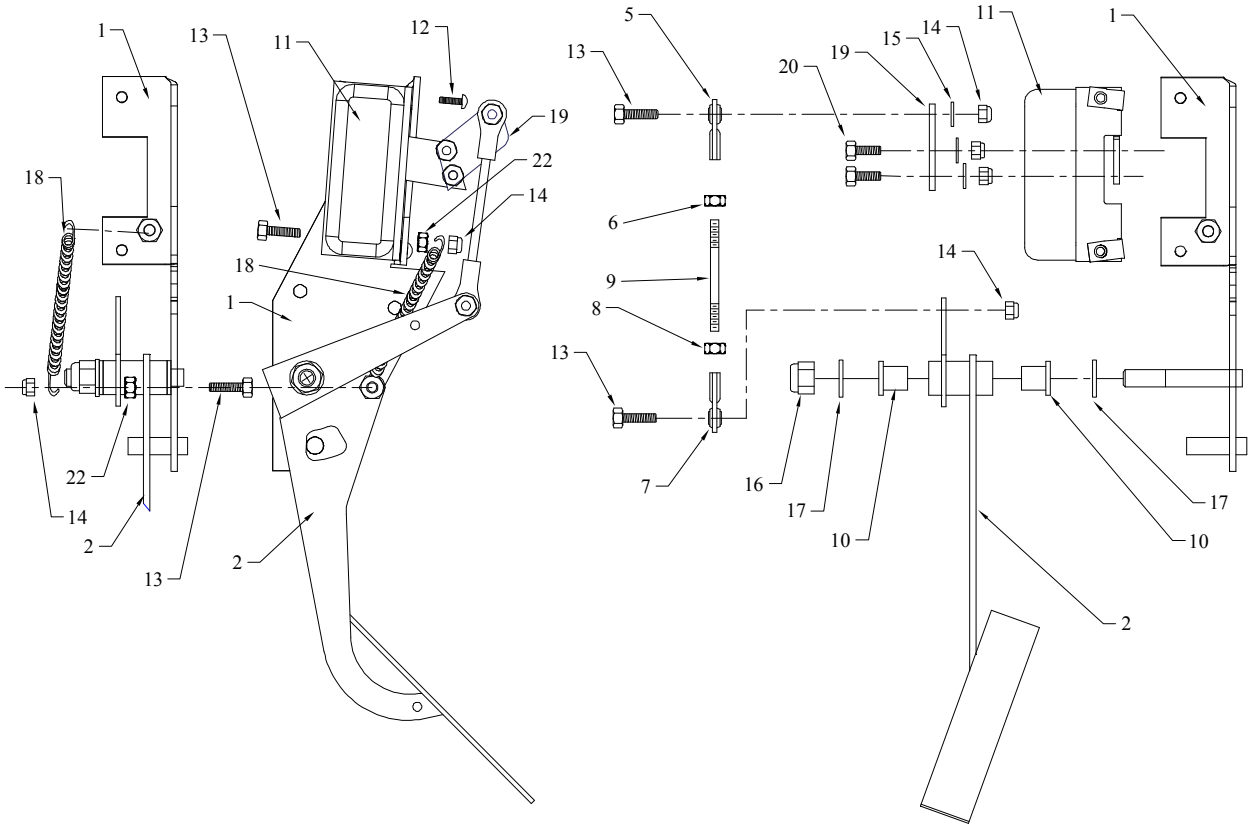
Motor


203
298
297
293
291
292
295
294
296
9
39
3900
98
(not in view)
224
41
42
1a
96

70-059-41 Motor Spec # ZFB40SO/4 DF100L-4			
ITEM #	PART #	DESCRIPTION	QTY
1a	41-354-05	Brake	1
9	*	Snap ring	1
39	*	O-ring	1
41	*	Key	1
42	*	Snap ring	1
96	*	Snap ring	1
98	*	Snap ring	1
203	*	Seal	1
224	*	Rubber Grommet	2
206	70-260-00	Terminal stud	3
291		Hex nut	3
292		Washer	3
293		Washer	3
294		O-ring	3
295		Hex nut	3
296		Washer	3
297		Lock washer	3
298		hex nut	3
3900	80-216-05	Sensor bearing	1
Not Shown	45-308-30	Rubber seal around brake	1

* - Not Available at Time of Printing

Throttle linkage

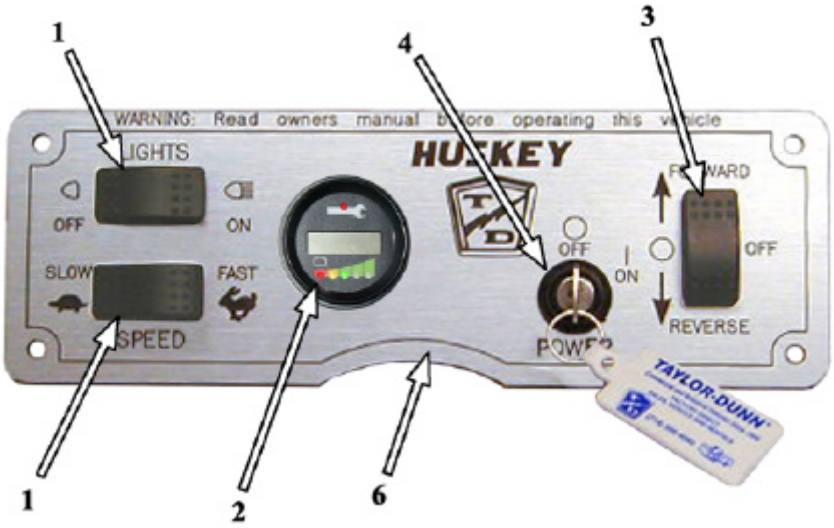


Throttle Linkage			
ITEM #	PART #	DESCRIPTION	QTY
1	00-425-21	Mounting bracket	1
2	00-425-09	Accelerator pedal arm	1
3	-	-	-
4	-	-	-
5	86-503-98	Rod end, left hand thread	1
6	97-211-00	1/4NF Hex nut, left hand thread	1
7	86-503-99	Rod end, right hand thread	1
8	88-079-80	1/4NF Hex nut	1
9	50-002-13	Link	1
10	32-215-00	Bushing	2
11	62-033-48	Accelerator module	1
12	88-065-11	1/4NC x 1 Phillips truss head screw	2
13	88-060-11	1/4NC x 1 Hex bolt	4
14	88-069-81	1/4NC Nylon locknut	6
15	88-068-61	1/4 SAE Flat washer	2
16	88-159-84	1/2NF Nylon lock nut	1
17	88-148-61	1/2 SAE Flat washer	2
18	85-295-00	Spring	1
19	62-033-28	Bracket	1
20	88-060-09	1/4NC x 3/4 Hex bolt	2
21	-	-	-
22	88-069-87	1/1NC KEPS nut	2
23	-	-	-

