Patriot Gravity Tenders™

Operator's Manual

Manufactured by
Minden Machine Shop Inc.
1302 K Road
Minden NE 68959
308-832-0220

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INTRODUCTION

Thank you for purchasing a Patriot Equipment Gravity Tender! We know you will get many years of productive use from it. The product has been designed to perform a certain function. The Gravity Tenders can be stationary or can be pulled to a location depending which model has been purchased. All product users must read and understand this manual prior to equipment operation. This manual is considered part of your machine and should remain with the machine at all times. Do not allow anyone to operate or maintain this equipment if they have not fully read and comprehended this manual. Failure to follow the recommended procedures may result in personal injury or death or equipment damage.

Information in this manual is designed to help owners and operators to obtain the best results and safe operation from their investment. The life of any machine depends largely on the care it is given and we suggest that the manual should be read and understood and referred to frequently. If for any reason you do not understand the instructions and safety requirements, please contact your authorized dealer. The intent of this manual is to provide guidelines to cover general use and to assist in avoiding accidents and injuries.

There may be times when circumstances occur that are not covered in the manual. At those times it is best to use common sense and contact your authorized dealer or our factory.

The requirements of safety cannot be emphasized enough in this publication. We urge you to make safety your top priority when using and maintaining the equipment. We strongly advise that anyone allowed to operate this equipment be thoroughly trained and tested, to prove they understand the fundamentals of safe operation.

Some photographs, diagrams or illustrations in this manual may show doors, guards and shields opened or removed to aid in clarity and understanding of a particular procedure. All guards, shields and safety devices must be in their proper position prior to operation.

SAFETY AND OPERATION RULES

General Safety Statements

Safety precautions are essential when the use of any mechanical equipment is involved. These precautions are necessary when using, storing, and servicing mechanical equipment. Using this equipment with the respect and caution demanded will considerably lessen the possibilities of personal injury. If safety precautions are overlooked or ignored, personal injury or property damage may occur.

The machine was designed for a specific application. It should not be modified and/or used for any application other than which it was designed. If there are any questions regarding its application, please write or call. Do not use this unit until you have been advised. For more information contact:

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Read this entire manual carefully. Know your equipment. Consider the application, limitations, and the potential hazards specific to your unit. Operator and bystander safety is of prime concern to us. This manual was written with the safety of the operator and others who come in contact with the equipment. This manual was written to help you understand the safe operating procedures of the product. We want you as our partner in safety. A copy of this manual should be available to all persons who may operate this machine.

It is your responsibility as an owner, operator, or supervisor to know what specific requirements, precautions, and work hazards exist and to make these known to all other personnel working with the equipment or in the area, so that they too may take any necessary safety precautions that may be required. Avoid any alterations of the equipment. Such alterations may create a dangerous situation where serious injury or death may occur and will void warranty.

Why is SAFETY important? Three reasons:

1. Accidents disable and kill
2. Accidents cost money
3. Accidents can be avoided

Note the use of the signal words **DANGER, WARNING,** and **CAUTION** with safety messages. The appropriate signal word for each message has been selected using the following guidelines:

DANGER: An immediate and specific hazard which will result in severe personal injury or death if proper precautions are not taken.

WARNING: A specific hazard or unsafe practice which could result in severe personal injury or death if proper precautions are not taken.

CAUTION: Unsafe practices which could result in personal injury if proper precautions are not taken or a reminder of good safety practices.

Safety Alert Symbol

BE ALERT! YOUR SAFETY IS INVOLVED!

The symbol shown above is used to call your attention to instructions concerning your personal safety. Watch for this symbol – it points out important safety precautions. The symbol means Attention! Become Alert! Your personal safety is involved! Read the message that follows and be alert to the possibility of personal injury or death.

Read this manual before operating or working around the equipment! This manual must be delivered with the equipment to its owner and operator. Failure to read this manual and its safety instructions is a misuse of equipment.

Safety Equipment

Please, remember safety equipment provides important protection for persons around a machine that is in operation. Be sure ALL SAFETY SHIELDS AND PROTECTIVE DEVICES ARE INSTALLED AND PROPERLY MAINTAINED. If any shields or guards are damaged or missing, contact Patriot Equipment for the correct items.

Safety Procedures

1. Use only lifting equipment with the proper capacity when installing or removing the machine. Forklifts with too little capacity may tip towards the front where the lifted weight is.
2. Do not operate unit without safety shields or guards in place.
3. IMPORTANT: Use caution when transporting. Be alert of the transport unit's overall width when approaching obstacles, such as post sign and poles, along the road. Check the transport width of the unit to ensure clearance before entering.
4. Comply with all safety warnings and cautions in this manual as well as the operator's manuals of any tow vehicles that may be used.
5. Do not allow anyone on the machine when in use or while in storage.
6. Do not allow anyone to enter the hopper.
7. In case of any defect or awareness of potential danger, please contact Patriot Equipment at 1-308-832-0220 immediately.

Operator Qualifications

Operation of this machine shall be limited to competent and experienced persons. In addition anyone who will operate or work around the machine must use good common sense. In order to be qualified, they must also know and meet all other requirements, such as:

1. Some regulations specify that no one under the age of 18 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation.
2. Current Occupational Safety Health Administration regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee or user in the safe operation and servicing of all equipment with which the employee or user is, or will be involved."
3. Unqualified persons are to stay out of the work area.
4. A person who has not read and understood all operating and safety instruction is not qualified to operate the machine.

Safety Overview

YOU are responsible for SAFE operation and maintenance of the machine. YOU must ensure that you and anyone who is going to operate and maintain or work around the machine must be familiar with the operating, maintenance, and safety information contained in the manual.

Remember YOU are the key to safety. GOOD PRACTICES protect not only you but also the people around you. Make these practices a working part of your safety program. Be certain EVERYONE operating this machine is familiar with the procedures recommended and follows safety precautions. Remember, accidents can be prevented. Do not risk injury or death by ignoring any information addressed.

Machine owners must give operating instructions to operators before allowing them to operate the machine. They must be reviewed at least annually thereafter per OSHA regulation 1928.57.

The most important safety device on the equipment is a SAFE OPERATOR. It is the operator's responsibility to read and understand ALL instructions in the manual and to follow them. All accidents can be avoided!

Any person who has not read and understood all operation and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

Do not modify the equipment in any way. Unauthorized modifications may impair the functions and/or safety and could affect the life of the equipment.

Safety Affirmation

1. I have read and understand the operator's manual and all safety signs before operation, maintenance, adjusting, or unplugging the machine.
2. I will allow only trained persons to operate the machine. *An untrained operator is not qualified to operate this equipment.
3. I have access to a fire extinguisher.
4. I have all guards in place and will not operate the machine without them.
5. I will not allow riders on the machine.
6. I understand the danger of moving parts (rotating parts, hydraulics, and pinch points) and will stop engine associated with the machine before servicing.
7. I recognize the danger of the machine coming in contact with power lines.
8. I have the safety lock up pins and know and understand where and when to use them.
9. I understand that any accidents that occur with the machine are my responsibilities.
10. I understand that Patriot Equipment will not be held responsible for any accidents that involve the machine.

Sign Off Sheet

(This sheet should be signed annually as part of your safety program)

As a requirement of OSHA, it is necessary for the owner/employer to train the employee in the safe operation and safety procedures with this machine. We include this sign off sheet for your convenience and personal record keeping.

DATE	EMPLOYER SIGNATURE	EMPLOYEE SIGNATURE

Machine Inspection

After delivery of your new machine and/or completion of assembly, and before each use, inspection of the machine is mandatory. This inspection should include, but not be limited to:

1. Check to see that all guards are in place, secured and functional.
2. That all fasteners are tight.
3. That all Hydraulic lines are free from leaks and defects.
4. That all electronics are working properly and wires are in good condition.
5. Check to see that all unnecessary personnel are out of the work area.
6. Inspect tires, if equipped, for the correct air pressure.

Lighting and Marking

It is the responsibility of the customer to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility if necessary.

Serial Number

To ensure efficient and prompt service, please furnish us with the model and serial number of the machine in all correspondence or other contact. The serial number is located on a visible location of the machine.

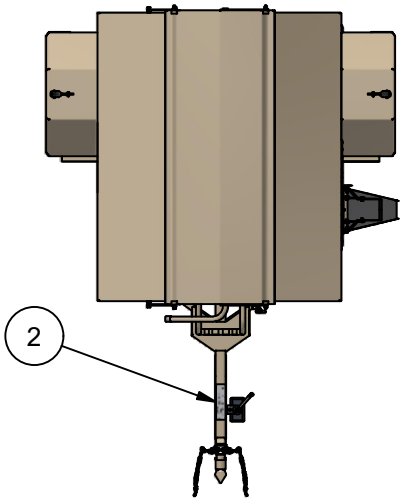
Safety Decals

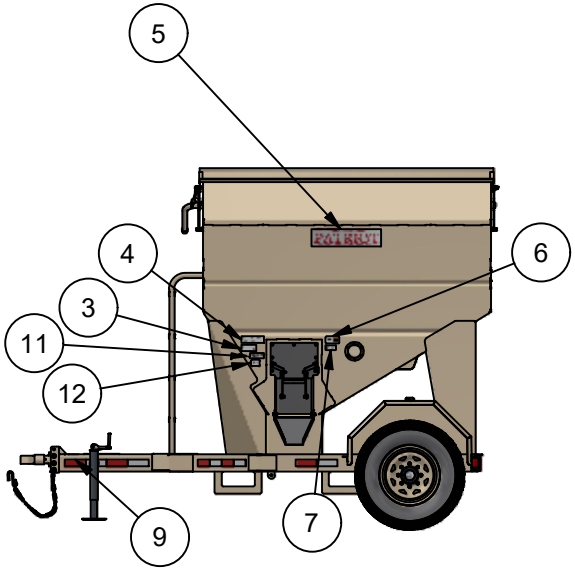
1. Keep safety decals clear and legible at all times.
2. Replace decals and signs that are missing or have become unreadable.
3. Safety signs are available from your Dealer or the Manufacturer.

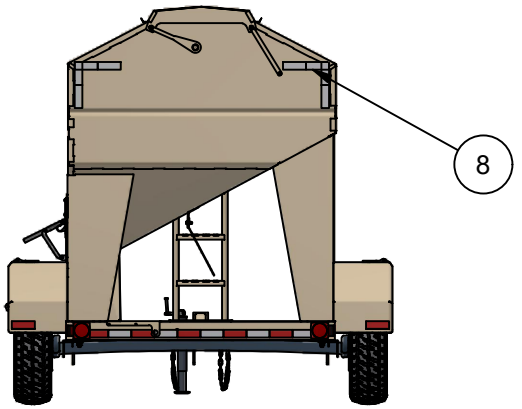
How to install Safety Decals

1. Be sure that the installation area is clean and dry.
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peal back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using a piece of decal backing paper.

