TAYLOR-DUNN®

The Best Way
To Go
About Your
Business

Service and Replacement Parts Manual

MANUAL MB-248-18

Model Numbers:

B0-248-36 (B 2-48, 36-volt)
B0-248-48 (B 2-48, 48-volt)
B0-254-36 (B 2-54, 36 volt)
B0-254-48 (B 2-54, 48 volt)
BT-248-36 (36-volt Back to Back Tram)
BT-248-48 (48-volt Back to Back Tram)
BT-280-36 (36-volt 10-passenger Tram)
BT-280-48 (48-volt 10-passenger Tram)

⚠WARNING

READ THE OPERATOR'S MANUAL BEFORE OPERATING THIS VEHICLE.

The operator's manual contains important information regarding the safe operation of this vehicle.

E

Starting Serial Range: 197830 - 205962

My Vehicle information

Serial Number: _____.

Date Purchased: _____.

Date Delivered: _____.

Dealer Purchased From: _____.

Salesman Name: _____.

Your satisfaction is out #1 goal. If you have questions or concerns with your vehicle, please contact your sales Representative or Service Advisor at your local dealership.

Taylor-Dunn has a worldwide dealer and distribution network to provide replacement parts and service for our vehicles.

Refer to our web site, www.taylor-dunn.com, for a dealer lookup application.

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Taylor-Dunn® Mfg.
2114 W. Ball Rd.
Anaheim, CA 92804
(800)-688-8680
(714) 956-4040
(FAX) (714) 956-0504

Visit our Web site: www.taylor-dunn.com

Taylor-Dunn Contact information

Service, Parts, Sales:

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

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

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

The Taylor-Dunn Corporation:

Leading Provider of Commercial & Industrial Vehicles since 1949

TAYLOR-DUNN®
Commercial and Industrial Vehicles Since 1949

Taylor-Dunn Manufacturing:

From the day we shipped our first vehicle in 1949, we have pursued a singular goal: to build tough, rugged, dependable vehicles to help our customers move personnel, equipment, and materials. It's that simple. For over sixty years, our standard and custom vehicles - Burden Carriers, Personnel Carriers, Stock Chasers, Electric Carts, Tow Tractors & more - have been the leading solution for customers in a broad range of industrial, commercial, and ground-support markets.

Decades of experience are an invaluable asset, and it is an asset we cherish and protect. Our guiding principle is to provide application-specific solutions, which are reliable, efficient, and economical.

Our domestic and international network of quality Taylor-Dunn Dealers and Parts & Service Support keeps our customers moving.

Tiger Tractor:

Tiger manufacturing has become a leading manufacturer of internal combustion industrial tractors and ground support equipment. With tractor capacities ranging from 3,000 - 12,000 pounds drawbar pull, they are ideal for industrial applications as well as aircraft ground support. As with all Taylor-Dunn vehicles; quality, service, support and reliability are built into all Tiger Tractor products.

Shown below is just a small sample of what Taylor-Dunn has to offer to keep your business moving:

Note: Each section title page contains a section table of contents

Master Table of Contents

Notes:

Table of Contents

Introduction

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

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 shall be familiar with the parts of this manual that apply to their use of this vehicle.

REPLACEMENT PARTS

To maintain peak performance, only use original Taylor-Dunn replacement parts intended for use on your vehicle.

Taylor-Dunn components are designed and tested for use on specific Taylor-Dunn model vehicles. Only use the correct Taylor-Dunn replacement components for your Taylor-Dunn vehicle.

Electrical components not tested by Taylor-Dunn (or intended for use on other Taylor-Dunn vehicles) may have unanticipated interaction and/or interference with the vehicles control system resulting in unsafe operation or damage to the electrical system.

Mechanical components not tested by Taylor-Dunn (or from other model Taylor-Dunn vehicles) may have an undesirable affect on the operation of the vehicle, result in additional frame stress, or stress other components resulting in premature failure or an unsafe condition.

Due to the unknown properties of non-Taylor-Dunn tested components or from components not originally equipped on the vehicle, we cannot approve their use in a Taylor-Dunn vehicle.

HOW TO USE THIS MANUAL

This manual is organized into three main sections:

Introduction

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

Maintenance, Service, and Repair

This section gives specific information on the servicing of the vehicle and a schedule for maintenance checks.

This manual is for mechanical repairs only and does not include electrical diagnosis procedures. Electrical diagnosis procedures are included in a separate manual.

Replacement Parts

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

Conventions

Symbols and/or words used to define Dangers, Warnings, Cautions, and Notices are found throughout this manual. The “Words” in this context will be referred to as “Signal words.” The words defined here as “signal words” may be used elsewhere in the text of this document without being a signal word. When used as a signal word, the signal word will be enclosed in a solid rectangle with white background (example below).

Signal Words and Their Definitions:

DANGER: This signal word will be accompanied by the safety alert symbol (see below). “DANGER” will indicate a hazard that, if not avoided, **WILL** result in death or serious bodily injury to yourself, the operator or passengers of the vehicle, or people in the immediate area of the vehicle.

WARNING: This signal word will be accompanied by the safety alert symbol (see below). “WARNING” will indicate a hazard that, if not avoided, may result in death or serious bodily injury to yourself, the operator or passengers of the vehicle, or people in the immediate area of the vehicle.

CAUTION: This signal word will be accompanied by the safety alert symbol (see below). “CAUTION” will indicate a hazard that, if not avoided, may result in minor or moderate injury to yourself, the operator or passengers of the vehicle, or people in the immediate area of the vehicle.

NOTICE: This signal word will not be accompanied by the safety alert symbol. “NOTICE” will indicate a condition that if not avoided may result in property damage. “Property” is defined as the vehicle, components in the vehicle and/or the surrounding area such as buildings, other vehicles, etc.

Safety Messages

Important information notifying you of any conditions that may result in hazards to yourself, persons nearby, and/or hazards to the vehicle will be presented in a text box with a black border and may include a signal word (see above). To the right is an example of a safety message.

The safety message may include additional warning icons representing the type of hazard. The following is a list of these icons and what they represent. These icons may also be included on the various warning and information decals applied to the vehicle.

WARNING

This is an example of a safety alert message. This message will contain information about a hazard and / or instructions on avoiding a hazard. The actual size and location of this warning box may vary.


Safety alert symbol (see above).


Represents a high voltage hazard.


Represents an explosion hazard.


Represents a corrosive chemical hazard.


Represents a fire hazard.


Represents a poisonous chemical hazard.

Some of the decals applied to the vehicle will have icons representing their function. The icons and their definitions are listed below:


Read the operators manual.


Read the maintenance manual.


Keep arms and legs inside the vehicle.


Parking brake ON.

Parking brake OFF.


Do not get wet.


Do not spray wash.

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.

The owner is also responsible for operator training per the following federal regulations:

- ANSI/ITSDF 56.8-2006 Personnel and Burden Carriers: Part II, Paragraph 6.2a.
- ANSI/ITSDF 56.9 – 2007 Safety Standard for Operator Controlled Industrial Tow Tractors: Part II, paragraph 4.11.
- Code of Federal Regulations (CFR) Title 29, Subtitle B, Chapter Xvii OSHA, Part 1910.178 Powered Industrial Trucks (2011): 1910.178, Section (l).

Per OSHA Regulation, 29 CFR 1910.178 Powered Industrial Truck Operator Training, the owner must keep a record of conducted training and maintenance performed on the vehicle.

Of the Service Personnel...

The service personnel are responsible for the service and maintenance of the vehicle. At no time shall 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 shall an untrained individual be allowed to service or repair a vehicle without supervision. This manual is not a training guide.

Personnel performing service and repair shall have knowledge of:

- Basic standard automotive repair procedures
- Basic DC and AC electrical theory
- AC motor speed control operation
- Use of digital and analog multi-meters
- Lead acid batteries

Personnel performing maintenance shall have basic knowledge of standard automotive maintenance procedures and lead acid batteries.

⚠ WARNING

To maintain peak performance, always use original Taylor-Dunn replacement parts intended for use on your vehicle. Taylor-Dunn components are designed and tested for use on specific Taylor-Dunn model vehicles. Only use the correct Taylor-Dunn replacement components for your Taylor-Dunn vehicle.

Do not modify your vehicle:
Modifications to this vehicle may have an undesirable affect on the operation of the vehicle, result in additional frame stress, or stress other components resulting in premature failure or an unsafe condition and may lead to an accident resulting in serious injury or death.

⚠ 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.

Of the Operator...

A vehicle shall not be operated until the operator has successfully completed an operator training course provided by the owner of the vehicle.

The operator is responsible to be sure that the vehicle is operated only on authorized roads, highways, and installations.

The operator is responsible to confirm that all passengers are properly seated and properly using the available restraints.

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 Passengers...

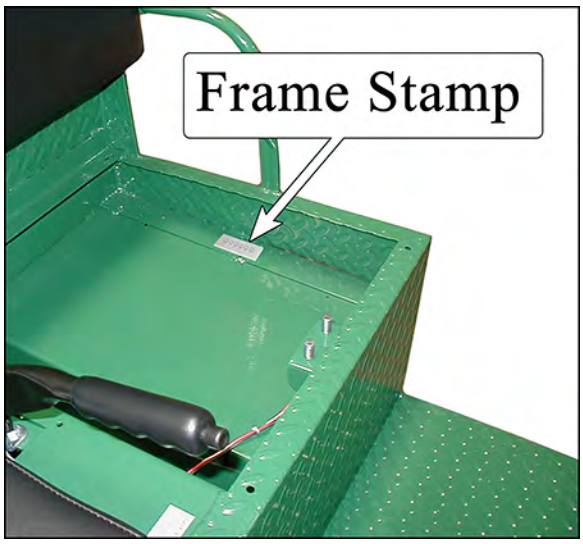
The passengers are responsible to remain fully seated, keeping their hands, arms, and legs inside the vehicle at all times. Each passenger shall be fully aware of the vehicle's operation. All forms of recklessness are to be avoided. Do not engage in horseplay.

HOW TO IDENTIFY YOUR VEHICLE

This manual is valid only for the serial numbers listed on the front cover. If the ending serial number is blank, then this manual was for current production vehicles when printed. If you did not receive this manual with the vehicle, you should confirm this manual is valid for your serial number at the Taylor-Dunn web site.

The locations of the model and serial numbers are shown in the illustrations below:

Data plate on the kick panel



ID tag found on the frame beneath the driver seat.

WEB SITE REGISTRATION

Registering on the Taylor-Dunn web site will give you access to a wealth of information about your vehicle and the entire Taylor- Dunn line of vehicles. Your contact information will remain confidential and will not be shared outside of the Taylor-Dunn corporation.

Once registered on the Taylor-Dunn web site, you will have access to:

- Additional Taylor-Dunn product information.
- Worldwide Taylor-Dunn dealer contacts
- Vehicle Service, Maintenance, Operator, Troubleshooting, and Parts manuals.
- Replacement part number lookup utility

www.taylor-dunn.com

Notes:

Service / Maintenance Guidelines

Table of Contents

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

READ ME FIRST:
MAINTENANCE GUIDELINES AND GENERAL INSTRUCTIONS

⚠ 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.

- Read the operator's manual before operating this vehicle.
- 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.
- Ventilate the work area properly.
- Only properly trained and authorized technicians should perform maintenance or repairs to this vehicle.

⚠ 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 or improper operation of 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.

⚠ 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 ensure that proper service and maintenance is performed on the vehicle, described in this manual.

⚠ WARNING

The vehicle may operate at any time while performing control system test procedures.

All tests must be performed with the drive wheels off of the ground and the vehicle supported with jack stands.

Testing with drive wheels on the ground may result in vehicle movement causing severe bodily injury and/or property damage.

- Regularly inspect and maintain the following systems 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.

⚠ WARNING

BEFORE STARTING ANY REPAIRS

1) **Make sure the start switch is in the "OFF" position, then remove the key.**
2) **Place the forward-reverse switch in the center "OFF" position.**
3) **Set the park brake or confirm the brake is set when equipped with an automatic brake.**
4) **Place blocks under the front or rear wheels to prevent vehicle movement.**
5) **Disconnect the main positive and negative cables at the batteries.**

⚠ WARNING

When lifting the vehicle, always use a hoist with lifting strap, or a jack of adequate capacity. Use jack stands to support the vehicle before starting any repairs. Failure to use lifting and support devices of rated load capacity may result in severe bodily injury.

⚠ WARNING

On a three wheel vehicle: When raising both rear wheels, the front end of the vehicle must be supported to prevent tipping. The rear of the vehicle should be raised by a means so that the left and right side are raised equally, such as a hoist with fixed length chains attached to the left and right side of the vehicle. Failure to properly support the vehicle may result in the vehicle tipping over causing severe bodily injury and/or property damage.

VEHICLE MODIFICATIONS

Taylor-Dunn vehicles are designed and manufactured in accordance with ANSI/ITSDF and OSHA regulations. Per ANSI/ITSDF and OHSA, modifications to the vehicle must be approved by the manufacturer. Listed below are the specific regulations:

ANSI/ITSDF 56.8-2006 Personnel and Burden Carriers:

Paragraph 8.2q:

Modifications and additions which affect capacity and safe machine operation shall not be performed by the customer or user without manufacture's prior written authorization; where authorized modifications have been made, the user shall ensure that capacity, operation, warning, and maintenance instructions plates, tags, or decals are changed accordingly.

Paragraph 8.2r:

Care shall be taken to ensure that all replacement parts are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment.

ANSI/ITSDF 56.9 – 2007 Safety Standard for Operator Controlled Industrial Tow Tractors:

Paragraph 6.2.14:

Modifications and additions which affect capacity and safe tow tractor operation shall not be performed without manufacture's prior written approval. Capacity, operation, and maintenance instructions plates, tags, or decals are changed accordingly.

Code of Federal Regulations (CFR) Title 29, Subtitle B, Chapter Xvii OSHA, Part 1910.178 Powered Industrial Trucks (2011)

1910.178(a)(4)

Modifications and additions which affect capacity and safe operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

1910.178(q)(6)

Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts, except as provided in paragraph (q)(12) of this section. Additional counterweighting of fork trucks shall not be done unless approved by the truck manufacturer.

Using Non-OEM Replacement Components:

To maintain peak performance, always use original Taylor-Dunn replacement parts intended for use on your vehicle.

Taylor-Dunn components are designed and tested for use on specific Taylor-Dunn model vehicles. Only use the correct Taylor-Dunn replacement components for your Taylor-Dunn vehicle.

Electrical Components:

Electrical components not tested by Taylor-Dunn (or intended for use on other Taylor-Dunn vehicles) may have unanticipated interaction and/or interference with the vehicles control system resulting in unsafe operation or damage to the electrical system.

Mechanical Components:

Mechanical components not tested by Taylor-Dunn (or from other model Taylor-Dunn vehicles) may have an undesirable affect on the operation of the vehicle, result in additional frame stress, or stress other components resulting in premature failure or an unsafe condition.

Due to the unknown properties of non-Taylor-Dunn tested components or from components not originally equipped on the vehicle, we cannot approve their use in a Taylor-Dunn vehicle.

Notes:

Special Tool List

Table of Contents

Special Tool List

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

TOOL LIST

The tools shown here are generic for servicing Taylor-Dunn vehicles. Not all tools will be required for servicing this vehicle.

75-089-00: Throttle Module Test Harness

Used in conjunction with a volt meter to test the throttle module. The module must be installed in a working control system.

Note: Part # 62-027-31 includes instructions

62-027-32: Throttle Module Analyzer

Tests the throttle module in or out of the vehicle

41-532-50: Chain Case Centering Tool

Used to center the chain case cover on all vehicles equipped with the Power Traction primary reduction and a pinion brake or speed sensor. Includes instructions.

43-201-50: Pinion Seal Installation Tool

Used to install the pinion seal on all vehicles equipped with the Power Traction primary reduction and a pinion brake or speed sensor.

62-027-00: Test Light

Used for testing electrical circuits. Switchable for 12, 24, 36, 48 volt systems.

Required to complete troubleshooting provided in the vehicle service manuals.

Controller Programming:

Sevcon: 62-027-63 “PCpaK Cable lead and application.”

Curtis AC: 62-027-66 “1314 PC Programming Station”

62-027-61 and -62: Sevcon System Handset

Diagnostics and adjustments (-62 only) of the Sevcon Power Pak and Micro Pak control systems.

Curtis AC System Handset. Diagnostics and adjustments of the Curtis AC control system.

62-027-67: Diagnostics and adjustments

62-027-68: Diagnostics only

96-500-43: PMT/C Meter Reset Module

Required to reset the PMT/C maintenance meter (special order option).

41-350-13: Disc Brake Boot Installation Tool

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

70-440-55: Pin Removing Tool

Removes pin from Amp circular harness connectors.

77-200-00: Hydrometer

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

77-201-00: Battery Filler

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

96-500-48: GT Drive Oil Fill Plug Tool

Used to remove the oil fill plug on GT drives. It is used with a 3/8" drive extension (not included).

Molex # 11-300-02: Pin Removing Tool

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

Molex # 11-300-06: Pin Removing Tool

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

75-442-55: Pin Removing Tool

Removes pins from Molex Mini-Fit harness connectors.

TROUBLESHOOTING GUIDE

This is a general troubleshooting guide for various mechanical faults. Refer to the electrical troubleshooting chapter for checking the electronic motor control system.

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

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

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

Lubrication

Table of Contents

Lubrication

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

LUBRICATION AND FLUIDS CHART

Assembly	Component	#	Capacity	Lubricant
Front Axle:				
	1: Ball Joint	4	-	General Purpose Grease
	3: Front Wheel Bearings	2	-	High Temperature Wheel Bearing Grease
	4: King Pin	2	-	General Purpose Grease
Brake Fluid:				
	Master Cylinder	1		DOT 3, Meets or exceeds SAE J1703
Linkages:				
	2: Pedal Linkages	3	-	General Purpose Grease
Rear Transaxle:				
	7: Drain Plug (ref)	1		
	8: Level Plug (ref)	1		
	9: Fill Plug	1	1.4-1.9 Liters	SAE 80W90 Gear Oil
	10: Motor Coupler	1		Part # 94-421-34 Moly Paste Grease

HAZARDOUS WASTE DISPOSAL

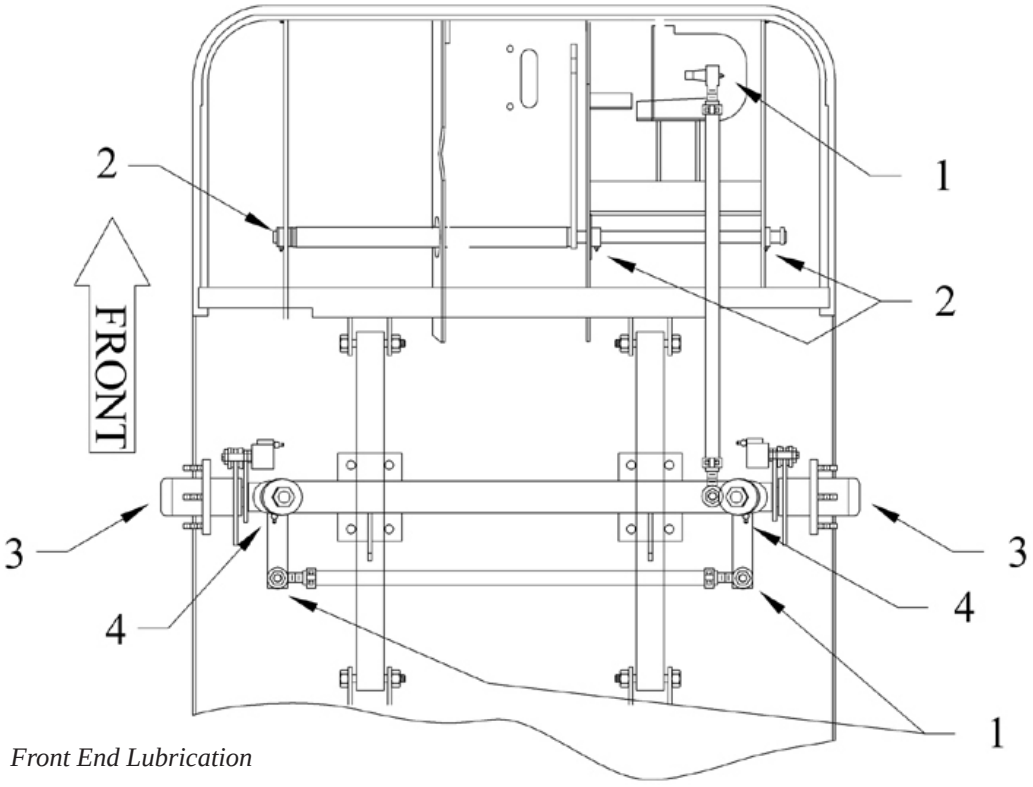
This vehicle contains various components and/or fluids that may be classified as hazardous waste.

This includes but is not limited to Lead, Acid, Oil, Grease.

The brake linings originally installed by the factory do not contain asbestos. However, since it is possible that asbestos brake linings were installed as replacement parts, brake linings should be handled as hazardous waste.

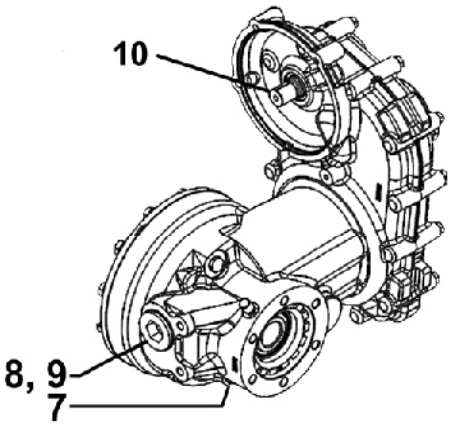
The requirements for disposal of hazardous waste vary by location. Consult your local regulations regarding the proper disposal of hazardous waste products.

LUBRICATION DIAGRAM

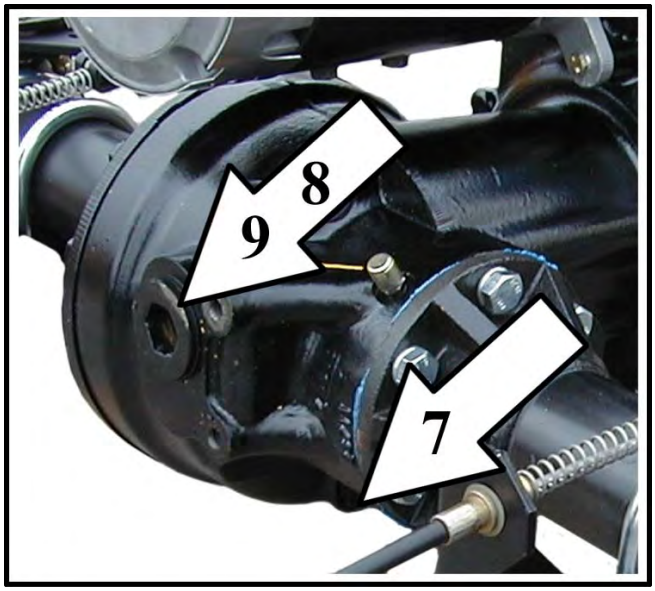


Front End Lubrication

Note: The transaxle is mounted at an angle in the vehicle. The transaxle must be level when checking oil level. This will require rasing the rear of the vehicle until the transaxle is level with the ground. Refer to Drive Axle service section.



Rear Axle Lubrication



Notes:

Front Axle

Table of Contents

Front Axle

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

REMOVE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Removal

1: Raise the front of the vehicle and support with jack stands.
2: Remove both front wheels. Refer to Tires and Wheels section for information regarding removing the front wheels.
3: Tie up or support the front axle so it can not fall out of the vehicle.
4: Disconnect the drag link ball joint or rod end from the steering knuckle or the steering gear pitman arm.

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

5: If equipped with front brakes, disconnect the hydraulic brake lines from the brake bodies.
6: Disconnect the front axle beam from the front springs and remove the axle from the vehicle.

Note: In some configurations the front springs and or shocks will have to be removed in order to remove the axle beam. Refer to section Front Suspension for information regarding removing the springs and shocks.

INSTALL

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Installation

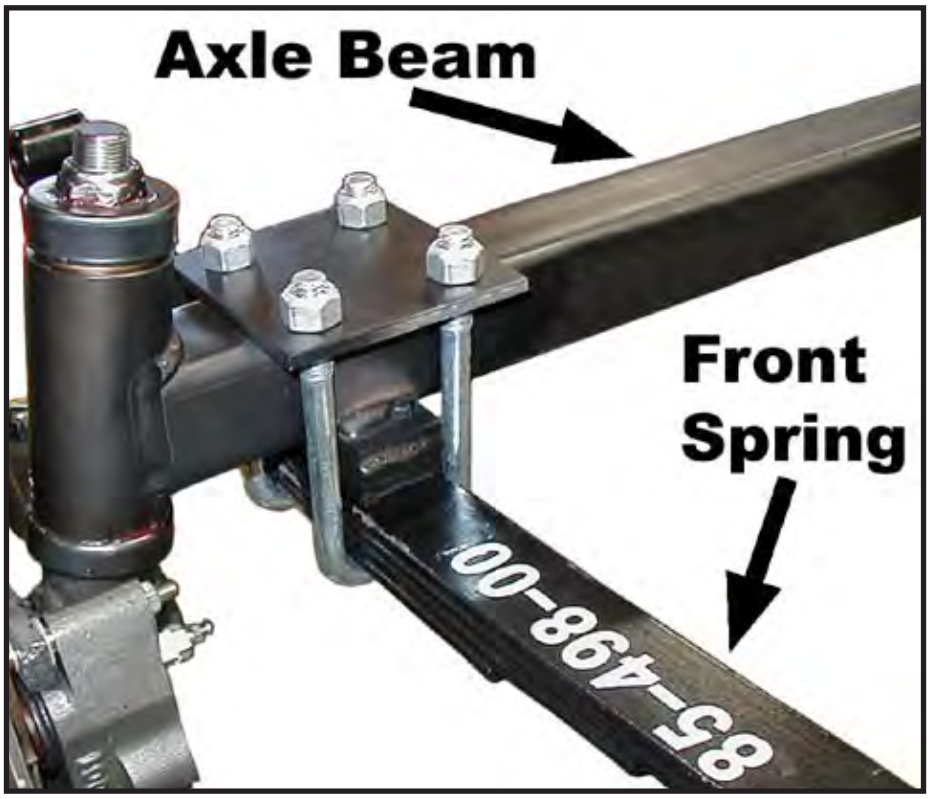
1: Raise the front of the vehicle and support with jack stands.
2: Install the front axle in reverse order of removal.

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.

3: Realign the front wheels. Refer to Steering Component Service section for information regarding realigning the front wheels.
4: If equipped with front brakes, bleed the brakes. Refer to Brake Service section for information regarding bleeding the brakes.
5: Lower the vehicle.
6: Reconnect the main positive and negative cables at the batteries.
7: Remove the blocks from behind the wheels.
8: Release the park brake and test drive the vehicle.



DISASSEMBLE

WARNING

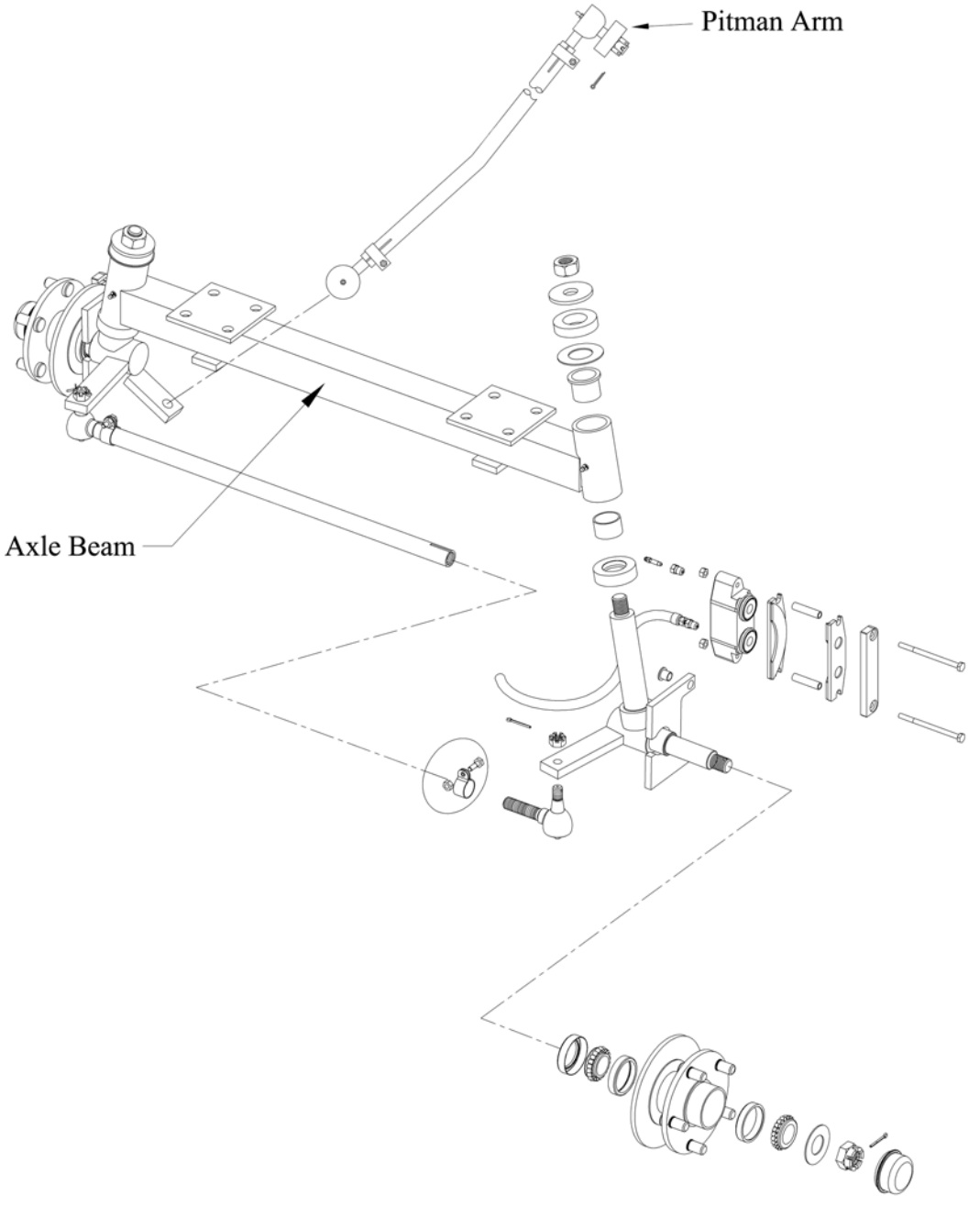
This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.



INSPECT FRONT WHEEL BEARINGS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

1: Raise the front of the vehicle and support with jack stands.

2: 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.

3: Spin the front wheel(s) by hand. The wheel should stop spinning in no more than 2-revolutions. A wheel that continues to spin freely is an indication of a loose wheel bearing.

Note: Refer to the Adjust Front Wheel Bearings section for detailed information regarding the proper adjustment of the wheel bearings.

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

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

5: Lower the vehicle.
6: Reconnect the batteries.
7: Remove the blocks from behind the wheels.
8: Release the park brake and test drive the vehicle.

3-Wheel vehicle front fork shown for illustration purposes only

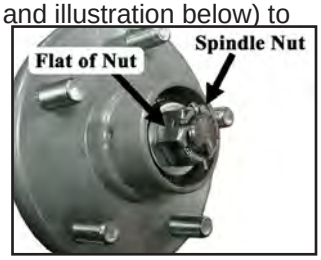
ADJUST FRONT WHEEL BEARINGS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

- **The bearings must be lubricated before performing this procedure.**

1: Raise the front wheel(s) off of the ground and support with jack stands.
2: While rotating the wheel, tighten the front axle nut until the wheel is difficult to rotate.
3: Continue to rotate the wheel for 5 compete revolutions.
4: Attach a rope to the tire and wrap around the tire with 1 foot remaining hanging in the air.
5: Tie a weight (see table and illustration below) to the end of the rope.



6: Slowly loosen the axle nut until the hanging weight rotates the wheel then rotate to the nearest flat and install a new cotter pin.
7: Remove the rope and weight.
8: Spin the wheel and listen for any grinding noise. Any grinding noise may be an indication of worn or damaged wheel bearings.

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

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

Tire Size	Weight NEW (pounds / kg)	Weight USED (pounds / kg)
4.80 x 8	2.15 / 0.975	1.00 / 0.454
5.70 x 8/	1.99 / 0.902	0.93 / 0.422
4.00 x 8	2.15 / 0.975	1.01 / 0.485
500 x 8	1.99 / 0.902	0.93 / 0.422
8.50 x 8	2.02 / 0.916	0.94 / 0.426
8 x 2.50	4.23 / 1.919	1.97 / 0.894
10 x 3.5	3.38 / 1.533	1.56 / 0.708

NEW: Weight = 16.931 / Radius

USED: Weight = 7.875 / Radius

FRONT WHEEL ALIGNMENT

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Note: Only Toe In can be set. Caster and Camber is not adjustable.

Center the Steering

1: Raise the front of the vehicle and support with jack stands.
2: Turn the front wheels so that they are in the straight ahead position and then tie off the wheels so that they cannot turn from the straight ahead position.
3: Disconnect the drag link from the pitman arm. Refer to Replace the Ball Joints in the Steering section for information regarding removing the ball joint or rod end from the drag link.
4: Center the steering gear and tie off the steering wheel so that it cannot rotate. Refer to Center the Steering Gear section for information regarding centering of the steering gear.
5: At this point both the steering wheel and the front wheels should be tied up and held in position. If one or the other is not tied up then you must start from the beginning.
6: Loosen the ball joint clamps or the rod end jam nuts on the drag link.

Note: Remember the position and orientation of the clamps.

7: Adjust the drag link so that it can be easily inserted into the pitman arm.
8: Tighten the ball joint or rod end nut as specified in the hardware torque table at the end of this section:
9: If equipped with ball joints, position the ball joint clamps in their original location and orientation.
10: Tighten the ball joint clamps as specified in the hardware torque table at the end of this section:
11: Untie the steering wheel and the front wheels.
12: 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.

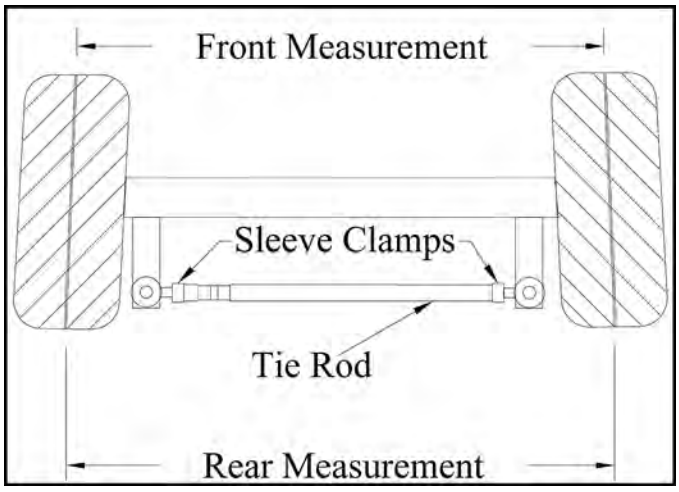
Front Wheel Alignment

Center the steering before aligning the front wheels.

13: Turn the front wheels so that they are in the straight ahead position and tie off the steering wheel so that it cannot rotate.
14: Using a piece of chalk, mark a line around the center of both front tires.
15: Loosen the ball joint clamps or the rod end jam nuts on the tie rod.

Note: Remember the position and orientation of the ball joint clamps.

16: Lower the front wheels to the ground and push the vehicle back and forth a few feet to settle the suspension.
17: Measure the distance between the chalk lines at the front of the tires.
18: Measure the distance between the chalk lines at the rear of the tires.
19: Adjust the tie rod so that the distance at the front and rear of the tires is within the toe in specification listed in the specification table at the end of this section.
20: If equipped with ball joints, position the ball joint clamps in their original location and orientation.
21: Tighten the ball joint clamps or the rod end jam nuts.
22: Untie the steering wheel.
23: Reconnect the main positive and negative cables at the batteries.
24: Remove the blocks from behind the wheels.
25: Release the parking brake and test drive.



REPLACE FRONT WHEEL BEARINGS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

1: Set the park brake.
2: Disconnect the batteries.
3: Raise the front of the vehicle and support with jack stands.
4: Remove the tire/wheel assembly from the hub. Refer to the Tire/Wheel section for information regarding removing the tire/wheel assembly.
5: Remove the hub dust cap, cotter pin, and spindle nut.
6: 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.

7: Thoroughly clean all grease from the inside of the hub and the bearings.
8: 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.

9: Assemble in reverse order, using new grease seals.
   a. Pack inner and outer bearings with grease.
   b. Adjust the bearing preload per specifications in the Adjust Front Wheel Bearing procedure.
   d. Install a new cotter pin.
10: Install the hub dust cap.
11: Reinstall the brake body. Refer to the Brakes section for information regarding the installation of the brake body.
12: Reinstall the tire/wheel. Refer to the Tire/Wheel section for information regarding installing the tire/wheel assembly
13: Lower the vehicle.
14: Reconnect the batteries.
15: Remove the blocks from behind the wheels.
16: Release the park brake and test drive.

REPLACE STEERING KNUCKLE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

1: Raise the front of the vehicle and support with jack stands.
2: Remove the tire/wheel assembly. Refer to Tires and Wheels section for information regarding removing the tire/wheel assembly.
3: 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.

4: 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.
5: While supporting the knuckle, remove the king pin and thrust bearing.
6: Remove the knuckle from the axle.
7: 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.