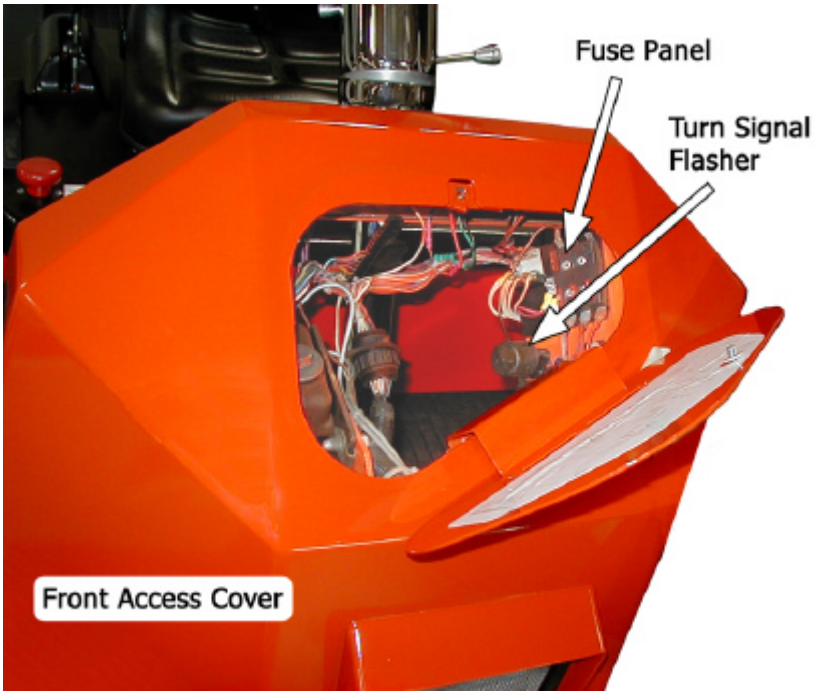
Wheels and Tires

Wheels and Tires			
ITEM #	PART #	DESCRIPTION	QTY
Not Shown	368-00127	INNACUSH WHEEL, 5 BOLT	4
	442-00007	TIRE, 15-1/2X5X10, zig-zag tread	4
	442-00006	TIRE, 15-1/2X6X10,ZIG-ZAG TEARD	4
	13-906-10	TIRE, 15-1/2X6X10,FINGER, TREAD	4
	368-00129	Tire/Wheel assembly (includes 442-00007 and 368-00127)	4
	368-00134	Tire/Wheel assembly (includes 442-00006 and 368-00127)	4
	13-734-35	Tire/Wheel assembly, 4.00 x 8 Soft Solid	4
	13-952-00	Tire/Wheel assembly (includes 368-00127 and 13-906-10)	4
	97-236-00	Lug nut	20

Instrument Panel (dash)