Gravity Tender DOT Decals







Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GT-3TS (DOT)	3TSD Assembly
2	1	TS1006	Slide Style Coupler Bumper Pull - Varies
3	1	TS1000	Generated at Factory
4	1	TS1002	Generated at Factory
5	2	TS2000	5x20 Red Patriot Decal
6	1	TS2012	Single Pinch Point
7	1	TS2017	Read Manual Before Use
8	2	TS2007-W	Required marking
9	15	TS2007	Required marking
10	2	TS-2007-R	Required marking
11	1	TS2003	Serial Number Decal
12	1	TS2018	P65 Warning
13	1	TS7000	Non-DOT Max Speed

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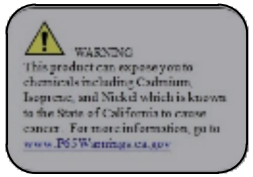
Gravity Tender DOT and Non-DOT Decals

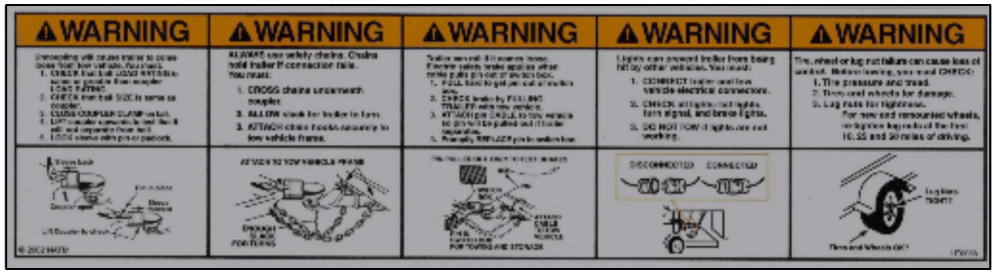
TS2017

TS2012

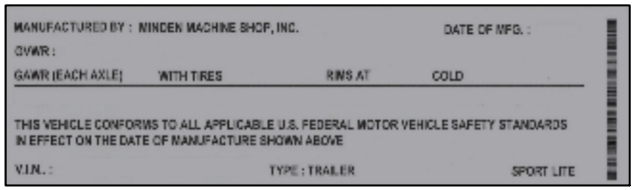


TS2018

TS2000

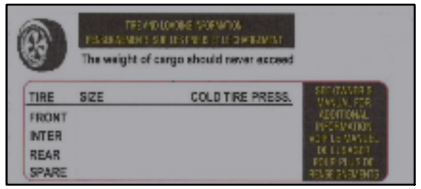


TS1006 - This decal will vary with hitch type

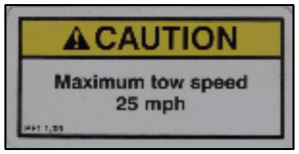


TS1002

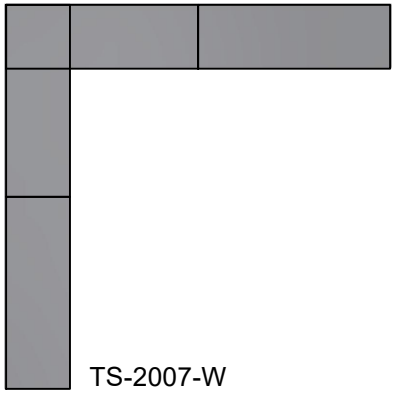
TS2003



TS1000



TS7000



TS-2007-W

TS-2007-R

TS-2007

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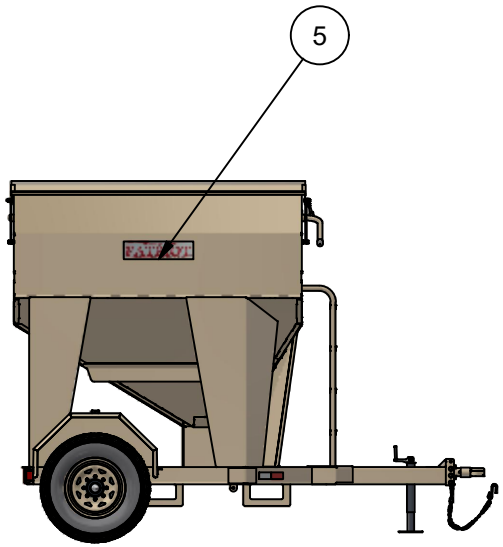
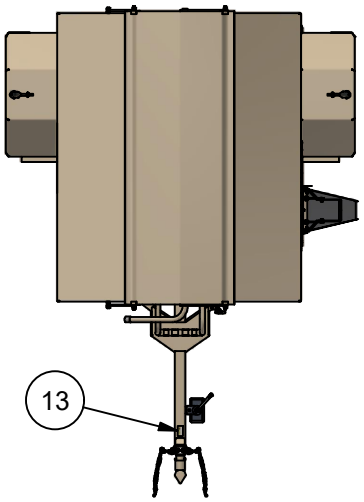
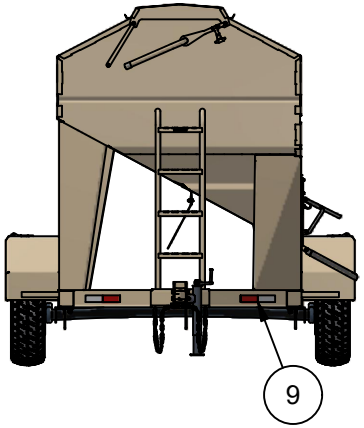
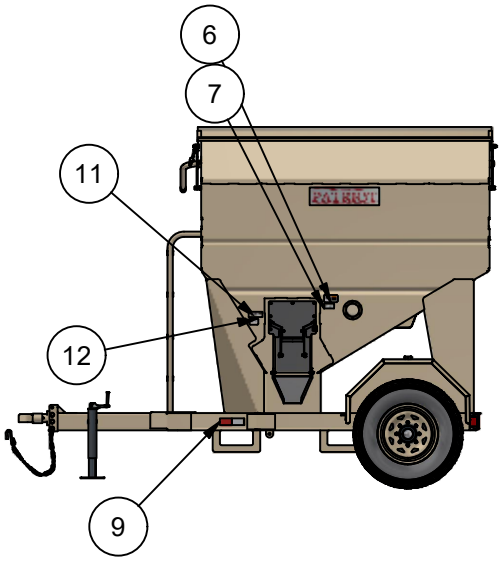
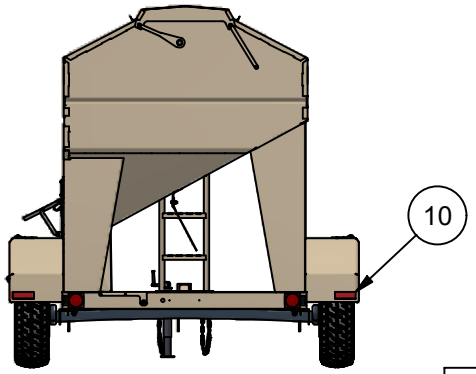
Gravity Tender Non-DOT Decals











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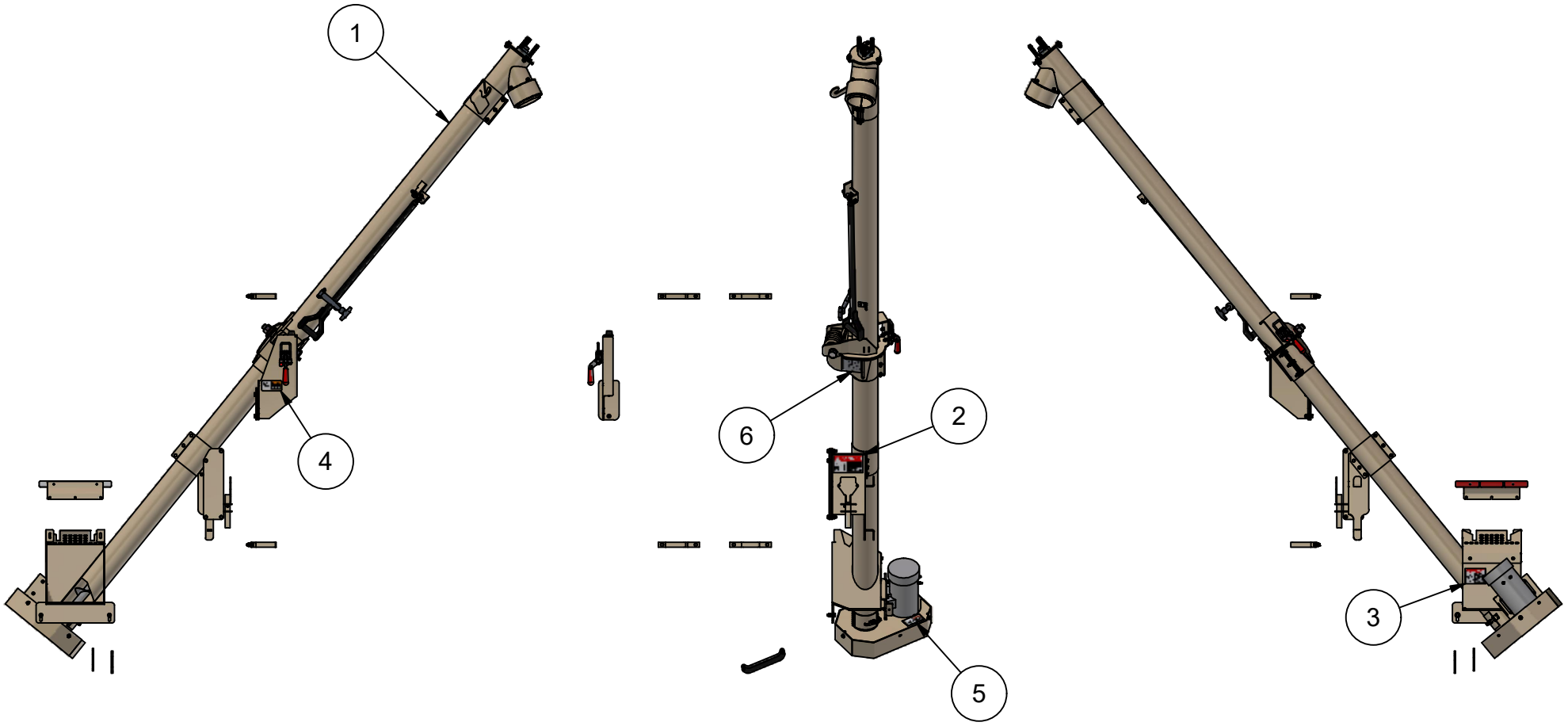
SAFETY DECAL LOCATIONS FOR GRAVITY TENDER AUGER



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GT 5in Auger Assembly	5 inch Auger Assembly
2	1	TS6013	Danger Auger in Electrical Lines
3	1	TS6014	Danger Rotating Flighting
4	1	TS2012	Single Pinch Point
5	1	CSP152	Pinch Point
6	1	TS2013	Machine Operating Warning

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SAFETY DECALS FOR GRAVITY TENDER AUGER

TS2012

CSP152

TS6013

TS2013

TS6014

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Tire Safety Information

Tire Safety Information

This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

Section 2.1 contains "Steps for Determining Correct Load Limit - Trailer".

Section 2.2 contains "Steps for Determining Correct Load Limit – Tow Vehicle".

Section 2.3 contains a Glossary of Tire Terminology, including "cold inflation pressure", "maximum inflation pressure", "recommended inflation pressure", and other non-technical terms.

Section 2.4 contains information from the NHTSA brochure entitled "Tire Safety – Everything Rides On It".

This brochure, as well as the preceding subsections, describes the following items:

Tire labeling, including a description and explanation of each marking on the tires, and information about the DOT Tire Identification Number (TIN). Recommended tire inflation pressure, including a description and explanation of:

1. Cold inflation pressure.
2. Vehicle Placard and location on the vehicle.
3. Adverse safety consequences of under inflation (including tire failure).
4. Measuring and adjusting air pressure for proper inflation.
5. Tire Care, including maintenance and safety practices.
6. Vehicle load limits, including a description and explanation of the following items:
7. Locating and understanding the load limit information, total load capacity, and cargo capacity.
8. Calculating total and cargo capacities with varying seating configurations including quantitative examples showing / illustrating how the vehicles cargo and luggage capacity decreases as combined number and size of occupants' increases. This item is also discussed in Section 3.
9. Determining compatibility of tire and vehicle load capabilities.
10. Adverse safety consequences of overloading on handling and stopping on tires.