8: Assemble in reverse order.
   a. Pack the thrust bearing with grease.
   b. Tighten the king pin nut until all of the up and down play is removed and the yoke rotates freely. The rubber washer must compress slightly to create a seal for the grease.
   c. Refer to Replace Front Wheel Bearings for information regarding proper tightening of the spindle nut
   d. Install new cotter pins.
9: Realign the wheels. Refer to the Steering section for information regarding realignment of the front wheels.
10: Lower the vehicle.
11: Reconnect the batteries.
12: Remove the blocks from behind the wheels.
13: Release the park brake and test drive.

REPLACE KING PIN/BUSHINGS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

There are different types of king pin bushings depending on the configuration of your vehicle. This is a generic procedure that covers all three types of bushings. Refer to the illustration below for the type of bushing in your vehicle.

- Bronze bushings in the axle beam.
- Bronze bushings in the steering knuckle.
- Metal backed Teflon bushings in the axle beam or suspension arm.

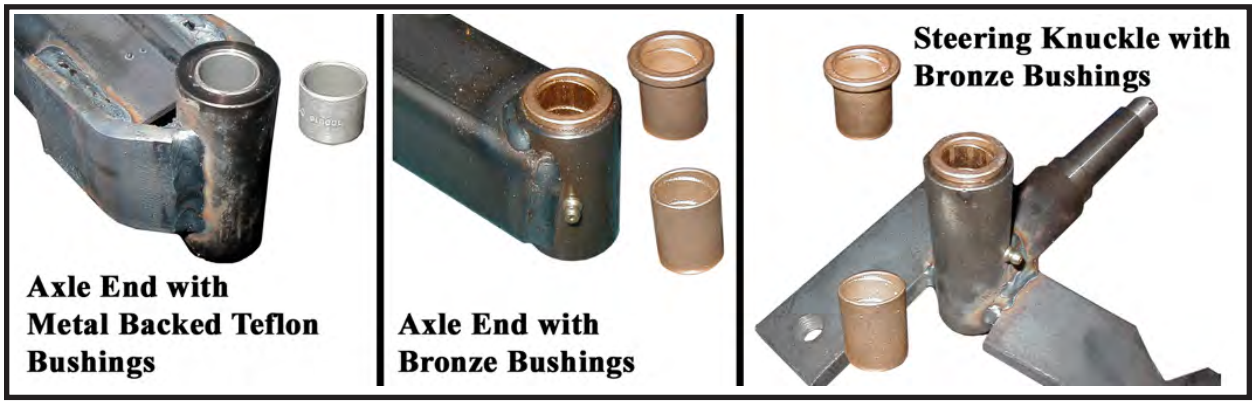
Note: Bronze bushings must be reamed or broached to the proper diameter after they are pressed into the axle beam or steering knuckle.

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

1: Raise the front of the vehicle and support with jack stands.
2: Remove the steering knuckle. Refer to Replace the Steering Knuckle for information regarding removing the steering knuckle.
3: Press the king pin bushings out from the axle, steering knuckle or suspension arm.
4: Press new bushings into the axle, steering knuckle or suspension arm. If equipped with bronze bushings, ream or broach the bushings per specification listed at the end of this chapter..
5: Inspect the king pin for damage or wear. If any damage or wear is noted then the king pin must be replaced.
6: Reassemble in reverse order.

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

7: Grease the bushings (bronze only).
8: Lower the vehicle.
9: Reconnect the batteries.
10: Remove the blocks from behind the wheels.
11: Release the park brake and test drive.



SERVICE LIMITS AND SPECIFICATIONS

King Pin Bushings

Ream or broach to 1.25 inch ±0.001
(31.75 mm ±0.0254)

Toe In

0 - + 0.25 inches (6.3 mm)

HARDWARE TORQUE

Description	Foot Pounds	Newton Meters
Ball Joint Clamp	28-32	37.9-43.4
Rod End Stud Nut	20-25	27.1-33.9
Rod End Jam Nut	20-25	27.1-33.9
Spindle Nut	30	40

Table of Contents

Drive Axle

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

CHECK OIL LEVEL

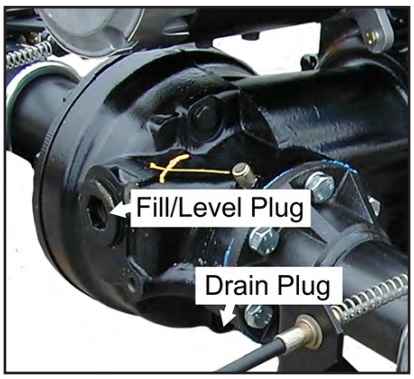
WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Fluid type and capacities are listed in the Lubrication chapter.

Note: 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.

1: Park the vehicle on a level surface and block the front wheels.
2: Disconnect the batteries.
3: Place a level on top of the motor.
4: Raise the rear of the vehicle until the level indicates that the drive is level with the ground.
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 batteries.
10: Remove the blocks from the wheels.



CHANGE OIL

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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

1: Raise the rear of the vehicle and support with jack stands.
2: Place a four quart drain pan under the axle assembly center section.
3: Remove the drain plugs from the differential case and gear case.
4: Replace the drain plugs once the oil has drained.
5: Remove the differential gear case fill/level plug and fill with oil. Refer to Check Oil Level procedure for proper oil level.
6: Replace the fill plug.
7: Reconnect the batteries.
8: Remove the blocks from the wheels.

Primary reduction case drain plug

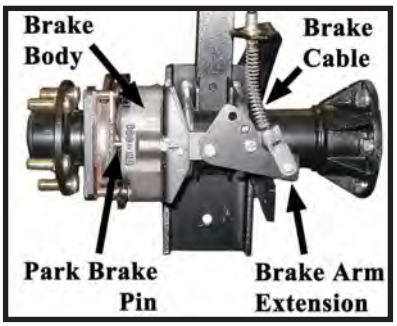
TRANSMISSION ASSEMBLY

WARNING

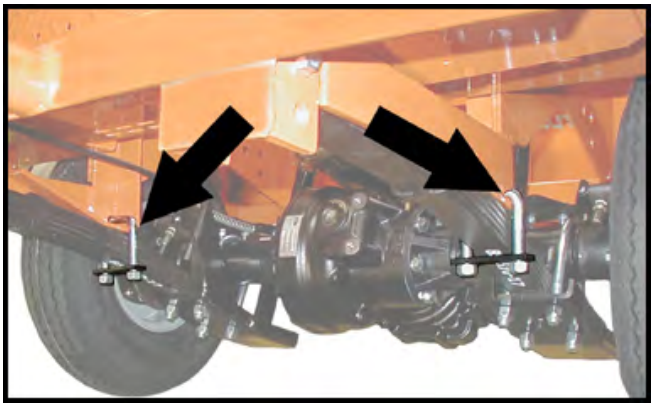
This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Remove

1: Release the park brake.
2: Remove the park brake cables from the spring axle mounting brackets and brake arms.



3: Disconnect the wiring from the motor.
4: Disconnect the hydraulic brake lines from the left and right brake bodies.
5: Remove the u-bolts holding the leaf springs to the frame as shown in the illustration below. Do not remove the u-bolts on the axle housing.



Rear Spring U-Bolts

6: Remove the lower shock mounting bolts and the front spring mounting bolts.
7: Raise the rear of the vehicle, lifting the frame up and off of the drive assembly. Support the rear of the vehicle with jack stands.

Install

8: Reinstall the drive in reverse order.
9: Bleed the brake system. Refer to Bleed the Brake System for information regarding bleeding the brakes.
10: Set the park brake.
11: Lower the vehicle.
12: Reconnect the main positive and negative cables at the batteries.
13: Remove the blocks from the wheels, release the park brake and test drive the vehicle.

AXLE SHAFT

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

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 have to be removed at the same time then all oil must be drained from the housing.

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

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

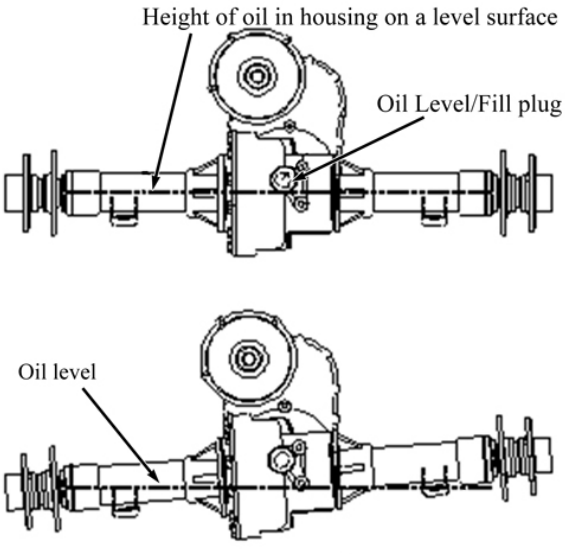
Note: The hub or rotor does not have to be removed but if they are to be replaced, then remove them before removing the axle from the housing.

Remove

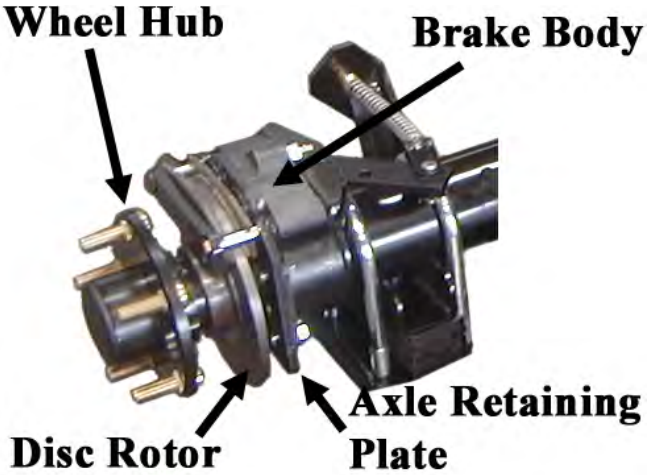
1: Disconnect the batteries.
2: If required, drain the oil. Refer to Change Oil Procedure.
3: Raise the rear of the vehicle and support with jack stands.
4: Release the park brake.
5: Remove the tire and wheel assembly. Refer to Tires and Wheels section for information regarding removing the tire and wheel assembly.
6: Remove the four bolts attached to the axle retaining plate.
7: Remove the axle retaining plate and brake body assembly as one unit.
8: Secure the brake body assembly, do not let it hang by the brake hose.
9: Pull the axle out of the housing.
10: Inspect all bearings for roughness or play, replace as needed.

Install

11: Install in reverse order or removal
  a. Lubricate the bearing external O-ring.
  b. Use new bolts for the axle retaining plate.
  c. If the wheel hub was removed, install the hub and rotor. Torque the hub bolt to the specification listed in the table at the end of this section.
12: Fill with oil to the level of the fill plug threads. Refer to Check Oil Level procedure.
13: Set the park brake.
14: Lower the vehicle.
15: Reconnect the batteries.
16: Remove the blocks from behind the wheels.
17: Release the park brake and test drive.



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



REAR HUB, ROTOR & BEARINGS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

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

1: Disconnect the batteries.
2: Raise the wheel off of the ground.
3: Release the park brake.
4: Remove the tire/wheel assembly, Refer to Tires and Wheels section for information regarding removing the tire/wheel assembly.
5: Remove the axle hub bolt and washer and remove the hub from the axle.
6: Remove the outer brake pad. Refer to section Brake Service for information regarding removing the brake pads.
7: Remove the rotor.
8: If also replacing the bearing, the axle shaft must be removed from the housing. Refer to Axle Shaft procedure for information on removing and installing the axle shaft.
9: Install in reverse order.
   a. Thoroughly clean the threads in the axle shaft.
   b. Lightly grease the hub splines.
   c. Refer to Brakes section for information regarding installing the brake pads.
   d. Using a new bolt, torque the axle hub bolt to the specification listed in the table at the end of this section.
   e. Refer to Tires and Wheels section for information regarding installing the tire/wheel assembly.
10: Set the park brake.
11: Lower the wheel to the ground.
12: Reconnect the batteries.
13: Remove the blocks from behind the wheels, release the park brake and test drive.

MOTOR REMOVAL/ 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.

1: Disconnect the batteries
2: 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.

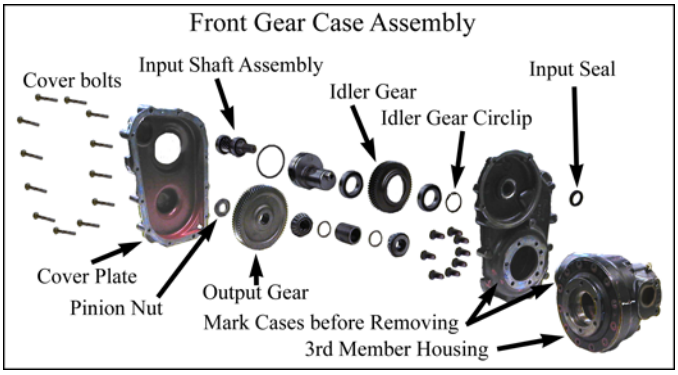
3: Remove the motor support bracket U-bolt (only used on larger motors).
4: Remove the motor mounting bolts and slide the motor off of the input shaft.
5: Install the motor in reverse order. Make sure that the motor coupler o-ring is properly installed on the transmission input shaft. Refer to the torque table in the motor section for tightening the motor terminals.
6: Apply a light coating of moly paste grease part number 94-421-34 to the splines on the transmission input shaft only.
7: Reconnect the batteries.
8: Remove the blocks from behind the wheels.
9: Release the park brake and test drive.

Transmission input shaft

PRIMARY GEAR CASE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



1: Disconnect the batteries.
2: Raise the rear of the vehicle and support with jack stands.
3: Place a drain pan under the gear case that is capable of holding 4 liters (4 quarts) of oil and drain the oil from the front gear case.
4: If required, remove the drive assembly from the vehicle. Refer to Remove assembly procedure.
5: Remove the motor only if the entire drive is to be disassembled. Refer to Motor procedure.
6: Remove the cover retaining bolts.
7: Remove the cover plate and let the remaining oil drain from the housing.
8: Remove the circlip from the idler gear.
9: Remove the input shaft/bearing assembly and idler gear/bearing assembly from the gear case cover at the same time.
10: Remove the pinion nut from the output gear and remove the output gear from the pinion shaft.


Idler Gear Circlip

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

11: Mark the gear case position in relation to the 3rd member housing so that it will be reassembled in the same position.
12: Remove the six retaining bolts holding the gear case to the 3rd member housing.
13: Remove the gear case housing from the 3rd member housing.
14: Inspect all parts for signs of wear or damage.


Remove Idler & Input Assy.

15: Assemble the gear case in reverse order.
   a. See note regarding special washers at the end of this section.
   b. Apply gasket sealer (#94-430-05) to the front flange on the 3rd member and gear case cover.
   c. Pack the motor seal with non-acetic based grease.
   d. Torque the drain plug, gear case to 3rd member bolts, and pinion nut per torque listed in the Hardware Torque table at the end of this section.
16: Fill the differential with oil. Refer to Check Oil Level for information on filling the drive with oil.
17: Lower the vehicle.
18: Reconnect the batteries.
19: Remove the blocks from behind the wheels.
20: Test drive the vehicle.

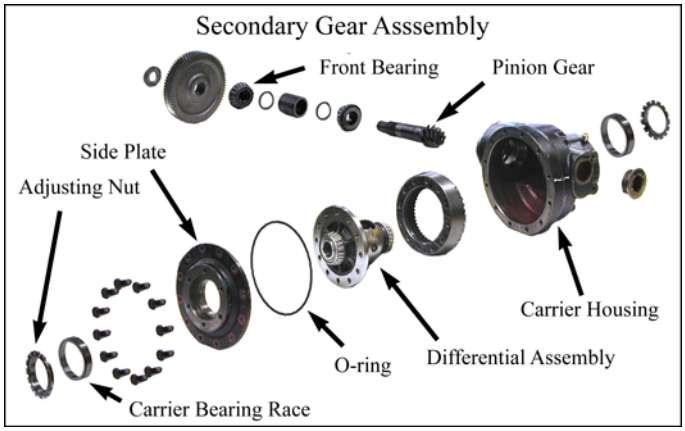
SECONDARY GEAR CASE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Disassemble

1: Remove the transaxle assembly from the vehicle. Refer to Remove in this section.
2: Place a drain pan under the gear case that is capable of holding 4 liters (4 quarts) of oil and drain the oil from the front and secondary gear case.
3: Place the axle assembly on an appropriate stand.
4: Remove the axle shafts and tubes as an assembly by removing the six axle tube flange bolts on each axle tube.
5: Remove the primary reduction gear case. Refer to Primary Gear Case for information on removing the gear case.
6: Remove the 12 side plate bolts, then remove the side plate.
7: Remove the carrier bearing adjusting nut roll pin and adjusting nut from the side plate.
8: Turn the side plate over and remove the carrier bearing race from the side plate.
9: Remove the differential assembly.
10: Remove the carrier bearing adjusting nut roll pin from the carrier housing, then remove the carrier adjusting nut.



11: Remove the carrier bearing race from the 3rd member housing.
12: Remove the front bearing from the pinion gear shaft.

Note: The pinion gear may have to be driven out to perform this procedure.

13: Remove the pinion gear shims and spacer.
14: Remove the pinion gear from the carrier housing.
15: Remove the front and rear pinion bearing races.
16: Inspect all parts for signs of wear or damage.
17: Thoroughly clean all parts.

Roll Pin

Assemble

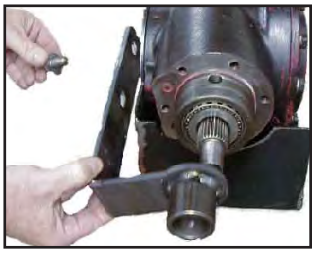
1: Temporarily install the pinion gear (hand tighten only).
2: Install the carrier bearing race adjusting nuts into the housing and cover.
3: Install the carrier bearing races into the housing and cover.
4: Place the differential assembly into the housing.
5: Tighten the housing carrier bearing race adjusting 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 per torque listed in the Hardware Torque table at the end of this section.
9: Pre set the carrier bearing preload by tightening the housing carrier bearing race adjusting nut until it requires 2.1 - 4.7 Nm (1.5 to 3.3 foot pounds) to rotate the differential assembly.

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

10: Mark the position of each carrier bearing adjusting nut in relation to the drive housing and cover and then remove the differential assembly, do not allow the nuts to rotate.
11: Install the pinion gear. Re-shim if required. Refer to Pinion Bearing Preload procedure.
12: Install the pinion gear holding tool (96-500-42) and tighten the pinion nut enough to keep the pinion gear from rotating.



Pinion Holding Tool

13: Install the differential assembly.
14: Install the cover and all of the cover bolts. *See note regarding special washers at the end of this section.* Torque per torque listed in the Hardware Torque table at the end of this section.
15: Check the gear lash between the ring and pinion gears. The gear lash should be 0.127-0.178 mm (0.005 to 0.007 inches).
16: Adjust the gear lash if needed by tightening or loosening the carrier bearing race adjusting nuts. The two ring nuts must be turned equally in opposite directions.

Note: To move the ring gear closer to the pinion: Loosen the housing carrier bearing race ring nuts and tighten the cover carrier bearing race ring nut equally.

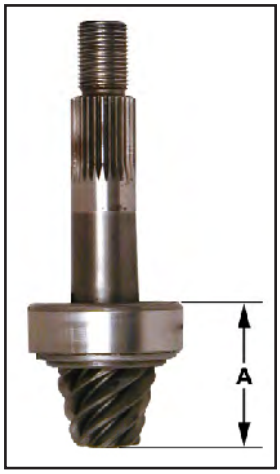
Note: To move the ring gear away from the pinion: Loosen the cover carrier bearing race ring nut and tighten the housing carrier race ring nut equally.

17: Install the locking roll pins into the housing and cover to lock the adjusting 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 Check Oil Level procedure for information regarding the proper oil level..
21: Lower the vehicle.
22: Reconnect batteries
23: Remove the blocks from behind the wheels and test drive.

PINION BEARING PRELOAD

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



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 required to properly set the depth:

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 illustration)

B = 54.

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

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

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

DV: On face of pinion gear

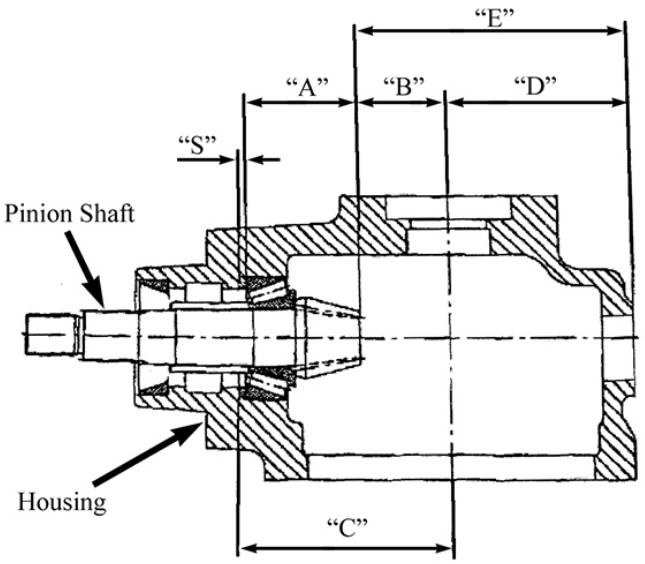
Once a shim has been selected and the pinion gear is installed, confirm that: E - D = B + (DV)

Set 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 220-241 Nm (154-169 foot pounds).
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 1.57-4.14 Nm (1.1 and 2.9 foot pounds). 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.

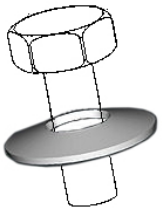


HARDWARE TORQUE

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

Description	Foot Pounds	Newton Meters
Pinion nut	154-169	209229
Drain plug	21-25	28.4-33
Gear case to 3rd member	18-20	24.4-27
3rd Member cover bolts	40-50	54-67.5
Axle hub bolt	275	392

Note: Special Washers



The washers for the primary gear case housing and carrier housing side plate are in the shape of a cone referred to as conical or belleville washers.

This type of washer is designed to maintain tension in bolted assemblies.

Belleville washers must be orientated correctly to function properly. See illustration.

Note: Values shown are for reference only

Table of Contents

Steering

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

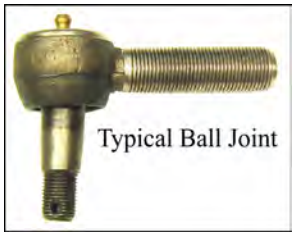
INSPECT BALL JOINTS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

1: Tie off the front wheels so that they cannot turn.
2: While watching the ball joints, rapidly rotate the steering wheel to the left and right.
3: If the housing moves up or down on the shaft then the ball joint is worn out and should be replaced. Refer to section Replacing a Ball Joint for information regarding replacing ball joints.
4: Untie the front wheels.
5: Reconnect the main positive and negative cables at the batteries.
6: Remove the blocks from behind the wheels.
7: Release the parking brake and test drive.


Typical Ball Joint

INSPECT ROD ENDS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

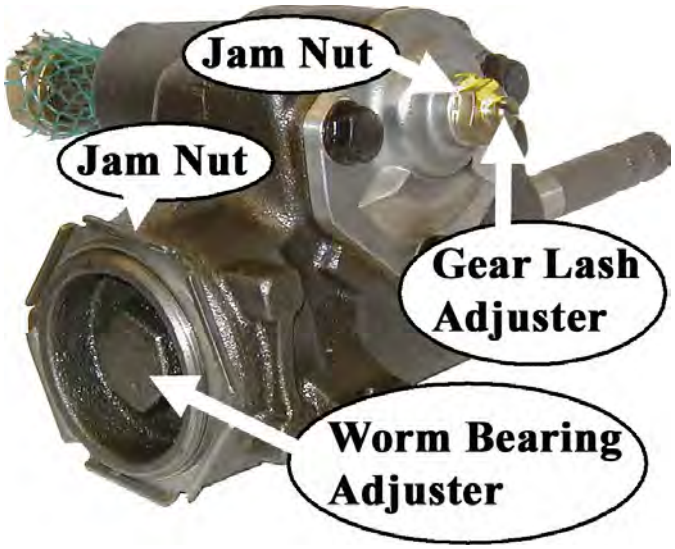
1: Visually inspect each rod end for any signs of play between the ball and the nylon or brass bushing in the housing.
2: If any play is evident, then the rod end is worn out and should be replaced. Refer to section Replace the Ball Joints, Tie Rods, and Drag Link for information regarding replacing ball joints.
3: Reconnect the main positive and negative cables at the batteries.
4: Remove the blocks from behind the wheels.
5: Release the parking brake and test drive.


Typical Rod End

ADJUST STEERING GEAR

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



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.

1: Raise the front of the vehicle and support with jack stands.
2: 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.

3: Loosen the gear lash jam nut and the worm bearing adjuster jam nut.
4: Unscrew the gear lash adjuster all of the way to the stop.
5: 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.
6: While holding the worm bearing adjuster so that it cannot turn, tighten the worm bearing adjuster jam nut.
7: 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.
8: 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.
9: While holding the gear lash adjusting screw so that it cannot turn, tighten the gear lash adjusting screw jam nut.
10: Reconnect the main positive and negative cables at the batteries.
11: Remove the blocks from behind the wheels.
12: Release the parking brake and test drive.

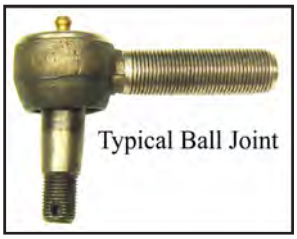
FRONT WHEEL ALIGNMENT

Refer to the Front Axle section for front wheel alignment procedure.

REPLACE BALL JOINT

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



1: Raise the front of the vehicle and support with jack stands.
2: Loosen the ball joint clamp on the steering sleeve.
3: Remove the cotter pin and ball joint nut.
4: Using a pickle fork, remove the ball joint from the steering arm.
5: Remove the ball joint from the steering sleeve.

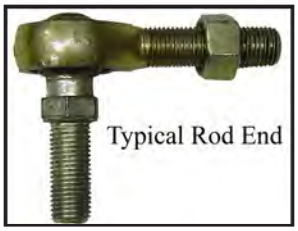
Note: Count the number of turns needed to remove the ball joint.

6: 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.
7: Install the ball joint into the steering arm. Tighten the ball joint nut per torque listed in the Hardware Torque table at the end of this section and install a new cotter pin.
8: Realign the front wheels. Refer to the Front Axle section for information regarding realignment of the front wheels.
9: Lower the vehicle.
10: Reconnect the main positive and negative cables at the batteries.
11: Remove the blocks from behind the wheels.
12: Release the park brake and test drive.

REPLACE ROD END

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



1: Raise the front of the vehicle and support with jack stands.
2: Loosen the rod end clamp or jam nut on the steering sleeve.
3: Remove the nut or bolt holding the rod end onto the steering arm.
4: Remove the ball joint from the steering sleeve.
5: Install the new rod end into the steering sleeve. Screw it into the sleeve the same number of turns counted in the previous step. Do not tighten the rod end clamp or jam nut at this time.

6: Install the rod end into the steering arm. Tighten the ball joint nut per torque listed in the Hardware Torque table at the end of this section.
7: Realign the front wheels. Refer to the Front Axle section for information regarding realignment of the front wheels.
8: Lower the vehicle.
9: Reconnect the main positive and negative cables at the batteries.
10: Remove the blocks from behind the wheels.
11: Release the park brake and test drive.

REPLACE STEERING SHAFT

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

1: If equipped with a horn switch in the steering wheel, remove the switch, disconnect the wires from the switch and cut the terminals off of the wires.
2: Remove the steering wheel. Refer to Replace the Steering Wheel procedure for information regarding removing the steering wheel.
3: Remove the upper steering shaft bushing or bearing from the steering column.
4: Remove the steering gear access cover from the steering column (if equipped).
5: Remove and discard the pinch bolt and nut from the steering shaft coupler.

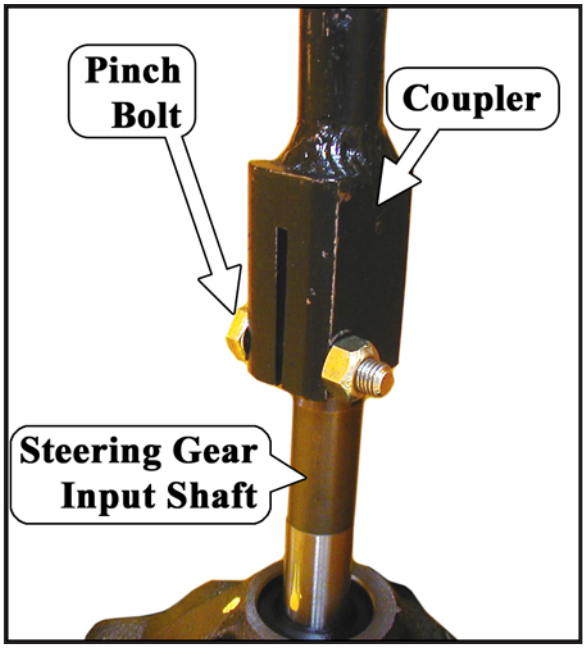
Note: Most vehicle configurations will now allow the steering shaft to slide off of the steering gear input shaft and then back down out of the steering column. If there is not enough clearance for this procedure then the steering gear must be removed. Refer to Replace the Steering Gear for information regarding removing the steering gear.

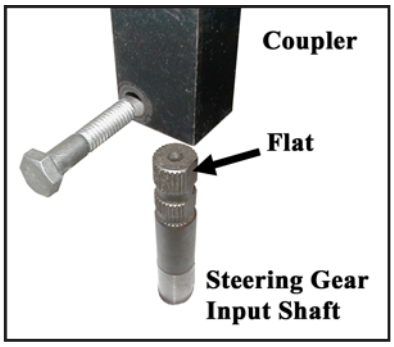
6: Remove the steering shaft from the vehicle.
7: Lightly grease the input shaft splines, steering wheel splines and the upper steering shaft bushing.
8: Install the steering shaft in reverse order using a new pinch bolt. Orientate the shaft so that the pinch bolt is opposite the flat in the steering gear shaft. See the illustration to the right.
9: Tighten the pinch bolt per torque listed in the Hardware Torque table at the end of this section.
10: Reconnect the main positive and negative cables at the batteries.
11: Remove the blocks from behind the wheels.
12: Release the parking brake and test drive.

WARNING

Do not use the original pinch bolt and nut. Failure to replace the pinch bolt and nut may result in failure of the steering causing loss of control of the vehicle. This could lead to property damage and/or severe bodily injury.

Make sure that the pinch bolt is not aligned with the flat on the steering shaft. Aligning the bolt with the flat could result in failure of the steering and loss of control of the vehicle. This could lead to property damage and/or severe bodily injury.





REPLACE STEERING WHEEL

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Note: The steering wheel is on a tapered shaft and may be damaged when it is removed.

1: If equipped with a horn switch in the steering wheel, remove the switch and disconnect the wires from the switch.
2: Remove the steering wheel nut.
3: Using a steering wheel puller, remove the steering wheel.
4: Position the front wheels in the straight ahead position.
5: Lightly grease the steering wheel splines and install the replacement steering wheel orientated as shown in the illustration.
6: Tighten the steering wheel nut to torque listed in the Hardware Torque table at the end of this section.
7: Reinstall the horn switch (if equipped).
8: Reconnect the main positive and negative cables at the batteries.
9: Remove the blocks from behind the wheels.
10: Release the parking brake and test drive.

STEERING GEAR

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Disassemble

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 an exploded 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.

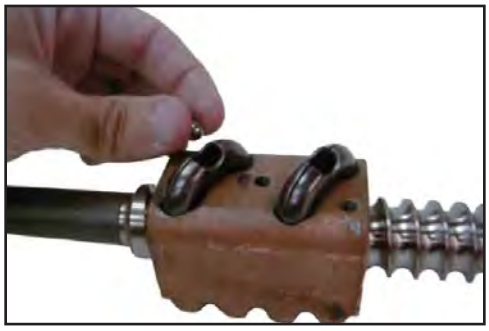
Note: The side cover/pitman shaft assembly normally does not have to be disassembled.

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.

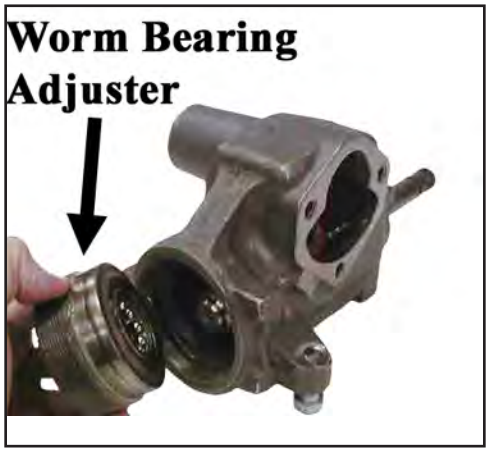
Reassemble

12: Lightly lubricate all parts before reassembly.
13: Install a new worm shaft seal and pitman shaft seal into the housing.
14: Install the upper worm bearing cup.
15: Divide the ball bearing into two equal groups.
16: Position the ball nut onto the worm shaft as shown in the illustration.
17: Insert the ball guides into the ball nut.
18: 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.

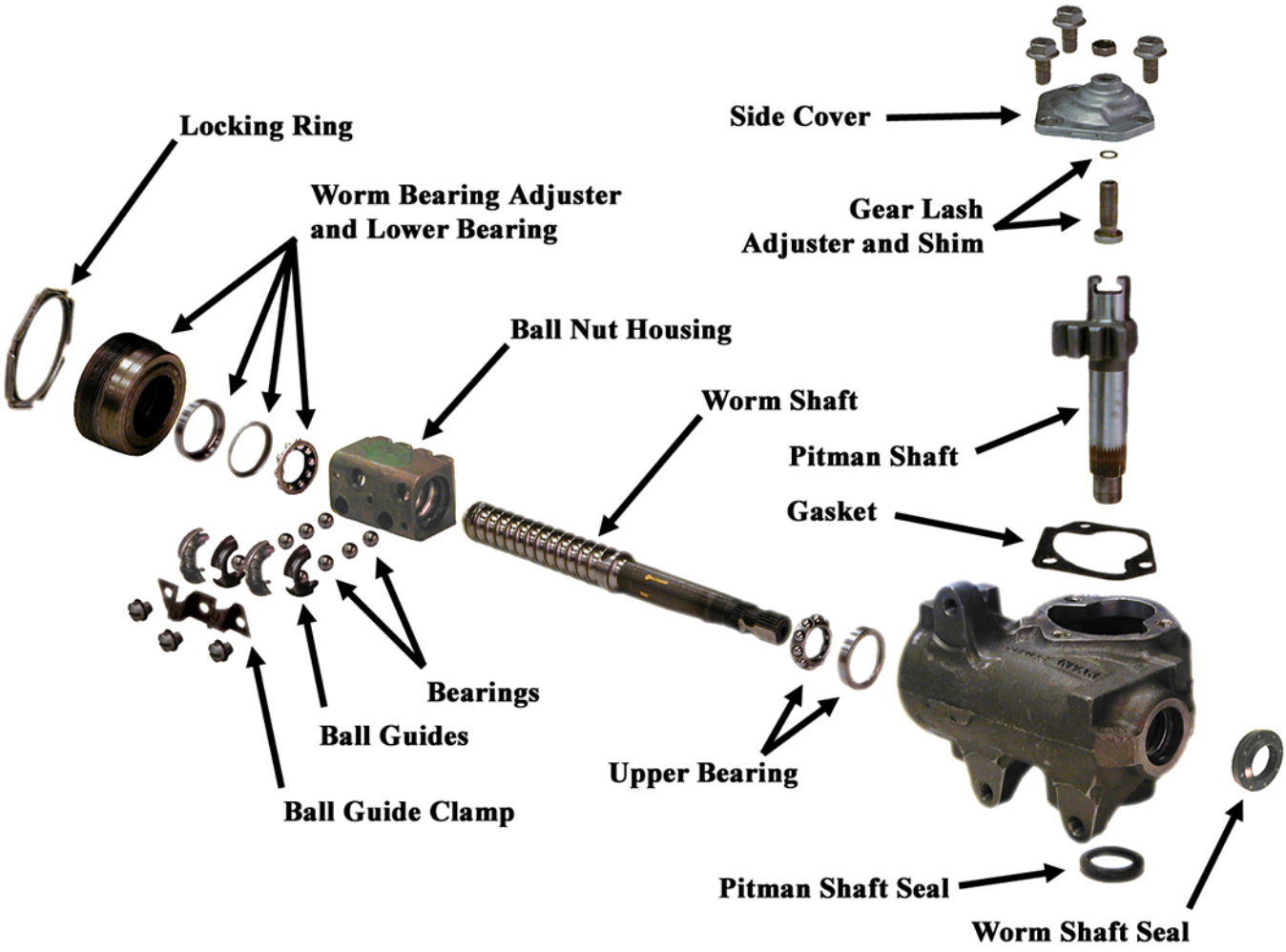


19: Install the ball guide clamp.
20: Place the upper worm bearing on the worm shaft and install the worm shaft/ball nut assembly into the housing being careful not to damage the worm shaft seal.
21: Install the assembled worm bearing adjuster into the housing and tighten just enough to remove all play in the worm shaft.
22: Install, but do not tighten the worm bearing adjuster lock nut.
23: Rotate the worm shaft to center the ball nut in the housing.
24: 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.
25: Pack the steering gear with grease through the open side cover bolt hole and then install the bolt.
26: Adjust the steering gear. Refer to Adjust the Steering gear section for information regarding adjusting the steering gear.
27: Once the adjustments are completed, make sure that the locking ring and jam nut are tight.