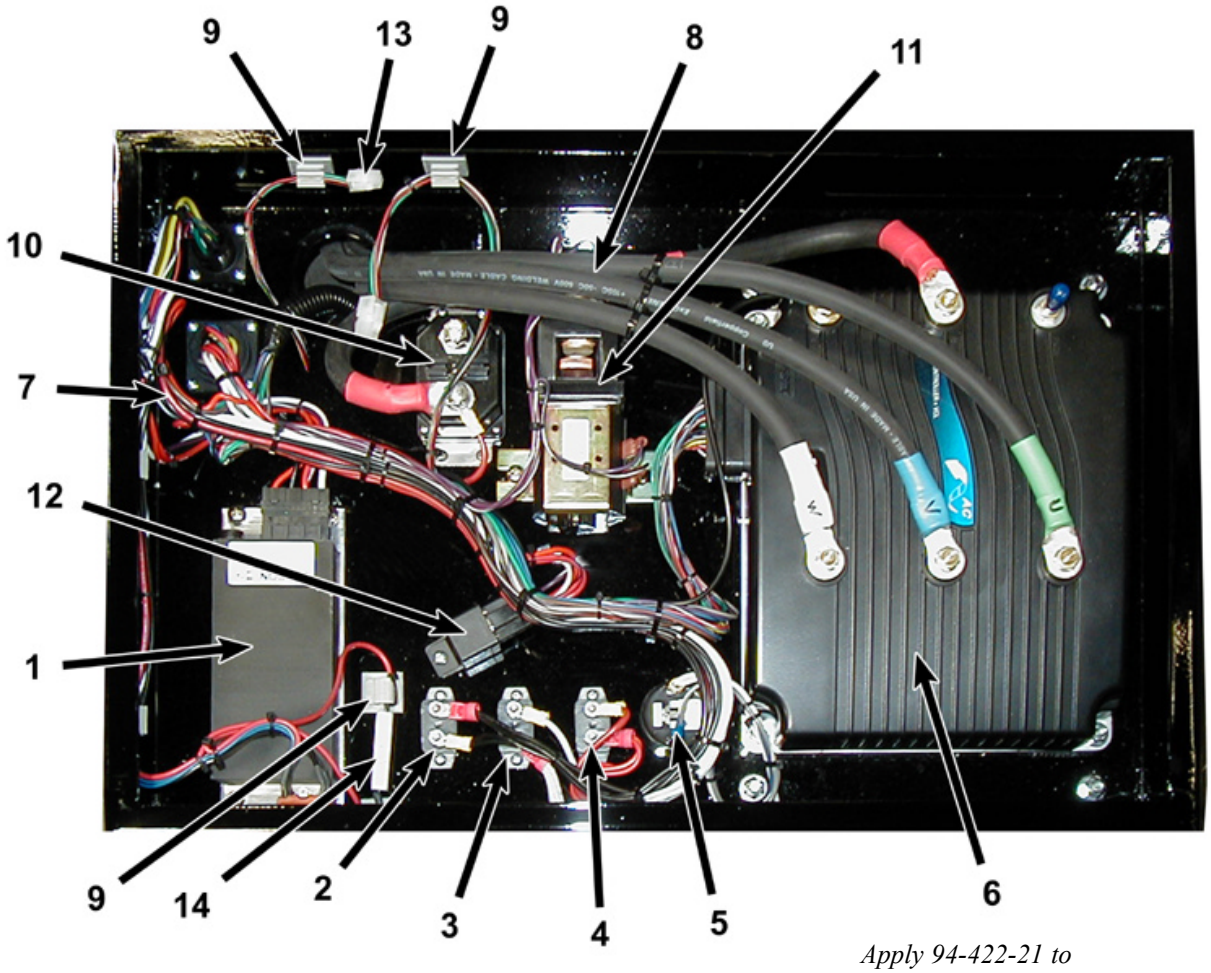
Lighting System



Instrument Panel			
ITEM #	PART #	DESCRIPTION	QTY
1 (top)	71-039-11	Light switch	1
1 (bottom)	71-039-11	High / Low (tow) speed switch	1
2	74-010-20	Gauge, Curtis Spy Glass	1
3	71-039-02	Forward and Reverse switch	1
4	71-120-10	Ignition switch	1
5	-	-	-
6	94-304-23	Dash panel	1
Not shown	97-211-20	1/4NC Blind nut (dash mounting)	4
Not shown	88-065-09	1/4NC x 3/4 Truss head machine screw (dash mounting)	4

Lighting System			
ITEM #	PART #	DESCRIPTION	QTY
-	72-025-03	Headlight	1
-	72-082-01	Headlight bulb	1
-	72-025-20	Tail light	2
-	97-211-15	Tail light mounting nut , 10-24 U-nut	4
-	88-034-13	Tail light mounting screw	4
-	72-082-02	Tail light/Brake light bulb (1157)	2
-	72-082-00	Back up/Turn signal bulb	4
-	71-900-05	Flasher (optional)	1
-	79-820-04	FUSE, ATO,10 AMP	3
-	78-010-30	Fuse, panel	1

Speed Control Panel



Apply 94-422-21 to mounting surface of #6

Control Panel			
ITEM #	PART #	DESCRIPTION	QTY
1	73-012-30	DC-DC converter	1
	88-838-06	#14X1/2 PAN HD SCR TYPE D THD	4
2	79-840-00	Circuit breaker, 10A	1
3	79-840-20	Circuit breaker, 20A	1
4	79-840-20	Circuit breaker, 20A	1
	88-818-06	#8 X 1/2 PAN HD SCR TYPE B THD (to mpunt items 2, 3, 4)	6
5	73-005-04	Motion alarm	1
6	62-400-45	Motor speed control	1
	88-060-13	1/4 X 1-1/4 NC HEX HD SCR, controller mounting	4
	88-069-81	1/4NC NYL INS LOCKNUT,PLTD, controller mounting	4
	88-068-61	1/4 SAE WASHER, controller mounting	4
7	75-153-00-60	*Harness, control	1
	88-818-02	#8 X 1/4 PAN HD SCR TYPE B THD (mount connectors)	8
8	75-153-01	Harness, power, used on serial number 167538 and starting 168562	1
	75-152-45	Harness, power, serial numbers 167360, 167361, 167752, 167753, 167754	1
9	96-650-02	Wire clip	4
10	79-844-20	Circuit breaker, 200A, up to August 2007	1
	88-818-06	#8 X 1/2 PAN HD SCR TYPE B THD	4
	79-829-06	Fuse, 355A starting September 2007	1
11	71-210-13	Line contactor	1
	71-210-11	Mounting bracker, line contactor	1
	88-838-06	#14X1/2 PAN HD SCR TYPE D THD	2
12	71-303-01	Relay	1
	88-025-08	8-32 X5/8 TRUS HD MACH SCR	1
	88-029-80	8-32 HEX NUT	1
	88-028-62	LOCK WASHER, #10	1
13	75-153-03	Harness, Spy glass	1
14	78-307-25	RESISTOR, 25 OHM, 10 W	2
Not Shown	98-451-20	TAPE,FOAM,1/2 WIDE X 1/8 THIc (lid gasket)	6'
	94-422-21	Heat sink paste, 13.5 oz. tube	-
	73-004-20	Horn, mounted under panel box	1
	88-838-06	#14X1/2 PAN HD SCR TYPE D THD	2
	98-603-00	GROMMET,RUBBER,3/8X.625X.188>	1
	98-599-20	BUSHING,SNAP,PLASTIC,2.5 HOLE	1
	97-211-30	U-NUT, 3/8-16, panel mounting to frame	4
	71-120-30	Brake bypass switch (mounted on right side of panel)	1