Steps for Determining Correct Load Limit – Trailer

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification/VIN label that is located on the forward half of the left (road) side of the unit. This certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

If your trailer has a GVWR of 10,000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer cannot exceed the stated GVWR.

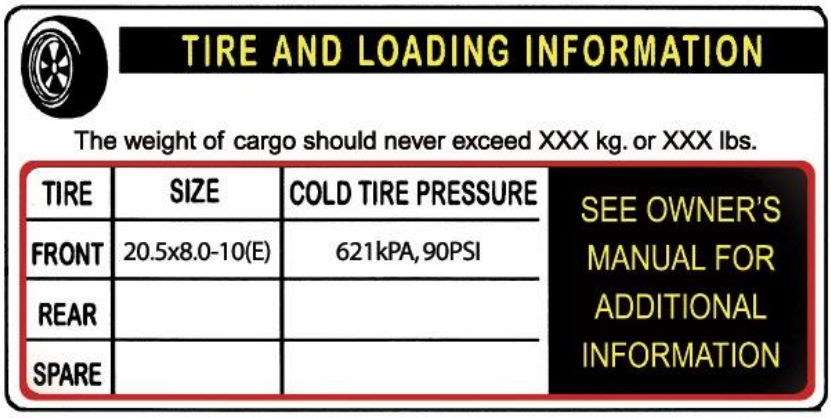
For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water however, is a disposable cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the

limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or under inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the certification/VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

Trailers 10,000 Pounds GVWR or Less



Tire and Loading Information Placard – Figure 1-1

1. Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard. See figure 1-1.
2. This figure equals the available amount of cargo and luggage load capacity.
3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

The trailer's placard refers to the Tire Information Placard attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer.

Trailers over 10,000 Pounds GVWR (Note: These trailers are not required to have a tire information placard on the vehicle)

Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.

Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.

Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight

is the maximum available cargo capacity of the trailer and may not be safely exceeded.

Steps for Determining Correct Load Limit – Tow Vehicle

1. Locate the statement, “The combined weight of occupants and cargo should never exceed XXX lbs.,” on your vehicle’s placard.
2. Determine the combined weight of the driver and passengers who will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.
4. The resulting figure equals the available amount of cargo and luggage capacity. For example, if the “XXX” amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.).
5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step # 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle’s manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

Glossary of Tire Terminology

Accessory weight
The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

Bead
The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

Bead separation
This is the breakdown of the bond between components in the bead.

Bias ply tire
A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

Carcass
The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

Chunking
The breaking away of pieces of the tread or sidewall.

Cold inflation pressure
The pressure in the tire before you drive.

Cord
The strands forming the plies in the tire.

Cord separation
The parting of cords from adjacent rubber compounds.

Cracking
Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

CT
A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

Curb weight
The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

Extra load tire
A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Groove
The space between two adjacent tread ribs.

Gross Axle Weight Rating
The maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.

Gross Vehicle Weight Rating
The maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.

Hitch Weight
The downward force exerted on the hitch ball by the trailer coupler.

Inner liner
The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

Inner liner separation
The parting of the inner liner from cord material in the carcass.

Intended outboard sidewall
The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

Light truck (LT) tire
A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

Load rating
The maximum load that a tire is rated to carry for a given inflation pressure.

Maximum load rating
The load rating for a tire at the maximum permissible inflation pressure for that tire.

Maximum permissible inflation pressure
The maximum cold inflation pressure to which a tire may be inflated.

Maximum loaded vehicle weight
The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

Measuring rim
The rim on which a tire is fitted for physical dimension requirements.

Pin Weight
The downward force applied to the 5^{th} wheel or gooseneck ball, by the trailer kingpin or gooseneck coupler.

Non-pneumatic rim
A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

Non-pneumatic spare tire assembly
A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

Non-pneumatic tire
A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

Non-pneumatic tire assembly
A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

Normal occupant weight
This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

Occupant distribution
The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

Open splice
Any parting at any junction of tread, sidewall, or inner liner that extends to cord material.

Outer diameter
The overall diameter of an inflated new tire.

Overall width
The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

Ply
A layer of rubber-coated parallel cords.

Ply separation
A parting of rubber compound between adjacent plies.

Pneumatic tire
A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

Production options weight
The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

Radial ply tire
A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

Recommended inflation pressure
This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.

Reinforced tire
A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Rim
A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Rim diameter
This means the nominal diameter of the bead seat.

Rim size designation
This means the rim diameter and width.

Rim type designation
This means the industry of manufacturer’s designation for a rim by style or code.

Rim width
This means the nominal distance between rim flanges.

Section width
The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

Sidewall
That portion of a tire between the tread and bead.

Sidewall separation
The parting of the rubber compound from the cord material in the sidewall.

Special Trailer (ST) tire
The "ST" is an indication the tire is for trailer use only.

Test rim
The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

Tread
That portion of a tire that comes into contact with the road.

Tread rib
A tread section running circumferentially around a tire.

Tread separation
Pulling away of the tread from the tire carcass.

Tread wear indicators (TWI)
The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

Vehicle capacity weight
The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle’s designated seating capacity.

Vehicle maximum load on the tire
The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

Vehicle normal load on the tire
The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CRF 49 571.110) and dividing by 2.

Weather side
The surface area of the rim not covered by the inflated tire.

Wheel center member
In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

Wheel-holding fixture
The fixture used to hold the wheel and tire assembly securely during testing.

Tire Safety - Everything Rides On It

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

Improve vehicle handling
Help protect you and others from avoidable breakdowns and accidents
Improve fuel economy
Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:
Basic tire maintenance
Uniform Tire Quality Grading System
Fundamental characteristics of tires
Tire safety tips.

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

Safety First–Basic Tire Maintenance

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Underinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

Finding Your Vehicle's Recommended Tire Pressure and Load Limits

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

1. Recommended tire size
2. Recommended tire inflation pressure
3. Vehicle capacity weight (VCW–the maximum occupant and cargo weight a vehicle is designed to carry)
4. Front and rear gross axle weight ratings (GAWR– the maximum weight the axle systems are designed to carry).

Both placards and certification labels are permanently attached to the trailer near the left front.

Understanding Tire Pressure and Load Limits

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure– measured in pounds per square inch (psi)–a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kpa), which is the metric measure used internationally.)

Manufacturers of passenger vehicles and light trucks determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)
Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Checking Tire Pressure

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

1. Most tires may naturally lose air over time.
2. Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
3. With radial tires, it is usually not possible to determine under inflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.
The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

Steps for Maintaining Proper Tire Pressure

- Step 1: Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual.
- Step 2: Record the tire pressure of all tires.
- Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
- Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
- Step 5: At a service station, add the missing pounds of air pressure to each tire that is underinflated.
- Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard or certification label. While your tire may still be slightly underinflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly

underinflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

Tire Size

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

Tire Tread

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in tread wear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

Tire Balance and Wheel Alignment

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

Tire Repair

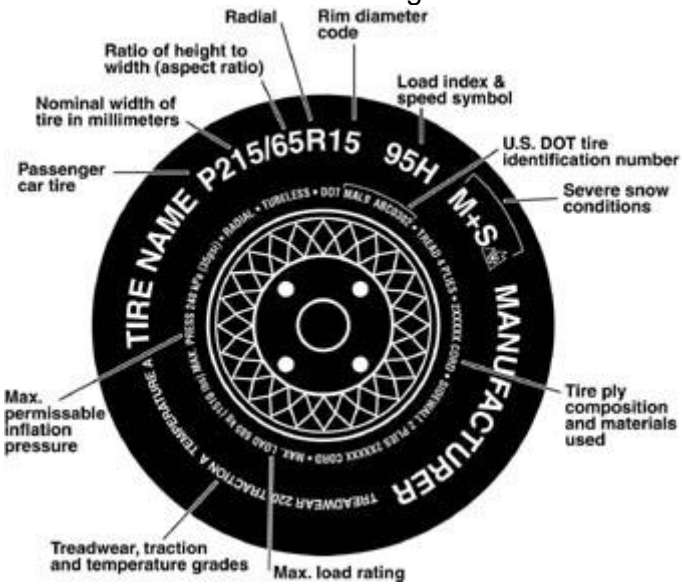
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

Tire Fundamentals

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

Information on Passenger Vehicle Tires

Please refer to the diagram below.



P
The "P" indicates the tire is for passenger vehicles.

Next number
This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

Next number
This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

R
The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

Next number
This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

Next number
This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

M+S
The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.

Speed Rating

The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. Note: You may not find this information on all tires because it is not required by law.

Letter Rating	Speed Rating
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168* mph
Y	186* mph

* For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

U.S. DOT Tire Identification Number

This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

Tire Ply Composition and Materials Used

The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

Maximum Load Rating

This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

Maximum Permissible Inflation Pressure

This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

UTQGS Information

Tread wear Number

This number indicates the tire's wear rate. The higher the tread wear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

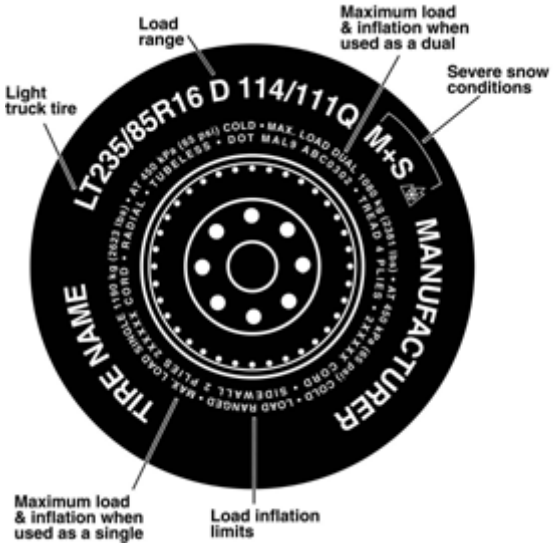
Traction Letter

This letter indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA","A", "B", and "C".

Temperature Letter
This letter indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, under inflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

Additional Information on Light Truck Tires

Please refer to the following diagram.



Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

LT
The "LT" indicates the tire is for light trucks or trailers.

ST
An "ST" is an indication the tire is for trailer use only.

Max. Load Dual kg (lbs.) at kPa (psi) Cold
This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

Max. Load Single kg (lbs.) at kPa (psi) Cold
This information indicates the maximum load and tire pressure when the tire is used as a single.

Load Range
This information identifies the tire's load-carrying capabilities and its inflation limits.

Tire Safety Tips

Preventing Tire Damage

1. Slow down if you have to go over a pothole or other object in the road.
2. Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

Tire Safety Checklist

1. Check tire pressure regularly (at least once a month), including the spare.
2. Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
3. Remove bits of glass and foreign objects wedged in the tread.
4. Make sure your tire valves have valve caps.
5. Check tire pressure before going on a long trip.
6. Do not overload your vehicle. Check the Tire Information and Loading Placard or User's manual for the maximum recommended load for the vehicle.

Wheel Attachment and Torque Requirements

Patriot Equipment would like to reiterate the extreme importance of properly matching your axles, wheels, and tires when specifying or replacing your trailer wheels. It is of equal importance that you apply and maintain proper wheel mounting torque on your trailer axle. Please follow the wheel selection, torque requirement, and torque sequence guidelines that follow.

Wheel Selection

Wheels are a very important and critical component of your running gear system. When specifying or replacing your trailer wheels it is important that the wheels, tires, and axle are properly matched. The following characteristics are extremely important and should be thoroughly checked when replacement wheels are considered.