B0-248; B0-254; BT-248; BT-280 (36v & 48v)

Exploded View of Steering Gear



HARDWARE TORQUE

Description	Foot Pounds	Newton Meters
Ball Joint Clamp	28-32	37.9-43.4
Rod End Stud Nut	20-25	27.1-33.9
Rod End Jam Nut	20-25	27.1-33.9
Ball Joint Castle Nut	40-45	54.2-61

Notes:

Table of Contents

Brakes

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

GENERAL GUIDELINES AND SAFETY

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

⚠ 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

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. Any debris or contaminates left in the brake system could lead to brake failure and result in property damage and/or severe bodily injury.

⚠ WARNING

When replacing or adding brake fluid:

- **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

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.

FRONT BRAKE

⚠ WARNING

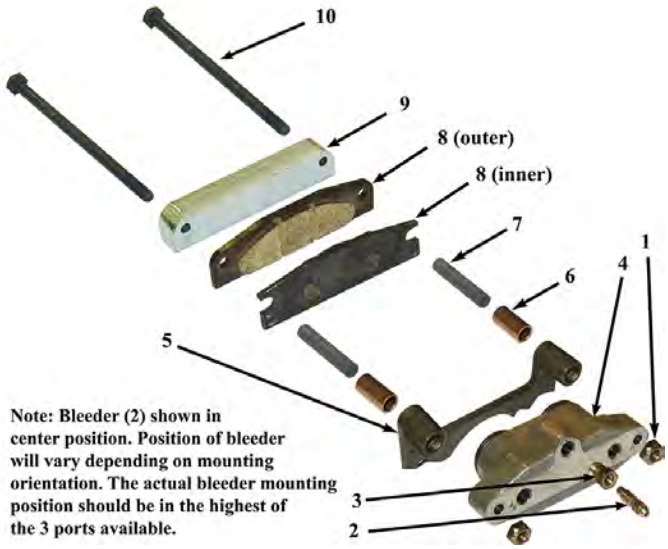
This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Service Limits

Refer to the table at the end of this section

Inspection

Note: Service Limits are listed in a table at the end of this section.



Note: Bleeder (2) shown in center position. Position of bleeder will vary depending on mounting orientation. The actual bleeder mounting position should be in the highest of the 3 ports available.

1: Raise the front of the vehicle and support with jack stands.
2: Remove the front wheels.
3: Measure the brake lining (not including the metal backing plate) of each pad at it's thinnest point. If any one of the brake pads are equal to or less that the service limit then all pads should be replaced.
4: Measure the rotor thickness in three places. If the rotor thickness is less than the service limit then the rotor must be replaced.
5: Measure the rotor runout. If the runout exceeds the service limit, then the rotor must be resurfaced. After resurfacing the rotor, measure the rotor thickness. If the rotor thickness is less than the service limit, then the rotor must be replaced.
6: Lower the vehicle.
7: Reconnect the battery, remove the blocks from behind the wheels and test drive.

Replace Pads

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

1: Thoroughly clean the area around the master cylinder cap.
2: Remove fluid from the master cylinder until it is 1/2 full.
3: Raise the front of the vehicle and support with jack stands.
4: 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 for the following steps.

5: Remove the brake body bolts (10) and discard the lock nuts (1) and brake pads (8).
6: Remove the spacer bushings (6) from the mounting bracket (5) and discard the bushings.
7: Inspect the brake rotor. See Inspect the Service Brakes section for information regarding inspecting the brake rotor.
8: Inspect the spacers (7) and replace if any wear or damage is found.
9: Install new spacer bushings in the mounting bracket.
10: Install new brake pads and assemble the caliper in reverse order. Torque the brake body per specification at the end of this section.
11: Install the tire/wheel assembly onto the hub and lower the vehicle to the ground.
12: Fill the master cylinder to the proper level. Refer to Check Master Cylinder Fluid section for information on the proper master cylinder fluid level.
13: Reconnect the battery, remove the blocks from behind the wheels and test drive.

REAR BRAKE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Service Limits

Refer to the table at the end of this section

Note: Service Limits are listed in a table at the end of this section.

Inspection

1: Raise the front of the vehicle and support with jack stands.
2: Remove the front wheels.
3: Measure the brake lining (not including the metal backing plate) of each pad at it's thinnest point. If any one of the brake pads are equal to or less that the service limit then all pads should be replaced.
4: Measure the rotor thickness in three places. If the rotor thickness is less than the service limit then the rotor must be replaced.
5: Measure the rotor runout. If the runout exceeds the service limit, then the rotor must be resurfaced. After resurfacing the rotor, measure the rotor thickness. If the rotor thickness is less than the service limit, then the rotor must be replaced.
6: Lower the vehicle.
7: Reconnect the battery, remove the blocks from behind the wheels and test drive.

Replace Pads

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

1: Thoroughly clean the area around the master cylinder cap.
2: Remove fluid from the master cylinder until it is 1/2 full.
3: Raise the rear of the vehicle and support with jack stands.
4: Remove the tire/wheel assembly. Refer to Tires and Wheels section for information on removing the tire and wheel assembly.
5: Remove the brake body bolts and discard the lock nuts and brake pads.
6: Remove the spacer bushings from the mounting bracket and discard.
7: Inspect the brake rotor. Refer to Inspect the Service Brake section for information regarding inspecting the brake rotor.
8: Inspect the spacers and replace if any wear or damage is found.
9: Install new spacer bushings in the mounting bracket.
10: Install new brake pads in reverse order. Torque the brake body per specification at the end of this section.
11: Repeat this procedure for the other wheel.
12: Install the tire/wheel assembly and lower the vehicle to the ground.
13: Fill the master cylinder to the proper level. Refer to Check Master Cylinder Fluid section for information regarding the correct master cylinder fluid level.
14: Reconnect the battery, remove the blocks from behind the wheels and test drive.

B0-248; B0-254; BT-248; BT-280 (36v & 48v)

REBUILD DISC BRAKE BODY

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

This procedure assumes that the component has been removed from the vehicle. Refer to the component assembly removal instructions for details and warnings regarding the removal and installation procedure.

⚠ WARNING

The pistons are very fragile. If the piston is damaged it must be replaced. Failure to replace a damaged piston could lead to brake failure and result in property damage and/or severe bodily injury.

1: Pull the pistons out of the brake body.
2: Remove the piston rubber boot.
3: Remove the piston o-ring from inside of the brake body.
4: Inspect and replace parts as required.
5: Lubricate the brake parts with clean brake fluid from a sealed container.
6: Install the O-rings into the brake body. Make sure that the O-rings are installed into the second groove and that they are not twisted (Fig 1).
7: Using tool #41-350-13 (optional), slide the rubber boots onto the pistons as shown. The boot should be hanging off of the end of the piston (Fig 2).
8: Insert the rubber boot/piston into the brake body making sure that the boot is properly seated in the groove (Fig 3).
9: Press the pistons all the way down into the brake body making sure that the boot seats properly into the upper groove on the piston.
10: Install any fittings or plugs that were removed from the brake body using teflon tape thread sealant.
11: If the brake body assembly is not to be immediately installed onto a vehicle, plug the brake hose fitting hole to prevent any contaminates from entering the brake body.

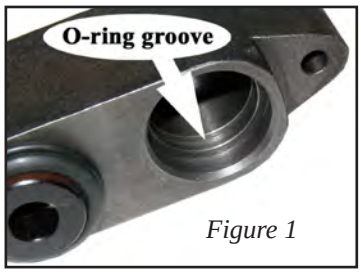


Figure 1


Figure 2

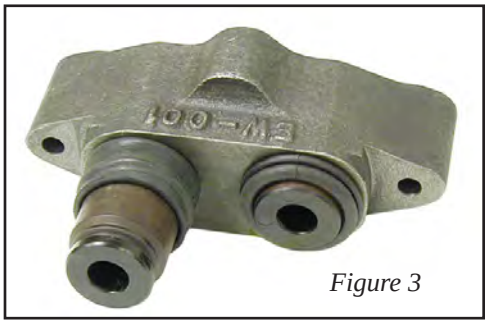


Figure 3

BLEED SYSTEM

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Note: Start this procedure at the wheel furthest from the master cylinder, then work toward the wheel closest to the master cylinder. The rear bleeder valves can be accessed through the center rear inspection cover.

1: Thoroughly clean the area around the master cylinder cap and remove the cap.
2: Add brake fluid from a new sealed container to the master cylinder. Fill to 1/4" from the top of the master cylinder chamber.
3: 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.
4: 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.
5: Pump the brake pedal a few times and then press and hold light pressure to the brake pedal.
6: Open the brake bleeder valve.
7: 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.
8: Slowly release the foot pedal, allowing it to return to its released position.

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.

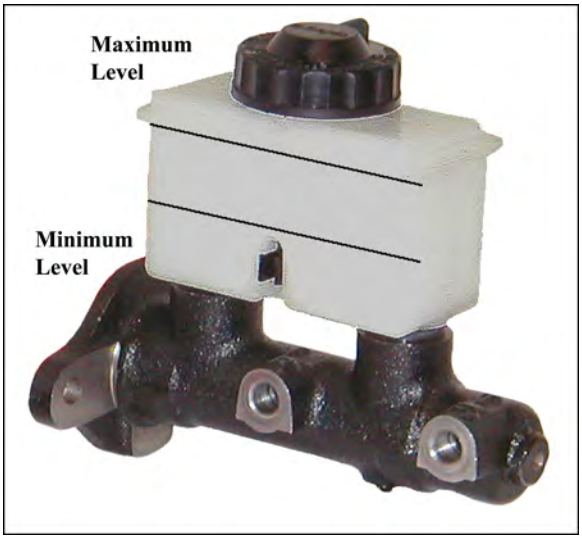
9: Repeat the above steps until you are sure that all of the air is expelled from the brake line. Any air bubbles that can be seen in the clear hose attached to the bleeder is an indication that there is still air in the brake lines.
10: Repeat this process with each of the other wheels.

Note: When finished, top off the master cylinder with fluid. See Check Master Cylinder Fluid for information on filling the master cylinder.

11: Reconnect the battery, remove the blocks from behind the wheels and test drive.

FLUSH SYSTEM

1: Raise the rear wheels off of the ground and support with jack stands.
2: If equipped with front brakes, raise the front wheels off of the ground and support with jack stands.
3: Release the park brake.
4: 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.
5: Remove the wheel cylinders from each axle. Refer to Replace the Wheel Cylinder section for information regarding removing the wheel cylinder.
6: 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.
7: Position the wheel cylinders so that the bleeder screw is pointing to the ground and open all bleeder screws.
8: Pump the master cylinder until all fluid has been pumped from the brake lines and all wheel cylinders.
9: Close all bleeder screws.
10: Fill the master cylinder with fluid.
11: 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.
12: Repeat the above two steps for each wheel cylinder.
13: Reinstall the wheel cylinders and bleed the brakes. Refer to Bleed the Brakes for information regarding bleeding the brakes.
14: Set the park brake.
15: Install the wheels and lower the vehicle to the ground.
16: Reconnect the battery, remove the blocks from behind the wheels and test drive.



MASTER CYLINDER

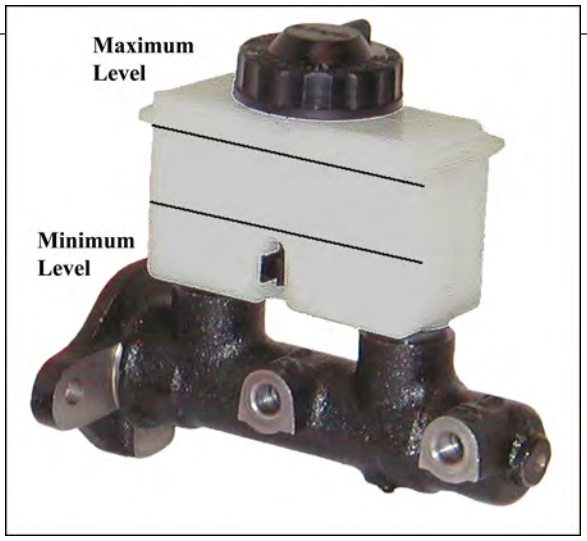
WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

There are no internally serviceable components in the master cylinder. If the master cylinder is faulty, it must be replaced

Add Fluid

1: Thoroughly clean the area around the master cylinder cap and remove the cap.
2: Add brake fluid from a new sealed container to the master cylinder until it as the maximum level line molded in the reservoir.



Level lines are highlighted in the illustration for clarity. They are not black.

PARKING BRAKE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

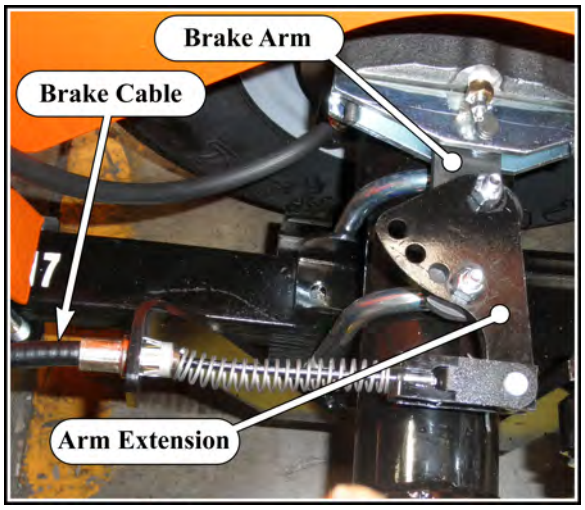
The brake pads and rotor should be inspected anytime the park brake requires adjustment.

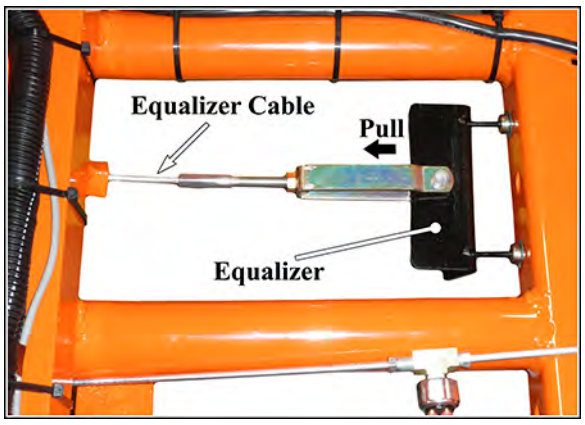
Adjust

1: Block the rear wheels.
2: Release the park brake.
3: Loosen the jam nut on the park brake equalizer cable.
4: Pull on the equalizer to remove all slack from the brake cables.
5: Tighten the cable until it is difficult to rotate the clevis pin and then loosen 1 turn.

Note: If there is no more cable adjustment, then move the brake arm extension to the next hole on the brake arm.

6: Check for brake drag. If there is noticeable drag, then loosen cable 1/2 turn and recheck.
7: Tighten the equalizer cable jam nut on the park brake linkage.
8: Set the park brake.
9: Reconnect the battery, remove the blocks from behind the wheels and test drive.





SERVICE LIMITS

Description	Imperial	Metric
Disc brake Pad minimum lining	00625 inch	1.58 millimeter
Front rotor minimum thickness	0.200 inch	5.08 millimeter
Rear rotor minimum thickness	0.200 inch	5.08 millimeter
Rotor runout (front/Rear)	0.005 inch	0.127 millimeter

HARDWARE TORQUE

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

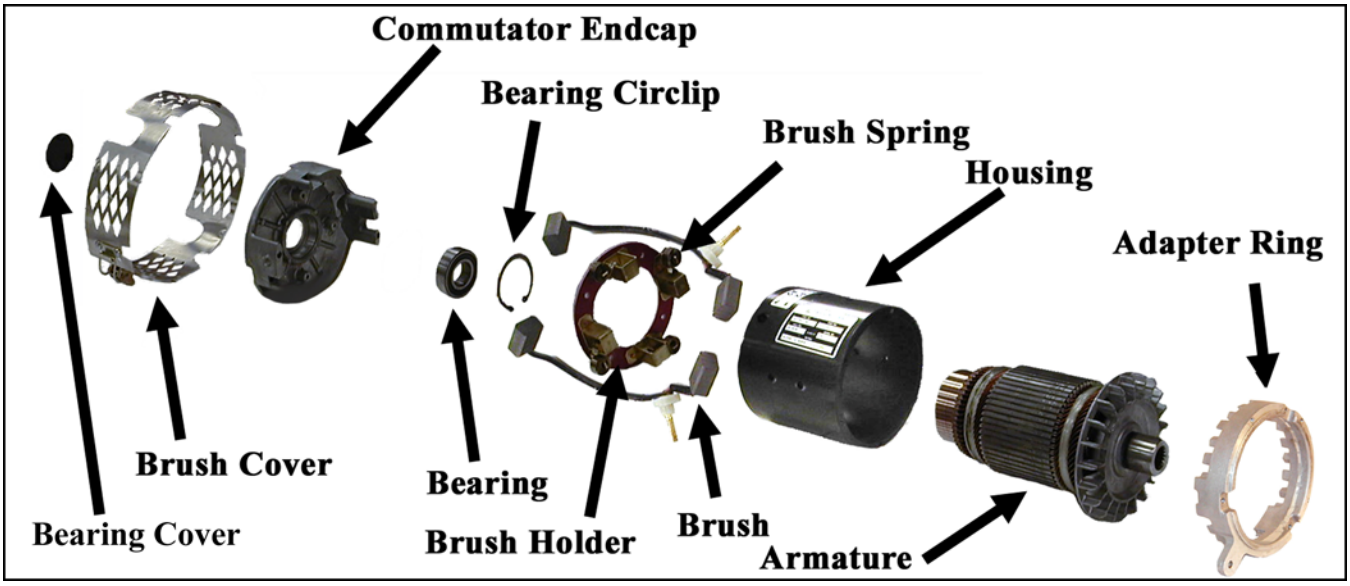
Description	Foot Pounds	Newton Meters
Brake Body Bolts	11	14.9

Notes:

Table of Contents

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.



REMOVE/INSTALL

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Refer to the Drive Axle section for details regarding removal and installation of the motor.

DISASSEMBLE

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

1: Remove the motor from the vehicle. See the Drive Axle section for information on removing the motor.
2: Remove the brush cover and pull the brushes out away from the commutator.
3: Remove the dust cap from the rear motor housing.
4: Place the motor in a press, and press the armature out of the rear bearing.

Note: Removing the armature will damage the motor bearing. The motor bearing should be replaced whenever the armature is removed.

5: Remove the housing screws from the rear motor housing and remove the housing from the motor.
6: Remove the nuts from the armature studs and remove the two brush assemblies.
7: Remove the bearing circlip and press the motor bearing out of the housing and discard.

INSPECT

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Brushes

Measure the length of each motor brush.

- If any one brush is less than or equal to the service limit specified in section Service Limits, then all four brushes should be replaced. Refer to Replacing the Brushes section for information regarding replacing the motor brushes.
- A burnt brush lead is an indication of excessive motor current or another brush was stuck in the brush holder, not in contact with the commutator.

Bearing

A faulty or worn bearing is typical a accompanied with a report of noise from the motor that could be called a growl or grinding noise and is best diagnosed while in the vehicle using a mechanics stethoscope.

Since disassembly of the motor typical damages the bearing, the bearing should be replaced whenever the motor is disassembled.

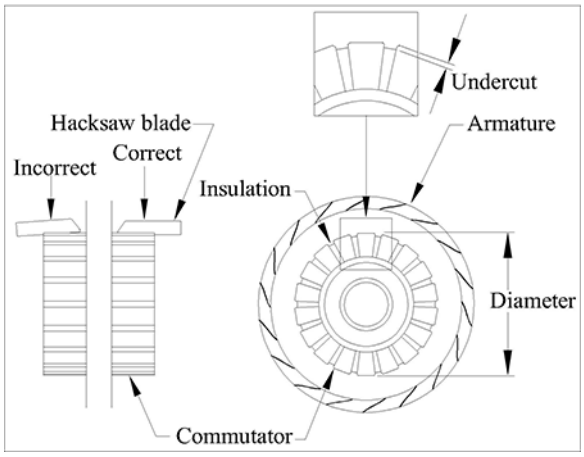
Commutator

Measure the diameter of the commutator.

- If the commutator is less than the minimum diameter specified in section Service Limits, then the motor must be replaced.

Measure the commutator undercut depth in 5-places around the commutator.

- If any one of the measurements is less than the minimum undercut depth specified in Service Limits at the end of this section, then the commutator must be undercut. Refer to Repair Commutator section for information regarding undercutting the commutator.

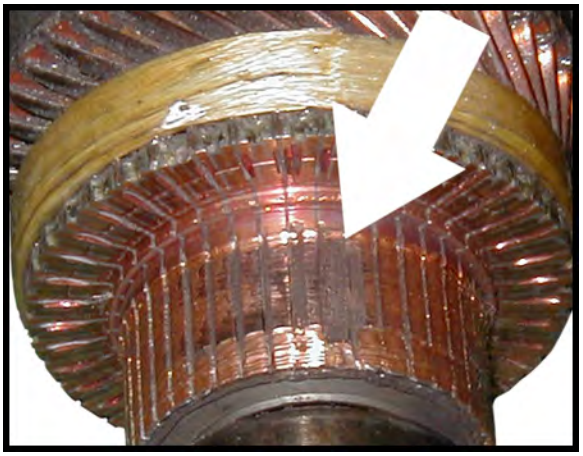


Inspect the commutator for groves.

- If the commutator is grooved then it must be machined on a lathe. Do not machine the commutator past the minimum diameter specified in Service Limits section. Refer to Repair Commutator section for information regarding machining the commutator.

Inspect the commutator for burn marks.

- Burn marks and/or raised commutator segments 90 or 180 degrees apart is evidence of a shorted armature. A tool called a growler is required to reliably test for a shorted armature.



Inspect the commutator for raised segments. Raised segments could be a result of a stalled motor or shorted armature. A tool called a growler is required to reliably test for a shorted armature.

- If the armature is not shorted then the raised segments can be removed by machining the commutator. Do not machine the commutator past the minimum diameter specified in Service Limits at the end of this section. Refer to Repair Commutator section for information regarding machining the commutator.

Armature Windings

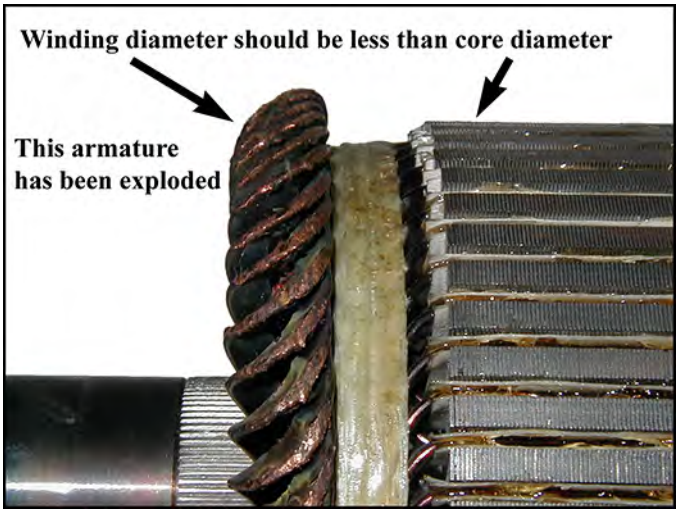
Visually inspect the armature windings for burnt insulation. Burnt insulation is a direct result of motor overheating and could lead to a shorted armature.

- If the insulation is cracked or burnt, then it is recommend that the armature or motor be replaced.

Note: If the armature has been burnt then there is a good possibility that the field windings may also be burnt. Symptoms indicating a shorted field include high motor current, lack of power and possibly excessive speed.

Inspect the armature windings where they loop back at the opposite end of the commutator.

- If the windings show indications of expanding (see illustration), then the motor has been operated at excessive RPM and the armature or motor must be replaced.
- If the armature windings expanded enough to contact the field, then it is likely that the motor controller has bee damaged.

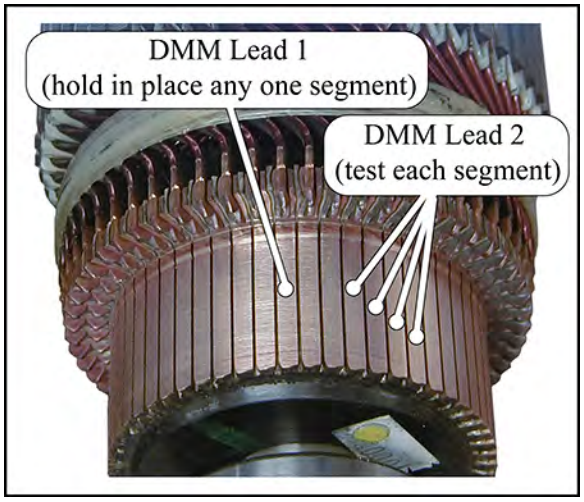


Using a growler, test the armature for shorts.

- If the armature is shorted, then it is recommend that the armature or motor be replaced.

Using the continuity function of digital multi meter, check the continuity around the entire commutator by placing one test lead against one of the commutator segments and the other test lead against all of the other segments one at a time. There should be continuity around the entire commutator.

- If any segment indicates an open circuit, then the motor must be replaced.



Using the continuity function of digital multi meter, check the continuity from any one of the commutator segments and the armature frame.

- If it is not an open circuit, then the armature is shorted and the motor must be replaced.

Measure the armature resistance (refer to Service Limits table at end of this section).

- If not within specification then the motor must be repaired or replaced.

Field Windings

Measure the field resistance (refer to Service Limits table at end of this section).

- If not within specification then the motor must be repaired or replaced.

REPAIR

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

The only recommended repair to a motor is cutting the commutator. If any other components are damaged then they should be replaced.

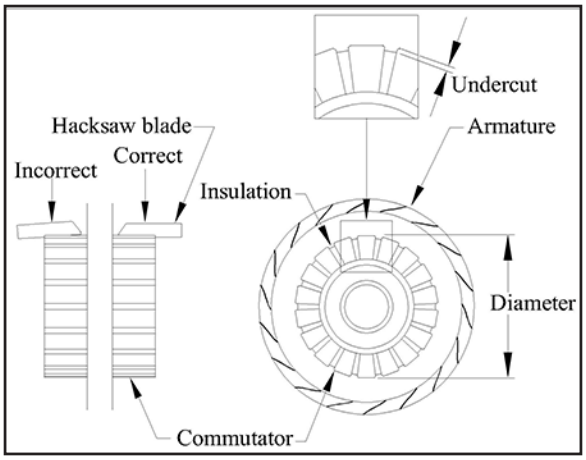
Repairing the Commutator

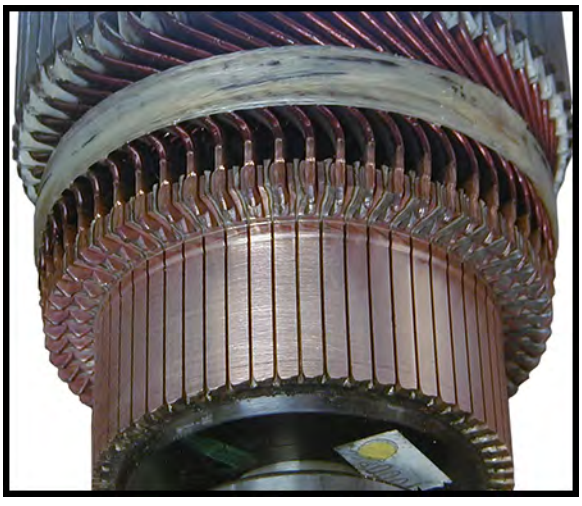
1: First measure the diameter of the commutator. If the commutator is close to minimum diameter specified in Service Limits at the end of this section, then it should be replaced.
2: Using a lathe, cut the armature just enough to remove all grooves, depressions or ridges.
3: Measure the diameter of the commutator. If the commutator is less than the minimum diameter specified in Service Limits at the end of this section, then the it should be replaced.
4: Thoroughly clean all copper debris from between the commutator segments.
5: Measure the commutator undercut depth in 5-places around the commutator. If any one of the measurements is less than the minimum undercut depth specified in Service Limits, then the commutator must be undercut (see below).
6: While still in the lathe, smooth the commutator with fine emery cloth and reinspect for debris between the commutator segments.

Undercutting the commutator

1: Using a small straight cut saw blade, cut the commutator insulation to the proper depth. Refer to undercut depth in Service Limits at the end of this section.
2: Once all segments have been properly undercut, mount the armature in a lathe and smooth the commutator with fine emery cloth.

Inspect the armature for shorts. Refer to Motor Inspection section for information on testing the armature.
Note: Copper debris in the undercut area can give a reading of a shorted armature.





Properly cut commutator

SERVICE LIMITS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

This is a generic section covering all currently available SEM motors at the time this manual was revised.

The service limits listed below are for each of the motors, by the specification number of the motor shown. The specification number can be found on the spec plate attached to the motor.

Motor part Number (Specification Number)	Undercut Depth		Commutator Diameter (min)		Brush Length (min)		Resistance (Ohms@75º F)	
	mm	inches	mm	inches	mm	inches	Armature	Field
70-052-40 (XP 1876 or DD3-4004)	0.635	0.025	69.85	2.75	15.87	0.625	0.011	0.73
70-054-40 (XP-1672 or DV1-4002)	0.635	0.025	69.85	2.75	15.87	0.625	0.0116	1.2
70-054-41 (XP-1789 or DY2-4001)	0.635	0.025	69.85	2.75	15.87	0.625	0.011	0.43
70-054-42 (DY8-4002)	0.635	0.025	69.85	2.75	15.87	0.625	0.011	0.43
70-057-40 (XP-1673 or DV1-4003)	0.635	0.025	69.85	2.75	15.87	0.625	0.008	0.58
70-061-40 (XP-1765A)	0.889	0.035	69.85	2.75	15.87	0.625	0.011	0.71
70-072-41 (XP 1820A)	0.635	0.025	69.85	2.75	15.2	0.6	0.0052	0.79

Motor Controller

Table of Contents

Motor Controller

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

REMOVE/INSTALL

NOTICE

Do not allow the wires to rotate while removing terminal hardware.

Internal electrical connection will be damaged if the terminal stud rotates.

NOTICE

Turn the start switch off BEFORE disconnecting the batteries. Disconnecting power from the controller while it is ON may corrupt the controller programming resulting in a fault 1.

It may be required to remove the control panel from the vehicle for this procedure.

Remove

⚠WARNING

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

6: While holding the wires so that they do not rotate, remove the terminal bolts.
7: Disconnect the logic connector.
8: Disconnect the can-bus connector.
9: Remove the four bolts holding the controller to the panel and remove the controller.

Note: If a heat sink is installed, then these bolts may also hold the heat sink to the panel.

Install

1: Thoroughly clean the controller base, mounting plate, and heat sink.
2: Apply thermal transfer compound to the controller base and heat sink.
3: Install the controller to the mounting plate.
4: Attach the wires to the studs and torque per specification listed in the table at the end of this section.

Note: DO NOT allow the wires to rotate while torquing the bolts (see notice above).

5: Install silicon dielectric grease (94-422-10, 5.3 ounce tube) into the two logic receptacles and reconnect the harnesses.
6: Reconnect the batteries and test drive.

INSPECT

Receptacles

The inside of each receptacle should be clean and free of any debris. Use aerosol electrical cleaner if required.

Base Plate

The base plate should be flat. If required, sand with 150 wet sandpaper to remove any raised areas.

Terminal Ends

The wire insulation at each terminal should be smooth and free of any sign of heat. Any indication of heat is a result of a loose connection at the terminal. This could have been a loose bolt or a faulty crimp. It is recommend to replace the cable terminal end.

Note: A loose bolt could result in damaging the terminal crimp.

'R' Terminal

Inspect the controller cover around the 'R' terminal. If the cover has melted around the stud, it is an indication that the vehicle was towed while the start switch was ON. The controller may be damaged due to the excessive current flowing through the 'R' terminal.

NOTICE

These motor controls are programmed to match the vehicle configuration.

DO NOT move a control to another vehicle unless the vehicle configurations are identical.

Any changes to the vehicle configuration may require reprogramming the controller.

Installing a controller that is not programmed correctly may result in damage to the controller or electrical system.

REPAIR/PROGRAMMING

NOTICE

The controller power base and logic are a matched set. DO NOT swap logics from one base to another as this may damage the logic or power base.

Repairs

There are no internally serviceable components in the motor speed controllers. If a controller is faulty then it must be replaced.

Note: Opening or disassembling a controller will void the controller warranty.

Programming

Taylor-Dunn does not support field modifications to the controller parameters.

Complete vehicle parameters are available by e-mail and can be uploaded to the controller using a laptop or PC with the PCpaK application and cable. Refer to the Tools section for part numbers.

If you have a special application that may require modified parameters, contact your local authorized Taylor-Dunn distributor to submit a request to the factory. Note: There may be a fee to created a custom parameter set.

Instructions for obtaining parameter sets and how to upload to the controller are included with the application.

TROUBLESHOOTING

Troubleshooting control system is not included in this manual.

All electrical troubleshooting information is included in a separate manual “Troubleshooting Electric Vehicles”. part number M7-001-69.

This manual was provided on the original vehicle CD. A hard copy can be purchased from your authorized Taylor-Dunn distributor or can be downloaded from the Taylor-Dunn web site.

HARDWARE TORQUE

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

Description	Inch Pounds	Newton Meters
Terminal stud	38-44	4.29-4.97

Notes:

Tires & Wheels

Table of Contents

Tires & Wheels

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

INFLATION

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

WARNING

Incorrect tire inflation can result in sudden failure of the tire and/or braking / steering problems leading to loss of control of the vehicle.

Never exceed the maximum pressure as indicated on the side wall of the tire. Exceeding the maximum pressure may cause explosive failure of the tire resulting in severe personal injury.

Air pressure

Maintaining the correct tire pressure is important to the safe operation of the vehicle as well as ensuring long tread life.

Under inflated tires result in:

- Excessive tire side wall flexing that can result in sudden tire failure.
- Excessive tread wear resulting in shortened tire life.

Over inflated tires result in:

- Tire explosion due to excessive pressure.
- Reduced road surface traction.
- Increased vibration from the road surface.
- Excessive tread wear resulting in shortened tire life.

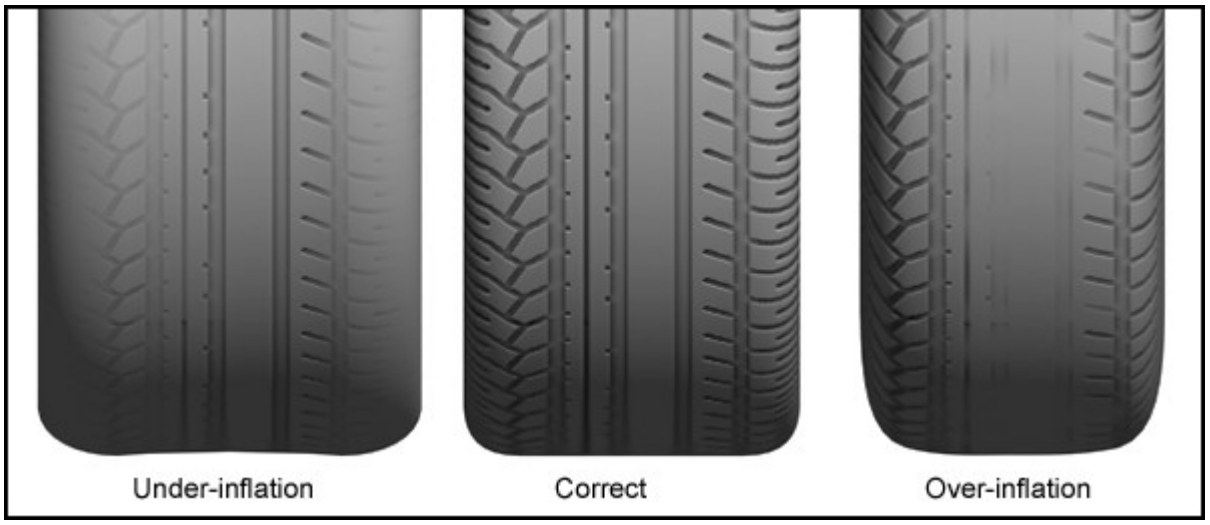
Unequal tire inflation may result in:

- Uneven braking and loss of control of the vehicle.
- Steering pulling to the left or right.

Only check the tire pressure when the tire is cold. When checking tire pressure, you must check all tires including your spare tire.

The correct tire size and pressure can be found in the specifications list in the manual.

Note: The front and rear tires may have a different tire pressure specification.



TREAD WEAR

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

WARNING

DO NOT operate a vehicle if the cord is visible on any tire (see illustration). A tire in this conditions may suddenly fail at any time and cause loss of control of the vehicle.

It is important to periodically inspect each tires tread for wear. Driving with inadequate tread increases the risk of loosing control of the vehicle due to hydroplaning on a wet road surface. It also increases the risk of a flat tire due to road debris. Extreme tire wear can result in sudden tire failure and loss of control of the vehicle.

Refer to the maintenance schedule in this manual for the recommended interval.

Minimum recommended tread depth is 1/16 inch (1.6 mm). There are a series of tread depth wear indicators around the circumference of the tire. They will appear as approximately 1/2 inch (12 mm) bands across the tread as the tire approaches its wear limit (see illustration). The tire should be replaced if any tread depth indicator can be seen or any part of the tread depth is 1/16 inch (1.6 mm) or less.

ROTATION

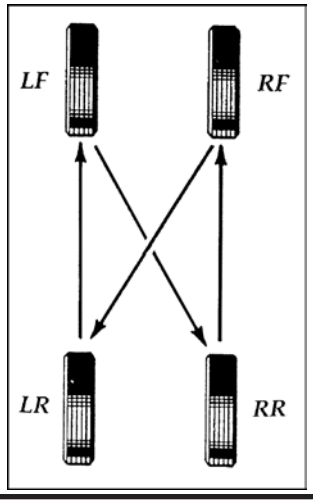
WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Front and rear tires as well as left and right tires can wear at different rates. It is important to periodically rotate your ties to extend your tire life. Refer to the maintenance schedule in this manual for the recommended interval.