** - Dose not include #14 resistor. Brake bypass switch must be soldered to harness.*

Miscellaneous Electrical

Miscellaneous Wire Harness Clamps

Miscellaneous Electrical			
ITEM #	PART #	DESCRIPTION	QTY
Not Shown	75-152-42	Chassis Control Harness	1
	75-153-03	Dash Harness	1
	75-152-43	Tail light harness	1
	94-422-10	Dielectric grease for harness connectors	
	98-599-15	Plastic grommet for 1.75 hole	
	98-599-20	Plastic Grommet for 2.5 hole	
	71-303-01	Horn relay, tilt steering (mounted behind dash)	1
	502136	Horn switch (floorboard)	1
	71-102-25	Seat interlock switch	1
1	-	-	-
2	96-650-01	Wire Harness Clip, stick on	
3	96-642-00	Wire harness Clip, push mount	
4	96-629-80 (not shown)	Clamp, Rubber Lined 3/16 ID	
	96-630-00 (not shown)	Clamp, Rubber Lined 5/8 ID	
	96-630-50 (not shown)	Clamp, Rubber Lined 5/8 ID (.265 mounting hole)	
	96-631-00 (not shown)	Clamp, Rubber Lined 3/4 ID	
	96-631-10 (shown)	Clamp, Rubber Lined 1.0 ID	
	96-631-15 (not shown	Clamp, Rubber Lined 1-1/2 ID	
5			
6	96-640-00	Clamp, 3/16 Push Mount	
7	96-624-00	Clamp, 1/4 Jiffy Clip	
	96-625-00 (not shown)	Clamp, 5/16 Jiffy Clip	
8	96-626-00	Clamp, 7/8 Jiffy Clip	

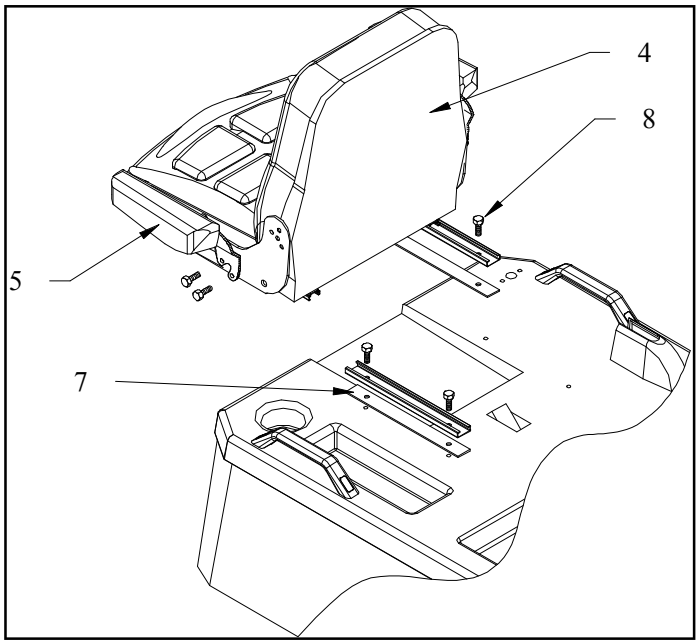
Seat Cushions and Deck

NOTE: Depending on the configuration of your vehicle, #1 may be located on the front cowl.

#1 on cowl

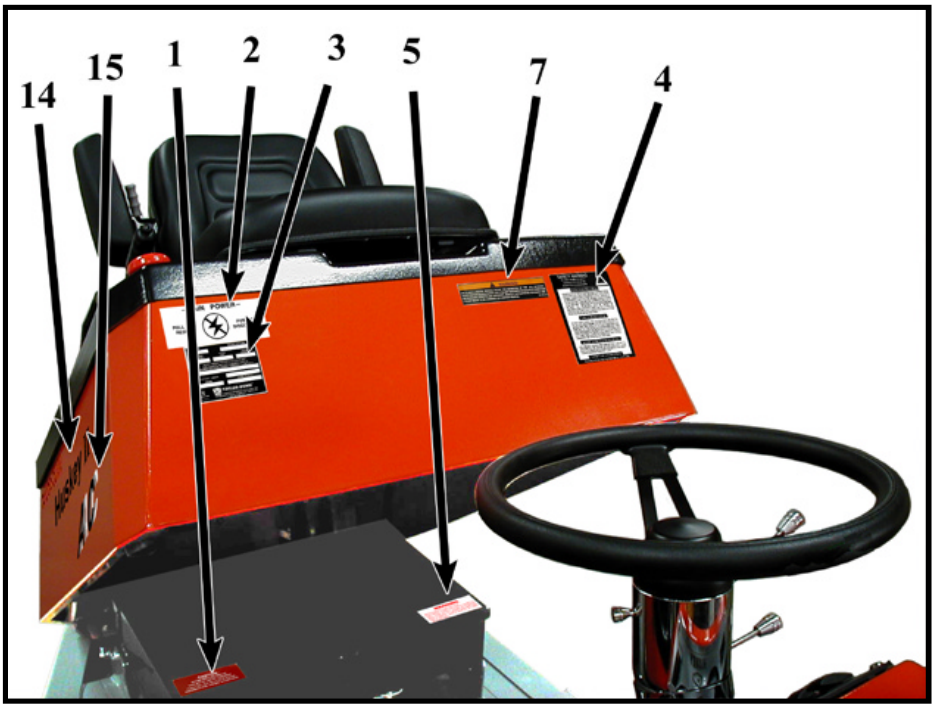
Seat Cushions and Deck			
ITEM #	PART #	DESCRIPTION	QTY
1	75-124-00	*Emergency stop switch	1
	71-120-14	**Emergency stop switch on cowl	1
2	-	-	-
3	95-512-00	Deck handle	2
4	90-160-70	Seat assembly	1
5	90-160-60	Arm rest kit	1
6	00-426-07	Deck cover	1
7	90-160-71	Seat spacer	2
8	88-080-13	5/16NC x 1-1/4 Hex bolt	4
	88-089-81	5/16NC Lock nut	4
	88-088-60	5/16 Cut flat washer	4

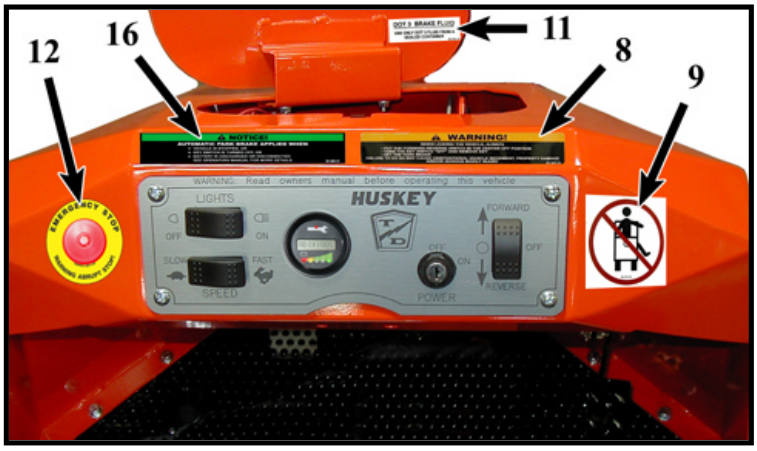
** - Used on Serial numbers 167630, 167631, 167752, 167753, 167754.*
*** - Used on serial number 167538 and all after serial number 167755.*