1. **Bolt Circle:** Many bolt circle dimensions are available and some vary by so little that it might be possible to attach an improper wheel that does not match the axle hub. Be sure to match your wheel to the axle hub, bolts circle, hub pilot and wheel mount surface to hub face. Also, confirm that proper studs stick out.
2. **Capacity:** Make sure that the wheels have enough load carrying capacity and pressure rating to match the maximum load of the axle tire and trailer.
3. **Offset:** This refers to the relationship of the center line of the tire to the hub face of the axle. Care should be taken to match any replacement wheel with the same offset wheel as originally equipped. Failure to match offset can result in reducing the load carrying capacity of your axle.
4. **Rim Contour.**

CAUTION

Replacement tires must meet the same specifications as the originals. Mismatched tires and rims may come apart with explosive force and cause personal injury to yourself and others. Mismatched tires and rims can also blow out and cause you to lose control and have an accident which can result in serious injury or death.

CAUTION

Do not attempt to repair or modify a wheel. Even minor modifications can have a great effect. Do not install a tube to correct a leak through the rim. If the rim is cracked, the air pressure in the tube may cause the pieces of the rim to explode with great force and can cause serious injury or death.

Torque Requirements

You should always consult with the wheel manufacturer to determine the appropriate torque level for your wheels. It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque is a measure of the amount of tightening applied to a fastener (nut or bolt) and is expressed as length times force. For example, a force of 90 pounds applied at the end of a wrench one foot long will yield 90 Ft Lbs. of torque. Torque wrenches are the proper method to ensure torque is applied correctly to a fastener.

CAUTION

Wheel nuts or bolts must be tightened and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheels from your axle, which can lead to an accident, personal injuries or death.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60 degrees or 90 degrees). The proper procedure for attaching your wheels is as follows:

1. Start all nuts/bolts by hand to prevent cross threading.
2. The tightening should be done in stages;
    a. Initially snug (10 ft-lb) the nuts/bolts to align and seat the wheel to the hub, in the order described in the torque sequence diagram below.
    b. Tighten the nuts/bolts performing the wheel torque sequence below.
3. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 10 miles, 25 miles and again at 50 miles. Check periodically thereafter, THIS IS VERY IMPORTANT.
4. Wheel nuts are designed to have full thread engagement with the wheel stud. Wheel stud threads should be visible outside the wheel nut. There will be varying amounts of thread stick out depending on variables such as center disc thickness and nut thickness. In general, there should be approximately three threads visible past the end of the nut.

Wheel Attachment and Torque Requirements

Wheel Installation Torque Sequence (Ft. Lbs.)					
Wheel Size	Stud Size	1st Stage	2nd Stage	Final Torque	Cone Nut Degree
12" - 440 BC	1/2"-20	20-25	35-40	60-75	60 Degree Cone Nut
12" - 545 BC	1/2"-20	20-25	35-40	60-75	60 Degree Cone Nut
13" - 440 BC	1/2"-20	20-25	35-40	60-75	60 Degree Cone Nut
13" - 545 BC	1/2"-20	20-25	35-40	60-75	60 Degree Cone Nut
14" - 545 BC	1/2"-20	20-25	50-60	100-120	60 Degree Cone Nut
15" - 545 BC	1/2"-20	20-25	50-60	100-120	60 Degree Cone Nut
15" - 655 BC	1/2"-20	20-25	50-60	100-120	60 Degree Cone Nut
16" - 655 BC	1/2"-20	20-25	50-60	100-120	60 Degree Cone Nut
16" - 865 BC	9/16"-18	20-25	50-60	140-170	60 Degree Cone Nut
16.5" - 655 BC	1/2"-20	20-25	50-60	100-120	60 Degree Cone Nut
16.5" - 865 BC	9/16"-18	20-25	50-60	140-170	60 Degree Cone Nut
16.5" x 9.75" 865 BC	5/8"-18	50-60	120-125	175-225	Special Stud Piloted with 90 degree Cone Nuts
17.5" Hub Pilot 865 BC	5/8"-18	50-60	100-120	190-210	Hub piloted with clamp ring. 90 degree cone nuts and greased threads.
17.5" Hub Pilot 865 BC	5/8"-18	50-60	90-200	275-325	Hub piloted with flange nut
17.5" Hub Pilot 865 BC	5/8"-18	50-60	60-110	150-175	Hub piloted with swivel flange nut

Medium and Heavy Duty Torque Requirements (Ft. Lbs.)				
Description	Part Number	Application	Torque Min. Ft. Lbs.	Torque Max. Ft. Lbs
5/8-19 90 degree Cone	006-109-00	Clamp Ring 033-052-01	190	210 Grease Threads
3/4-10 Hex Nut	006-117-00	Demountable Rim Clamp	210	260
3/4-16 Sherical Nut	006-064-01, 02 006-069-01, 02	Single Wheel Inner Dual	450 450	500 500
1-1/8 - 16 Spherical Nut	006-070-01, 02	Outer Dual	450	500
5/8-18 Non-swiveling Flange Nut	006-058-00	Wheels	275	325
5/8-18 Swiveling Flange Nut	006-209-00	Wheels	150	175
M22-1.5	006-118-00	Swiveling Flange Nut	450	500

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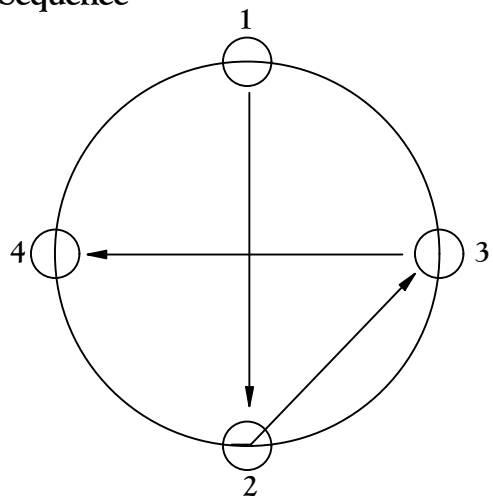
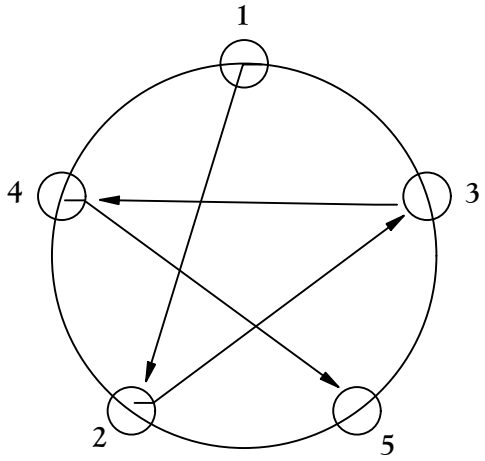
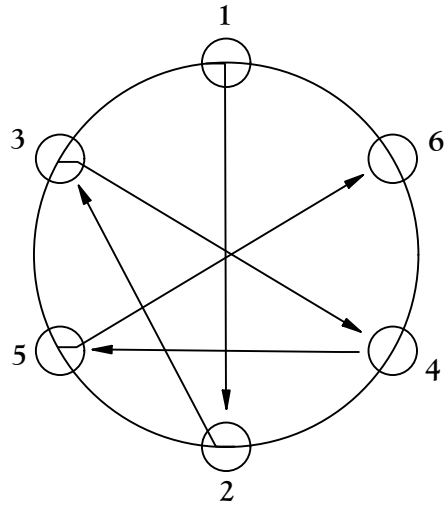
Torque Sequence



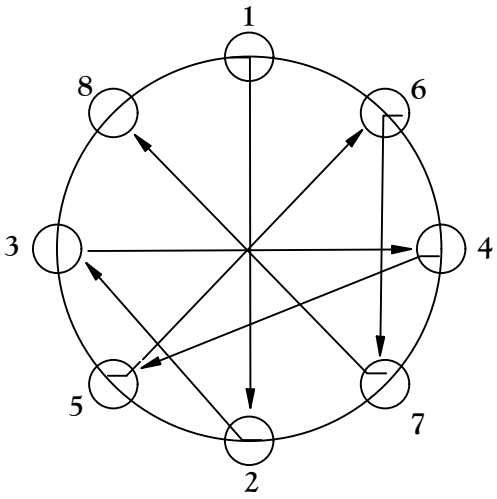
4 Bolt



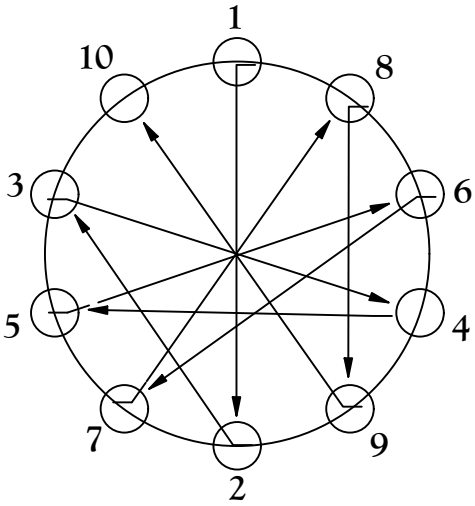
5 Bolt



6 Bolt



8 Bolt



10 Bolt

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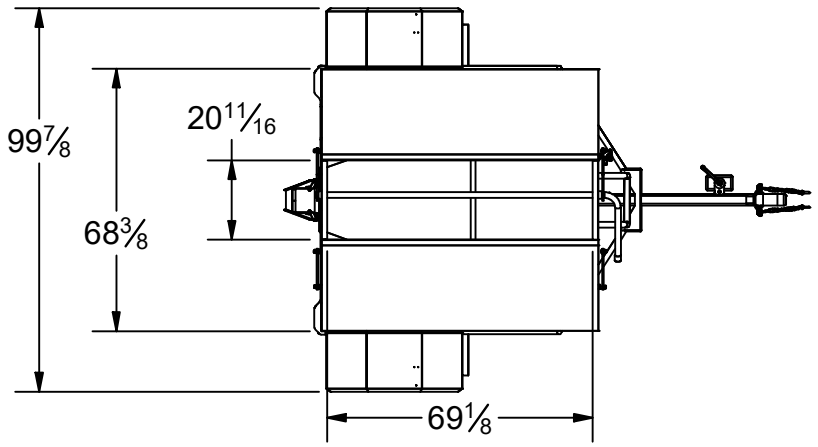
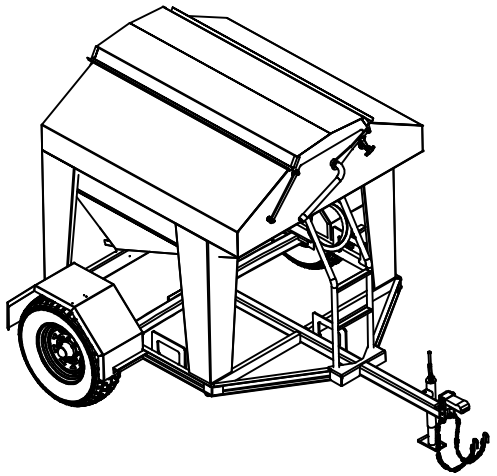
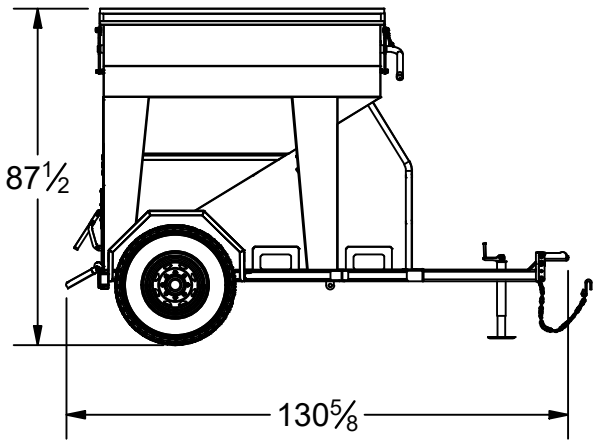
Machine Measurements