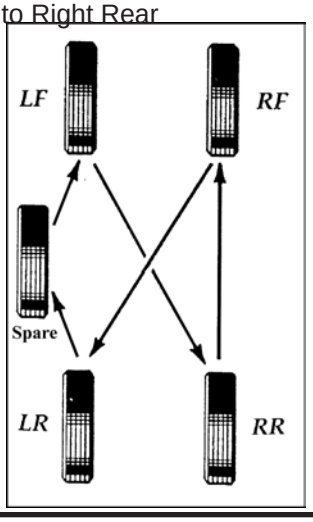
Use the following pattern for a vehicle with no spare tire:

- Right Rear to Right Front
- Right Front to Left Rear
- Left Rear to Left Front
- Left Front to Right Rear



Use the following pattern for a vehicle with spare tire:

- Right Rear to Right Front
- Right Front to Left Rear
- Left Rear to Spare
- Spare to Left Front
- Left Front to Right Rear



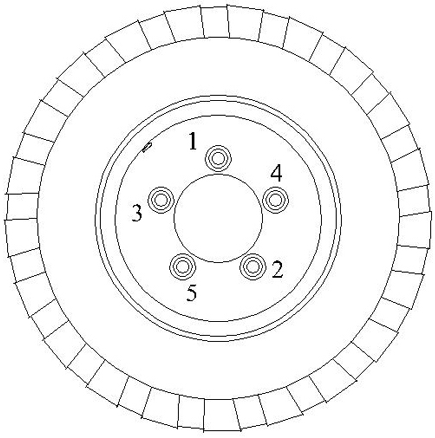
CHANGING TIRE/WHEEL ASSEMBLY

WARNING

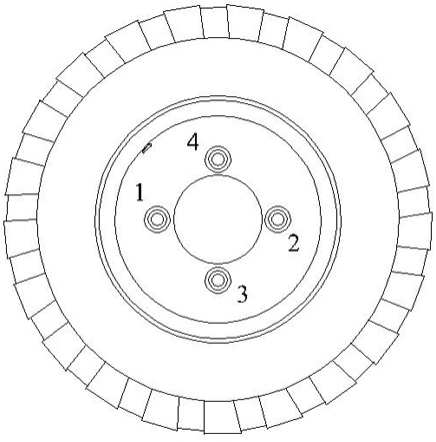
This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Note: A spare tire, jack, or lug wrench is not attached to the vehicle.

1: Loosen the wheel nuts (do not remove) before raising the tire off of the ground.
2: Raise the tire to be changed off of the ground and support with a jack stand.
3: Remove the wheel nuts and tire/wheel assembly.
4: Install the replacement tire/wheel assembly.
5: Install the wheel nuts and cross tighten to torque specified in table.
6: Check the tire for proper inflation.
7: Lower the vehicle to the ground and remove the blocks from the wheels.
8: Check wheel nuts for tightness after 100 miles.



5-Bolt Pattern



4-Bolt Pattern

REPLACE THE TIRE (PNEUMATIC)

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

Tire replacement should only be performed by personnel trained in tire replacement.

The tire replacement procedure will be unique to the type of replacement equipment being used. Refer to the instructions provided with your equipment.

Always use a new valve stem when replacing a tire.

1: Remove the tire from the wheel.
2: Cut the old valve stem off of the wheel.
3: Remove the valve stem cap from the new valve stem.
4: Lubricate the valve stem with liquid soap.
5: Install a new valve stem using a valve stem tool.

Note: The valve stem tool is available at most auto repair shops.

6: Install the tire onto the wheel following the instructions provided with your tire replacement equipment.
7: Inflate the tire to the proper pressure and check for leaks.
8: Install the valve stem cap.

REPAIR THE TIRE (PNEUMATIC)

WARNING

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

Note: To properly repair a puncture, the tire must be removed from the wheel. Refer to Replace the Tire section for information on removing the tire from the wheel.

It is recommended to repair a tire with a combination vulcanized plug and internal patch.

Tire repairs should only be performed by personnel trained in tire repair.

The tire repair procedure will be unique to the type of repair equipment or repair components used. Refer to the instructions provided with your equipment or repair components.

B0-248; B0-254; BT-248; BT-280 (36v & 48v)

HARDWARE TORQUE

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

Description	Foot Pounds	Newton Meters
Wheel nut	85	115

Notes:

Table of Contents

Batteries

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

GENERAL GUIDELINES AND SAFETY

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

NOTICE

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

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

CLEANING

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Disconnect the batteries before cleaning.

Dry dirt can be readily blown off with low-pressure air or brushed off.

Note: Wetness or wet dirt on the top of the battery indicates battery acid boil over or excessive gassing.

Using a nonmetallic brush with flexible bristles, wash the battery off with a strong solution of baking soda and hot water mixed with a ratio of one pound of soda to one gallon of water (0.5 kg / 3.7 liters). 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.

WATERING

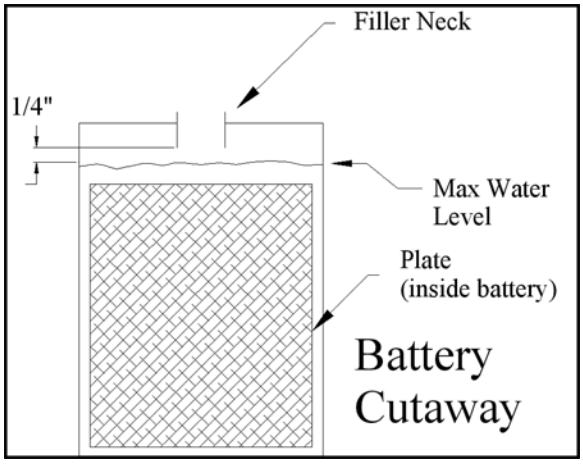
WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

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.

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

Check the electrolyte level in all battery cells. If low, fill to the correct level (see illustration) with distilled water using part number 77-201-00 battery filler, never add additional battery electrolyte to the batteries.



CHARGING

Refer to the Operator manual for information regarding charging the battery.

TESTING

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Specific Gravity

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

The specific gravity of a cell is an indication of the actual state of charge of the cell. A fully charged cell should have a reading of 1275 to 1300 (see the illustration below). 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 25 points may be an indication of a bad or weak cell.

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

Using part number 77-200-00 hydrometer or equivalent graduated type hydrometer, test and record the specific gravity of each cell in the battery.

Use the highest reading to compare to all other cells. Any cell or cells that are more than 25 points less than the highest reading should be suspected as being a bad cell.

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 pack is no longer accepting a charge and should be replaced.

It may be possible to replace Individual cells in industrial batteries. Contact the battery manufacturer for details.

Typical Hydrometer Float

STORING

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

NOTICE

DO NOT attempt the test the specific gravity of a sealed battery. Removing the caps of a sealed battery will damage the battery resulting in premature failure.

Storage

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

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

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

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

Returning to Service

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

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

Test the battery. Refer to Testing section for information on testing the battery.

The battery is now ready to be put back into service.

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

REMOVE/INSTALL

⚠ WARNING

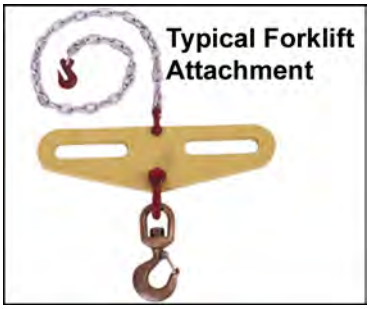
This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

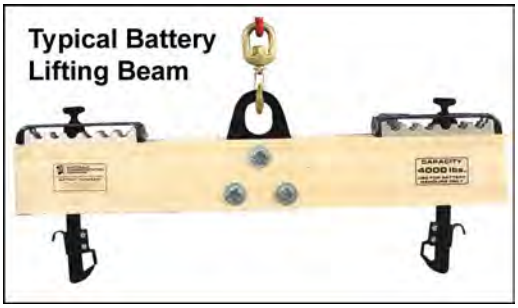
⚠ WARNING

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

Industrial Battery or Lift Out Battery Pack

1: Thoroughly clean the battery and battery compartment. Refer to Cleaning in this section for information regarding cleaning the batteries.
2: Using a hoist or forklift equipped with a proper battery lifting device (see illustration), slowly raise the battery out of the vehicle.
3: Inspect the battery compartment for signs of corrosion.
4: If minimal signs of corrosion are seen, then the damaged paint should be stripped off and the entire battery compartment cleaned and repainted.
5: 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.
6: Inspect the battery cables and terminals. If any of the cables or terminals show signs of corrosion, then they must be repaired or replaced.
7: Install the battery in reverse order.
8: Remove the blocks from the wheels and test drive.





⚠ WARNING

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

Individual Batteries

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

HARDWARE TORQUE

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

Description	Inch Pounds	Newton Meters
Battery terminal, Trojan bolt	95-105	11-12
Battery terminal, Trojan stud	95-105	11-12
Battery terminal, T/D bolt	168	19

Notes:

Suspension

Table of Contents

Suspension

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

REPLACE THE REAR SPRINGS

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

If a spring has failed or is fatigued, then it is recommended that both rear springs are replaced as a set.
Hint: In most vehicles it will be easier if the springs are replaced one at a time.

⚠WARNING

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

⚠WARNING

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

6: Raise the rear of the vehicle and support with jack stands.
7: Tie up or support the rear axle so it cannot fall out of the vehicle.
8: Unbolt the spring from the axle housing.
9: Support the spring so that it cannot fall out of the vehicle.
10: Remove the remaining hardware retaining the spring to the frame.
11: Remove the spring from the vehicle.
12: Inspect the spring bolts and spring hangers for signs of wear or damage. If any wear or damage is found, then they must be replaced.
13: Install the new spring in reverse order.

⚠WARNING

Damaged or worn spring bolts or hangers could result in sudden failure of the suspension causing severe bodily injury or property damage.

14: If the spring hanger bolts do not have a grease fitting, lube the spring bushings before installing the spring.
15: Tighten the spring hanger bolts securely, but not so tight as to bind the spring.
16: Lower the vehicle.
17: Reconnect the main positive and negative cables at the batteries.
18: Remove the blocks from behind the wheels.
19: Release the parking brake and test drive the vehicle.

REPLACE THE FRONT SPRINGS

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

If a spring has failed or is fatigued, then it is recommended that both front springs are replaced as a set.
HINT : In most vehicles it will be easier if the springs are replaced one at a time.

⚠WARNING

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

⚠WARNING

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

6: Raise the front of the vehicle and support with jack stands.
7: Tie up or support the front axle so it cannot fall out of the vehicle.
8: Unbolt the spring from the front axle beam.
9: Support the spring so that it cannot fall out of the vehicle.
10: Remove the lower bolt from the spring hanger.
11: Remove the spring bolt from the other end of the spring and remove the spring from the vehicle.
12: Inspect the spring bolts and spring hangers for signs of wear or damage. If any wear or damage is found, then they must be replaced.
13: Install the new spring in reverse order.
14: If the spring hanger bolts do not have a grease fitting, lube the spring bushings before installing the spring.
15: Torque the spring hanger bolts to amount listed in the Hardware Torque table at the end of this section.

16: If the spring bolts are equipped with grease fittings, lube them at this time.
17: Lower the vehicle.
18: Reconnect the main positive and negative cables at the batteries.
19: Remove the blocks from behind the wheels.
20: Release the parking brake and test drive the vehicle.

⚠WARNING

Damaged or worn spring bolts or hangers could result in sudden failure of the suspension causing severe bodily injury or property damage.

REPLACE THE SPRING BUSHINGS

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

It is recommended that all front spring bushings are replaced as a set.

Your vehicle will be equipped with one of two types of spring bushings, internal and external (see illustration to the right):

- The internal bushing is a plastic insert that is pressed into the spring eye. There are one of these bushings for each spring eye.
- The external bushing consists of two plastic bushings on each end of the spring eye.
- Refer to the parts list to identify the bushings used in your vehicle.

⚠WARNING

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

⚠WARNING

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

6: Raise the front or rear of the vehicle depending on which spring is to be removed and support with jack stands.
7: Remove the spring from the vehicle.
Note: Refer to Replace the Front Springs section for information regarding removing the front springs.
8: If the vehicle is equipped with spring hangers, remove the spring hanger bolt from the vehicles frame.
9: Remove the spring bushing(s):
- For internal bushing, press the spring bushings out of the two spring eyes and from the mounting eye on the vehicles frame.
- For external bushing, Remove the bushings from the spring eye.

10: Install the new bushings in reverse order.
Hint: Apply a light coating of grease to the bushing before pressing into the spring eye.
11: Install the spring onto the vehicle.
Note: Refer to Replace the Front Springs section for information regarding installing the front springs.
12: Repeat for the other spring.
13: Lower the vehicle.
14: Reconnect the main positive and negative cables at the batteries.
15: Remove the blocks from behind the wheels.
16: Release the parking brake and test drive the vehicle.

REPLACE THE SHOCKS

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

It is recommended to replace all shocks as a set.

Note: On some vehicles it may be required to remove the front wheel to gain access to the shock mounting bolts. Refer to Tires and Wheels section for information regarding removing the front 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) Set the park brake.
4) Place blocks under the front wheels to prevent vehicle movement.
5) Disconnect the main positive and negative cables at the batteries.

⚠WARNING

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

6: 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 positive and negative cables at the batteries.
12: Remove the blocks from behind the wheels.
13: Release the parking brake and test drive the vehicle.

HARDWARE TORQUE

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

Description	Foot Pounds	Newton Meters
Spring Hanger Bolts	20	27

Notes:

Wire Diagram

Table of Contents

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

DIAGRAM PART NUMBERS

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Wire diagrams are too large to be legible when printed at this size. The wire diagram for this vehicle is included on the Vehicle Documentation CD provided with the vehicle.

The diagram # for this vehicle is: SCH-00009 (see description below)

This vehicle diagram as well as other Taylor-Dunn vehicle diagrams can be downloaded from the Taylor-Dunn web site at www.taylor-dunn.com.

Listed below are the available diagrams as of the revision date of this manual.

SCH-00001	B4K4560, VEHICLE
SCH-00002	R380, VEHICLE
SCH-00004	T48, VEHICLE
SCH-00005	PAR-KAN, VEHICLE
SCH-00006	P249, VEHICLE, EV-1
SCH-00007	B248AC, VEHICLE
SCH-00008	B248AC, VEHICLE, W/DC CONV
SCH-00009	SEVCON POWERPAK, TYPICAL
SCH-00010	SEVCON MICROPAK, TYPICAL
SCH-00011	SPECIAL, KBG-C48-074
SCH-00012	R380, VEHICLE, GT-PMC
SCH-00013	R380, VEHICLE, F2-PMC
SCH-00014	SC159/SC-90, VEHICLE
SCH-00015	G150, VEHICLE, OIL LIGHT
SCH-00016	G150, VEHICLE, OIL KILL
SCH-00017	B210, VEHICLE, PMC
SCH-00018	T48, VEHICLE, F2, 2 PC CHARGE
SCH-00019	T48, VEHICLE, F2, 1 PC CHARGE
SCH-00020	ET3000, VEHICLE
SCH-00021	T48AC/R-380AC, VEHICLE
SCH-00022	ET150, VEHICLE, PMC
SCH-00023	TT316, VEHICLE
SCH-00024	B42500, VEHICLE TO 163333
SCH-00025	B42500, VEHICLE 164796 TO
SCH-00026	CURTIS PMC, TYPICAL
SCH-00027	VEHICLE, SEVCON W/HYD DUMP
SCH-00028	ET150AC, VEHICLE
SCH-00029	C426AC, VEHICLE, FED EX
SCH-0003	C426, VEHICLE, FED EX, SEVCON
SCH-00030	SC-100, VEHICLE, FED EX
SCH-00031	SS, VEHICLE, STARTING 97450
SCH-00032	MX600, VEHICLE,STARTING 113277
SCH-00033	TC50, CHASSIS, FED EX
SCH-00034	ENGINE, PSI 3.0L
SCH-00035	TRAM, FEDEX
SCH-00036	TIGER TRACTOR, TYPICAL
SCH-00037	TC-50E, VEHICLE
SCH-00038	TC50, CHASSIS, FEDEX FORD
SCH-00039	ENGINE, FORD DSG
SCH-0004	C426AC, VEHICLE
SCH-00040	SEVCON, TYPICAL WITH DC CONV
SCH-00041	TT316, VEHICLE,STARTING 178410
SCH-00042	T48, VEHICLE, DC CONVERTER
SCH-00043	TRIDENT, VEHICLE
SCH-00044	TC30/60, VEHICLE, CAN-BUSS
SCH-00045	C425, DASH (SEVCON)
SCH-00046	C425, CONTROL PANEL (SEVCON)
SCH-00047	B248AC, VEHICLE, DC CONVERTER
SCH-00048	CHARGER, LESTER E-SERIES
SCH-00049	TYPICAL SEVCON, HARDWIRED DASH
SCH-00050	R-380, RHEOSTAT
SCH-0005	426AC, VEHICLE
SCH-00051	POWER-TRON, POT MODULE
SCH-00052	POWER-TRON, SS MODULE
SCH-00053	TC-3060 CHASSIS, CUMMINS B3.3
SCH-00054	ENGINE, FORD MSG-425
SCH-00055	CURTIS PMC, TYPICAL NO TAP
SCH-00056	G-150, KOHLER TH16 ENGINE
SCH-00057	TYPICAL PMC, 12V TAP DC CNVRTR
SCH-00058	ENGINE INTERFACE, FORD MSG/DSG
SCH-00059	ENGINE INTERFACE, FORD MSG/DSG
SCH-0006	C426AC, VEHICLE, FED EX
SCH-00060	B-210 AC SYSTEM W/12V TAP
SCH-00061	B-210 AC SYSTEM W/DC-DC

TABLE OF CONTENTS

Replacement Parts

⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

Note: Your vehicle may have been ordered with special order options. These options typically start with the letter "K". Refer to your vehicle sales order for information.

Replacement part numbers for special order options are not included in the standard manual.

ORDERING PARTS FOR YOUR VEHICLE

⚠ 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.

⚠ WARNING

To maintain peak performance, always use original Taylor-Dunn replacement parts intended for use on your vehicle. Taylor-Dunn components are designed and tested for use on specific Taylor-Dunn model vehicles. Only use the correct Taylor-Dunn replacement components for your Taylor-Dunn vehicle.

Do not modify your vehicle:

Modifications to this vehicle may have an undesirable affect on the operation of the vehicle, result in additional frame stress, or stress other components resulting in premature failure or an unsafe condition and may lead to an accident resulting in serious injury or death.

This section contains a comprehensive parts list that includes all of the typical replacement parts available as of the published date of this manual. This parts list should be used as a guide only.

This parts list does not include special order options that may have been ordered for your vehicle. To identify special order options, refer to the original vehicle sales order. Any special order options will have a 'K' letter prefix in the option number. The vehicle option list is also available on the Taylor-Dunn web site. The serial number of the vehicle is required to obtain the option list.

Only use original Taylor-Dunn parts purchased from an authorized Taylor-Dunn distributor. Refer to the Taylor-Dunn web site to locate your local distributor or call the factory direct at (714) 956-4040 for referral to a local dealer.

When contacting your dealer, always include the serial number of the vehicle to ensure obtaining the correct replacement parts. The Taylor-Dunn web site includes a parts lookup utility. By using this utility you can obtain the most current parts list for your vehicle. The serial number of the vehicle is required to use the lookup utility.

TAYLOR-DUNN WEB SITE INFORMATION

Registering on the Taylor-Dunn web site will give you access to a wealth of information about your vehicle and the entire Taylor-Dunn line of vehicles. Your contact information will remain confidential and will not be shared outside of the Taylor-Dunn corporation.

Once registered on the Taylor-Dunn web site, you will have access to:

- Additional Taylor-Dunn product information.
- Worldwide Taylor-Dunn dealer contacts
- Vehicle Service, Maintenance, Operator, and Parts manuals.
- Replacement part number lookup utility

www.taylor-dunn.com

My Vehicle information

Serial Number: _____.

Date Purchased: _____.

Date Delivered: _____.

Dealer Purchased From: _____.

Salesman Name: _____.

My local Parts Dealer: _____.

Notes:

TAYLOR-DUNN®

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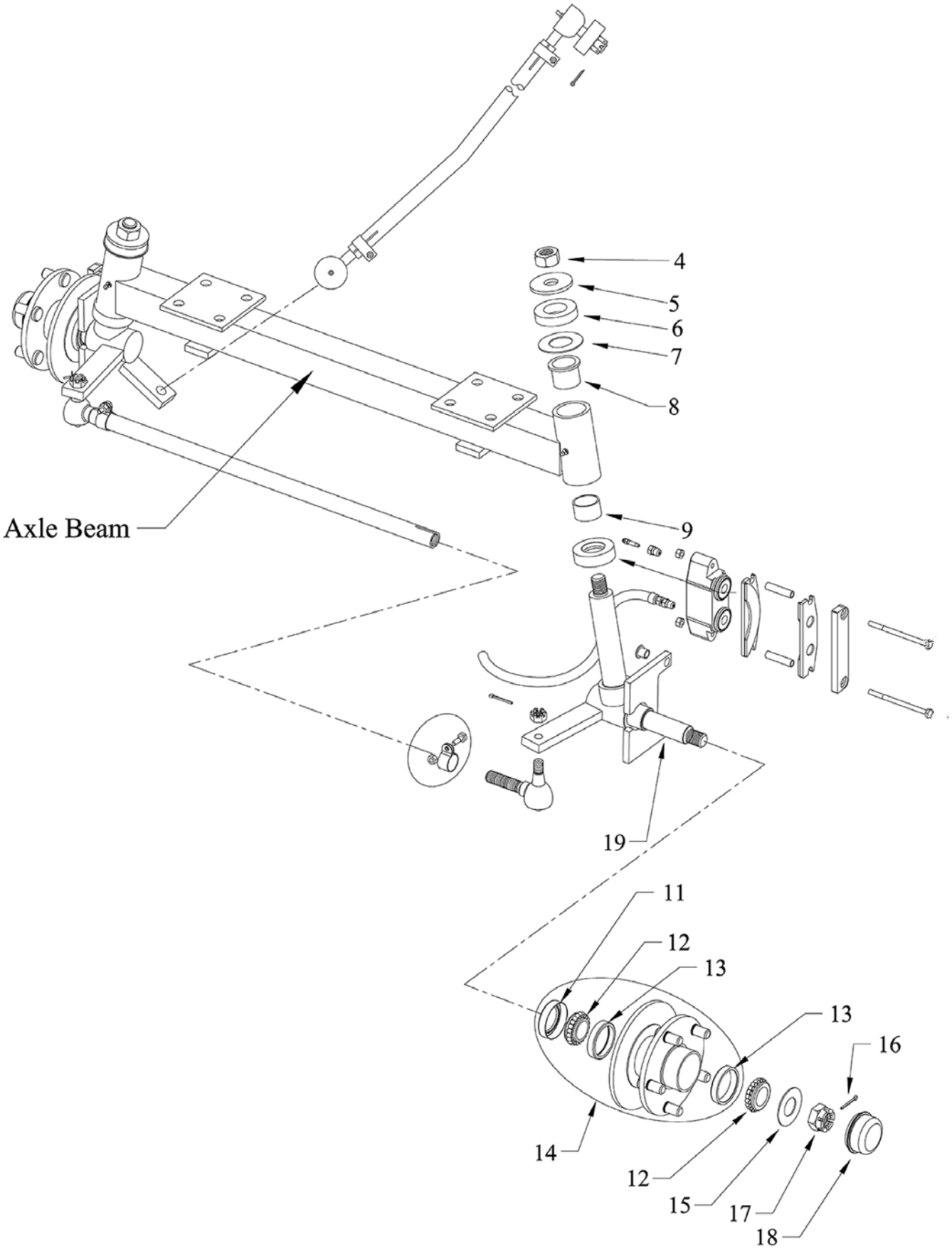
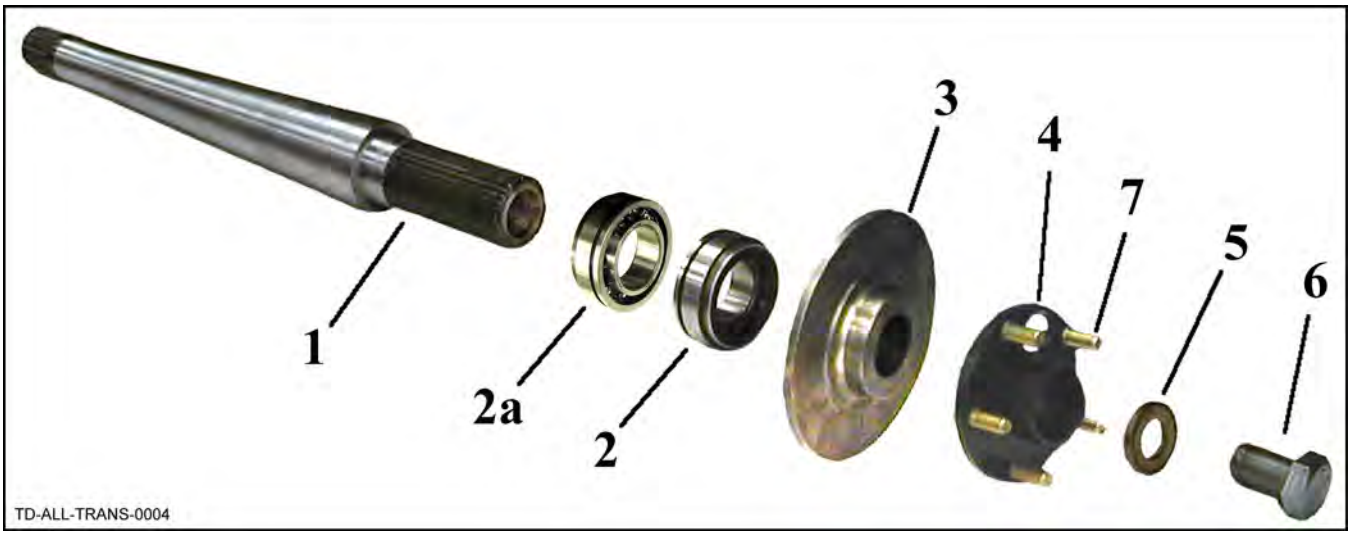
AXLE ASSEMBLY, FRONT

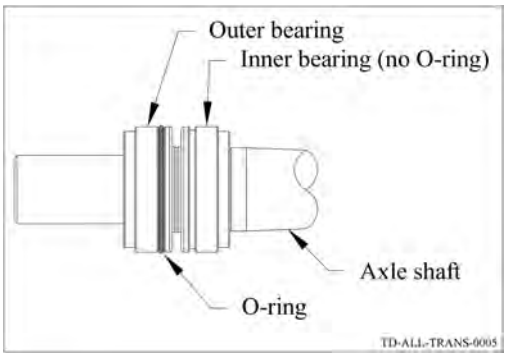


Axle Assembly, Front

Item No.	Part No.	Description	Qty
-	15-049-71	Axle Beam, B 2-48, BT 2-48, B 2-54	1
-	15-049-77	Axle beam, BT 2-80	1
4	88-239-86	3/4-NF Hex Slotted Nut	2
5	88-228-60	3/4 Cut Flat Washer	2
6	98-603-07	Rubber Bushing	2
7	01-220-99	Washer	2
8	32-240-44	Bushing	2
9	32-240-43	Bushing	2
10	80-309-12	Thrust Bearing	2
11	45-338-00	Grease Seal	2
12	80-017-00	Tapered Bearing	4
13	80-103-00	Tapered Bearing Race	4
14	12-158-10 12-124-00	Wheel Hub W/Rotor (incl 1-#12, 1-#11, 1-#13) Wheel Hub no rotor (incl 1-#12, 1-#11, 1-#13)	2 2
15	88-228-61	3/4 SAE Flat Washer	2
16	88-527-14	1/8 x 1-1/2 Cotter Pin	2
17	88-239-85	3/4-NF Hex Slotted Nut	2
18	92-104-01	Bearing cap	2
19	21-020-25 21-020-24 21-020-22 21-020-23	Right Steering knuckle, disc brake Left Steering Knuckle, disc brake Right Steering knuckle, no brake Left Steering Knuckle, no brake	1 1 1 1
20	96-329-00	Wheel stud	10

AXLE SHAFT ASSEMBLY, REAR





Note: The double bearing axle assembly is optional. Most vehicles will only have the single bearing (#2)

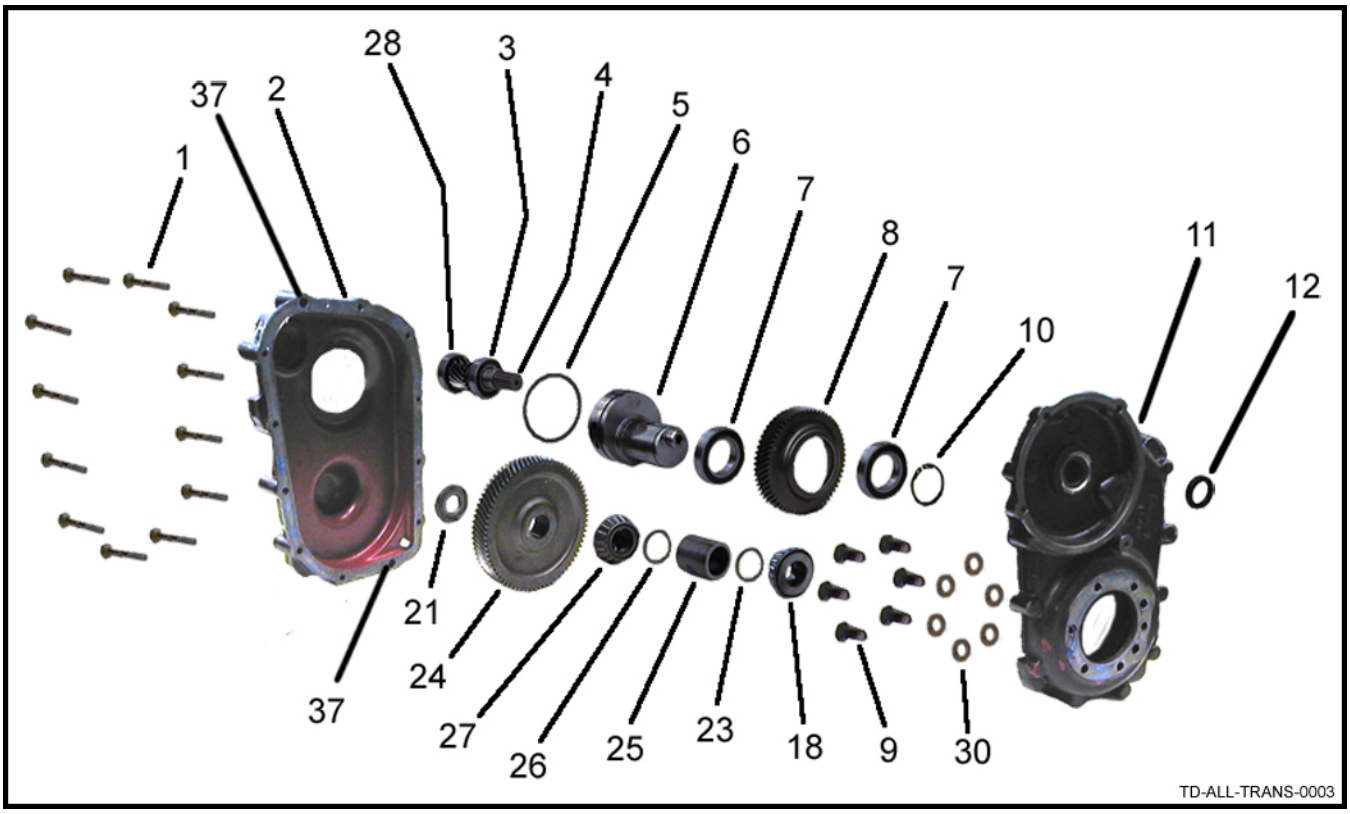
Inner bearing on double bearing axle does not have an oil seal or O-ring. Orientation of bearing should have O-ring groove adjacent to O-ring on outer bearing.

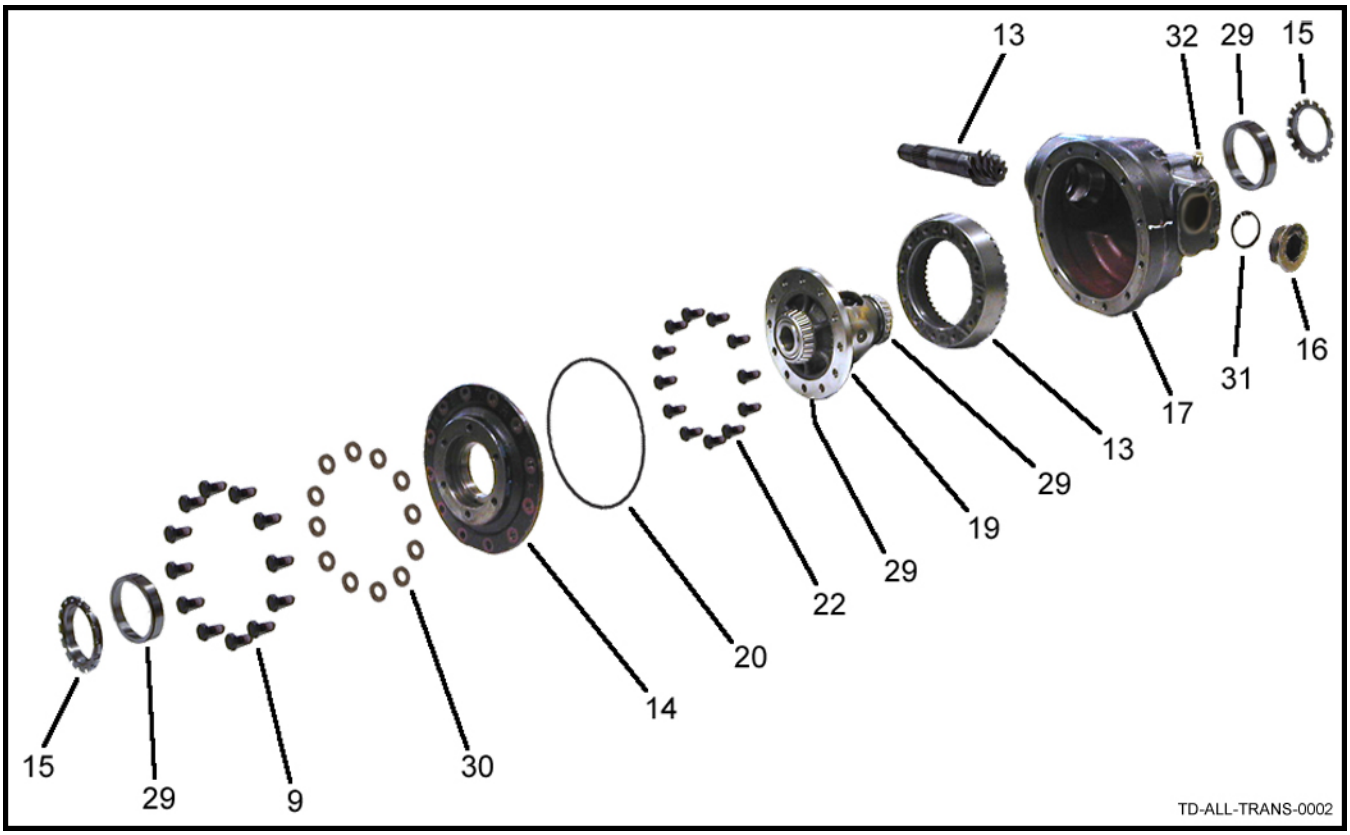
Axle Shaft Assembly, Rear

Item No.	Part No.	Description	Qty
1	41-154-10	Axle shaft, BT 2-80	2
	41-154-20	Axle shaft, B 2-48, BT 2-48, B 2-54 (single bearing)	2
	41-154-25*	*Axle shaft, B 2-54	2
2	80-505-20	Bearing	2
2a	80-505-30*	*Bearing	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	1
Not shown			
	92-104-10	Hub cover	2
	41-290-40	Axle housing (L), B 2-48, BT 2-48, B 2-54 (single bearing)	1
	41-290-43	Axle housing (R), B 2-48, BT 2-48, B 2-54 (single bearing)	1
	41-290-46	Axle housing (L), BT 2-80	1
	41-290-47	Axle housing (R), BT 2-80	1
	41-290-78*	*Axle housing (L), B 2-54	1
	41-290-79*	*Axle housing (R), B 2-54	1
	89-113-30	M12 x 1.75 x 30mm Hex bolt (axle housing to center section)	6
	89-113-60	M12 Split lock washer (axle housing to center section)	6