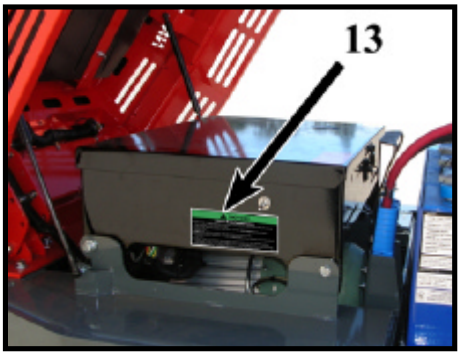


Seat Mounting

Decals


14
15
1
2
3
5
7
4

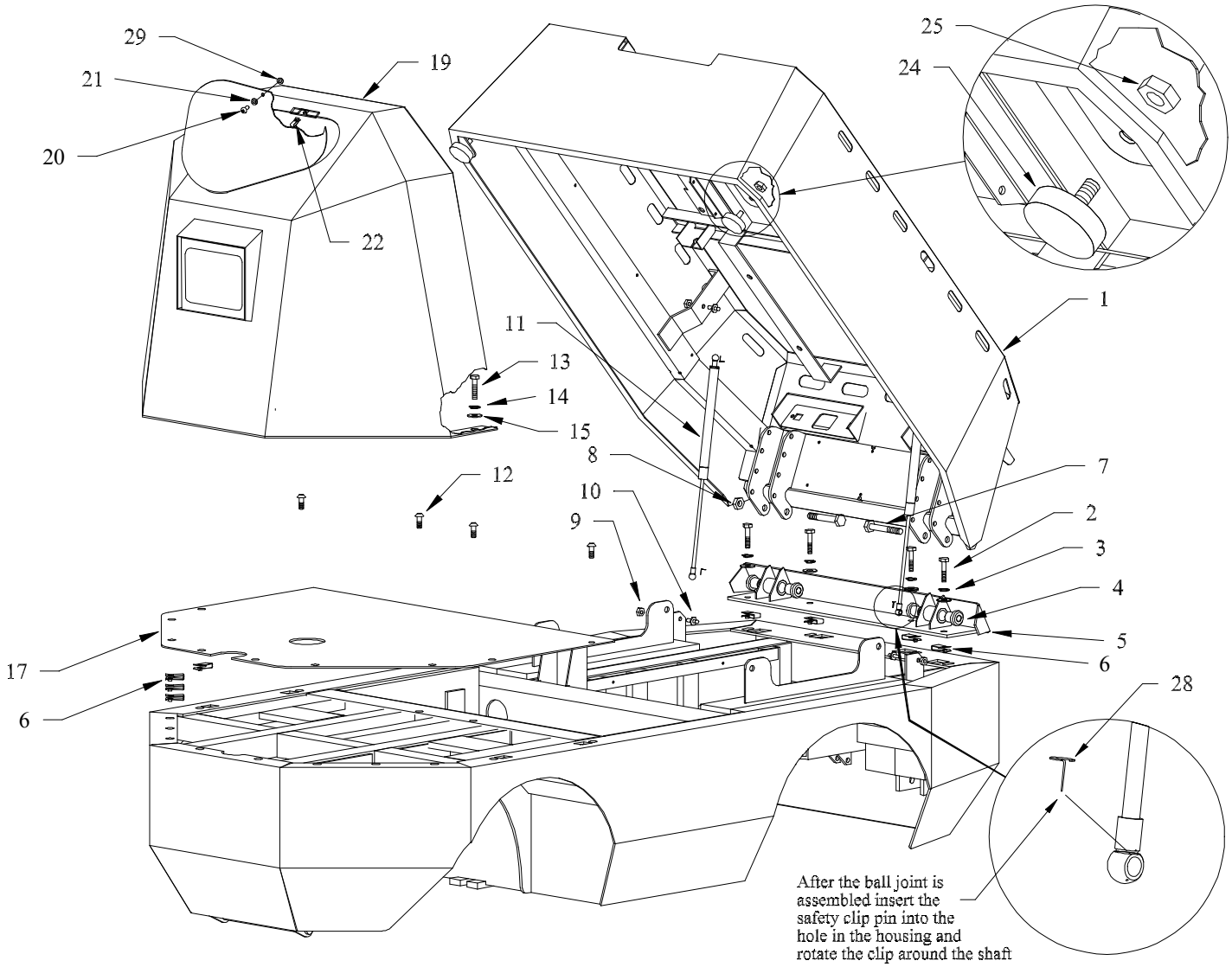

12
16
11
8
9
WARNING! Read owners manual before operating this vehicle
HUSKEY
LIGHTS
SPEED
POWER
FORWARD
REVERSE


13

Decals			
ITEM #	PART #	DESCRIPTION	QTY
1	94-319-00	Disconnect the battery	1
2	94-376-00	*Battery disconnect switch	1
3	94-373-12	Data plate (decal)	1
4	94-313-20	Safety waring	1
5	94-313-00	Explosive gases	1
6	-	-	-
7	94-384-01	Not a motor vehicle	1
8	94-384-14	When leaving vehicle	1
9	94-301-44	Keep arms and legs inside	1
10	-	-	-
11	94-301-41	DOT 3 brake fluid	1
12	94-384-24	**DECAL, EMERGENCY STOP	1
13	94-384-06	Brake bypass	1
14	94-301-16	Huskey II	2
15	94-301-17	AC	2
16	94-384-21	Auto park brake	1