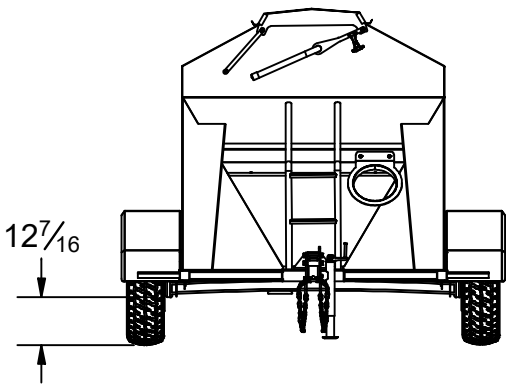
Gravity Tender 2 Ton Rear Discharge Dimensions

Empty Weight: 1507 Lbs









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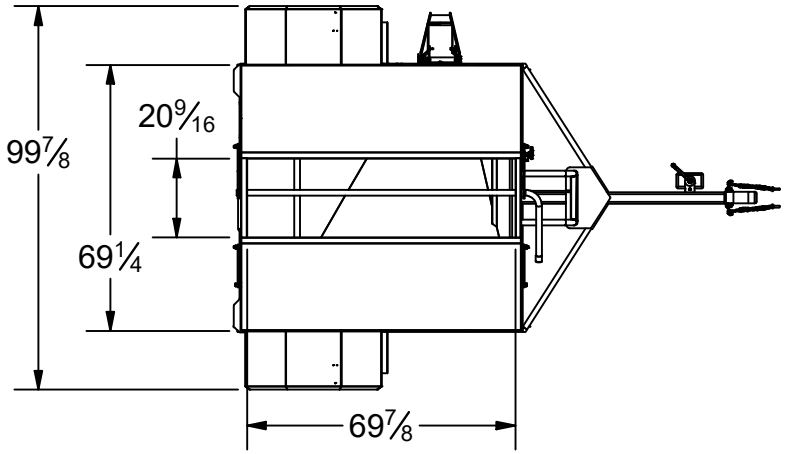
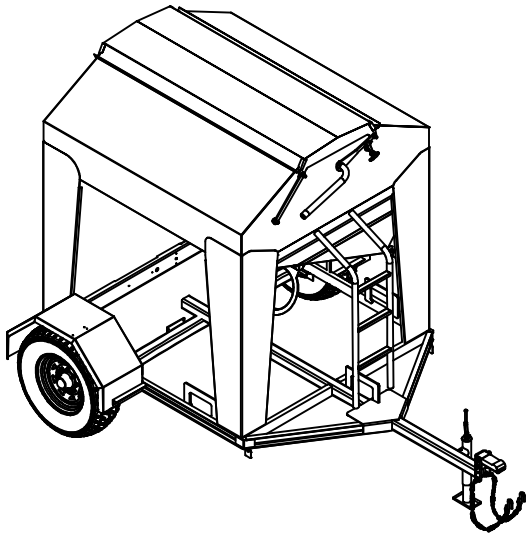
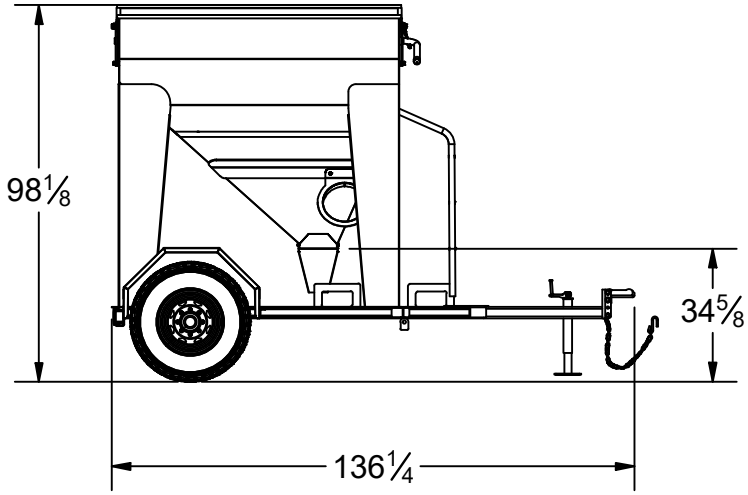
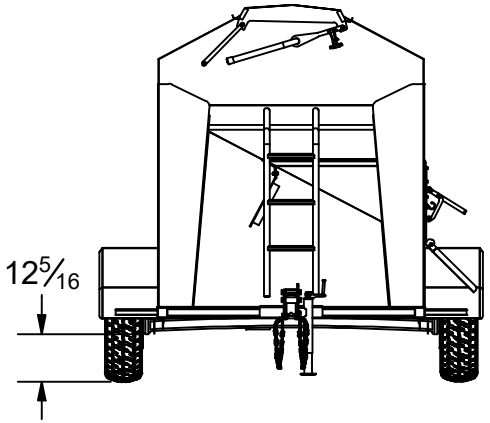
Gravity Tender 2 Ton Side Discharge Dimensions

Empty Weight: 1532 Lbs









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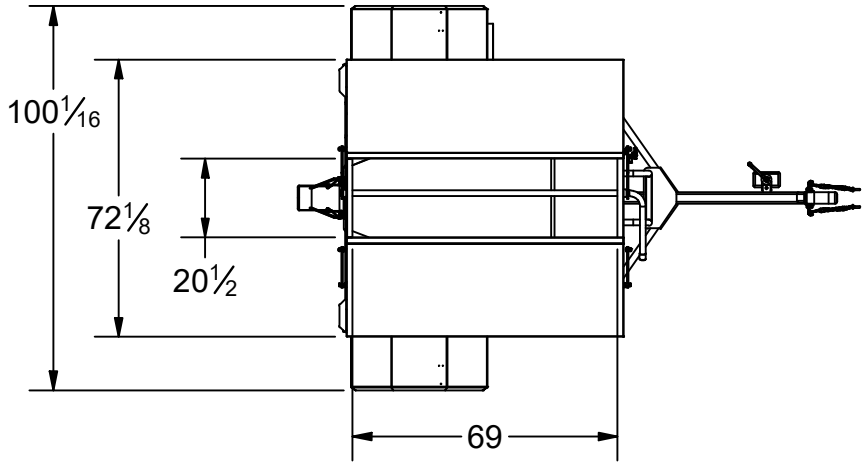
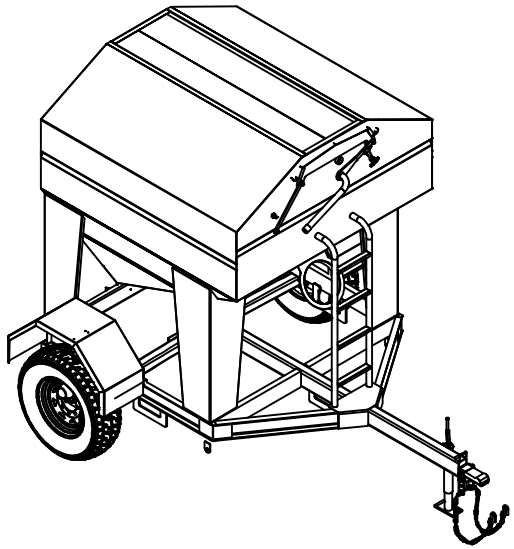
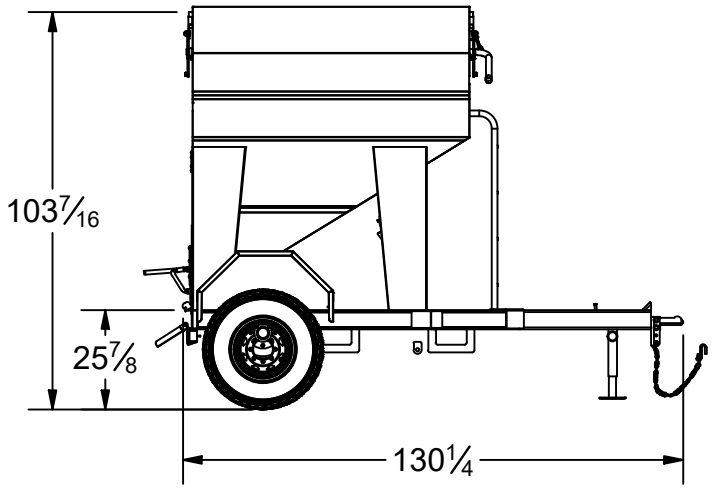
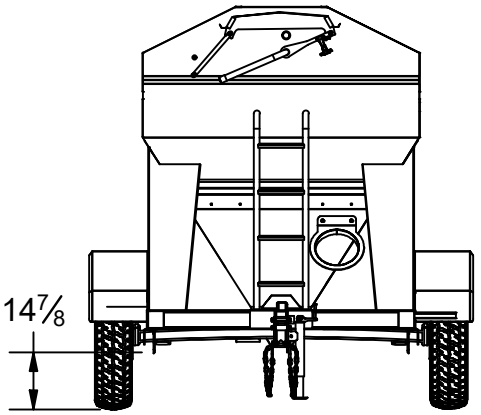
Gravity Tender 3 Ton Rear Discharge Dimensions

Empty Weight: 1626 Lbs.









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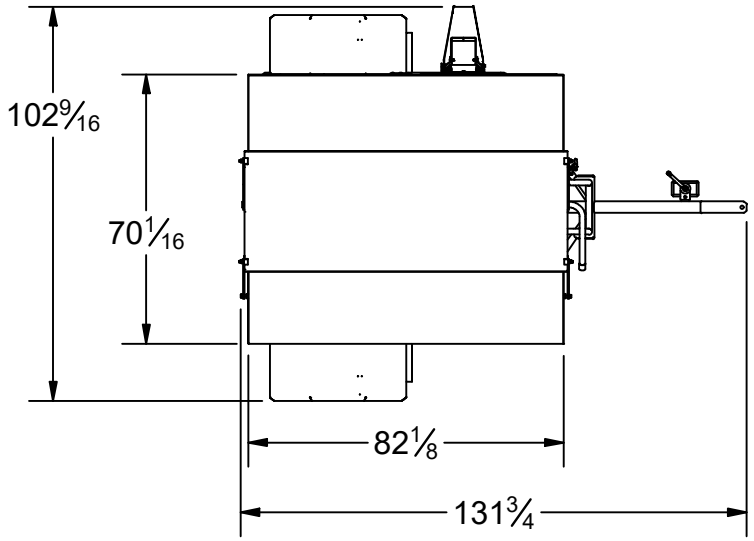
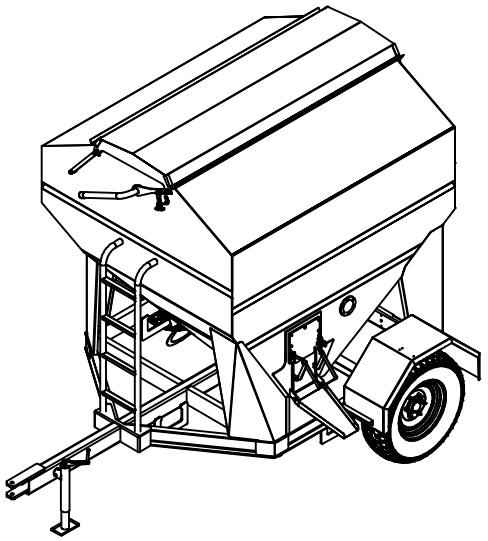
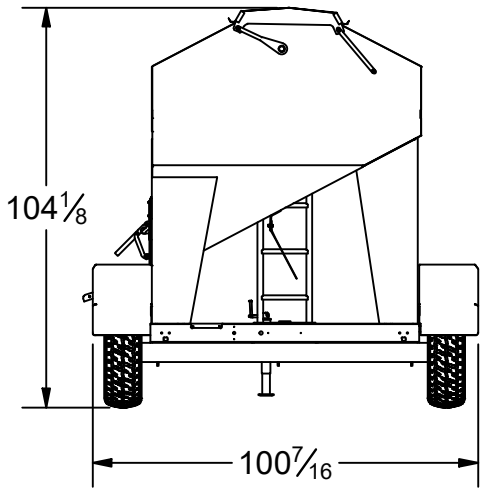
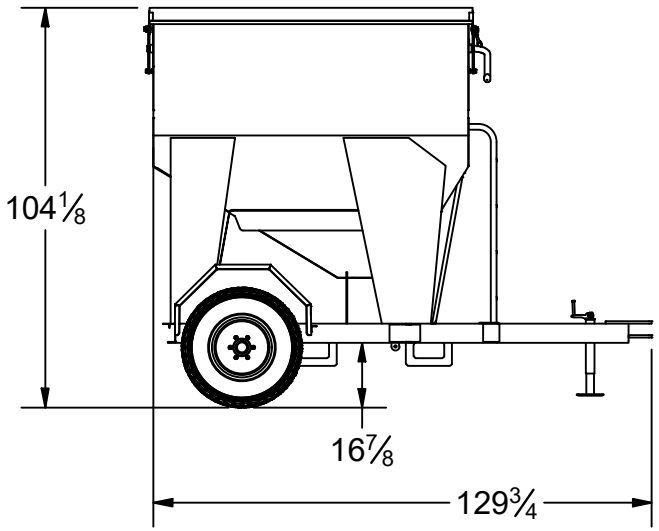
Gravity Tender 3 Ton Side Discharge Dimensions

Empty Weight: 1331 lbs.