* - B 2-54 optional double bearing axle after serial number 163766

TRANSAXLE ASSEMBLY, REAR



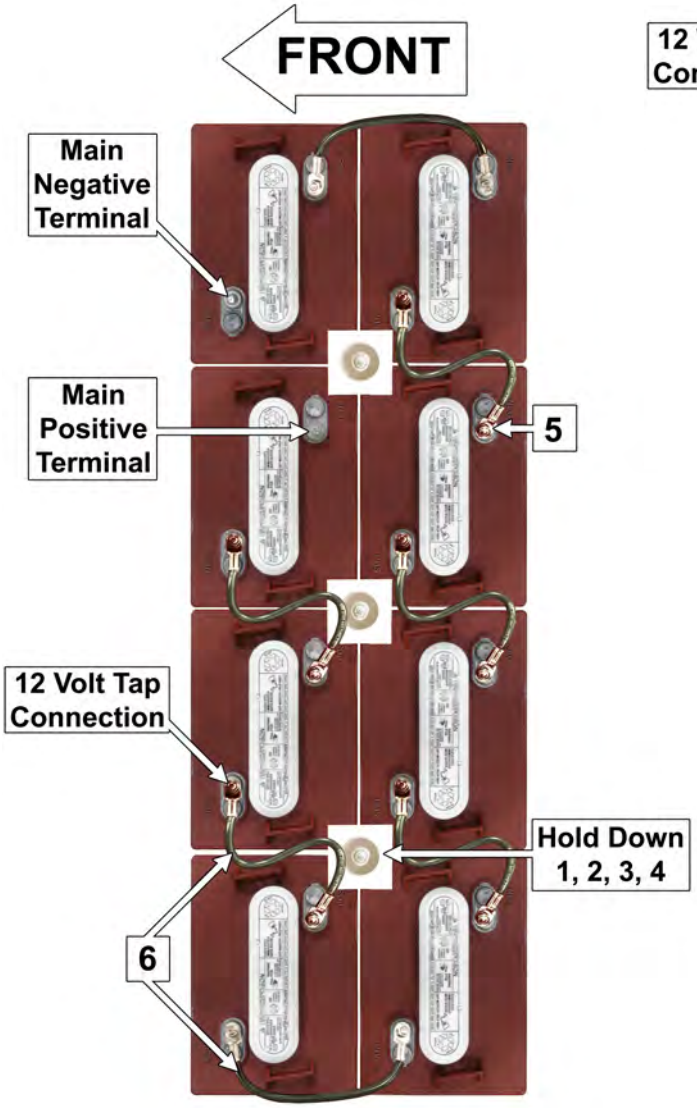


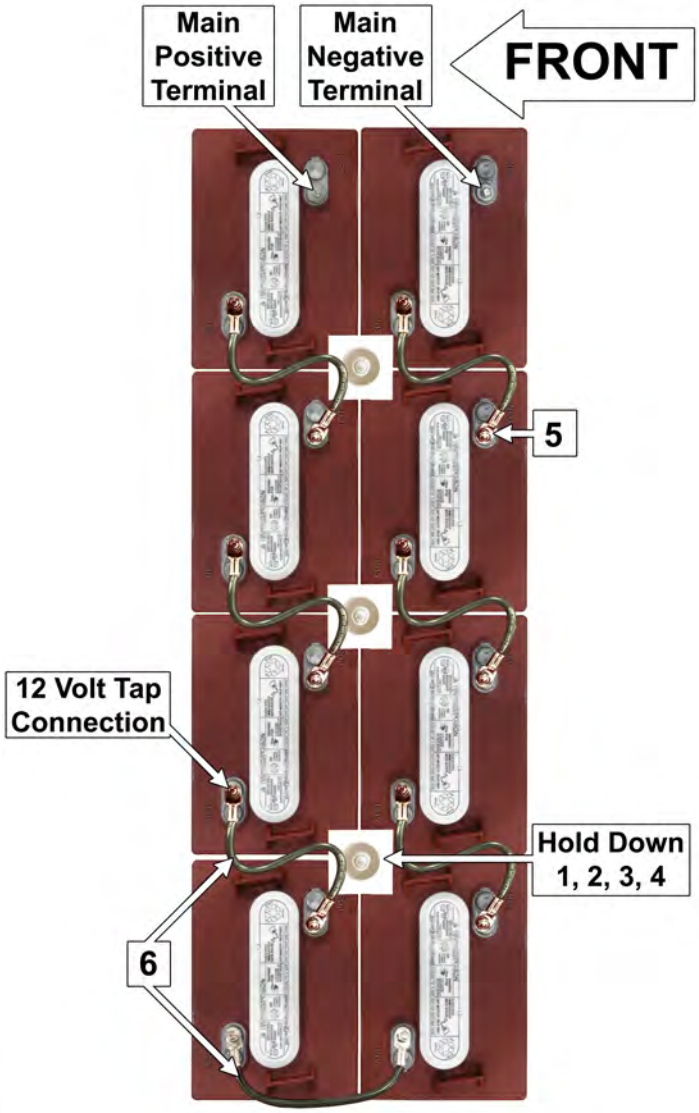
*Note: Spacer (item No. 23) is available in increments of .05mm starting at 3.9mm. 3.9mm spacer is part number GT-3287213. Add 10 to the part number for every 0.05mm over 3.9. For example, if 4.55mm is needed: 4.55-3.9 = .65mm over, 0.65/.05 = 13, 13*10 = 130. Part number for 4.5mm spacer is 3287213+130 = 3287343.*

Axle Assembly, Rear

Item No.	Part No.	Description	Qty
1	GT-71682	M8 x 60 bolt	12
2	GT-3287563	Gear case cover	1
3	GT-71259	Bearing	1
4	GT-3287513	Input shaft, 30:1	0 or 1
	GT-3287523	Input shaft, 24:1	0 or 1
	GT-3287533	Input shaft, 18:1	0 or 1
	GT-3287543	Input shaft, 12:1	0 or 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
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
18	GT-71979	Bearing	1
19	GT-3287143	Differential case	1
20	GT-72013	O-ring	1
21	GT-3273633	Pinion nut	1
22	GT-71896	M10 x 25 Bolt	12
23	See Note 1, previous page		
24	GT-3287453	Output gear, 30:1	0 or 1
	GT-3287463	Output gear, 24:1	0 or 1
	GT-3287473	Output gear, 18:1	0 or 1
	GT-3287483	Output gear, 12:1	0 or 1
25	GT-3287813	Spacer, 46.100mm	0 or 1
	GT-3289403	Spacer, 46.125mm	0 or 1
	GT-3289413	Spacer, 46.150mm	0 or 1
	GT-3289423	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
29	GT-71978	Bearing and race	2
30	GT-70299	10mm Washer	12
31	GT-71881	Seal	1
32	GT-70052	Vent	1
37	GT-3252633	Dowel pin	2

Depending on the configuration of your vehicle, the batteries may be wired as shown in these two illustrations.

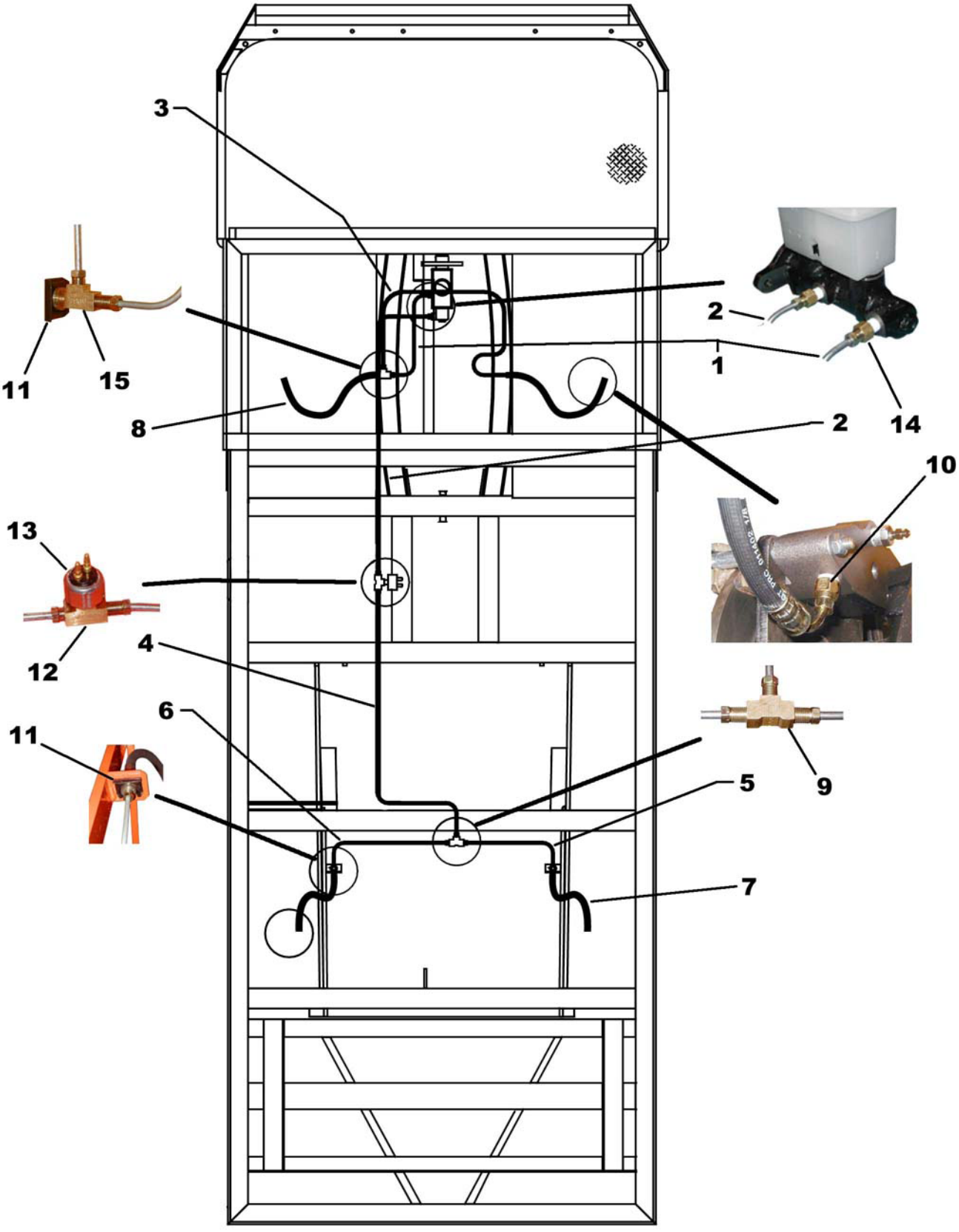




Item No.	Part No.	Description	Qty
1	50-243-10	Battery rod	*
2	50-250-00	Battery hold down	*
3	88-088-66	Flat washer, tin/lead plated	*
4	88-069-81	1/4NC Nylon lock nut	*
5	88-089-80	5/16NC Hex nut, stainless steel	*
	88-089-70	5/16 Split lock washer, stainless steel	*
6	75-237-00	Battery jumper	*
-	77-042-00	217AH, T-105	*
-	77-042-50	217AH, TD-217	*
-	77-042-80	217AH, T-105 Moist charge (dry)	*
-	77-044-00	230AH, T-125	*
-	77-044-10	195AH, Mainenance free (Note: requires special charger)	*
-	77-047-00	244AH, T-145	*
-	77-047-50	250AH, TD-250	*
-	77-047-80	244AH, T-145 Moist charge (dry)	*
-	77-048-00	250AH, J-250	*
-	77-048-80	250AH, J-250 Moist charge (dry)	*
-	77-051-00	160AH Gell (Note: requires special charger)	*

Not Shown			
	77-055-15	Battery watering system for Trojan batteries (optional)	
	77-055-12	Battery watering system for Exide or Taylor-Dunn batteries (optional)	
	77-055-13	BATTERY FILLING GUN, used with watering systems (optional)	
	01-534-43	Battery locator (angle in bottom of battery box, 72 v only)	2
*	Quantities depend on voltage configuration of vehicle.		

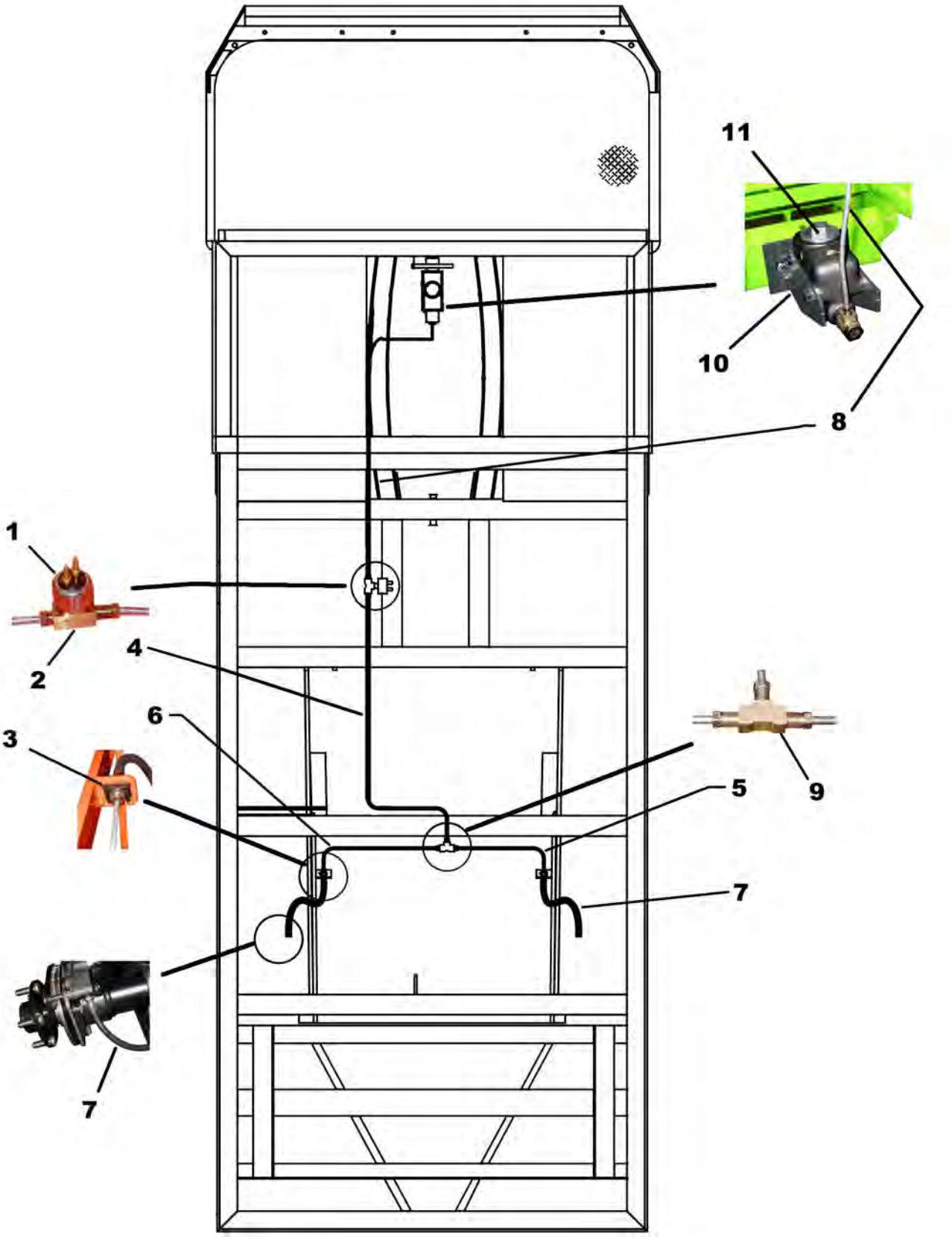
Single Reservoir Master Cylinder



Brake Lines (Dual Reservoir Master Cylinder)

Item No.	Part No.	Description	Qty
1	99-609-61	Brake Line, Front	1
2	99-607-59	Brake Line, Rear	1
3	99-606-51	Brake Line, Front Right	1
4	99-607-62	Brake Line, Rear, B 2-48, B 2-54, BT 2-48	1
	99-608-58	Brake Line, Rear, BT 2-80	1
5	99-603-68	Brake Line, Rear Right, B 2-48, B 2-54, BT 2-48	1
	99-608-56	Brake Line, Rear Right, BT-280	1
6	99-603-68	Brake Line, Rear Left, B 2-48, B 2-54, BT 2-48	1
	99-608-57	Brake Line, Rear Left, BT 2-80	1
7	99-580-20	Brake Hose, Rear	2
8	99-580-10	Brake Hose, Front	2
9	99-564-00	T-Fitting	1
10	99-575-10	Adaptor, 3/16T X 1/8P	2
11	99-576-00	Hose Clip	4
12a	99-591-00	Brake light switch adaptor (optional)	0 or 1
13	71-110-00	Brake Light Switch (optional)	0 or 1
14	99-575-32	Adaptor, 3/16T x M10-1.0	2
15	99-559-00	T-Fitting, Single Male Flare to 2-Female Flare, 3/16 Tube	1

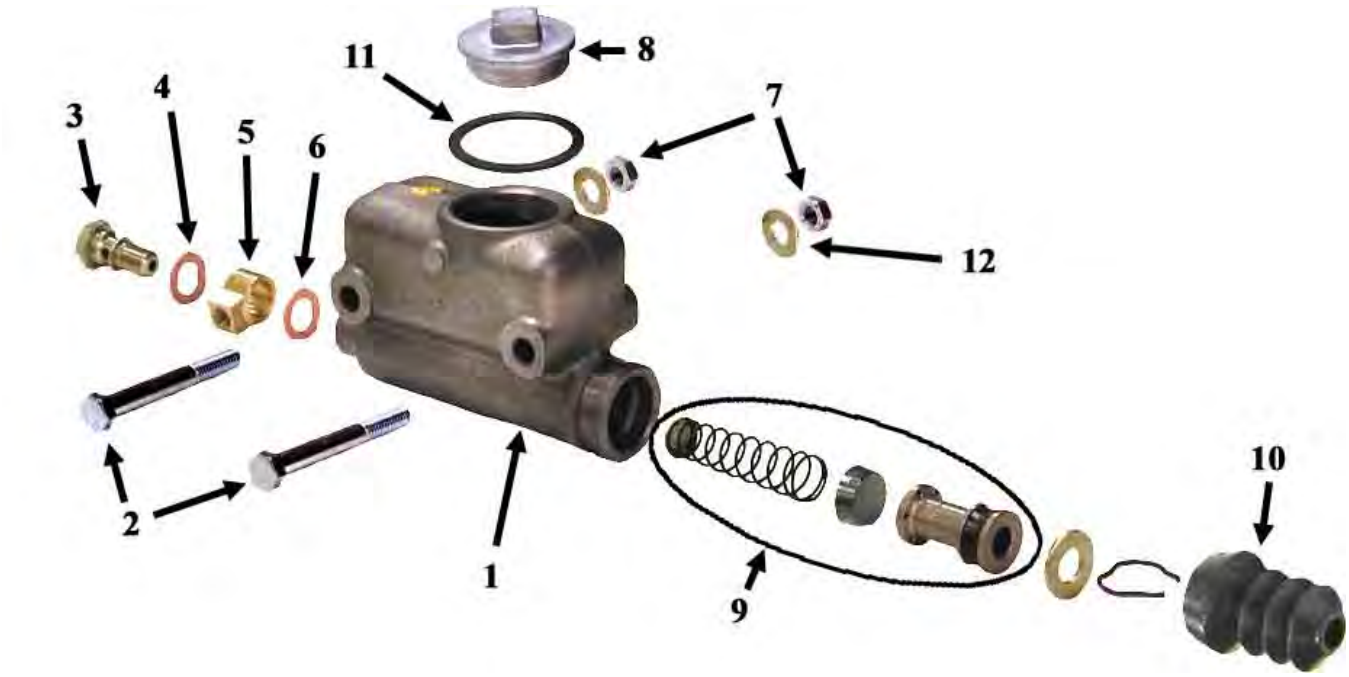
Single Reservoir Master Cylinder



Brake Lines (Single Reservoir Master Cylinder)

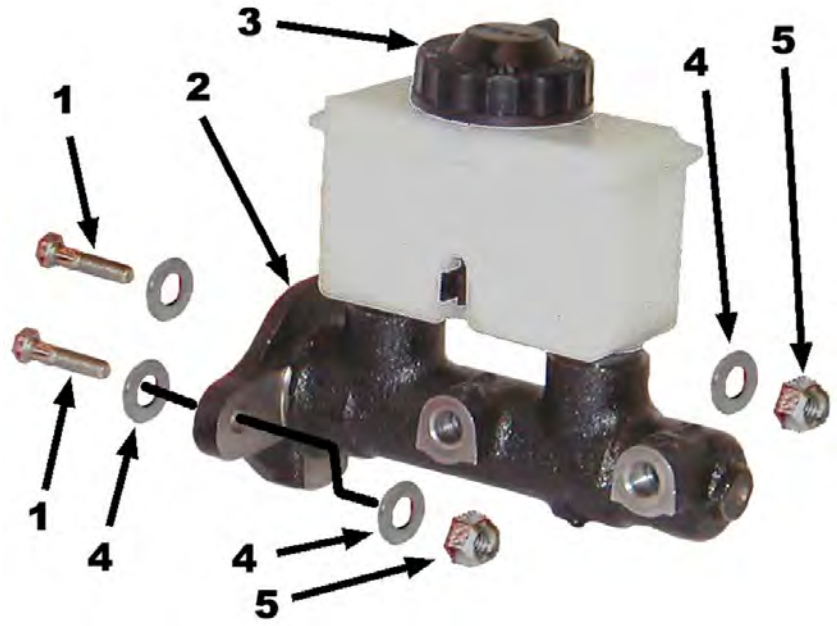
Item No.	Part No.	Description	Qty
1	71-110-00	Brake Light Switch (optional)	1
2	99-591-00	Brake light switch adaptor (optional)	1
3	99-576-00	Hose Clip	2
4	99-608-58	Brake Line, Rear, BT 2-80	1
	99-607-62	Brake Line, Rear, B 2-48, B 2-54, BT 2-48	1
5	99-604-56	Brake Line, Rear Right, BT 2-80	1
	99-603-68	Brake Line, Rear Right, B 2-48, B 2-54, BT 2-48	1
6	99-604-57	Brake Line, Rear Left, BT 2-80	1
	99-603-68	Brake Line, Rear Left, B 2-48, B 2-54, BT 2-48	1
7	99-580-20	Brake Hose, Rear	2
8	99-607-61	Brake Line, Front	1
9	99-564-00	T-Fitting	1
10	01-204-86	Master Cylinder Mounting Bracket	1
11	See Master Cylinder	Master Cylinder	4

BRAKES, MASTER CYLINDER



Master Cylinder (Single Reservoir)

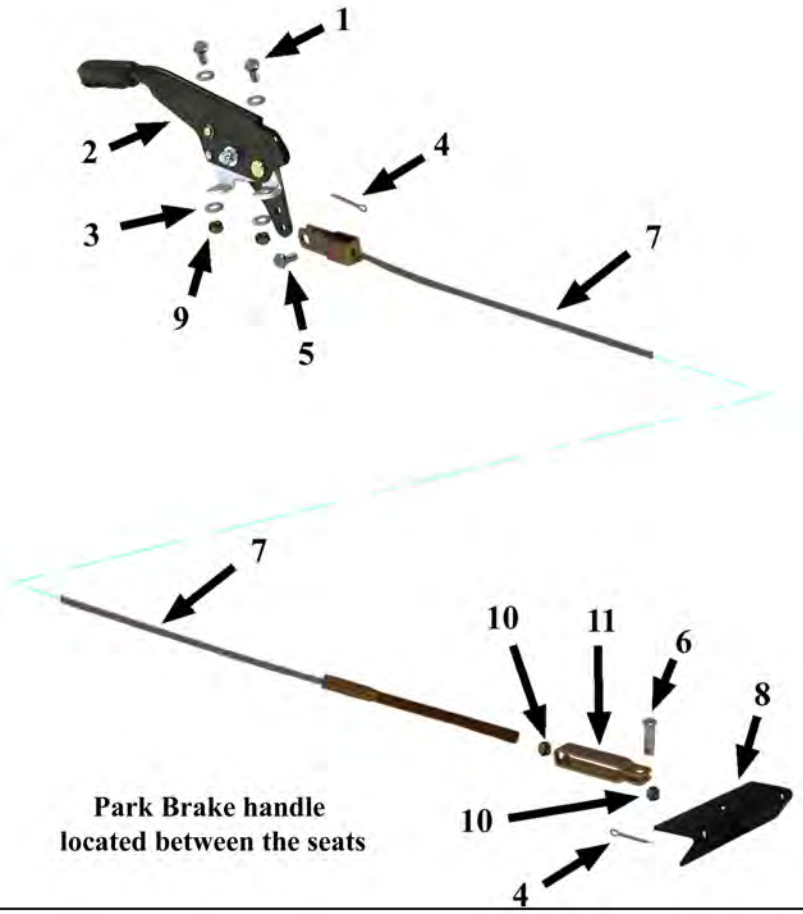
Item No.	Part No.	Description	Qty
1	99-511.00	Master cylinder assembly	1
2	88-101-20	Hex bolt	2
3	99-579-00	Fitting, bolt	1
4	99-572-00	Washer	1
5	99-566-00	Fitting	1
6	99-571-00	Washer	1
7	88-109-81	Hex lock nut	2
8	99-510-52	Cap	1
9	99-510-61	Rebuild kit for 1” bore	1
10	99-510-51	Boot	1
11	99-510-53	Gasket	1
12	88-108-60	Flat washer	2



Master Cylinder (Dual Reservoir)

Item No.	Part No.	Description	Qty
1	88-080-14	Bolt, 5/16” X 1-1/2” NC, Hex Head	2
2	See Usage Table	Master Cylinder (includes item #3)	1
3	99-511-52	Cap Seal, Master Cylinder	1
	99-511-53	Cap, Master Cylinder	1
4	88-088-61	Washer, 5/16”	4
5	88-089-81	Locknut, 5/16”	2
Not Shown			
	99-511-51	Rubber Boot, Master Cylinder	1

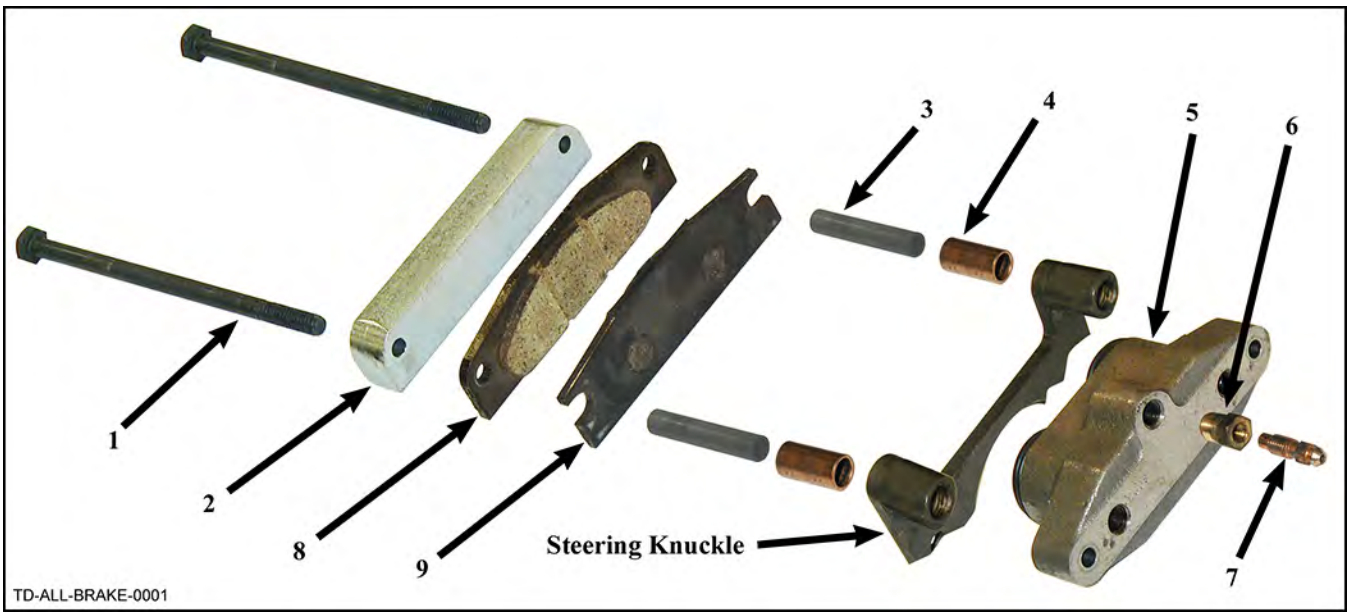
BRAKES, BRAKE LINKAGE



Brake Linkage

Item No.	Part No.	Description	Qty
1	88-080-11	Bolt, 5/16 x 1”, Hex Head	2
2	51-344-80	Park Brake Handle	1
3	88-088-61	Washer, 5/16”	4
4	88-089-81	Locknut, 5/16”	2
5	96-813-00	Adjusting Brake Cable Assembly, B 2-48, BT 2-48, B 2-54	1
	96-820-20	Adjusting Brake Cable Assembly, BT 2-80	1
6	96-771-00	Clevis Pin, 3/8 x 3/4”	1
7	01-204-32	Brake Equalizer	1
8	96-760-00	Brake Cable Clevis	1
9	88-099-80	Nut, 5/16” Hex Head	2
10	96-773-00	Clevis Pin, 5/16 x 1”	1
11	88-527-11	Cotter Pin, 1/8 X 1” Steel	2
Not Shown			
	41-350-59	Brake arm extension (located at the rear brakes) starting serial number 157201	2
	96-826-12	Park Brake Cable from equalizer to the rear brakes	2
	85-250-00	Brake pedal return spring	1
	50-009-00	Master cylinder push rod (99-510-02 or 99-511-00 master cylinder)	1
	50-009-05	Master cylinder push rod (99-511-20 master cylinder)	1
	96-762-00	Clevis (pushrod)	1

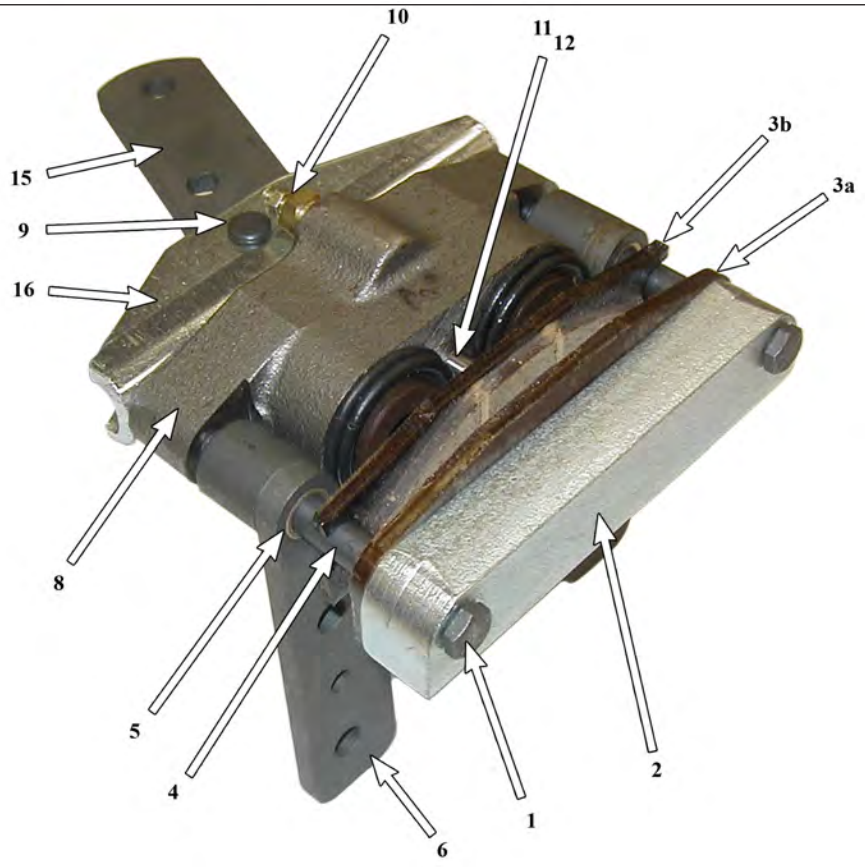
BRAKES, FRONT AXLE



Front Brakes

Item No.	Part No.	Description	Qty
1a	88-067-29	Bolt	4
1B	88-069-82	Locknut, 1/4” Nc, Grade C (Included In Rebuild Kit)	4
2	41-350-91	Plate, Secondary	2
3	41-348-58	Spacer (Included In Rebuild Kit)	4
4	32-208-01	Bushing (Included In Rebuild Kit)	4
5	41-351-35	Brake Body Assembly (No Internally Serviceable Parts)	2
6	99-588-01	Bleeder Adaptor	2
7	99-588-00	Bleeder Valve	2
8	See Rebuild Kit	Brake Pad, Inner	2
9	See Rebuild Kit	Brake Pad, Outer	2
Not Shown			
	41-886-00	Plug, 1/8 Pipe, Hex Socket	2
	41-351-16	Piston	4
	41-348-61	Rebuild Kit, Brake Rebuild (Left And Right) Includes Items #1B, 3, 4, 8, 9	
	41-351-15	Kit, Boots And Piston O-Rings (One Cylinder)	

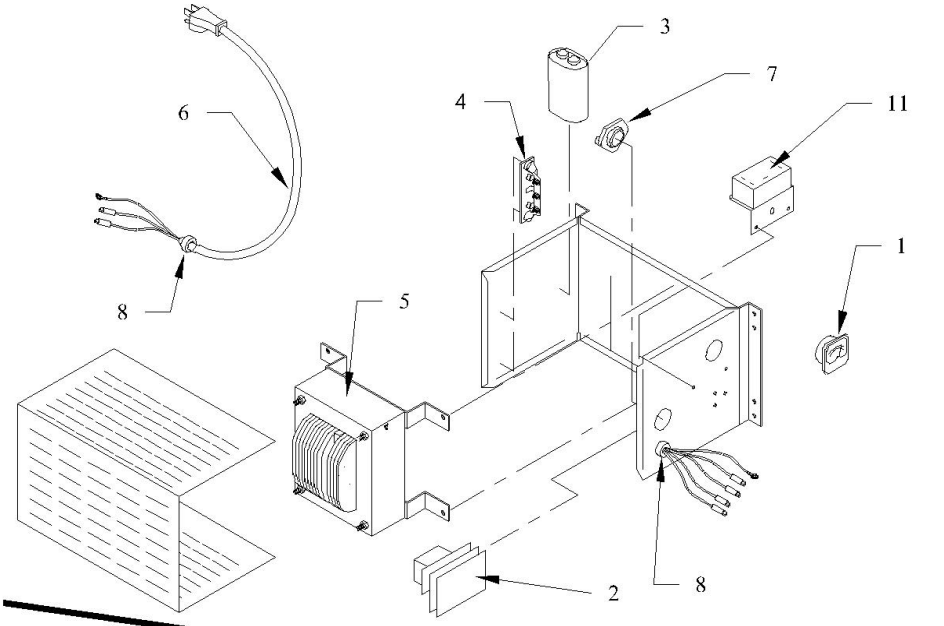
BRAKES, REAR AXLE



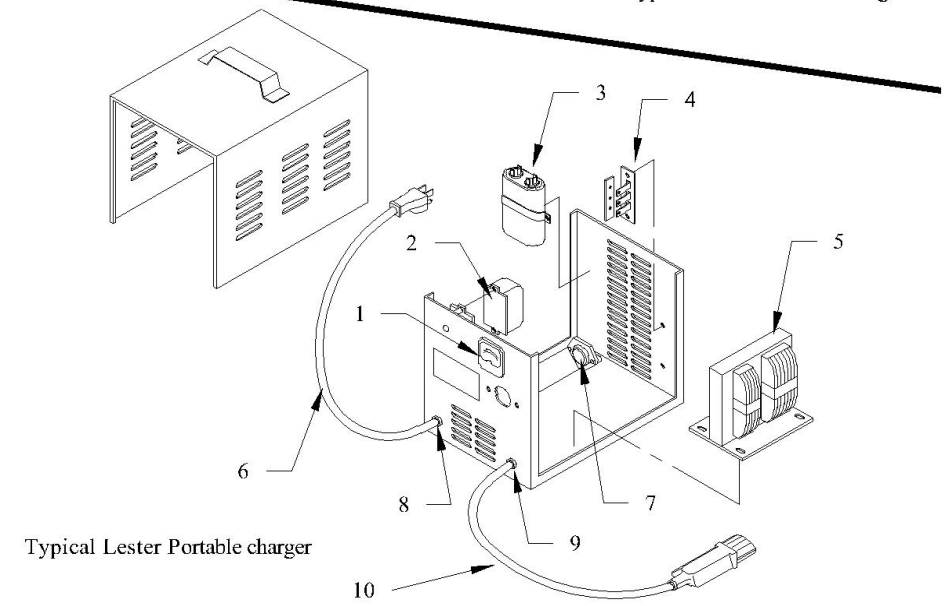
Brakes, Rear Axle

Item No.	Part No.	Description	Qty
1	88-060-27	1/4NC x 4-1/2 Hex bolt, grade 8	4
	88-069-82	1/4NC locknut, grade C (included in rebuild kit)	4
2	41-350-91	Secondary plate	2
3	See kit below	Brake pad, Inner	2
	See kit below	Brake pad, Outer	2
4	41-348-58	Spacer (included in rebuild kit)	4
5	32-208-01	Bushing, Bronze (included in rebuild kit)	4
6	41-350-28-1	Mounting bracket	2
8	41-350-39	Brake body assembly	2
9	88-840-11	Retaining ring	2
	41-350-52	Clevis pin	2
10a	99-588-00	Brake bleeder	2
10b	99-588-01	Adapter, brake bleeder	2
11	41-350-56	Park brake pin	2
12	32-220-03	Bushing, Park brake pin	1
15	41-350-53	Brake arm	2
16	41-350-12	Park brake lever bracket	2
Not shown			
	41-350-59	Extension, brake arm	2
	41-351-80	Brake assembly, left side, complete	
	41-351-81	Brake assembly, right side, complete	
	96-327-10	Hex bolt with thread locking compound (retains bracket to drive housing)	8
	41-348-61	Brake rebuild kit, 1 axle front or rear, (Includes brake pads and #4, #5, nut #1)	

CHARGER, LESTRONIC



Typical Lester Built In charger



Typical Lester Portable charger

	Charger Model >	9695	16910	22620	16920
	Style >	Portable	Built In	Built In	Built In
Item #	Description	Part #			
	Charger Assembly	79-309-00	79-309-10	79-303-25	79-309-20
1	Ammeter	79-851-10	-	-	-
2	Timer	79-805-65	79-805-68	79-805-68	*
	Relay, Timer	79-808-20	79-808-20	79-808-20	*
3	Capacitor	79-902-00	79-902-00	79-902-00	79-902-00
4	Diode assy.	79-749-13	79-749-13	79-749-13	79-749-13
5	Transformer	*	*	79-603-10	*
6	Cord, AC	79-575-10	-	-	-
7	Fuse	79-831-00	79-831-00	79-831-00	79-831-00
8	Strain relief	79-730-00	79-530-00	79-530-00	79-530-00
9	Strain relief	79-730-00	-	*	*
10	Cord, DC	79-566-10	-	-	-
11	Relay, Interlock	-	-	79-809-50	-
	Plug, 120 VAC	76-200-00	76-200-00	76-200-00	-

CHARGER, SIGNET

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

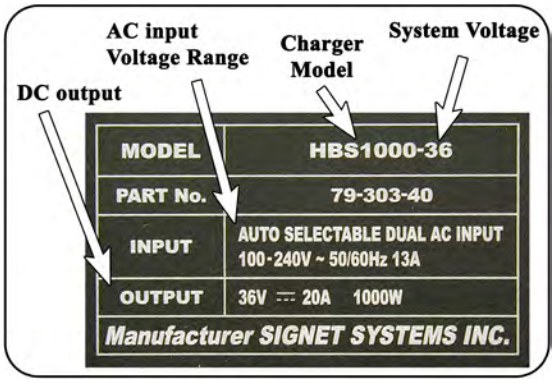
Model HBS Charger	
PART #	DESCRIPTION
79-309-42	48 volt Flooded Batteries (WET, FLA)
79-309-43	48 volt Sealed Batteries (GEL, SLA, AGM)

Note: There are no user serviceable components inside the charger

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

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

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



Standard Single Phase AC wire Color Codes as of 2010.
Note: Older systems may use a alternate color code.