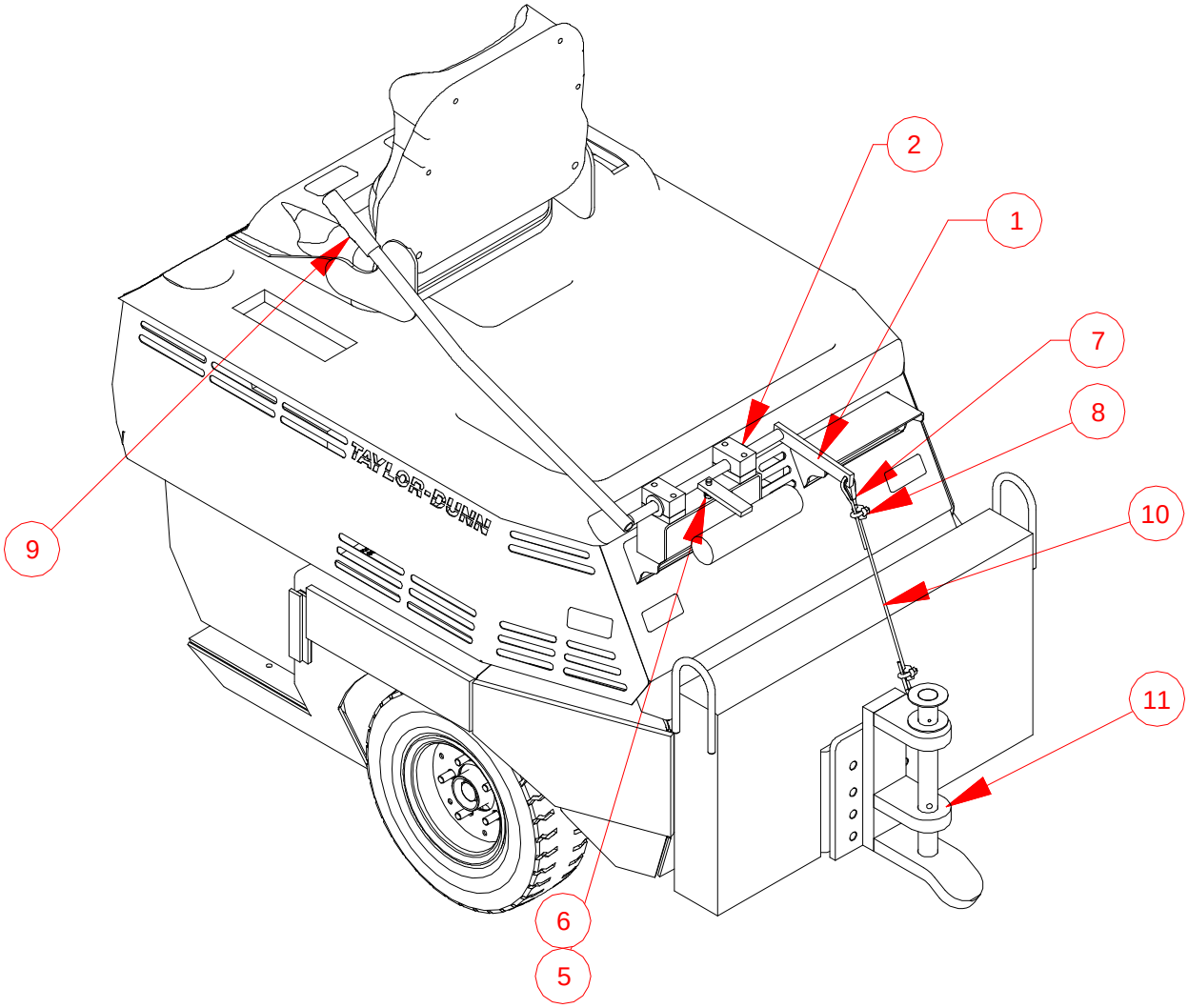
** - Used on Serial numbers 167630, 167631, 167752, 167753, 167754.*
*** - Used on serial number 167538 and all after serial number 167755.*

Frame Components



Frame Components			
ITEM #	PART #	DESCRIPTION	QTY
1	00-426-02	Battery cover (not painted)	1
2	88-100-14	3/8 x 1-1/2 Hex bolt	4
3	88-108-62	3/8 Split lock washer	4
4	32-214-50	Bushing	4
5	00-425-16	Mounting bracket (not painted)	1
6	97-211-30	3/8 blind nut	18
7	96-240-00	1/2NC x 4 Hex bolt	2
8	88-149-81	1/2NC lock nut	2
9	88-089-81	5/16NC lock nut	4
10	85-195-01	Gas spring mount	4
11	85-195-00	Gas spring	2
12	96-245-05	3/8NC Button head socked screw	4
13	88-100-14	3/8NC x 1-1/2 Hex bolt	10
14	88-106-62	3/8 Split lock washer	10
15	88-108-61	3/8 SAE Flat washer	10
16	-	-	-
17	00-426-03	Floorboard	1
18	-	-	-
19	00-426-01	Front cowl	1
20	88-065-12	1/4NC x 1 Truss head machine screw	1
21	97-169-10	Nylon washer	1
22	97-211-20	1/4NC Blind nut	1
23	-	-	-
24	98-753-12	Bumper	2
25	88-109-81	3/8NC lock nut	2
26	-	-	-
27	-	-	-
28	85-195-02	Retaining clip	4
29	96-245-20	Retaining washer	1
	00-425-10	GUARD,WIRE, font cowl	1
	00-425-11	MNT,WIRE GUARD, front cowl	1
	94-201-00	T/D emblem	1
	88-567-91	Push clip for T/D emblem	3
Not Shown	00-426-13	Door, left side battery extract option	1