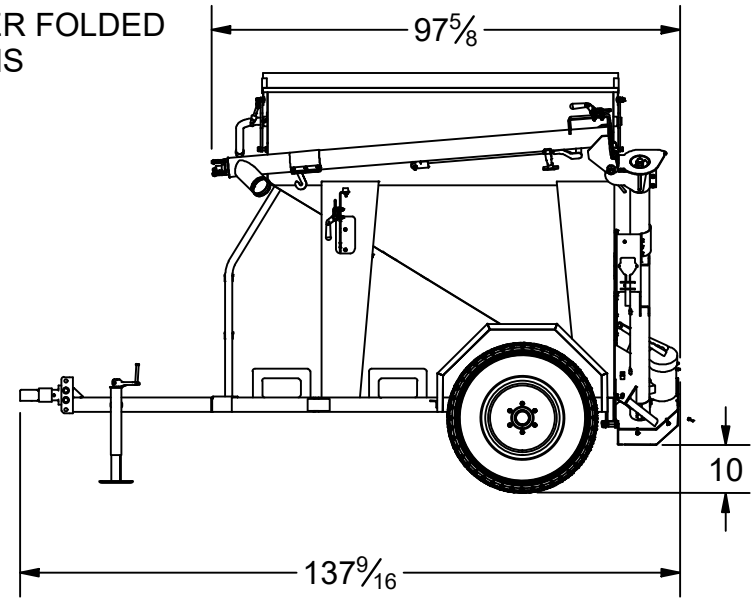


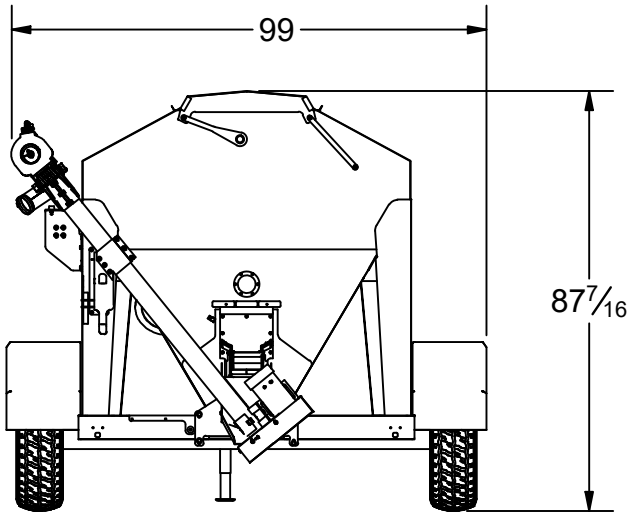




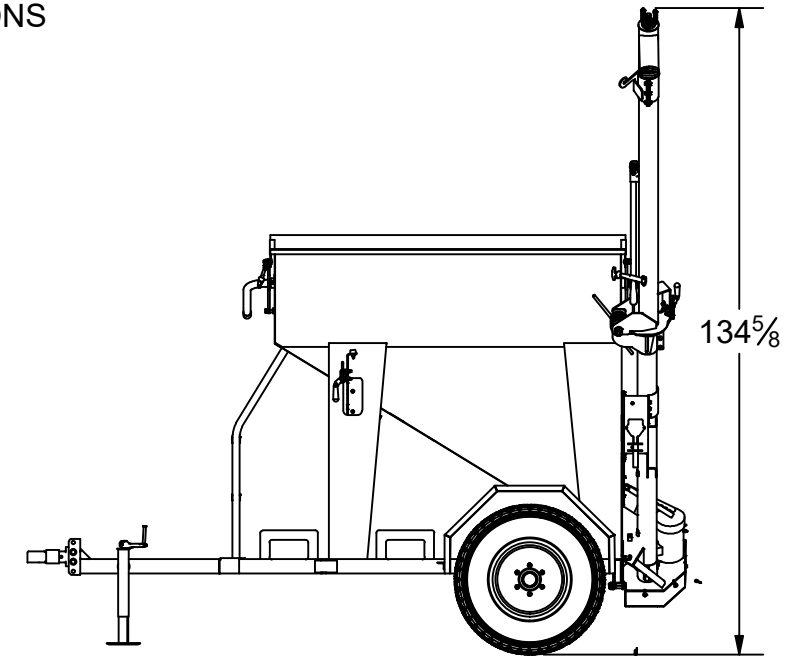
Patriot Equipment 1302 K Road Minden, NE 308-832-0220	This drawing, and the information hereon, are the property of Minden Machine Shop Inc., and may be used only as authorized by us. Unpublished - All rights reserved under the copyright laws.

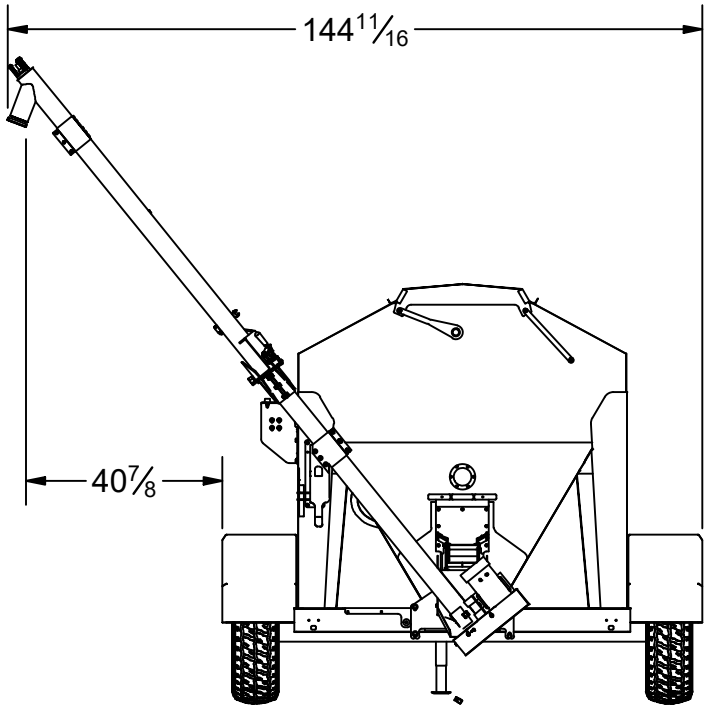
GRAVITY TENDER
WITH AUGER FOLDED
DIMENSIONS





GRAVITY TENDER WITH
AUGER RAISED
DIMENSIONS





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Torque Data for Standard Nuts, Bolts, and Capscrews

Tighten all bolts to torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt chart as guide. Replace hardware with some grade bolt.

Note: Unless otherwise specified, high-strength Grade 5 hex bolts are used throughout assembly of equipment.

Bolt Torque for Standard Bolts

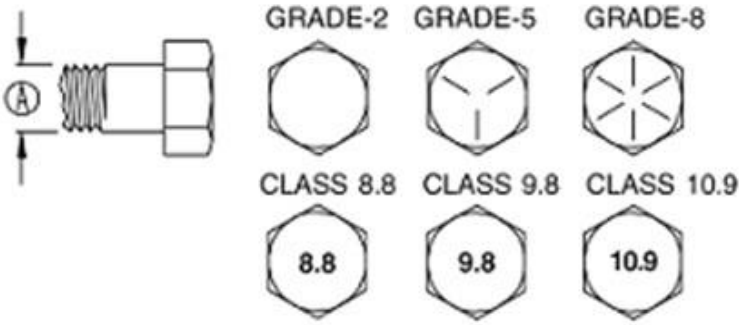
	Grade 2		Grade 5		Grade 8	
Bolt Size A	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
1/4"	6	8	9	12	12	16
5/16"	10	13	18	25	25	35
3/8"	20	27	30	40	45	60
7/16"	30	40	50	70	80	110
1/2"	45	60	75	100	115	155
9/16"	70	95	115	155	165	220
5/8"	95	130	150	200	225	300
3/4"	165	225	290	390	400	540
7/8"	170	230	420	570	650	880
1"	225	300	630	850	970	1310

Bolt Torque for Metric Bolts

	Class 8.8		Class 9.8		Class 10.9	
Bolt Size A	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
6	9	13	10	14	13	17
7	15	21	18	24	21	29
8	23	31	25	34	31	42
10	45	61	50	68	61	83
12	78	106	88	118	106	144
14	125	169	140	189	170	230
16	194	263	216	293	263	357
18	268	363	..	..	364	493
20	378	513	..	..	515	689
22	516	699	..	..	702	952
24	654	886	..	..	890	1206

Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

Grade or Class value for bolts and capscrews are identified by their head markings.



Operating the Gravity Tender

The Patriot Gravity Tender allows for easy storage and/or transport of bulk feed to a farm location or to a field. The Patriot Gravity Tender has a rear or side discharge to make it easy for the operator to get bulk feed into a bucket or directly into a feed bunk.

To fill the Patriot Gravity Tender

1. Undo the rubber lid latch to unlock the lid.
2. Grip the lid handle securely and move the handle in a downward direction to open the Gravity Tender lid.
3. The Gravity Tender can now be loaded.
4. Once the Gravity Tender is loaded to its desired capacity, the lid can be closed.
5. Grip the lid handle and move it towards the right side of the Gravity Tender. This motion will cause the lid to close.
6. Close the lid completely.
7. Place the rubber lid latch in the locked position to lock the lid closed.

To distribute feed, simply:

1. Retrieve the bucket from the bucket holder of the tender.
2. Place the bucket under the lowered discharge chute.
3. Open the discharge door by lifting up on the discharge door handle and fill the correctly placed bucket.
4. When the bucket has the amount of bulk feed desired, close the discharge door by pushing down on the discharge door handle.
5. The bulk feed can be taken to the distribution area.
6. Repeat the above steps until the desired amount of bulk feed has been dispensed.
7. Place the discharge chute back into the upright storage position and be sure the discharge door is closed securely.
8. Place the bucket back into the provided bucket holder.

The side discharge Patriot Gravity Tender can also be used to place bulk feed directly into feed bunks if desired. This model of Gravity Tender will have wheels on it enabling it to be towed.