Refer high voltage wiring repairs to a qualified technician

United States / Canada

Neutral: White
Hot: Black or Red
Ground: Green

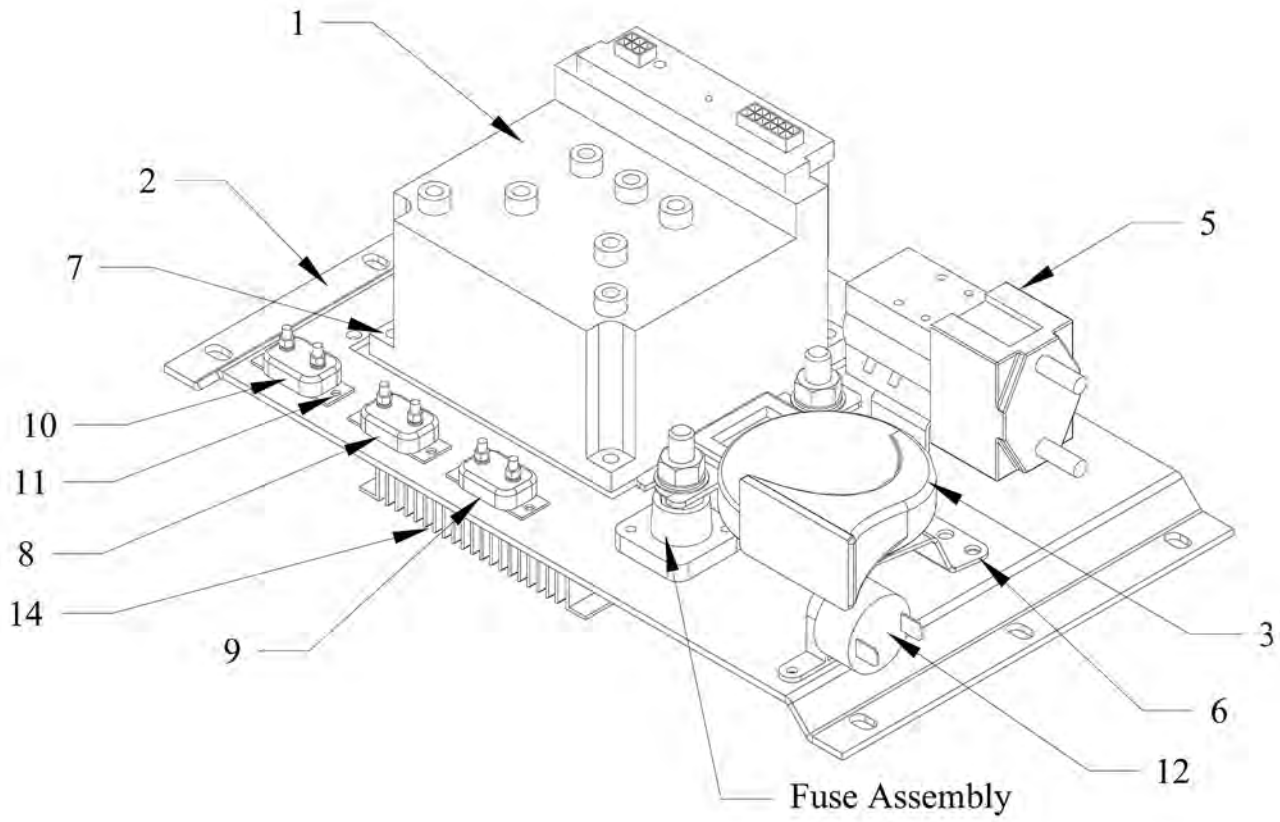
IEC (Europe) and United Kingdom

Neutral: Blue
Hot: Brown
Ground: Green/Yellow

CHARGER, X-SERIES

Item No.	Part No.	Description	Qty
	79-303-49	Charger Assembly, X-Series, 48 volt	1
	79-831-00	Fuse	
	79-809-61	Relay boad assembly	
	*	Control board assembly	
	79-749-14	SCR assembly	
	79-840-02	Circuit breaker	
	79-848-01	Ammeter	
	79-810-01	Switch kit (start/stop, low voltage, self diagnostic)	
	79-575-41	AC cord (includes bushing)	
	79-566-21	DC cord (includes bushing)	
	79-809-50	Interlock relay	
	79-722-03	Wiring kit (includes LED's)	
	79-575-06	AC Cord**	0 or 1

** - AC cord has integral NEMA plug. 


1
2
7
10
11
8
14
9
5
3
6
12
Fuse Assembly


Type
Part
Serial
632S45617
2001120905

Speed Control Panel

Item No.	Part No.	Description	Qty
1	62-400-05	(see note) Speed controller, 400 Amp	1
	62-400-15	(see note) Speed controller, 500 Amp	
2	01-200-06	Mounting panel	1
3	73-004-20	Horn	1
4	See Below	See below	1
5**	71-300-02	Line contactor	1
	71-300-01	Mounting bracket	1
6	88-838-06	#14 x 1/2 Sheet metal screw	4
7	88-060-13	1/4 NC x 1-1/4 Hex bolt	4
8	79-840-00	10 Amp circuit breaker	1
9	79-840-20	20 Amp circuit breaker	1
10	79-840-20	20 Amp circuit breaker	1
11	88-818-06	#8 x 1/2 Sheet metal screw	8
12	73-005-01	Reverse/Motion alarm	1
13	88-818-06	#8 x 1/2 Sheet metal screw	1
14	62-400-13	Heat sink	1
	88-838-06	#14 x 1/2 Sheet metal screw	4
Not shown			
	69-068-55	Resistor (across #5 power terminals)	1

Note: To order part number 62-400-05 or 62-400-15, you will need to provide the vehicle serial number. The controller will be programmed to match the vehicle as originally manufactured.

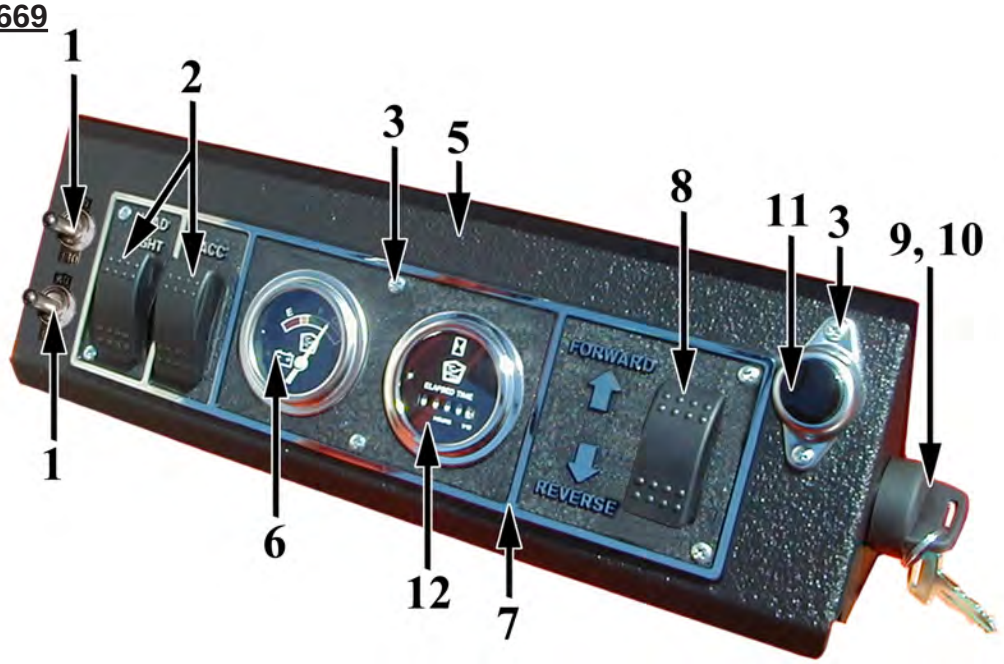
Item #4:

Depending on the model and serial number of the vehicle, item #4 will be a circuit breaker or a fuse

Model No.	Description	Serial No. Range	Part No.
B0-248-36	Circuit Breaker	146189 to current production	79-844-20
B0-248-48	Circuit Breaker	146189 to 173490, and 173625, 173671	79-844-20
B0-248-48	Fuse	173541 to current production, except 173625, 173671	79-829-15
B0-254-36	Circuit Breaker	146186 to current production	79-844-20
B0-254-48	Fuse	173253 to current production	79-829-10
BT-248-36	Circuit Breaker	150719 to current production	79-844-20
BT-248-48	Circuit Breaker	150719 to 173425 and 173505 to 173508	79-844-20
BT-248-48	Fuse	173426 to current production except 173505 to 173508	79-829-10
BT-280-36	Circuit Breaker	159916 to 173621	79-844-20
BT-280-36	Fuse	173622 to current production	79-829-10
BT-280-48	Circuit Breaker	159916 to 172122	79-844-20
BT-280-48	Fuse	173551 to current production	62-016-59

CONTROL SYSTEM, INSTRUMENT PANEL

Dash up to Serial # 179669



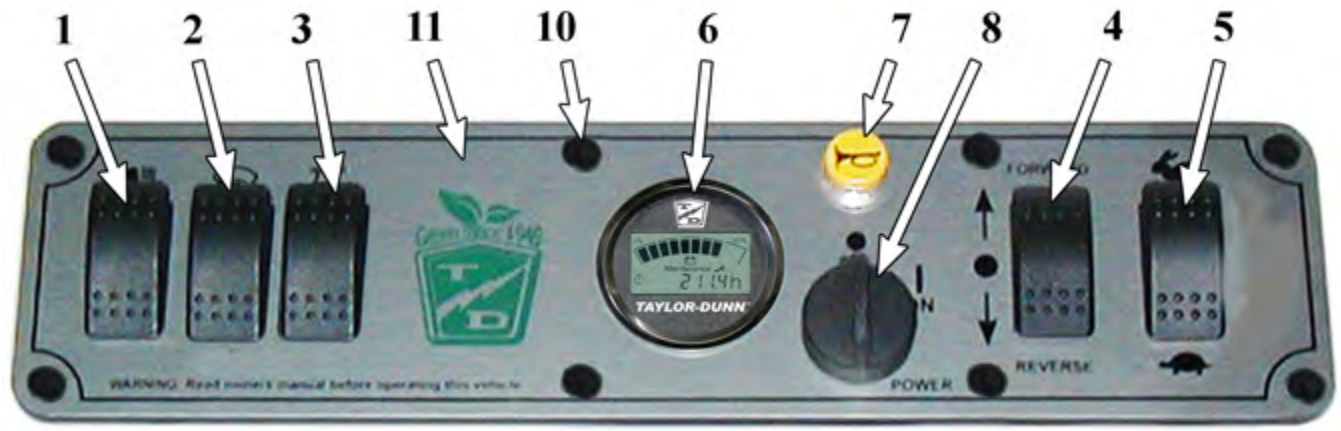
#6 Bargraph battery status indicator

#6 Analog Status Indicator

Instrument Panel

Item No.	Part No.	Description	Qty
1	71-100-00	Auxiliary switches	0, 1, 2
2	71-039-11	Auxiliary switches	0, 1, 2
3	88-817-07	Screw	6
4	-	-	-
5	01-200-09	Console	1
6	74-010-00 74-009-00 74-009-02 74-009-48	Smart View gauge Battery Gauge, analog 36 volt Battery Gauge, bar graph 36 volt Battery Gauge, bar graph 48 volt	0 or 1 0 or 1 0 or 1 0 or 1
7	94-304-13	Dash panel	1
8	71-039-02	Forward/reverse switch	1
9	71-120-10	Key Switch	1
10	71-119-99	Spacer, key switch	1
11	71-501-00	Horn Switch	1
12	74-000-00	Hour meter	0 or 1

Dash Starting Serial #179670



Instrument Panel

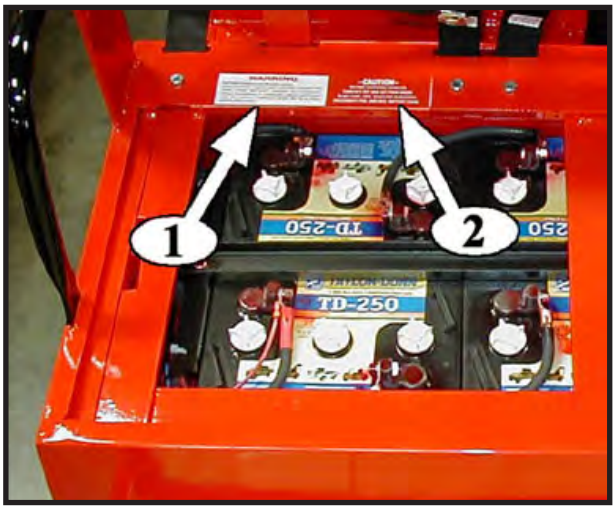
Item No.	Part No.	Description	Qty
1	71-039-11	Light switch	1
2	71-039-11	Wiper switch	0 or 1
3	71-039-11	Strobe switch	0 or 1
4	71-039-02	Forward/reverse switch	1
5	71-039-11	High/low speed switch	0 or 1
6	74-010-00	Smart View gauge (shown)	1
7	71-102-15	Horn switch	1
8	71-120-10 71-119-99	Key Switch Spacer, key switch	1 1
9	-	-	-
10	88-607-06	Rivet, push in	8
11	94-303-91	Dash Panel	1

Note: If your vehicle was not originally equipped with the Smart View display, then the Sevcon speed control must be reprogrammed before the display will function.

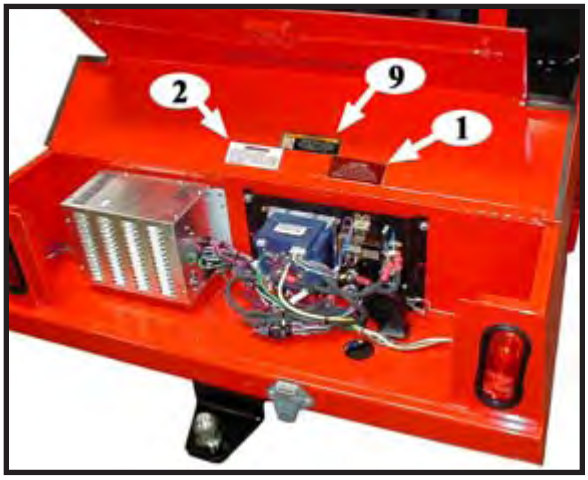
Note: If you have the Smart View display and wish to have the maintenance feature turned on, then the Sevcon speed control must be reprogrammed.

Note: To reprogram the Sevcon speed control, the speed control must be returned to the factory. Contact your local Taylor-Dunn® distributor for more information.

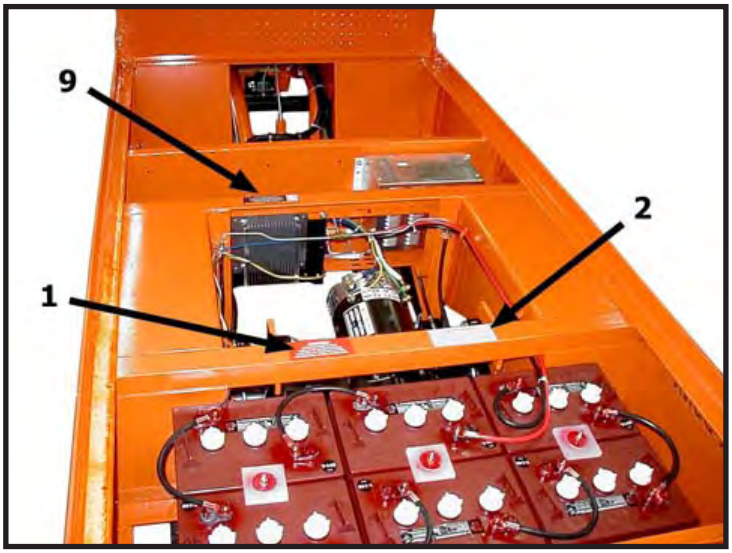
DECALS



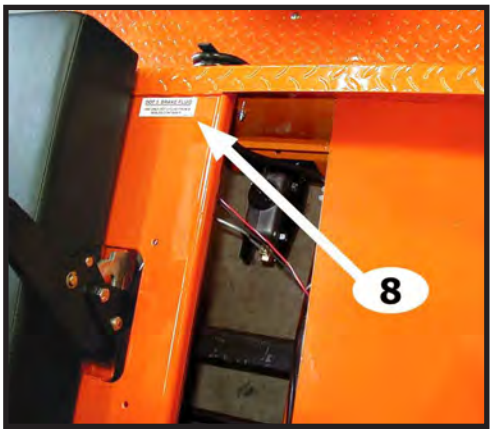
BT 2-80 under 2nd seat



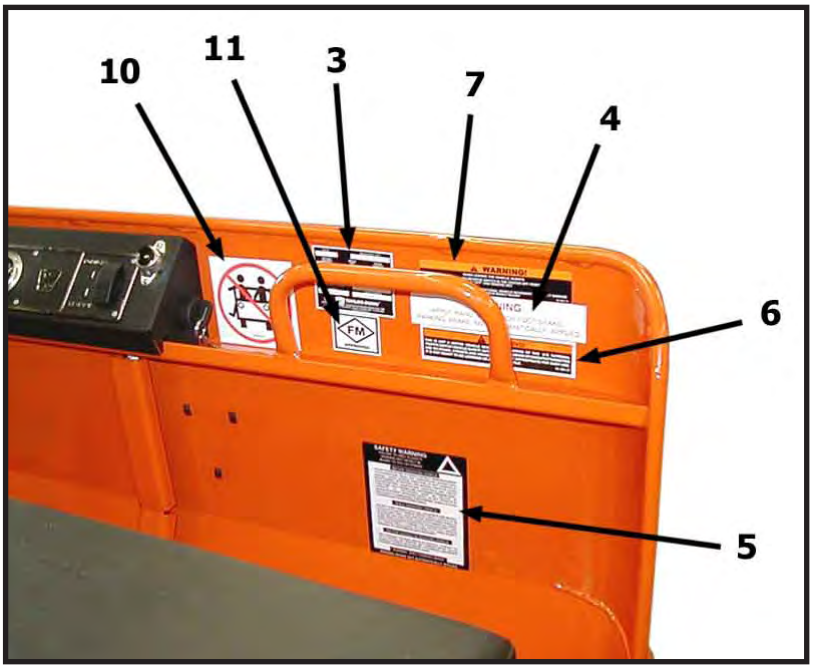
BT 2-80 Electronics compartment



B 2-48 and B 2-54



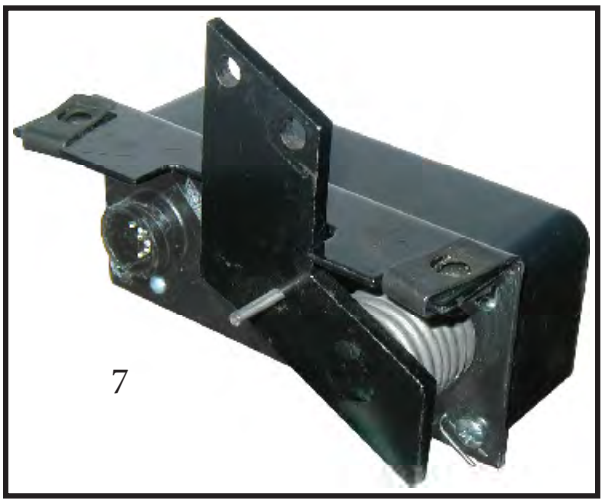
Between seats

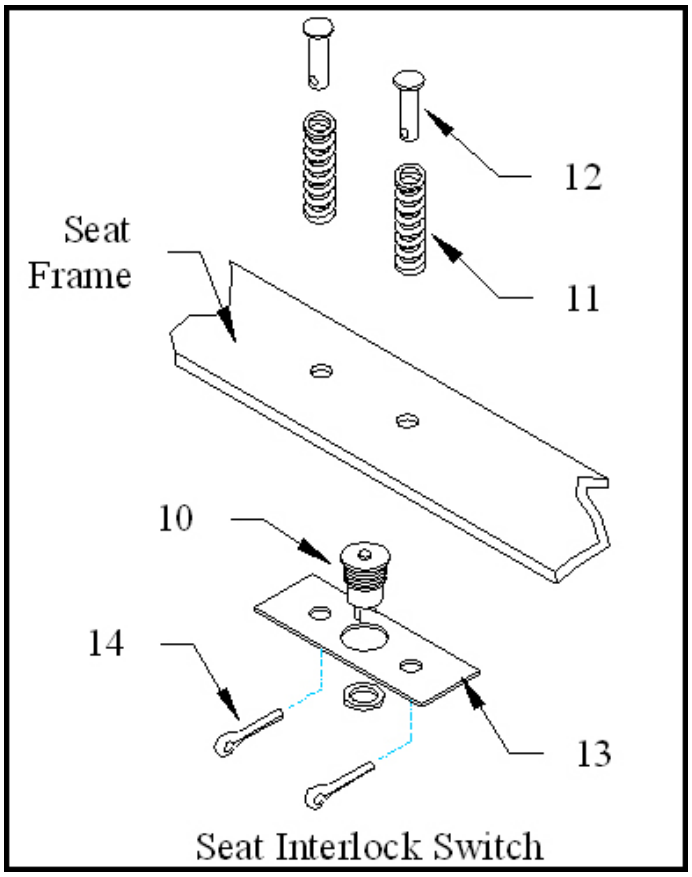


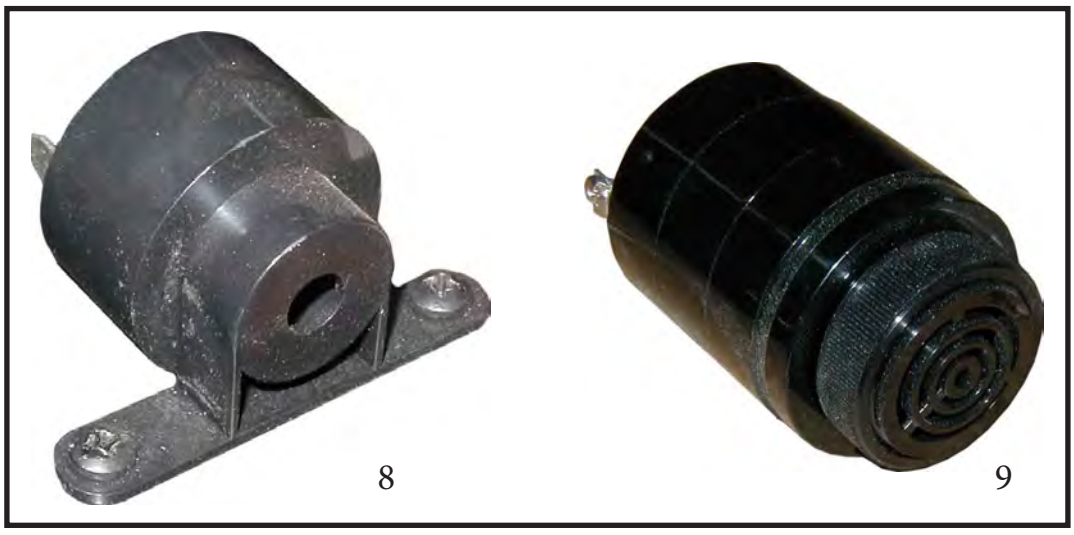
Decals

Item No.	Part No.	Description	Qty
1	94-319-00	Battery disconnect	1 or 2
2	94-313-00	Battery warning	1 or 2
3	94-373-10	Vehicle identification	1
4	94-309-00	Brake warning	1
5	94-313-20	Safety warning	1
6	94-384-01	Not a motor vehicle	1
7	94-384-14	When leaving vehicle warning	1
8	94-301-41	Brake fluid	1
9	94-384-17	Do not wash	1
10	94-301-42	Arms and legs	1
11	94-333-00	FM - Ending serial number 201169	1
Not Shown			
	94-301-54	Tip Over (installed on optional ladder racks)	

Miscellaneous Wire Harness Clamps







Motion Alarms

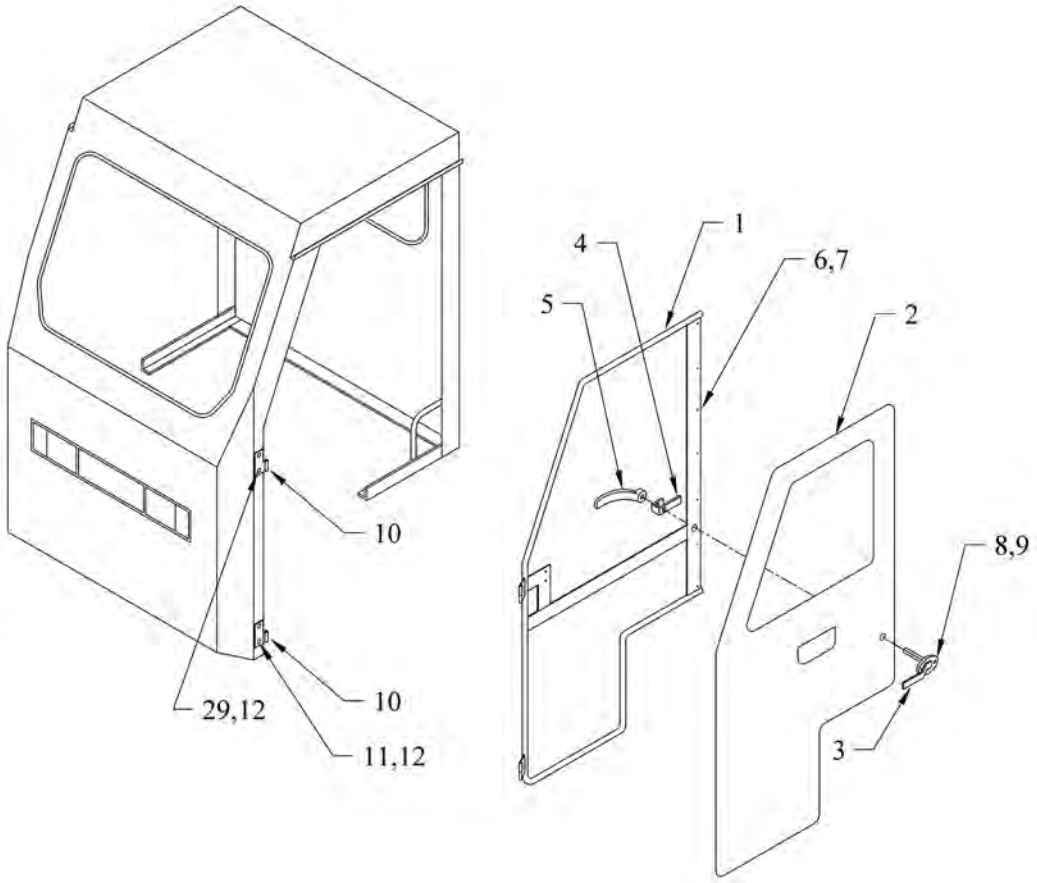
Electrical

Item No.	Part No.	Description	Qty
1	96-624-00 96-625-00	Clamp, 1/4 Jiffy Clip Clamp, 5/16 Jiffy Clip	
2	96-626-00	Clamp, 7/8 Jiffy Clip	
3	96-640-00	Clamp, 3/16 Push Mount	
4	96-642-00	Wire harness Clip, push mount	
5	96-650-01	Wire Harness Clip, stick on	
6	96-629-80 (not shown) 96-630-00 (not shown 96-630-50 (not shown 96-631-00 (not shown 96-631-10 (shown) 96-631-15 (not shown	Clamp, Rubber Lined 3/16 ID Clamp, Rubber Lined 5/8 ID Clamp, Rubber Lined 5/8 ID (.265 mounting hole) Clamp, Rubber Lined 3/4 ID Clamp, Rubber Lined 1.0 ID Clamp, Rubber Lined 1-1/2 ID	
	62-033-48	Throttle Module, 24-48 volt system	1
	71-122-20	Horn Switch	1
	88-065-06	1/4-NC x 21/2 Phillips Truss Head Screw, Horn Switch	2
	88-069-81	1/4-NC Hex Nylon Locknut, Horn Switch	2
7	62-033-48	Accelerator Module	1
8	96-650-01	Wire Harness Clip, stick on	0 or 1
9	73-005-05	Reverse Warning alarm	0 or 1
10	71-102-10	Seat interlock Switch	1
11	85-030-00	Spring	2
12	96-773-10	Clevis Pin	2
13	02-610-18	Mounting Plate	1
14	88-527-11	Cotter Pin	2
Not Shown			
	98-599-15	Plastic grommet for 1.75 hole	
	98-599-20	Plastic Grommet for 2.5 hole	
	75-107-10	Portable Charger Harness	1
	JF3-86181-00-00	Portable Charger Receptacle	1
	78-321-10	Ground Strap (optional)	1
	71-111-00	Brake Light Switch	1
	88-045-06	10-32 x 1/2 Machine Screw, brake light switch	2

Harnesses

Item No.	Part No.	Description	Qty
	75-152-80	Chassie Control Harness, BT 2-80	1
	75-152-03	Chassie Control Harness, BT 2-48, B 2-48, B 2-54	1
	75-152-13	Control panel harness	1
	75-152-81	Power Harness, BT 2-80	1
	75-152-11	Power Harness, BT 2-48, B 2-54	1
	75-152-02	Power Harness, B 2-48	1
	75-148-80	Harness for Pole Mounted Strobe Light	1
	75-107-10	Potratble Charger Harness	1
	76-013-00	Portable Charger Receptacle	1
	75-152-90	Harness, Smart View display	1

Steel Cab


1
4
6,7
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8,9
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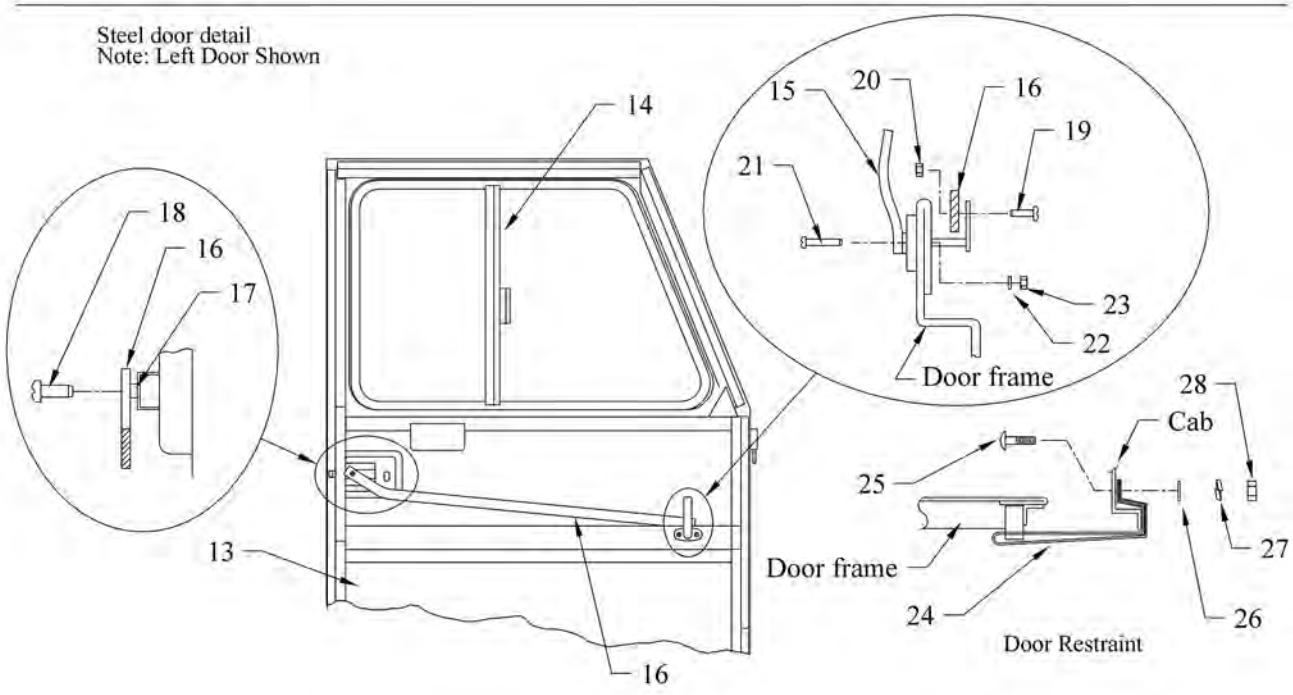
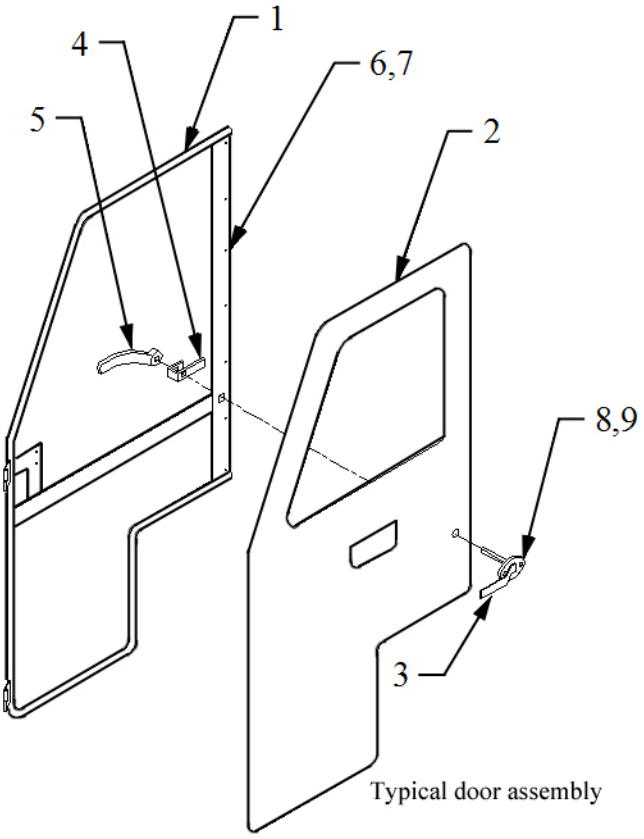
29,12
11,12
3


Steel door detail
Note: Left Door Shown
14
15
20
16
19
21
18
16
17
23
22
Door frame
28
Cab
25
27
Door frame
24
26
Door Restraint
13
16

Steel Cab

Item No.	Part No.	Description	Qty
1	90-923-98	Door Frame, Left	1
2	90-924-98	Side Curtain, Left	1
3	97-315-53	Handle Assembly, Outer	2
4	97-315-51	Door Latch	2
5	97-315-54	Handle Assembly Inside	2
6	97-303-03	Snap Fastner	14
7	88-727-06	Rivet, 5/32 X 5/8”	14
8	88-025-08	Locknut, #8-32”	4
9	88-029-86	Screw, #8-32 X 5/8”, Truss Head	4
10	91-814-10	Hinge, Female, Left	2
11	88-082-09	Bolt, 5/16 X 5/8”, Carriage	8
12	88-089-81	Locknut, 5/16” NC	8
13	91-011-66	Kit, Cab Door, Left, Specify Color (includes #10, 11,12)	1
	91-011-68	Kit, Cab Door, Left, Orange (includes #10, 11,12)	1
14	90-853-10	Window, Left	1
15	97-315-58	Door Handle, Inner	2
16	91-012-12	Connecting Bar	2
17	16-510-00	Spacer	2
18	88-065-06	Screw, 1/4 X 1/2” NC, Phillips Truss Head	2
19	88-045-08	Screw, #10-32 X 5/8”, Truss Head	2
20	88-049-86	Locknut, #10-32	2
21	88-045-11	Screw, #10-32 X 1”, Truss Head	4
22	88-048-62	Lock Washer, #10	4
23	88-049-80	Nut, #10-32	2
24	91-012-45	Strap, Door Restraint	2
25	88-082-11	Bolt, 5/16 NC X 1” Carriagee	2
26	88-088-60	Washer, 5/16 Cut	2
27	88-088-62	Lock Washer, 5/16”	2
28	88-089-83	Acorn Nut, 5/16” NC	2
29	91-011-31	Door Weldment, Left (unpainted)	1
Not Shown			
	91-011-67	Kit, Cab Door, Right, Specify Color (includes #10, 11,12)	1
	91-011-69	Kit, Cab Door, Right, Specify Color (includes #10, 11,12)	1
	90-853-11	Window, Right	1
	91-011-32	Door Weldment, Right (unpainted)	1
	90-923-99	Door Frame, Right	1
	90-924-99	Side Curtain Right	1
	91-814-11	Hinge, Female, Right	2
	97-811-00	1-7/8 inch Ball	
	97-821-00	2-inch Ball	
	88-140-14	1/2NC x 1-1/2 Hex bolt	4
	88-149-80	1/2NC Hex nut	4
	88-148-62	1/2 Split lock washer	4