Hitch and Hitch Release



Hitch and Hitch Release			
ITEM #	PART #	DESCRIPTION	QTY
1	00-426-14	Lever	1
2	02-426-00	Pillow block (lower)	2
	84-006-00	Pillow block (upper)	2
	88-088-61	5/16 SAE WASHER	8
	88-089-81	5/16 NC LOCK NUT	4
	88-080-18	5/16 X 2-1/2NC HEX HD SCR	4
3	-	-	-
4	-	-	-
5	88-100-11	3/8 X 1 NC HEX HD SCREW	1
6	88-119-82	3/8 NC HEAV HEX NUT,PLAIN	1
7	96-812-21	THIMBLE FOR STEEL ROPE,3/16" D	1
8	96-812-22	Clamp	2
9	98-351-00	HAND GRIP	1
10	96-812-23	Cable	1
11	503479	E-HITCH ASSY 1-1/4 PIN W/RAMP	1
	88-151-16	1/2X2 NF HEX HD SCREW,GR-5	8
	88-159-61	1/2 WASHER, HEAVY DUTY	8
	88-159-84	LOCKNUT,NY-LOCK, 1/2-20 NF	8

Charger

ITEM #	PART #	DESCRIPTION	QTY
	71-102-25	CHARGER, 48V, EXIDE D1-24-600	1

Battery

ITEM #	PART #	DESCRIPTION	QTY
	77-059-10	BATTERY,48V,340AMPS	1
	76-020-26	HANDLE, SB CONNECTOR	1
	76-020-25	CONNECTOR, SB CABLE CLAMP	1
	88-060-15	1/4 X 1-3/4 NC HEX HD CAP SCR	2
	88-068-60	1/4 CUT WASHER	2
	88-069-81	1/4NC NYL INS LOCKNUT,PLTD	2

Appendixes

Contents

APPENDIX A: SPECIAL TOOLS

DESCRIPTION	PURPOSE	PART #
Test Light	Used for testing electrical circuits. Powered by the truck batteries, switchable for 12, 24, 36, and 48 volts.	62-027-00
Accelerator Test Harness	Used to test the solid state accellerator module part number series 62-033-XX.	62-027-31
User level maintenance handset	Used for diagnostics of the AC motor speed control system.	62-027-64
Disc Brake Boot Installation Tool	Used to install the rubber boot on all disc brake bodies.	41-350-13
Pin Removing Tool	Used to remove pins and sockets from AMP connectors.	75-440-55
Pin Removing Tool	Used to remove pins and sockets from MOLEX connectors.	75-442-55
Hydrometer	Used to check the specific gravity of battery electrolyte.	77-200-00
Battery Filler	Used to safely add water to batteries.	77-201-00

APPENDIX B: SUGGESTED TORQUE LIMITS FOR STANDARD HARDWARE

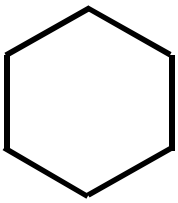
HARDWARE IDENTIFICATION

Standard Head Markings

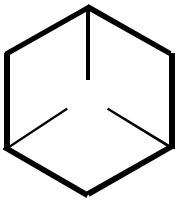
NOTE: Torque value used should be for lowest grade of hardware used. If a grade 2 nut is used on a grade 8 bolt, use grade 2 torque value.

NOTE: Toque values specified are for clean dry threads.

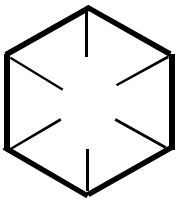
Hex Bolts



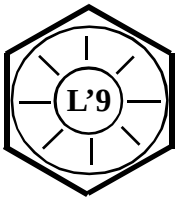
S.A.E. Grade 2



S.A.E. Grade 5



S.A.E. Grade 8



L'9

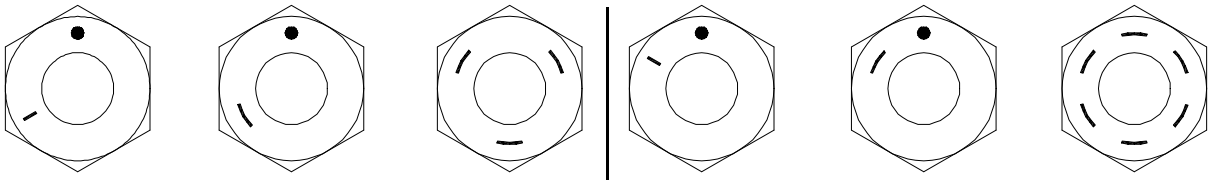
Other Bolts

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

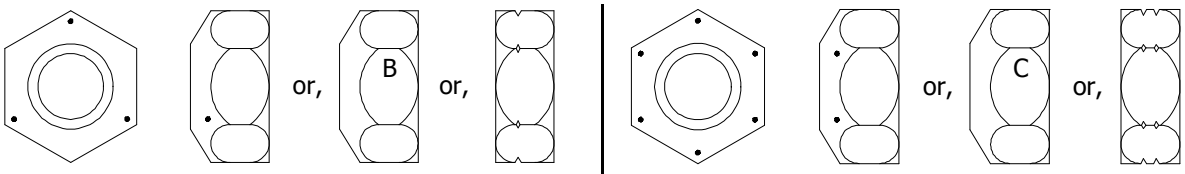


S.A.E. Grade 5 | *S.A.E. Grade 8*

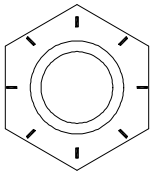
Hex Lock Nuts (stover)

Lock nuts use a letter to indicate the grade of the nut. Grade A' locknuts would be the equivelent 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



S.A.E. Grade B | *S.A.E. Grade C*



Grade L'9

Other Nuts

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

Suggested Torque Values (non-critical hardware)