1. Align the side discharge chute with the feed bunk.
2. Place the chute in the down position.
3. Open the discharge door by lifting the discharge door handle until the desired amount of bulk feed is flowing.
4. Operate the tow vehicle in a forward direction at the correct speed to discharge the desired amount of bulk feed into the feed bunk.
5. When the operation is over, stop the tow vehicle and secure it so that it will not move on its own and close the discharge door by pushing down on the discharge door handle until the discharge door is closed.
6. Place the chute in the upright position for storage.
7. Park the gravity tender on a flat and level area.

The side discharge Patriot Gravity Tender has an optional actuated chute available as well. The actuator will open and close the bulk feed door. The optional actuated system will allow the operator to distribute bulk feed from the tow vehicle into feeding chutes or at designated feeding areas. The actuator system uses a simple toggle switch system to open and close the feed door.

Troubleshooting

Troubleshooting

Symptom	Solution
Discharge chute difficult to lower and/or raise	Adjust the mounting bolts
Feed gate raises and lowers slowly	Clean any debris that may be in the guide Adjust the mounting bolts for the raise/lower handle
Feed Gate Actuator Models – gate is slow or doesn't move at all	Check the battery, is it fully charged? Has the fuse blown? Check the transformer. Are the switches working? Check wire connections. Clear debris from gate track. Is the actuator working properly?
No feed is flowing	Tap on the bottom of the hopper. Is the hopper empty?

Service and Maintenance

To ensure the proper operation of the Gravity Tender:

- Clean the hopper out periodically to prevent build-up of feed debris
- Charge the battery periodically
- Check the wheel bearings for end play.
- Clean and repack the wheel bearings
    - Performed annually
- Check the operation of lights if equipped before each use.
- Check the operation of brakes if equipped before each use.
- Lubricate any pivot points and slides.
- Inspect the pressure in the tires before operation.
- Inspect the hitch before operation to ensure that it couples correctly and securely

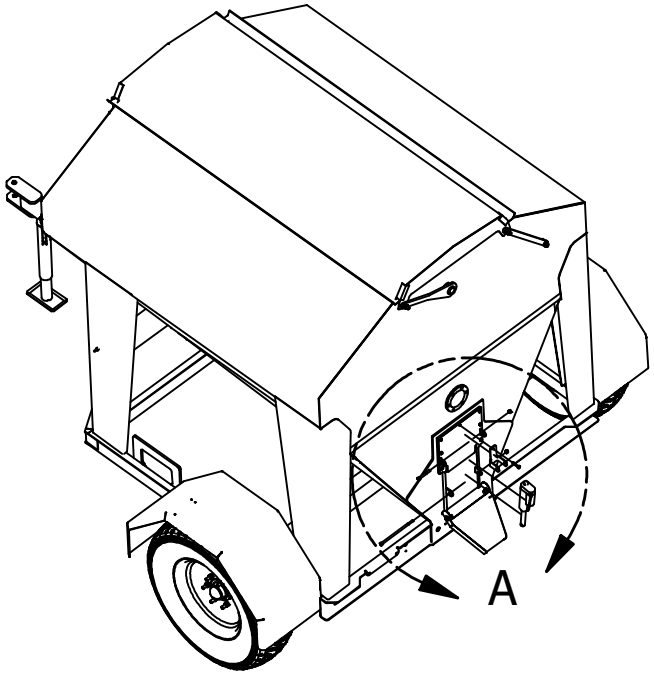
Storage

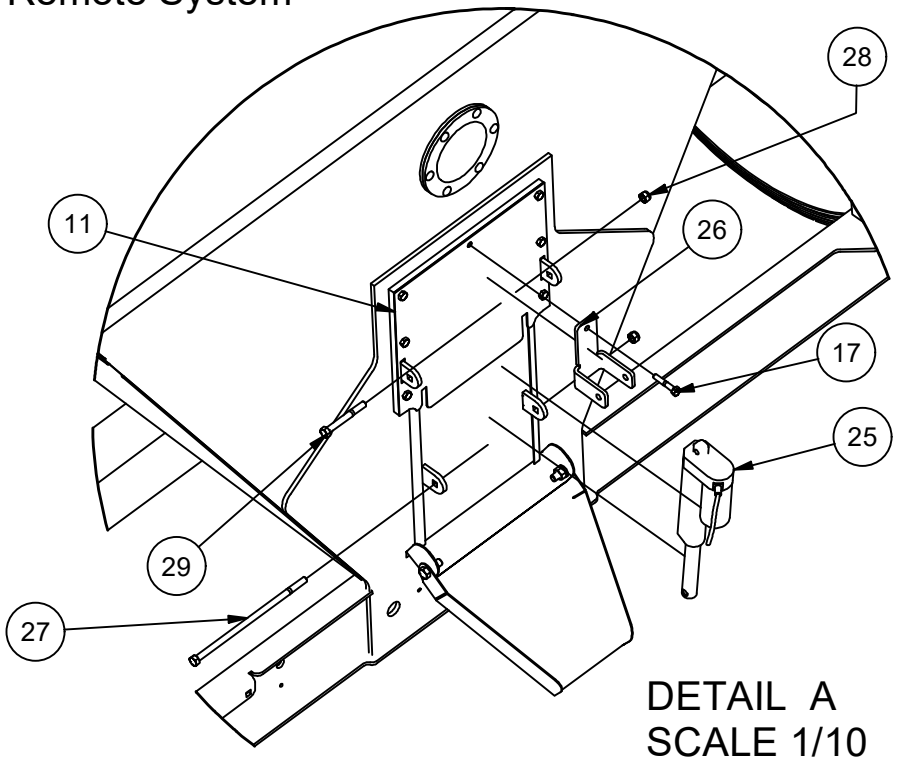
If the Gravity Tender is to be stored for an extended period of time:

- Clean out the hopper.
- If equipped with a battery, disconnect the battery
- Clean the Gravity Tender and perform touch up painting to prevent rust or any corrosion
- Inspect and repack the wheel bearings so that the Gravity Tender is ready to go for the next season.

Optional Equipment

Gravity Tender Gate Actuator Mount Assembly/Wireless Remote System





DETAIL A
SCALE 1/10

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
11	1	GT-CP-P024	Gate Cover
17	7	B1/4X1.5	Hex Bolt
25	1	CAF5135	24 Volt Actuator
26	1	GT-CP-P059	Actuator Bolt On Mount
27	1	B5/16X8.0	Hex Bolt
28	2	N5/16NYL	Nylock Nut
29	1	B5/16X2.75	Hex Bolt
30	1	GT-CP-P060	Battery Plate
31	1	Group 24 battery 12v	12 V Battery
32	1	CAF5140	DC12v to 24v Step up Converter
33	1	CAF9040 (RF24V1PR-ASL)	24V DC RF Remote Polarity Reverse Control
34	2	GT-CP-P074	Bolt Plate, Lower Auger Weldment
35	4	B1/4X4.0	Hex Bolt
36	4	N1/4NYL	1/4 Std NC Nylock Nut
37	1	CAF5210	TOGGLE SWITCH
38	1	RAA1511	Relay

To Add On Actuator:

1. The actuator will mount to the existing gate assembly
2. Remove manual pull handle assembly
3. Attach actuator bolt on mount (#26) using a (#17) to the gate cover (#11). Make sure mount is straight with the actuator mount as shown above.
4. Attach the actuator (#25) to the actuator mount (#26) using a 5/16 x 2-3/4" bolt (#29) with a 5/16" nylock nut (#28). Tighten the fastener enough so that it is tight, but the actuator can still pivot freely.
5. Align the hole of the actuator ram with the lower mount holes of the gate ears. Insert a 5/16" x 8" bolt (#27) to retain. Use a 5/16" nylock nut (#28) to retain bolt. Tighten the fastener.
6. Connect the electronics (see wiring diagrams and controller directions)to control the actuator.
7. Test.

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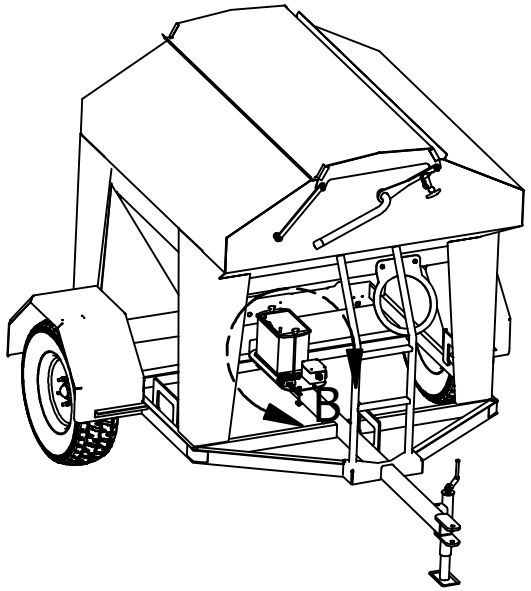
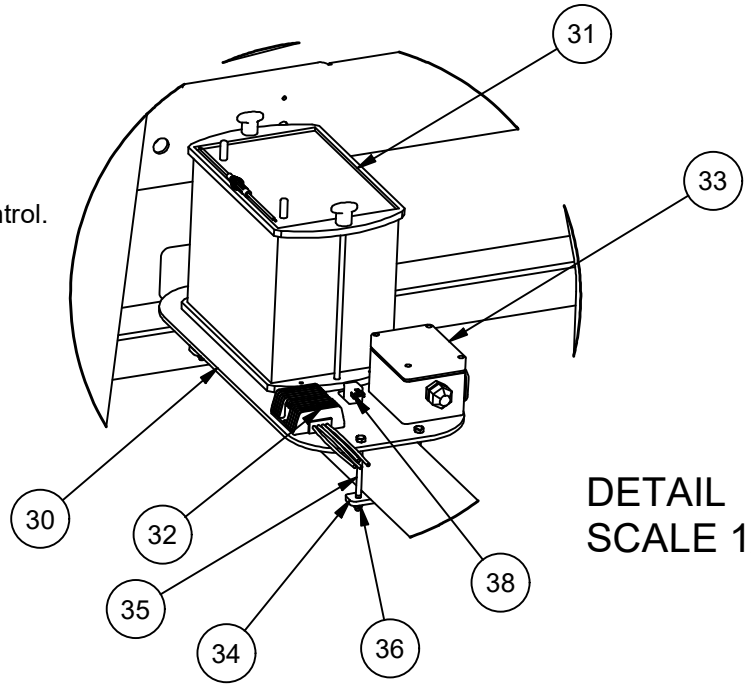
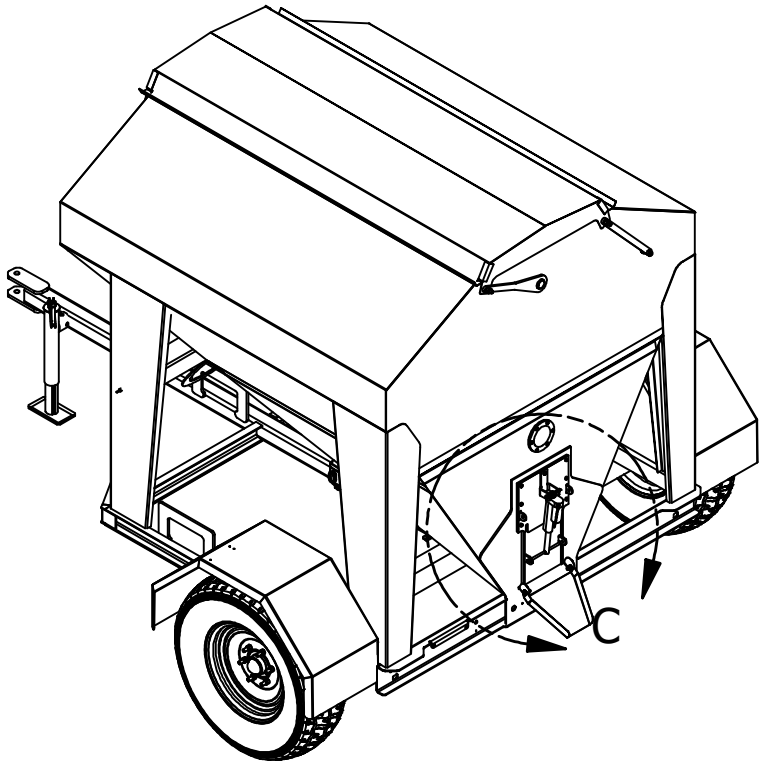
Gravity Tender Gate Actuator Mount Assembly/Wireless Remote System



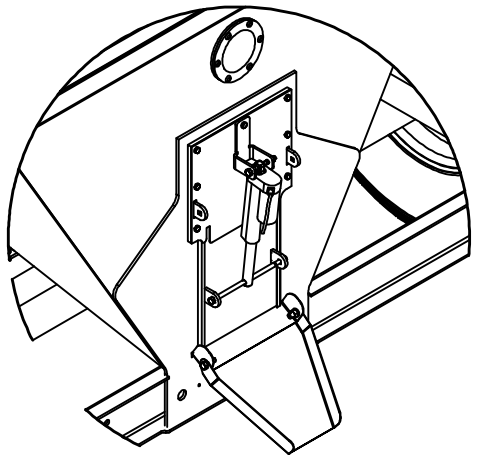
Electronics for actuator control.