Fiberglass Cab



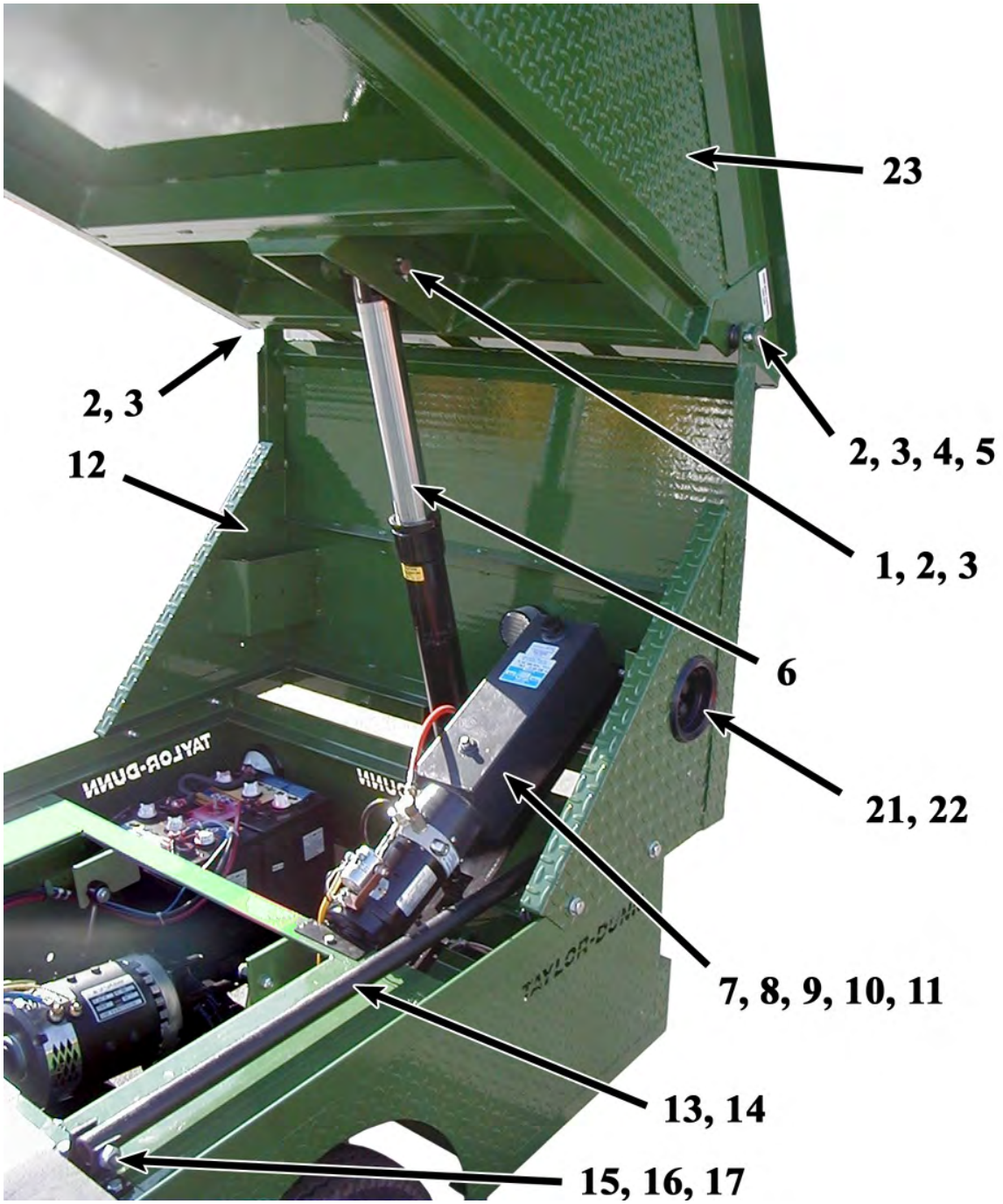
Typical door assembly

Fiberglass Cab

Item No.	Part No.	Description	Qty
1	90-921-98	Door Frame, Left	1
	90-921-99	Door Frame, Right	1
	98-451-11	Weather seal tape (by the foot)	-
2	90-908-98	Side Curtain, Left	1
	90-908-99	Side Curtain Right	1
3	97-315-53	Handle Assembly, Outer	2
4	97-315-51	Door Latch	2
5	97-315-54	Handle Assembly Inside	2
6	97-304-50	Snap Fastner	12
7	88-737-08	Rivet, 5/32 X 5/8”	14
8	88-029-86	Locknut, #8-32”	4
9	88-025-08	Screw, #8-32 X 5/8”, Truss Head	4
10	-	- -	
11	-	- -	
12	-	- -	
13	-	- -	
14	94-036-00	Drip moulding	1
15	91-810-00	Lower hinge	2
	17-104-00	Collar	2
16	91-809-10	Upper hinge	2

Not Shown			
	97-811-00	1-7/8 inch Ball	
	97-821-00	2-inch Ball	
	88-140-14	1/2NC x 1-1/2 Hex bolt	4
	88-149-80	1/2NC Hex nut	4
	88-148-62	1/2 Split lock washer	4

Dump Bed



Dump Bed Option

Item No.	Part No.	Description	Qty
1	21-018-00	Cylinder Pin	-
2	88-060-11	Bolt, 1/4 X 1-1/4"" NC, Hex Head	-
3	88-069-81	Locknut, 1/4"" NC	-
4	21-019-00	Shaft, Dump Bed Pivot	-
5	17-112-00	Collar, Shaft	-
6	99-524-00	Hydraulic Cylinder	-
7	99-957-00	Hydraulic Pump and Motor	-
8	99-567-50	Bracket, Hydraulic Pump	-
9	88-100-11	Bolt, 3/8 X 1"" NC, Hex Head	-
10	88-109-81	Locknut, 3/8"" NC	-
11	98-753-08	Isolator Mount, Rubber	-
12	Special Order	Carrier Frame, Dump Bed	-
13	91-285-11	Safety Prop Rod	-
14	98-754-00	Rubber Bumper, Safety Prop Rod	-
15	91-285-10	Bracket, Safety Prop Rod, used up to 11/1/2008	-
16	96-244-00	Bolt, 1/2"" NC, Hex Head with Grease Fitting, used up to 11/1/2008	-
	96-248-00	Bolt, 9/16, starting 11/1/2008	-
17	88-149-81	Locknut, 1/2"" NC, Hex Head, used up to 11/1/2008	-
	88-169-82	Locknut, 9/16, starting 11/1/2008	-
21	72-022-51	Rubber Mounting Ring	-
22	-	-	-
23	Special Order	Dump Bed	-

Not shown			
	90-442-00	Deckboard	-
	AA-000-11	Fluid, Hydraulic, Dextron 2, Quart	-
	75-124-00	Wire Harness	-
	See below	Buss Bar, Circuit Breaker	-
	See below	Circuit Breaker	-
	99-526-11	Fitting, Adapter 3/8 X 3/8 NPTF, used up to 7/10/2008	-
	99-527-01	Fitting, Swivel Adapter	-
	99-527-02	Fitting, Swivel Adapter, used starting 11/1/2008	-
	99-597-50	Bracket, Hydraulic Pump	-
	99-597-51	Hose Assembly, 24""	-
	72-510-00	Solenoid, Pump (metal can)	-
	72-510-10	Solenoid, Pump (plastic can)	-
	98-753-05	Bumper (Option B2-008-70)	-
	91-285-40	Dump Body (Option B2-008-70)	-
	71-102-15	Switch (rubber cap)	-
	71-102-16	Switch (plastic housing)	-

Circuit Breaker Usage:

Up to serial number 175999 use:

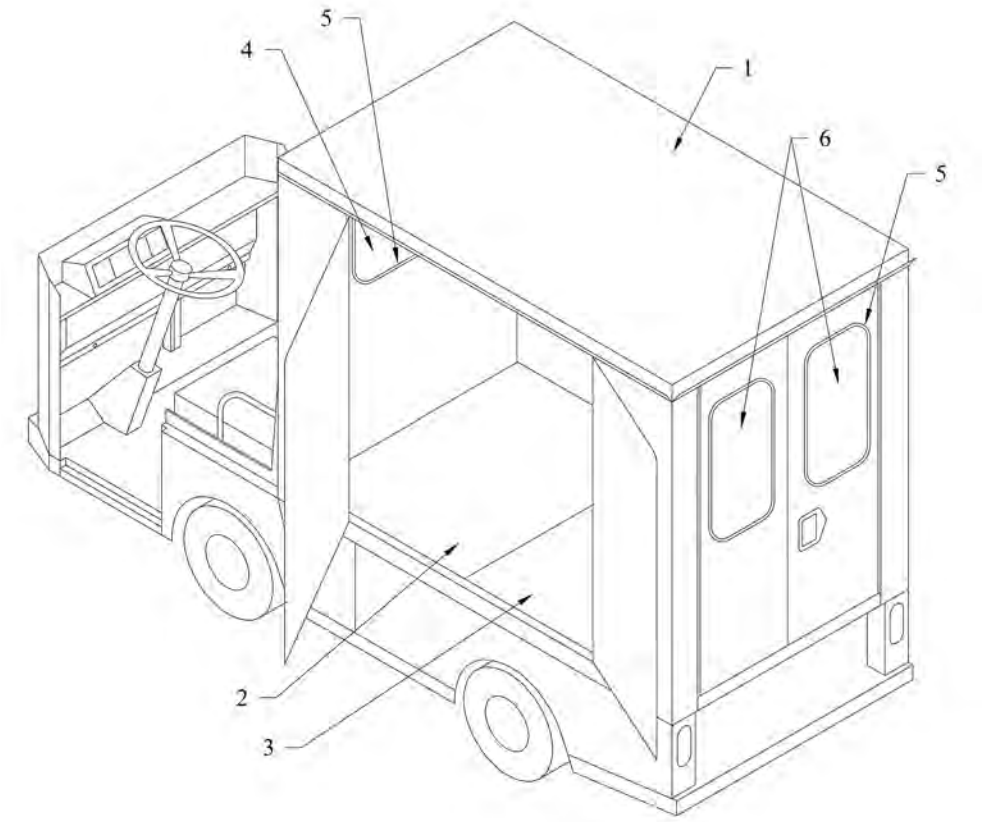
79-843-00	Circuit breaker	1 each
78-106-00	Buss bar	2 each
71-610-02	Mounting bracket	1 each

Starting with serial number 176000 use:

79-843-01	Circuit breaker	1 each

Contact the pump manufacturer for internal parts for the pump assembly.
http://www.monarchhyd.com/
The pump assembly model number is: M-303

Rear Cargo Box

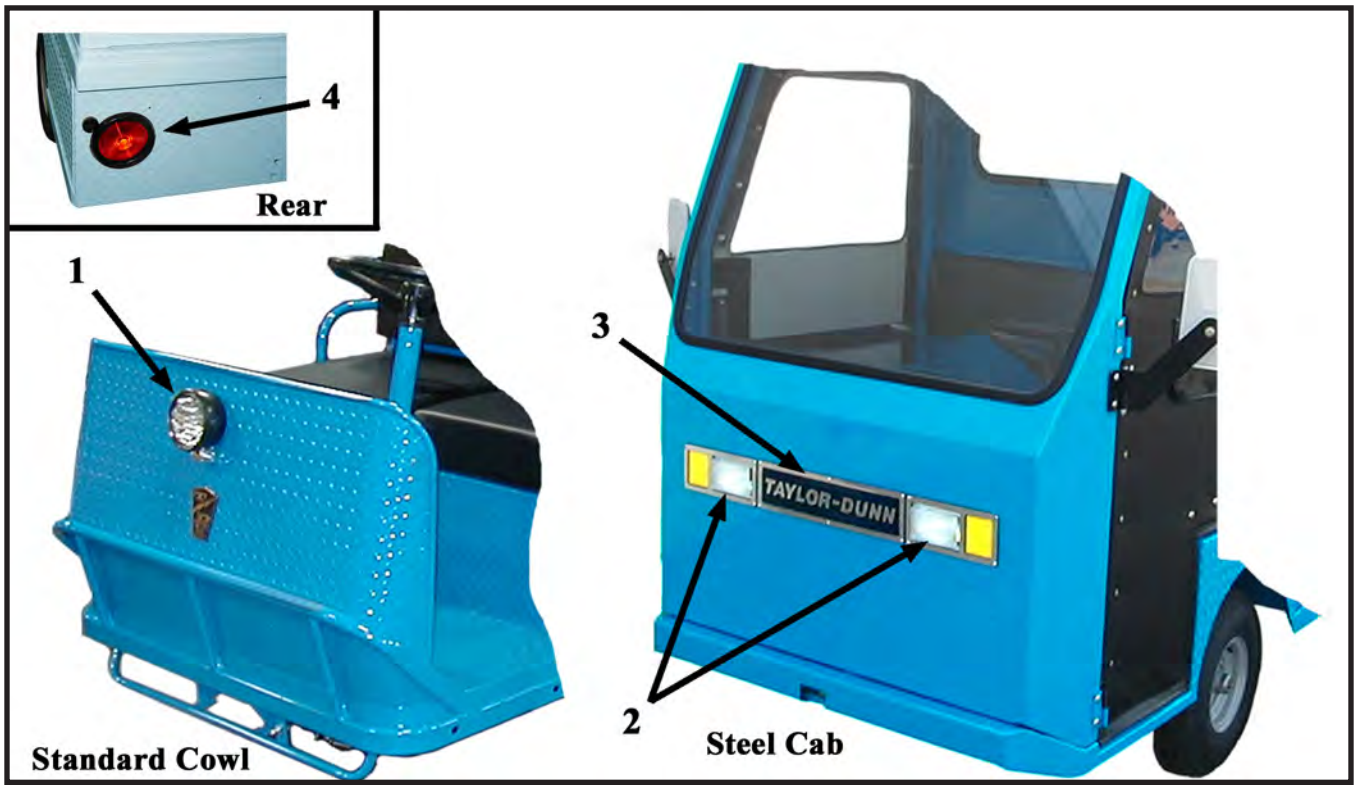


Rear Cargo Box

Item No.	Part No.	Description	Qty
1	91-333-02	Cargo box (unpainted)	1
2	90-471-00	Front deck board	1
3	90-472-00	Rear deeck board	1
4	90-850-10	Front window	1
5	98-310-00	Rubber window gasket (by the foor)	-
6	90-851-00	Rear window	2
Not shown			
	94-320-10	Load line decal	1
	00-210-23	Deck support angle	1

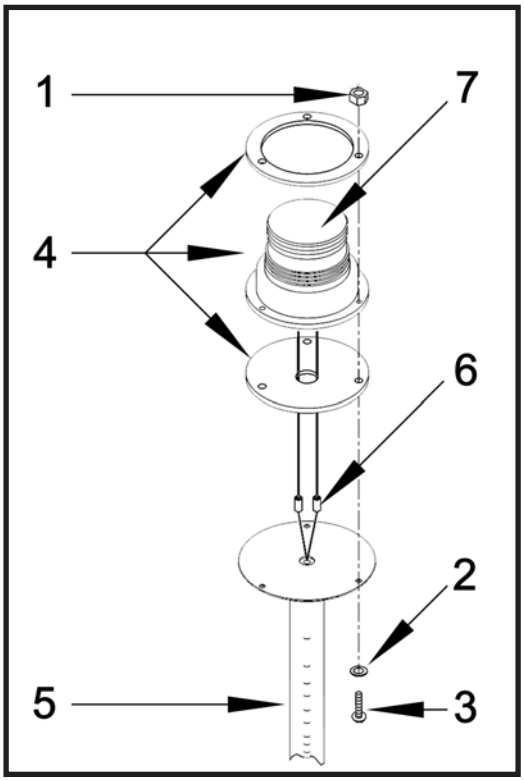

TAYLOR - DUNN®
The Best Way To Go About Your Business

LIGHTS



Head and Tail Lights

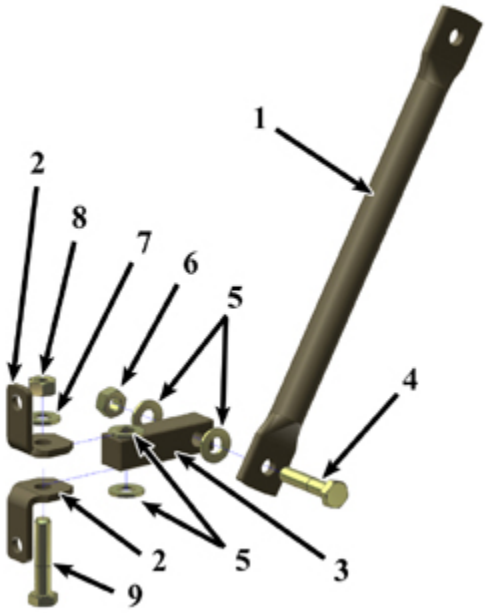
Item No.	Part No.	Description	Qty
1	72-005-00	5” Round head light	1 or 2
	72-072-00	Replacement bulb	1 or 2
2	94-050-10	Rectangular light , left (steel cab)	1
	94-050-11	Rectangular light , right (steel cab)	1
	72-082-01	Replacement bulb	2
3	94-201-10	Name plate	1
4	72-022-00	Tail light	1 or 2
	72-022-51	Tail ligh rubber grommet	1 or 2
	72-022-52	Tail light pigtail	



Strobe Light

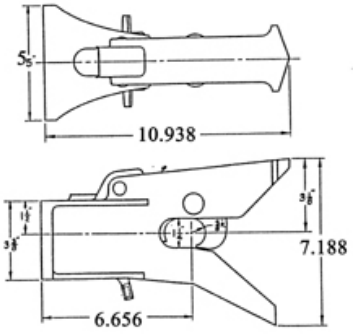
Item No.	Part No.	Description	Qty
1	88-029-80	8-32 Hex Nut	3
2	88-028-62	#8 Lock Washer	3
3	88-025-06	8-32 X 1/2 Machine Screw	3
4	72-023-20	Strobe Assembly (Amber)	1
5	**	Mounting Pole	1
6	**	Harness	1
7	72-023-22	Amber Lens	1
	72-023-23	Red Lens	1
Not Shown			
	72-023-21	Replacement Bulb	1

MIRRORS

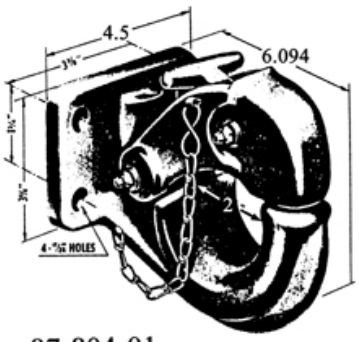


Item No.	Part No.	Description	Qty
-	92-202-00	Mirror mounting bracket assembly, Fiberglass cab	
1	92-202-21	Arm	1
2	92-202-23	Bracket	2
3	92-202-22	Joint	1
4	88-080-14	5/16NC x 1-1/2 Hex bolt	1
5	88-088-61	5/16 SAE flat washer	4
6	88-089-81	5/16NC Lock nut	1
7	88-088-62	5/16 Split lock washer	1
8	88-089-80	5/16NC Hex nut	1
9	88-080-14	5/16NC x 1-1/2 Hex bolt	1
Not Shown			
-	92-201-00	Mirror, rectangular, 4-1/2 x 8-1/2 (side view)	1
-	92-202-12	Mounting bracket, left, Steel cab	1
-	92-202-13	Mounting bracket, right, Steel Cab	1
-	91-814-16	Hinge, left (used with 92-202-12)	1
-	91-814-17	Hinge, right (used with 92-202-13	1
-	92-202-15	Spacer (used with 92-202-12 and -13)	1
-	92-207-00	Mirror, multi-panel (inside cab)	1
-	91-810-00	Mounting tab for multi-panel mirror	2
-	97-176-00	Washer, Neoprene	2
-	92-206-00	Mirror, rectangular, 5-1/2 x 8 (inside cab)	1
-	02-210-70	Bracket for 92-206-00	1
-	02-201-11	BRACKET,MIRROR,LEFT,BOTTOM, Fiberglass cab)	1
-	02-201-10	BRACKET,MIRROR,LEFT,TOP (fiberglass cab)	1
-	02-201-12	TUBE,MIRROR MOUNT,RIGHT (fiberglass cab)	1

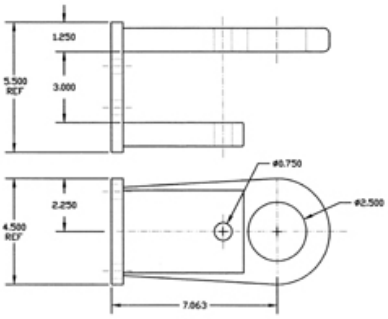
MOUNTING HARDWARE



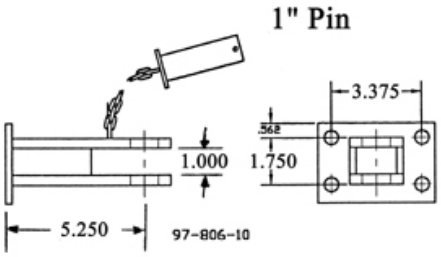
97-808-00
Automatic Coupling Hitch



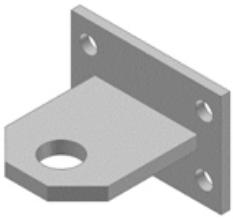
97-804-01
Pintle Hitch



Hook Pin and Eye Hitch
97-809-00

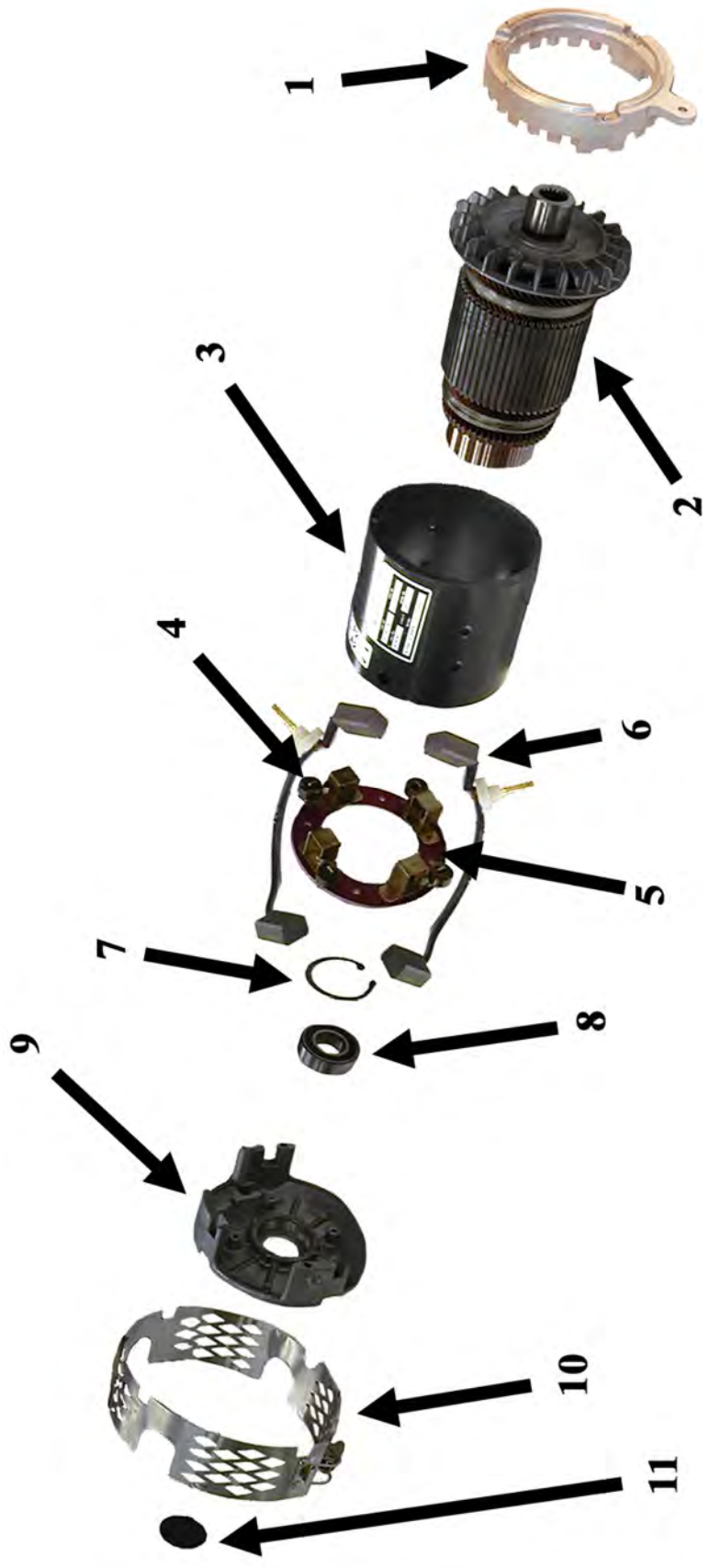


97-806-10
Pin and Clevis Hitch



Ball Hitch Mount
97-805-00 (1-7/8")
97-807-00 (2")

Item No.	Part No.	Description	Qty
	97-811-00	1-7/8 inch Ball	
	97-821-00	2-inch Ball	
	88-140-14	1/2NC x 1-1/2 Hex bolt	4
	88-149-80	1/2NC Hex nut	4
	88-148-62	1/2 Split lock washer	4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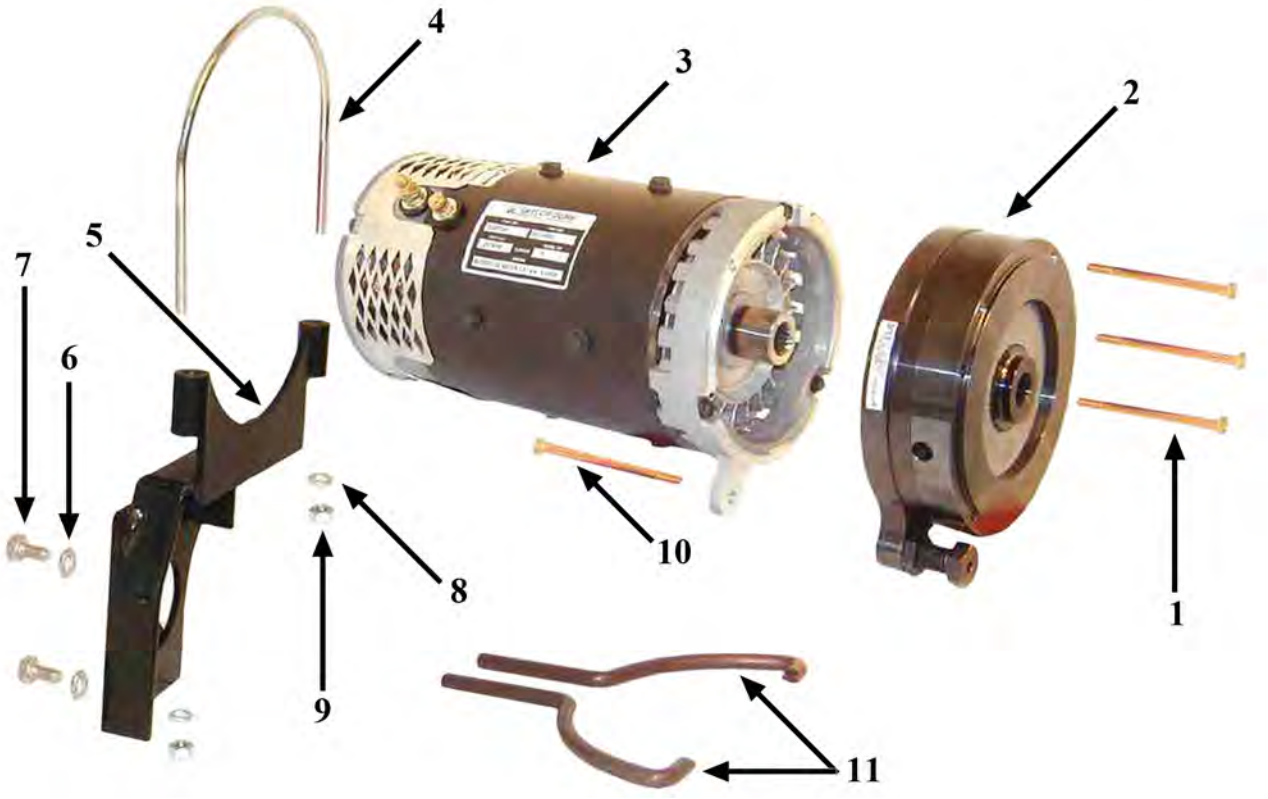
Motors, Separately Excited Field

ITEM #	DESCRIPTION	Motor Spec # / Motor Part #							
		DV1-4002 70-054-40[1]	XP1789 or DY24001 70-054-41	DV1-4003 70-057-40	XP-1786 or DD3-4004 70-052-40	203-21-4001 or XP1820A 70-072-41	DY8-4002 70-054-42		
1	Front housing	70-421-10	70-421-10	70-421-10	*	*	70-421-10		
2	Armature	70-400-00	70-400-00	70-400-10	*	*	70-412-30		
3	Field assembly	70-209-30	*	70-209-40	*	*	*		
4	Brush spring	70-412-20	70-412-20	85-403-00	70-412-20	85-403-00	70-412-20		
5	Brush holder	70-170-00	70-170-00	70-173-00	70-170-00	70-173-00	70-170-00		
6	Brush	70-109-00 (2)	70-109-00 (2)	70-170-10 (8)	70-109-00 (2)	70-170-10 (1)	70-109-00		
7	Bearing retainer	70-417-00	70-417-00	70-417-00	70-417-00	*	70-417-00		
8	Bearing	80-212-00	80-212-00	80-212-00	80-212-00	*	80-212-00		
9	Rear housing	70-421-20	70-421-20	70-421-30	70-421-20	*	*		
10	Brush cover	70-421-00	70-421-00	70-421-40	70-421-00	*	70-421-00		
11	Dust cap	98-930-00	95-930-00	95-930-00	95-930-00	-	-		
Not shown	1-1/8” lg. grade 8 Mounting bolt	88-067-17	88-067-17	88-067-17	88-067-17	-	88-067-17		
	2” lg. Grade 8 mounting bolt	88-067-22	88-067-22	88-067-22	88-067-22	-	88-067-22		
*	Not available at time of printing								
Note 1:	The original motor provided under part number 70-054-40 has been discontinued. It has been replaced by 70-054-41. The 70-054-41 motor has slightly more power & torque. The 70-054-40 motor can be directly replaced with the 70-054-41 motor. The 70-054-41 motor will perform with the original parameters in the Sevcon® controller; however the vehicle will have about a 15% reduction in top speed. To take full advantage of the increased performance of the 70-054-41 motor, new parameters must be programmed into the Sevcon® controller. Please contact Taylor-Dunn® Manufacturing for details on returning the controller for re-programming.								

MOTOR MOUNT



Item No.	Part No.	Description	Qty
1	88-067-22 88-067-29	Bolt,1/4 X 2” NC, Grade (no brake option) Bolt,1/4 X 4-1/4” NC, Grade 8 (brake option only)	3 3
2	**	Automatic Electric Brake Unit	1
3	See Motor	Motor (Typical)	1
4	96-114-10	U-Bolt, 5/16” NF, Motor Support	1
5	K66-600-03	Motor, Support Bracket	1
6	88-128-62	Lock washer, 7/16”	2
7	89-111-27	Bolt, 10m X 1.5 X 20 Hex Head	2
8	88-088-62	Lockwasher, 5/16”	2
9	88-099-80	Nut, 5/16” NF	2
10	88-067-17 88-067-29	Bolt, 1/4 X 1-1/8” NC, Grade 8 (no brake option) Bolt, 1/4 X 4-1/4” NC, Grade 8 (brake option only)	 1
11	**	Tool, Electric Brake, Manual Release	2
**	This electric brake is obsolete. Refer to bulletin BUL-10-06-004.		