Diameter and TPI	Grade 2 Tightening Torque (ft-lb)	Grade 5 Tightening Torque (ft-lb)	Grade 8 Tightening Torque (ft-lb)	L'9 Tightening Torque (ft-lb)
1/4-20	4-7	7-10	10-14	11
1/4-28	5-8	8-12	11-16	12
5/16-18	9-14	14-21	20-29	22
5/16-24	10-15	15-23	22-33	25
3/8-16	16-24	25-37	35-52	40
3/8-24	18-27	28-42	40-59	45
7/16-14	26-38	40-59	56-84	65
7/16-20	29-43	44-66	62-93	70
1/2-13	39-59	60-90	85-128	95
1/2-20	44-66	68-102	96-144	110
9/16-12	56-84	87-131	123-184	140
9/16-18	63-94	97-146	137-206	160
5/8-11	78-117	120-180	170-254	195
5/8-18	88-132	136-204	192-288	225
3/4-10	138-207	213-319	301-451	350
3/4-16	154-231	238-357	336-504	390
7/8-9	222-334	344-515	485-728	565
7/8-14	245-367	379-568	534-802	625
1-8	333-500	515-773	727-1091	850
1-14	373-560	577-866	815-1222	930
1.125-7	472-708	635-953	1030-1545	1700
1.125-12	530-794	713-1069	1156-1733	1850
1.25-7	666-999	896-1344	1454-2180	2950
1.25-12	738-1107	993-1489	1610-2414	3330

Suggested Torque Values (critical hardware)

Torque Table

Group	Description	Torque Range Ft-Lbs	In-Lbs	Nm
Brakes				
	Brake bolt (disc brake body)	11 - 11	132 - 132	15 - 15
	Brake line tube nut fittings	12 - 13	144 - 156	16.3 - 17.7
	Brake spider bolts (Dana 160mm hyd brakes)	25 - 35	300 - 420	34 - 47.6
	Brake spider bolts (Dana 160mm mech brakes)	15 - 19	180 - 228	20.4 - 25.8
	Brake spider bolts (Dana 7x1-3/4 brakes)	16 - 20	192 - 240	21.8 - 27.2
Electrical				
	Battery terminals	8 - 9	96 - 108	10.9 - 12.2
Front Axle				
	Front spindle nut	-	-	-
	Note: Refer to maintenance section in the service manual			
	King pin	-	-	-
	Note: Refer to maintenance section in the service manual			
Rear Axle/Transmission				
	3rd member Gear case cover (GT drive)	45 - 50	540 - 600	61.2 - 68
	Axle bolt (GT drive)	275 - 275	3300 - 3300	374 - 374
	Axle hub nut (Dana)	95 - 115	1140 - 1380	129.2 - 156.4
	Axle tube to center section (Dana F-N-R)	25 - 35	300 - 420	34 - 47.6
	Carrier cap bolts (Dana)	100 - 120	1200 - 1440	136 - 163.2
	Differential Cover plate (Dana H12)	18 - 25	216 - 300	24.5 - 34
	Drain plug (Dana H12)	25 - 40	300 - 480	34 - 54.4
	Drain plug (GT drive)	21 - 25	252 - 300	28.6 - 34
	Gear case to 3rd member (GT drive)	18 - 20	216 - 240	24.5 - 27.2
	Motor mounting (GT/Dana)	6.5 - 7	78 - 84	8.8 - 9.5
	Pinion nut (F2/F3)	175 - 175	2100 - 2100	238 - 238
	Pinion nut (GT drive)	154 - 169	1848 - 2028	209.4 - 229.8
	Ring gear (Dana)	35 - 45	420 - 540	47.6 - 61.2
	Wheel lug nut	75 - 90	900 - 1080	102 - 122.4
Steering				
	Ball joint clamp	28 - 32	336 - 384	38.1 - 43.5
	Ball joint nut	40 - 45	480 - 540	54.4 - 61.2
	Pitman nut (18-308-21 steering gear)	75 - 100	900 - 1200	102 - 136
	Pitman nut (18-308-25 steering gear)	181 - 217	2172 - 2604	246.2 - 295.1
	Rod end nut	20 - 25	240 - 300	27.2 - 34
	Steering shaft pinch bolt	24 - 26	288 - 312	32.6 - 35.4
	Steering wheel nut (18-308-21 steering gear)	28 - 32	336 - 384	38.1 - 43.5
	Steering wheel nut (18-308-25 steering gear)	72 - 86	864 - 1032	97.9 - 117
Suspension				
	Leaf spring hangers	-	-	-
	Note: Refer to maintenance section in the service manual			

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.

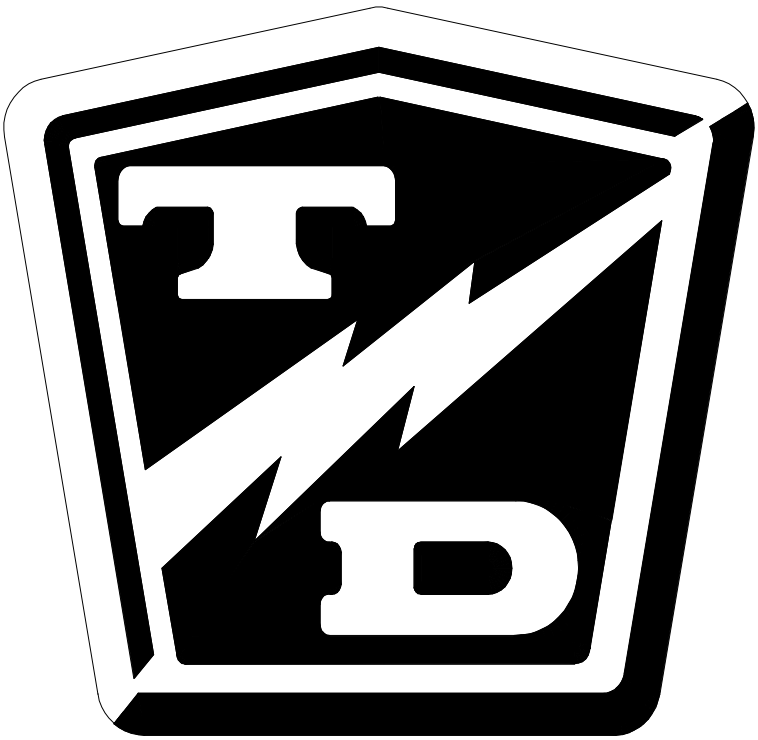
Never use compressed air or dry brush to clean the brake assemblies. Use an OSHA approved vacuum cleaner or any alternate method approved by OSHA to minimize the hazard caused by airborne asbestos fibers and brake dust.

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.



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