SEATS

Shown with optional top and windshield

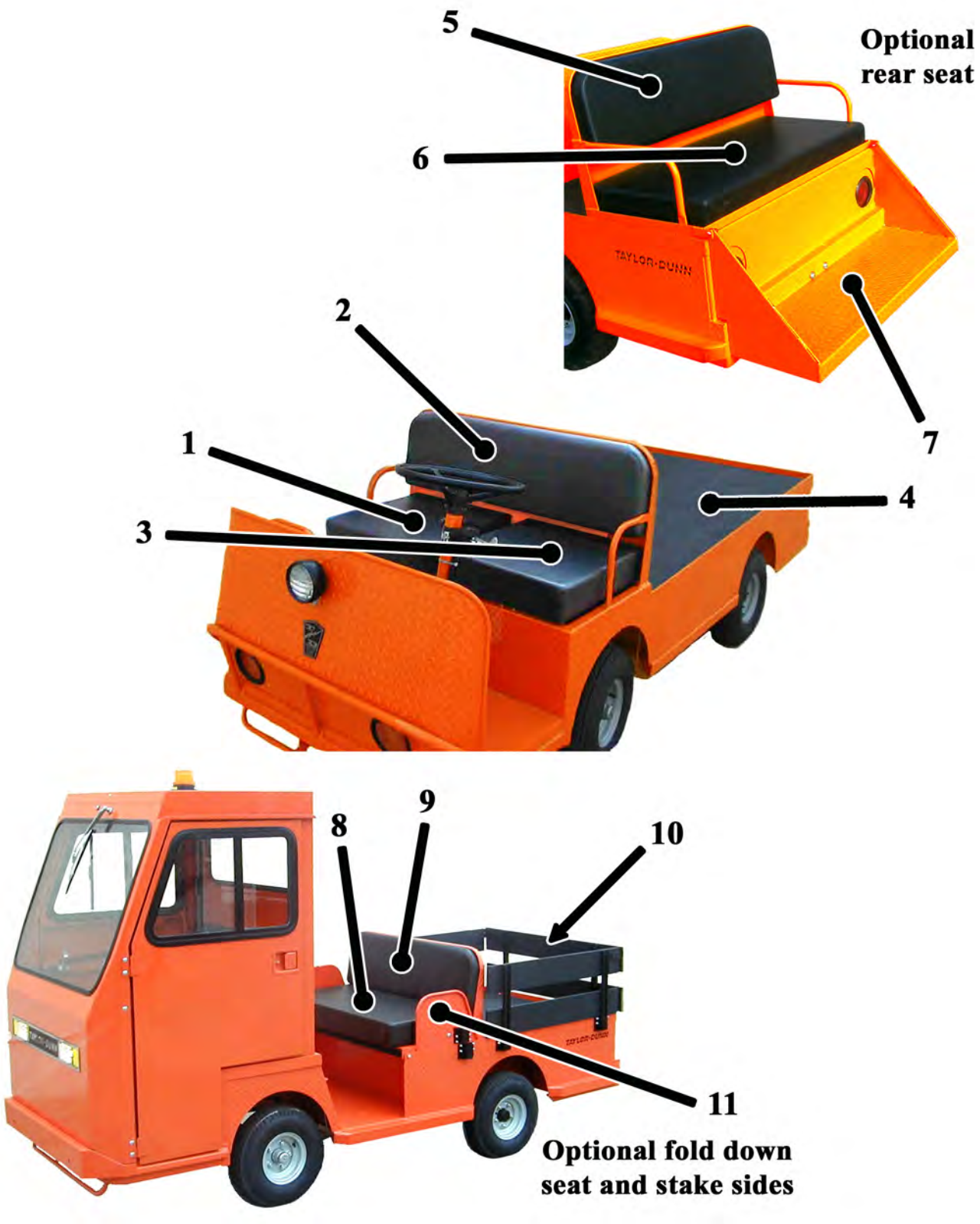
BT 2-48 Seat Cushions

Item No.	Part No.	Description	Qty
1	90-195-00	Rear seat back	4
	02-203-14	Seat back mounting plate	4
	88-837-11	#14 x 1 Sheet metal screw	30
2	90-194-00	Rear seat cushion	4
3	90-140-00	Front seat back	1
4	90-148-00	Front seat cushion	2

Shown with optional seat belts

BT 2-80 Seat Cushions

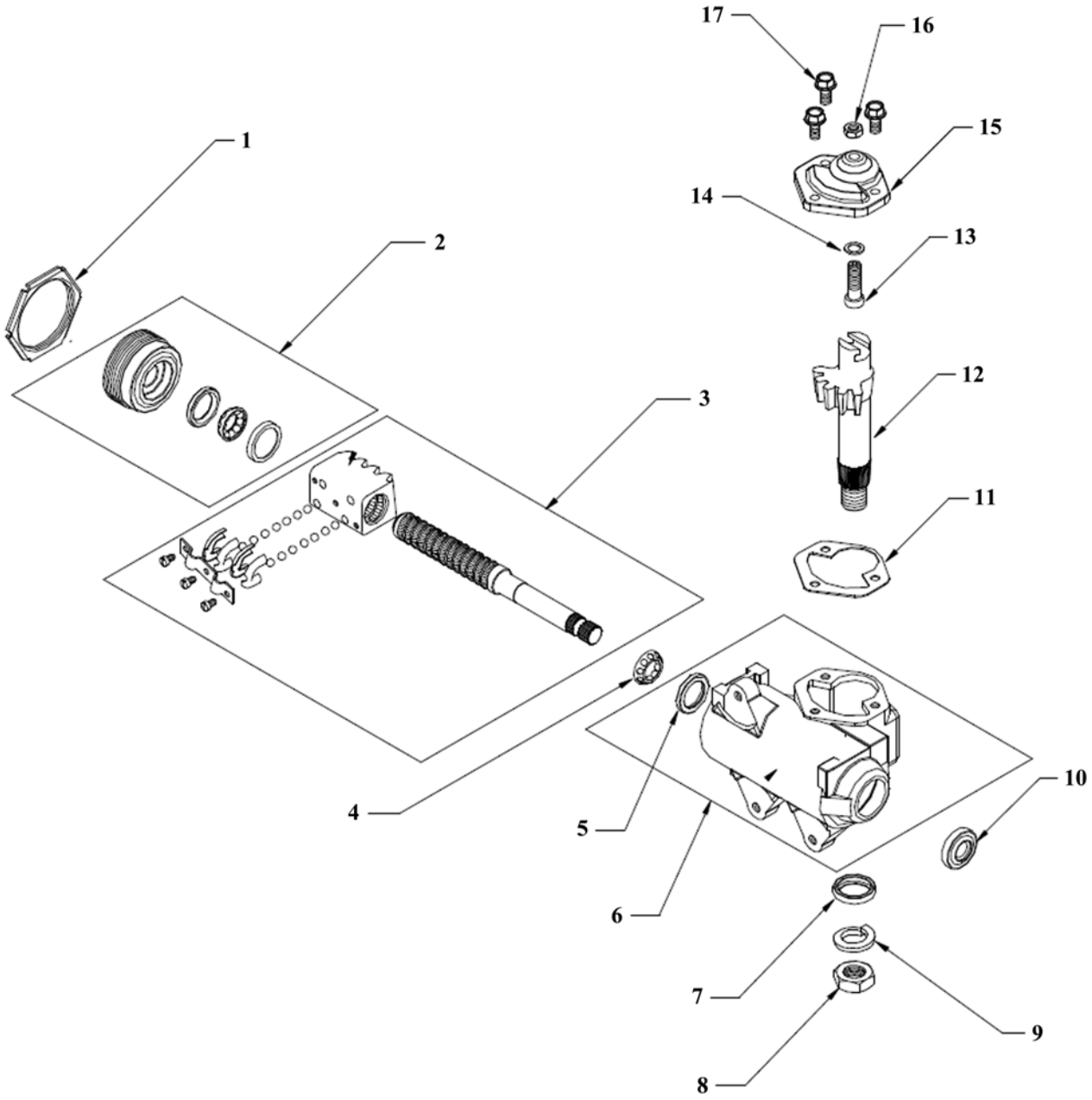
Item No.	Part No.	Description	Qty
1	90-165-20	Front driver seat chshion	1
2	90-165-20	Front passenger seat cushion	1
3	90-132-00	Backrest	3
4	90-165-20	Rear seat cushion	2
Not shown			
	88-837-11	#14 x 1 Phillips Screw	12


5
Optional
rear seat
6
TAYLOR-DUNN
2
7
1
4
3
9
8
10
11
Optional fold down
seat and stake sides

B 2-48 and B 2-54 Seats and Deck

Item No.	Part No.	Description	Qty
1	90-148-00	Passenger seat cushion (standard)	1
	90-172-00	Passenger seat cushion (with steel cab)	1
2	90-140-00	Seat back (standard)	1
	90-179-00	Seat back (with steel cab)	1
3	90-148-00	Driver seat cushion (standard)	1
	90-172-00	Driver seat cushion (with steel cab)	1
4	90-444-00	Deckboard, 75-1/4 x 41 (standard bed)	1
	90-466-10	Deckboard, 19-1/2 x 41	1
	90-467-10	Deckboard, 55-3/4 x 41	1
	90-466-00	Deckboard, 21-3/4 x 41 (fold away seat option)	1
	90-468-00	Deckboard, 32-3/4 x 41 (fold away seat option)	1
	90-469-00	Deckboard, 19-11/16 x 41 (f oldaway seat option)	1
	90-464-00	Deckboard, 55 x 41 (fold away seat option)	1
	90-441-00	Deckboard, 37-1/2 x 41	1
	90-440-43	Diamond plate deck cover, 32-3/4 x 41	1
	90-440-50	Diamond plate deck cover, 19-1/2 x 41	1
	90-440-54	Diamond plate deck cover, 55-3/4 x 41	1
	88-607-09	Rivet, diamond plate deck	-
	95-530-10	Handle, fold away seat	1
5	90-140-00	Seat back	1
	90-107-01	Seat frame	1
6	90-134-00	Seat cushion	1
7	90-108-01	Rear step	1
8	90-134-00	Seat cushion	1
9	90-140-00	Back rest	1
10	90-542-01	End gate	1
	90-542-06	Left gate , 75”	1
	90-542-05	Right gate, 75”	1
	90-542-03	Left gate, 37-1/4	1
	90-542-02	Right gate, 37-1/4	1
	90-542-04	Left gate, 37-1/2”	1
	90-542-07	Right gate, 37-1/2”	1
11	90-101-50	Seat frame, lower (unpainted)	1
	90-101-51	Seat frame, upper (unpainted)	1

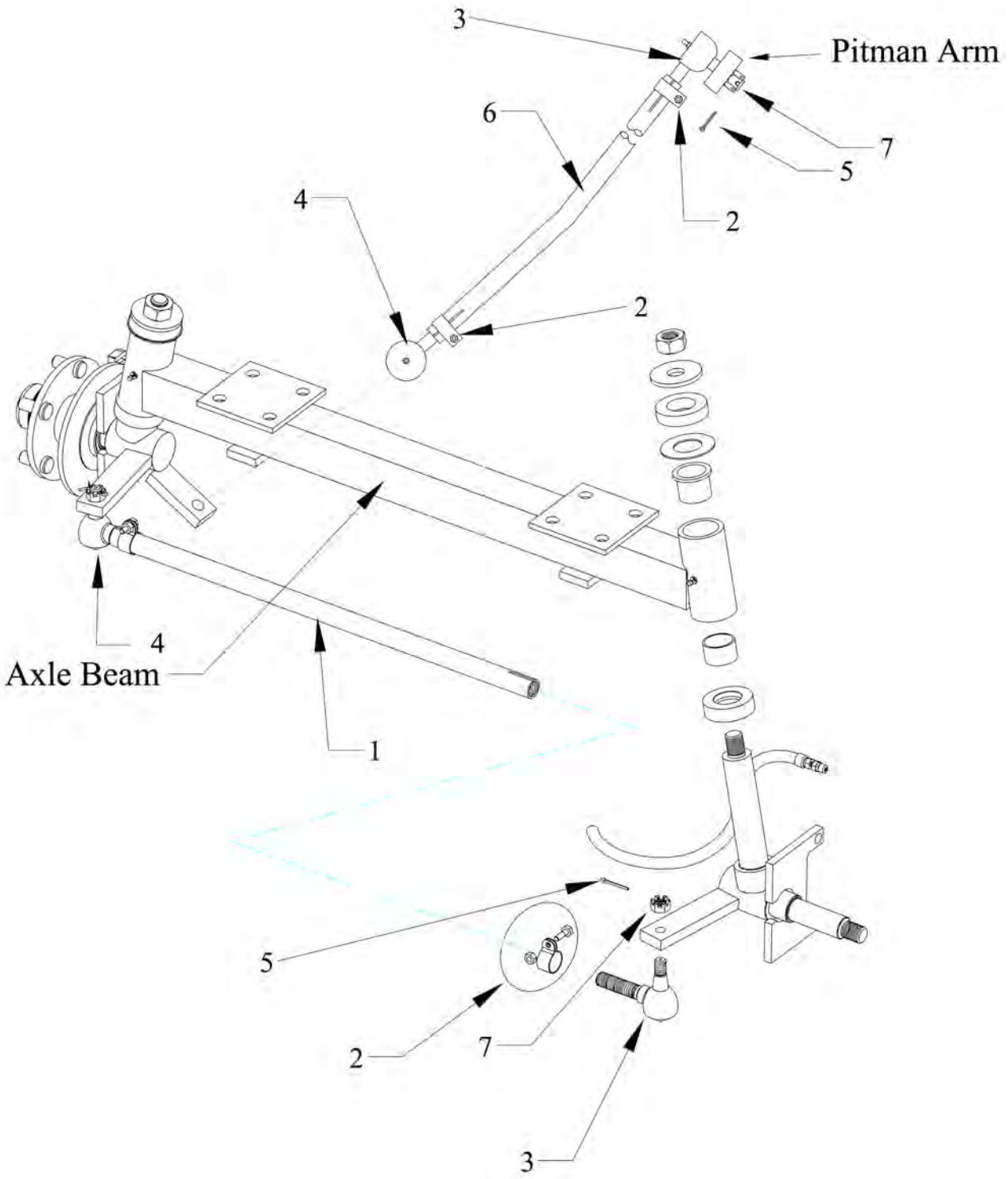
STEERING GEAR



Steering Gear, 18-308-21

Item No.	Part No.	Description	Qty
1	18-308-70	Locknut	1
2	18-308-71	Adjuster assembly	1
3	18-308-72	Worm assembly	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

STEERING LINKAGE

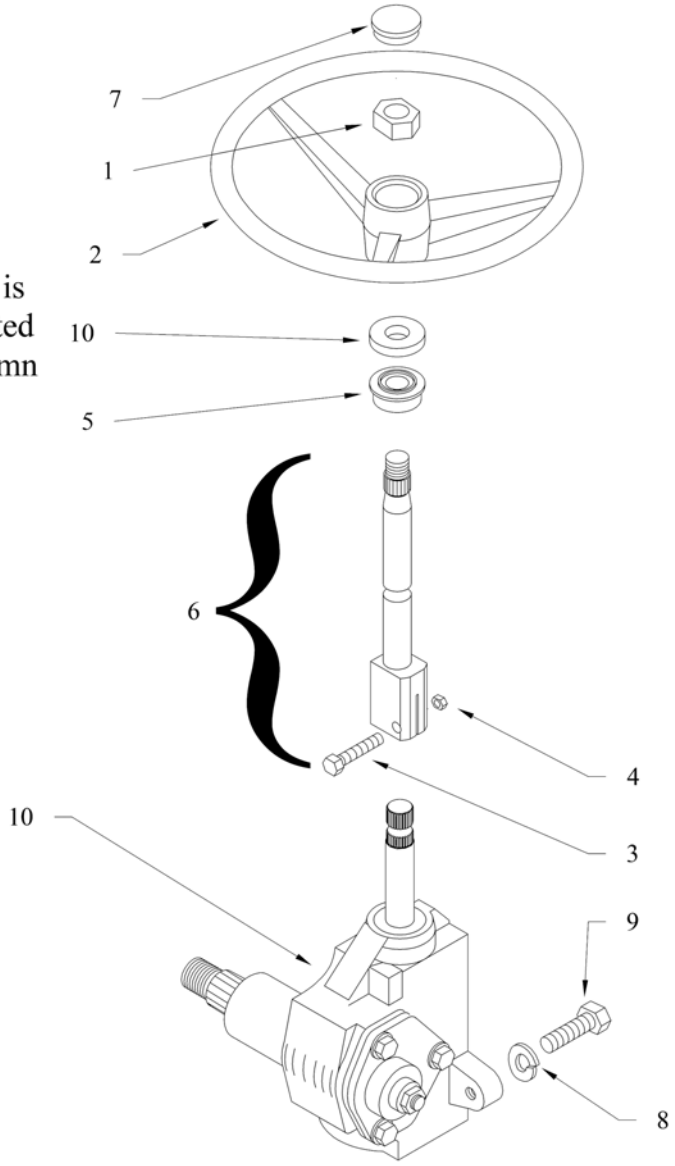


Steering Linkage

Item No.	Part No.	Description	Qty
1	18-041-05	Tie rod, B 2-48, B 2-54, BT 2-48	1
	18-057-00	Tie rod, BT 2-80	1
2	86-510-00	Ball joint clamp	4
3	86-501-98	Ball joint (left)	2
4	86-501-99	Ball joint (right)	2
5	88-527-11	1/8 x 1 Cotter pin	4
6	18-057-11	Drag link	1
7	88-159-85	1/2NF Castle nut	4

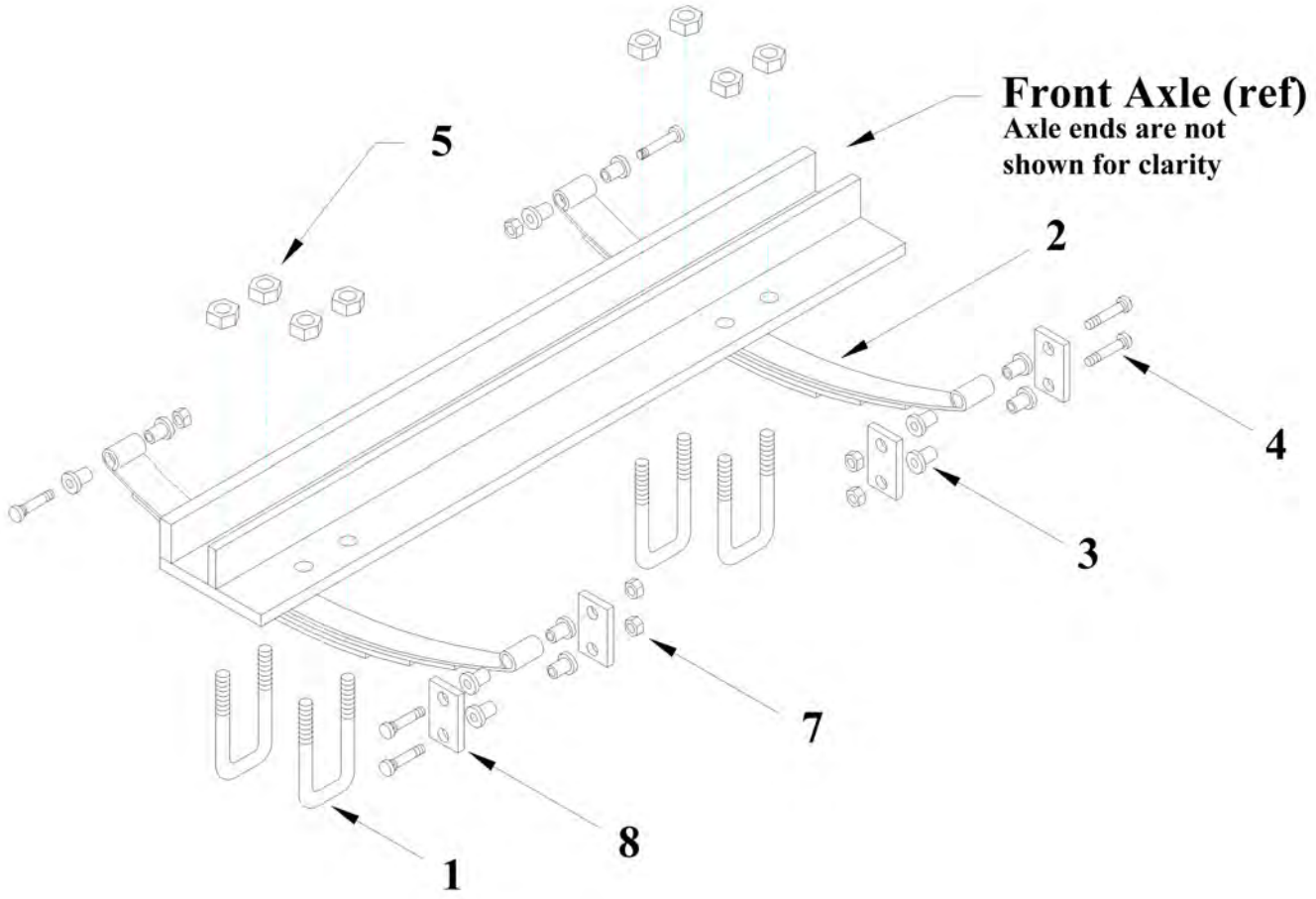
STEERING COLUMN

The steering column is an integral part of the frame and is not shown. Part ID# 5 is located in the top of the steering column tube.

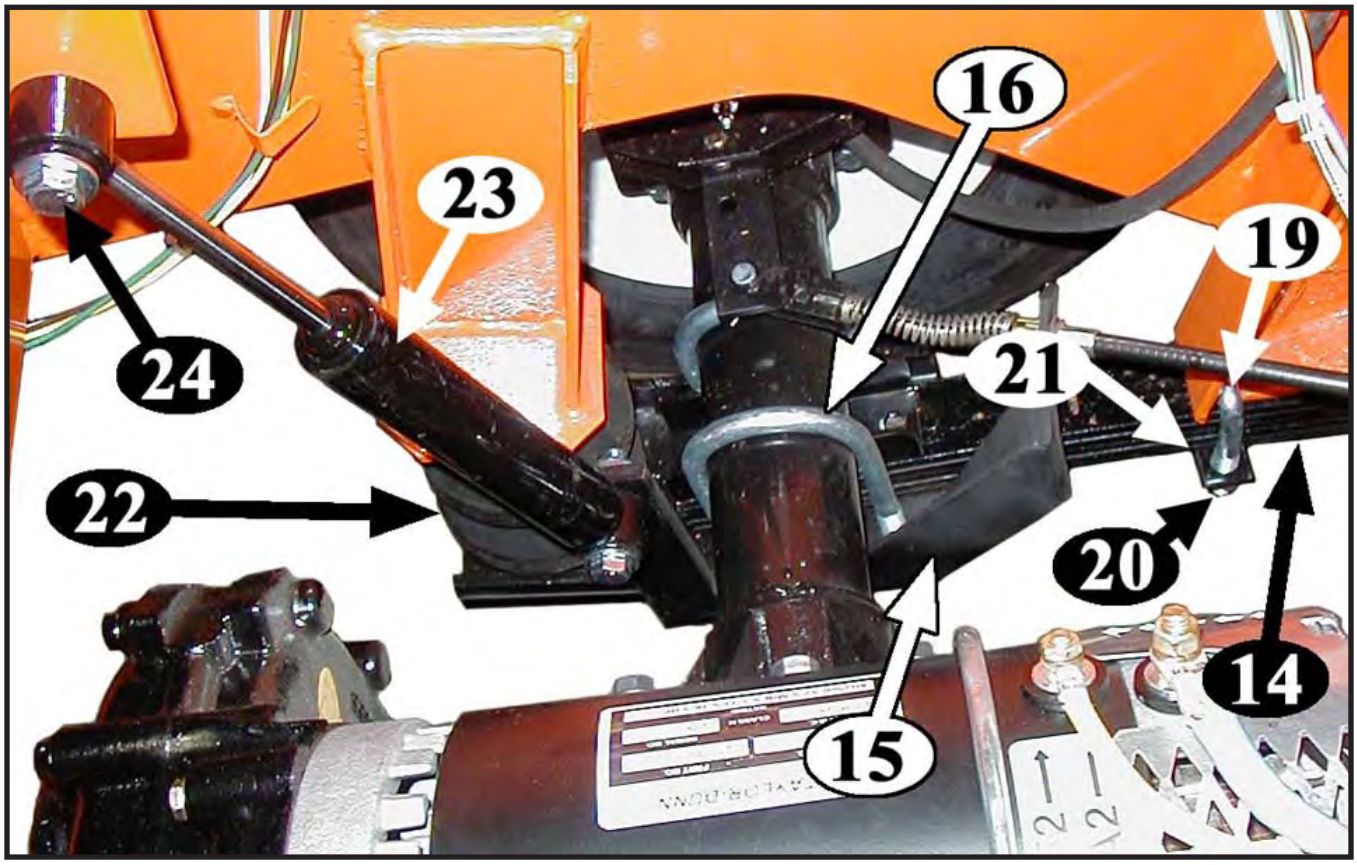


Item No.	Part No.	Description	Qty
1	88-199-82	5/8NF Hex nut	1
2	19-011-20	Steering wheel	1
3	88-081-14	5/16NF x 1-1/2 Hex bolt, grade 8	1
4	88-089-84	5/16NF Hex lock nut, grade C	1
5	32-248-10	Upper bushing	1
6	20-031-65	Steering shaft assembly (incl. 3 and 4)	1
7	19-011-25	Steering wheel cap	1
8	88-128-62	7/16 Split lock washer	3
9	88-120-15	7/16 x 1 Hex bolt	3
Not Shown			
	88-279-82	7/8NF Thin pattern hex nut, Pitman shaft	1
	88-268-62	7/8 Split lock washer, pitman shaft	1

SUSPENSION, FRONT



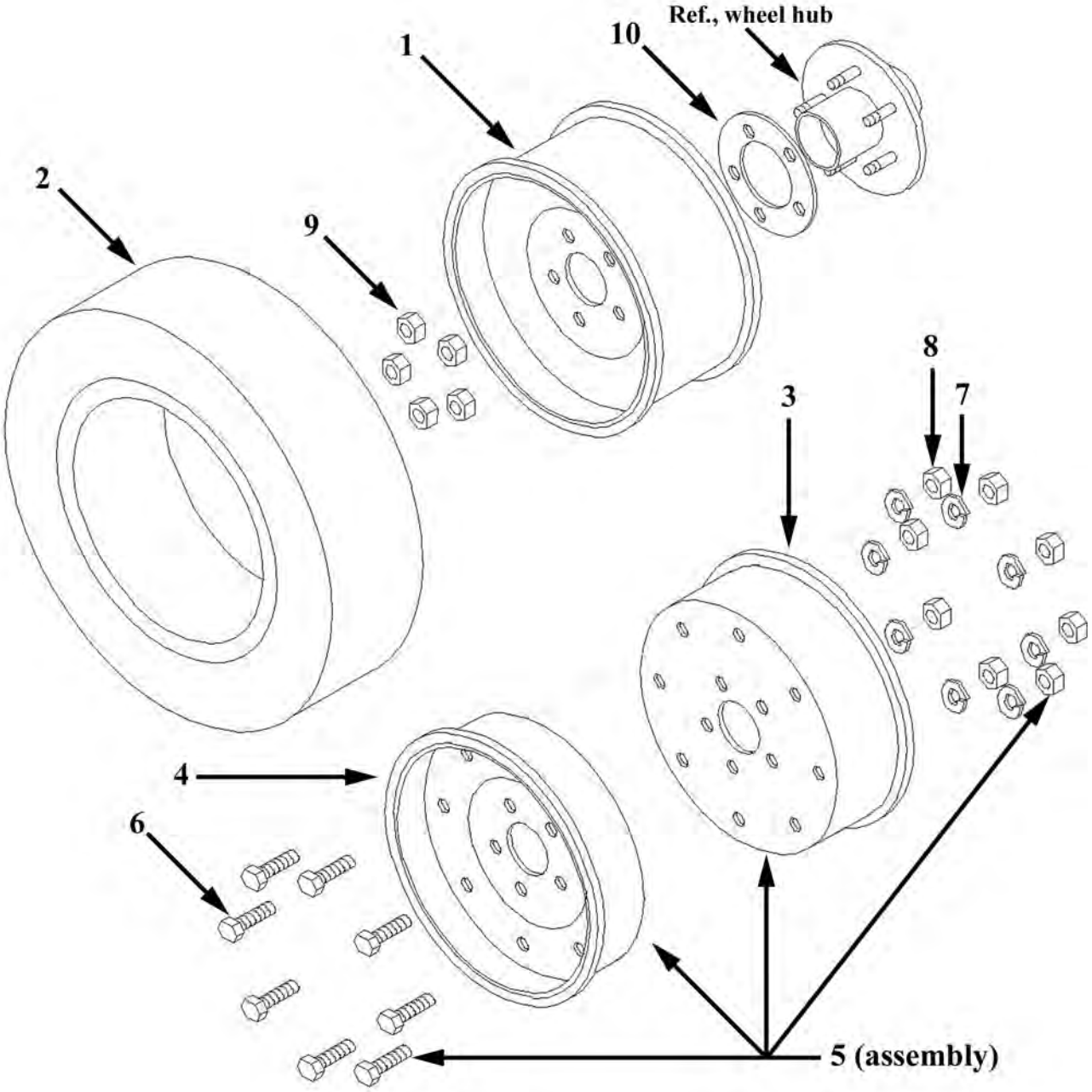
Item No.	Part No.	Description	Qty
1	96-121-00	U-bolt	4
2	85-498-00	Leaf spring, B 2-48, BT 2-48, BT 2--80	2
	85-486-00	Leaf spring, B 2-54	2
3	32-214-50	Bushing	12
4	96-240-00	1/2NC x 4 Hex bolt	6
5	88-149-81	1/2NC Lock nut	8
6	-	-	-
7	88-149-81	1/2NC Lock nut	6
8	16-872-00	Spring hanger	4


16
23
19
24
21
22
20
14
15


22

Rear Suspension

Item No.	Part No.	Description	Qty
14	85-510-17	Leaf spring	2
15	16-861-44	Spring mounting plate (left)	1
	16-861-45	Spring mounting plate (right)	1
16	96-114-00	U-bolt	4
	88-159-84	1/2NC Nylon lock nut	8
18	-	-	-
19	96-103-00	U-bolt	2
20	88-149-81	1/2NC Lock nut	4
21	50-460-00	Strap	2
22	98-002-00	Rubber overload spring	2
23	86-602-00	Shock	2
24	88-120-17	7/16NC x 2-1/4 Hex bolt	2
	88-129-81	7/16NC Lock nut	2
	88-128-60	7/16 Flat washer	2
Not shown			
	96-240-00	1/2NC x 4 Spring bolt (front of the leaf spring)	2
	32-214-50	Spring bushing (front of the leaf spring)	4


Ref., wheel hub
10
1
2
9
8
7
3
4
6
5 (assembly)

Wheels and Tires

Item No.	Part No.	Description	Qty
1	**Wheels**		
	12-012-00	5 X 8” Tubeless	
	12-020-00	8.5 X 8 Tubeless	
	12-050-00	12-1/8 Diameter Cast Iron	
2	**Tires**		
	10-075-00	4.80 X 8 LR B Pneumatic	
	10-076-00	4.80 X 8 LR C Pneumatic	
	10-081-00	5.70 X 8 LR B Pneumatic	
	10-082-00	5.70 X 8 Extra Grip	
	10-083-00	5.70 X 8 LR C	
	10-093-00	8.50 X 8 LR B	
	10-091-10	8.50 X 8 Knobby	
	10-092-00	8.50 X 8 LR C	
	10-086-00	5.00 X 8 Man-Toters with Lugs (Soft Solid)	
	10-264-00	20 X 8 X 10 LR E	
	10-250-00	16 X 4 X 12 Solid Rubber	
	Split Rim Wheels		
3	12-041-12	Inner Wheel (2.5 Bead)	
3A	12-042-12	Inner Wheel (12-Bolt)	
4	12-041-13	Outer Wheel (2.5 Bead)	
4A	12-042-13	Outer Wheel (12-Bolt)	
5	12-041-00	Wheel Assembly, 2.5 Bead Width (Includes #3, #4, #6, #7, #8)	
5A	12-042-00	Wheel Assembly, 3.75 Bead Width (Includes #3A, #4A, #6, #7, #8	
6	88-110-09	3/8 X 3/4-Nf Hex Bolt, Grade 5	
7	88-109-62	3/8 Split Lock Washer	
8	88-119-80	3/8-Nf Hex Nut	
9	97-236-00	Wheel Nut	
Not Shown			
	13-989-00	Valve Stem, Tubeless Tire Only	
	11-041-00	8.50 X 8 Tube	
	11-040-00	5.70 X 8 Tube	
	11-030-00	4.80 X 8 Tube	
Tire And Wheel Assemblies			
	13-734-00	4.80 X 8 LR B Pneumatic	
	13-734-11	4.80 X 8 LR B Split Rim Pneumatic	
	13-739-10	4.80 X 8 LR C Split Rim Pneumatic	
	13-952-10	16 X 4 X 12 Solid Rubber, Cast Iron Wheel	
	13-742-00	5.70 X 8 LR B Pneumatic	
	13-742-40	5.70 X 8 Man-Toter	
	13-742-11	5.70 X 8 Split Rim	
	13-746-10	8.50 X 8 Pneumatic	
	13-746-15	20 X 8 X 10 8-Ply	

WINDSHIELD WIPER

Item No.	Part No.	Description	Qty
	74-050-00	Wiper motor	1
	74-051-00	Wiper arm, up to 8/31/20008	0 or 1
	74-051-01	Wiper arm, starting 9/1/2008	0 or 1
	74-052-00	Wiper blade, up to 8/31/2008	0 or 1
	74-052-01	Wiper blade, starting 9/1/2008	0 or 1
	75-152-09	Harness	1

TURN SIGNALS

Item No.	Part No.	Description	Qty
-	72-051-00	Front lights(standard cowl)	2
-	72-082-10	Front bulb (steel cab)	2
-	72-082-20	Light socket (steel cab)	2
-	71-141-22	Turn signal switch	1
-	71-900-05	Flasher	1
-	72-405-00	Front light guard (standard cowl)	1

Table of Contents

Hardware Information

WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

TORQUE GUIDELINES FOR STANDARD HARDWARE

Note: Torque values specified are for clean dry threads.

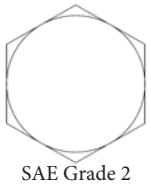
Note: Torque value used should be for lowest grade of hardware used. If a grade 2 nut is used on a grade 8 bolt, use grade 2 torque value.

Hardware Identification

Hex Head Bolts and Screws

The grade of SAE bolts and screws are identified by markings on the head as illustrated to the right.

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


SAE Grade 2


SAE Grade 5


SAE Grade 8

SAE Grade 9

Other types of bolts and screws


Truss Head, Grade 2

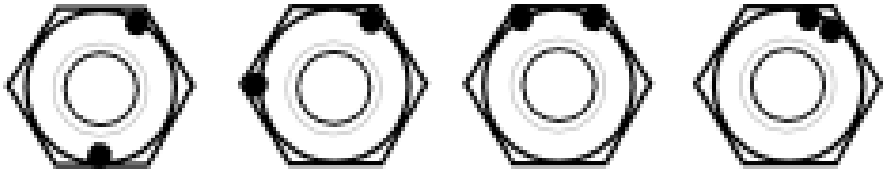

Carriage Bolt, Grade 2

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



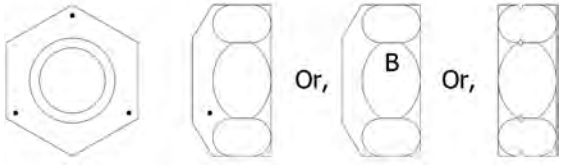
5.8 8.8 10.9 12.9

Metric Nuts

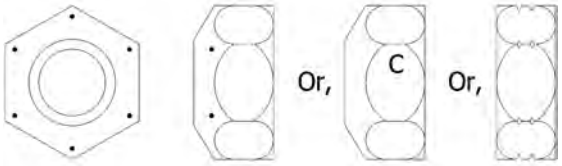
Hex Lock Nuts (stover)

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'.

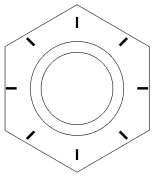
Note: Nuts with no markings are to be treated as S.A.E. Grade A



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

Generic Torque Values

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

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

Imperial (inch), Foot Pounds

		Grade, SAE			
Dia.	Pitch	2	5	8	L9
#4	40	*	*	*	*
#6	32	*	*	*	*
#8	32	*	*	*	*
#10	32	*	*	*	*
#12	32	*	*	*	*
1/4	20	5.5	8.5	12.5	11
	28	6.5	10.5		
5/16	18	12.0	17.5	24.5	22
	24	12.5	19.0	*	*
3/8	16	20	30	43	40
	24	22.5	33	50	45
7/16	14	27	50	70	65
	20	36	55	77	70
1/2	13	49	75	106	95
	20	55	85	120	110
9/16	12	70	109	153	140
	18	78	121	171	160
5/8	11	97	150	212	195
	18	110	170	240	225
3/4	10	172	275	376	350
	16	192	297	420	390
7/8	9	278	429	593	565
	14	306	473	818	625
1	8	416	644	909	850
	14	466	721	1018	930
1-1/8	7	590	794	1287	1700
	12	662	891	1444	1850
1-1/4	7	832	1120	1817	2950
	12	922	1241	2012	3330

Imperial (inch), Newton Meters

		Grade, SAE			
Dia.	Pitch	2	5	8	L9
#4	40	*	*	*	*
#6	32	*	*	*	*
#8	32	*	*	*	*
#10	32	*	*	*	*
#12	32	*	*	*	*
1/4	20	7.4	11.5	16.9	14.9
	28	8.8	14.2		
5/16	18	16.2	23.7	33.2	29.8
	24	16.9	25.8	*	*
3/8	16	27.1	41	58	54
	24	30.5	45	68	61
7/16	14	37	68	95	88
	20	49	75	104	95
1/2	13	66	102	144	129
	20	75	115	163	149
9/16	12	95	148	614	190
	18	106	164	232	217
5/8	11	132	203	287	264
	18	149	230	325	305
3/4	10	233	373	510	475
	16	260	403	569	529
7/8	9	377	582	804	766
	14	415	641	1109	847
1	8	564	873	1232	1152
	14	632	978	1380	1261
1-1/8	7	800	1076	1744	2304
	12	897	1208	2364	2508
1-1/4	7	1128	1518	2463	4000
	12	1250	1682	2727	4514

Conversion Formulas:

1: Foot Pounds = Newton Meters x 0.737562149
2: Newton meters = Foot Pounds x 1.355817948

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

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

Metric, Newton Meters

		Grade, N-m			
Dia.	Pitch	4.6	8.8	10.9	12.9
3	0.50	0.51	*	*	*
4	0.70	0.95	3.1	*	*
5	0.80	2.28	6.1	*	*
6	1.00	3.92	10.4	15.5	*
8	1.00	*	27.0	*	*
	1.25	9.48	25.0	37.0	*
10	1.00	*	57.0	*	*
	1.25	*	54.0	*	*
	1.50	19.1	51.0	75.0	*
12	1.25	*	96.0	*	*
	1.50	*	92.0	*	*
	1.75	32.6	87.0	160	*
14	1.50	*	150	*	*
	2.00	51.9	140	205	*
16	1.50	*	*	*	*
	2.00	79.9	215	310	*
18	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	110	300	*	*
20	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	156	430	*	*
22	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	211	580	*	*
24	2.00	*	*	*	*
	3.00	270	740	*	*
27	3.00	*	*	*	*
	3.00	398	*	*	*
30	2.00	*	*	*	*
	3.50	540	*	*	*

Metric, Foot Pounds

		Grade, N-m			
Dia.	Pitch	4.6	8.8	10.9	12.9
3	0.50	0.38	*	*	*
4	0.70	0.7	2.3	*	*
5	0.80	1.7	4.5	*	*
6	1.00	2.9	7.7	11.4	*
8	1.00	*	19.9	*	*
	1.25	7	18.4	27.3	*
10	1.00	*	42	*	*
	1.25	*	40	*	*
	1.50	14.1	38	55	*
12	1.25	*	71	*	*
	1.50	*	68	*	*
	1.75	24	64	118	*
14	1.50	*	111	*	*
	2.00	38	103	151	*
16	1.50	*	*	*	*
	2.00	60	158	229	*
18	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	81	221	*	*
20	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	115	317	*	*
22	1.50	*	*	*	*
	2.00	*	*	*	*
	2.50	156	428	*	*
24	2.00	*	*	*	*
	3.00	199	524	*	*
27	3.00	*	*	*	*
	3.00	293	*	*	*
30	2.00	*	*	*	*
	3.50	398	*	*	*

Conversion Formulas:

1: Foot Pounds = Newton Meters x 0.737562149
2: Newton meters = Foot Pounds x 1.355817948

REPLACING HARDWARE

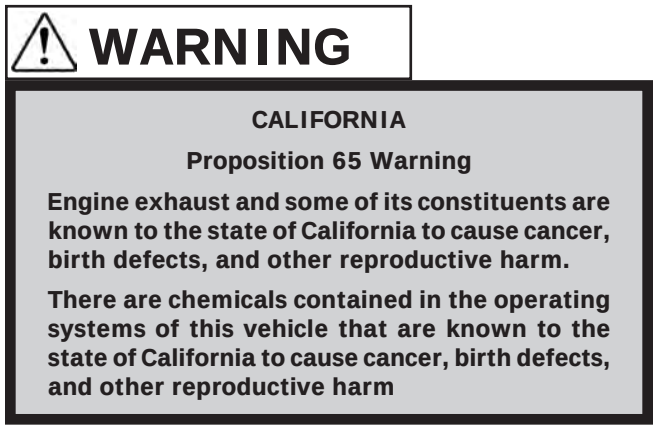
⚠ WARNING

This section is one section of a complete service manual. Before starting any procedure, read all warnings and instructions that are located in the Service Guidelines chapter.

⚠ WARNING

Failure to follow the following guidelines may result in failure of the hardware resulting in severe bodily injury or property damage:

- **Many assemblies require specific torque settings for some hardware. Refer to the appropriate assembly procedure for information regarding proper hardware torque.**
- **All hardware should be inspected for thread damage or corrosion prior to reassembly. If any evidence of damage is found then the hardware should be replaced.**
- **Battery hardware should always be replaced when installing new batteries.**
- **Never reuse cotter pins or safety locking wire. Never use a wire, nail, or any other material to substitute for a cotter pin.**
- **The locking force of a locknut is diminished when it is removed. Locknuts should be replaced whenever removed.**
- **Some hardware may requires the use of a thread locking compound. Always thoroughly clean both male and female threads when applying thread locking compounds.**


WARNING
CALIFORNIA
Proposition 65 Warning
Engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.
There are chemicals contained in the operating systems of this vehicle that are known to the state of California to cause cancer, birth defects, and other reproductive harm

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