DETAIL B
SCALE 1/10



DETAIL C
SCALE 1 / 15



Completed assembly should look like this.

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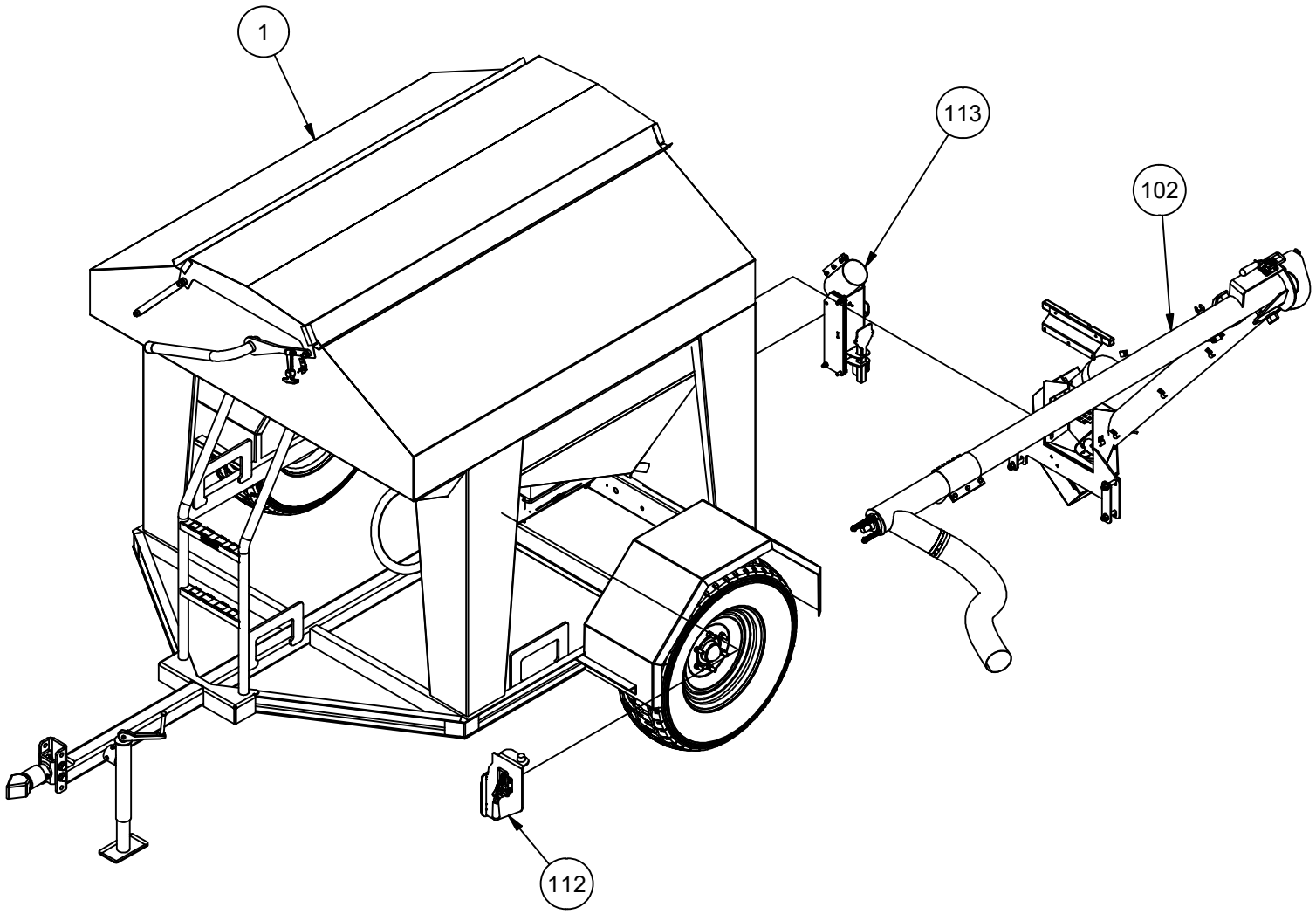
AUGER ASSEMBLY ON A GRAVITY TENDER



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GT-2TR	2TR Assembly
102	1	GT-CP-A050	Auger Assembly
112	1	GT-CP-A051	Auger Rest Assembly
113	1	GT-CP-A040	Auger Mount Support

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308-832-0220

ELECTRONICS

GAMA ELECTRONICS

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RF24V-1PR-ASL

Instruction Manual

Included in this Kit:
(1) RF24V1PR-ASL Receiver
(1) 2-Button Transmitter ***Image shown with standard transmitter***

Available accessories:
- **Standard Transmitter KF340-2**
- **Waterproof Transmitter KF340-2WP**
- **6-Pack of Replacement A-23 12V Batteries A23-6**
- **Rechargeable 2-Button Transmitter GKF-WPTX-2**
- **Long Range Antenna LRA340** ****SEE PAGE 3 FOR SETUP****

The RF24V-1PR-ASL is an RF receiver operating at a fixed frequency of 340MHz. The receiver operates from 24VDC and provides a polarity reversing output. Up to thirty, two button keyfob transmitters (model KF340-2) can be used to activate the receiver's relay. The receiver provides four, 1/4-inch quick connect terminals for connecting the power and relay contacts. The receiver is encased in a small, waterproof enclosure. Each transmitter has a unique address that is transmitted when a button is pressed. A "PROGRAM" pushbutton switch is provided on the receiver to program the transmitter(s) address into the receiver's memory. An LED on the receiver indicates the receiver's programming status and illuminates when either relay is energized. Additionally, there are three lead wires that can be connected to an external switch which allows the receiver to be operated without using the remote transmitter. **The black switch lead wire is common. The auxiliary leads will only provide momentary operation.**

Maximum Ratings: Power for the receiver can be in the range of 21VDC to 28VDC. The receiver is reverse polarity protected. The relay contacts are rated at 30A @ 24VDC.

Power Consumption: 10mA when the relays are de-energized, 45mA when the relay is energized.

Input Power Connection: 24VDC power connects to the -24V and +24V terminals.

Output Connection: The output of the receiver is connected to the "M1", and "M2"terminals.

Momentary or Latching Output: The transmitter and receiver can be configured for momentary or latching operation. For momentary operation, the output of the receiver will be active for as long as the transmitter switch is depressed, and will turn off when the switch is released. In the latching configuration, the receiver output will turn on as soon as the transmitter switch is depressed and released. To turn off the latching output, the transmitter switch must be depressed and released again.

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RF24V-1PR-ASL
Instruction Manual

Programming Instructions

Each transmitter has its own unique internal address along with the data as to which button is pressed and transmitted. The receiver needs to be programmed to respond only to the specific transmitter it is intended to operate with. The following steps configure the receiver to operate with a particular transmitter. Up to 30 transmitters can be programmed to one receiver. Please read the entire programming procedure before starting. When the receiver enters program mode, all previous transmitter addresses that were programmed will be erased from the receiver's memory.

1. Locate the pushbutton labeled "PROGRAM" on the receiver. Press and hold this button until the red LED next to the program button illuminates (approximately 3 seconds). The receiver is now in the transmitter program mode. Release the button. At this point all previously programmed transmitter addresses are erased from the receiver's memory.

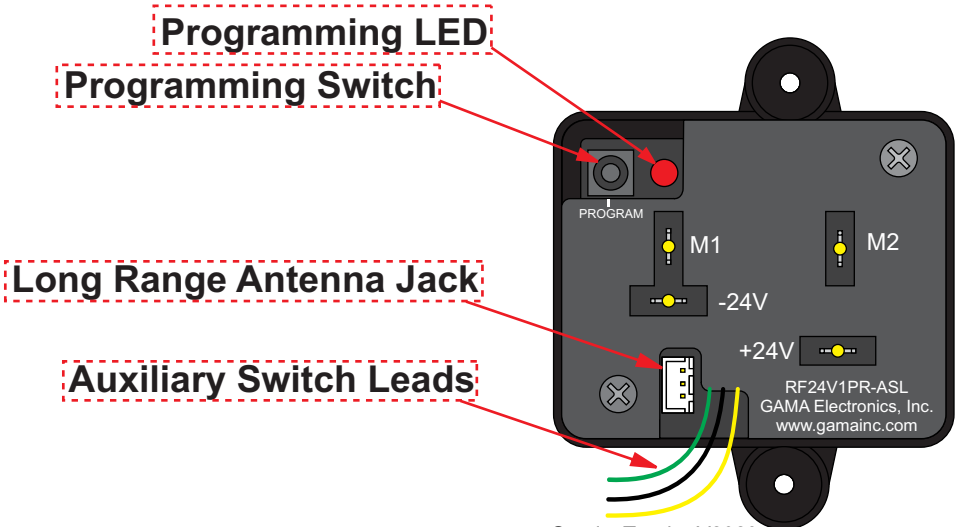
2. To configure the receiver for a latching output, go to Step 4.

3. To configure the receiver for momentary output, press and release the UP button on the transmitter and verify that the red program LED
extinguishes and then illuminates (blinks once). Proceed to Step 5.

4. To configure the receiver for latching output, press and release the DOWN button on the transmitter and verify that the red program LED extinguishes and illuminates (blinks once).

5. Repeat previous step for additional transmitters that will operate with this particular receiver. The red LED on the receiver will extinguish and illuminate (blink) once for the first transmitter being programmed, twice for the second, three times for the third, etc. The receiver will not respond to transmitters that have already been programmed. The first transmitter that is programmed determines the receiver's relay operating mode.

6. The receiver will return to normal mode if no transmitter buttons are pressed for 5-seconds. The red LED on the receiver will blink rapidly, then extinguish. The receiver is now in the normal mode of operation. This completes the programming instructions. The receiver will retain all of its programming even when power is removed.



To Add Long Range Functionality

The remote control system is equipped with an internal antenna. The expected range in normal conditions is approximately 100 feet. When additional range is needed, or if the control is placed locations adverse to RF signal reception, a long range antenna can be added to the system. GAMA Electronics long range antenna, part number LRA-340, replaces the internal antenna on the system. In normal operating conditions expected range is greater than 500 feet. If the long range option is purchased with the system, this modification will be made prior to shipment.

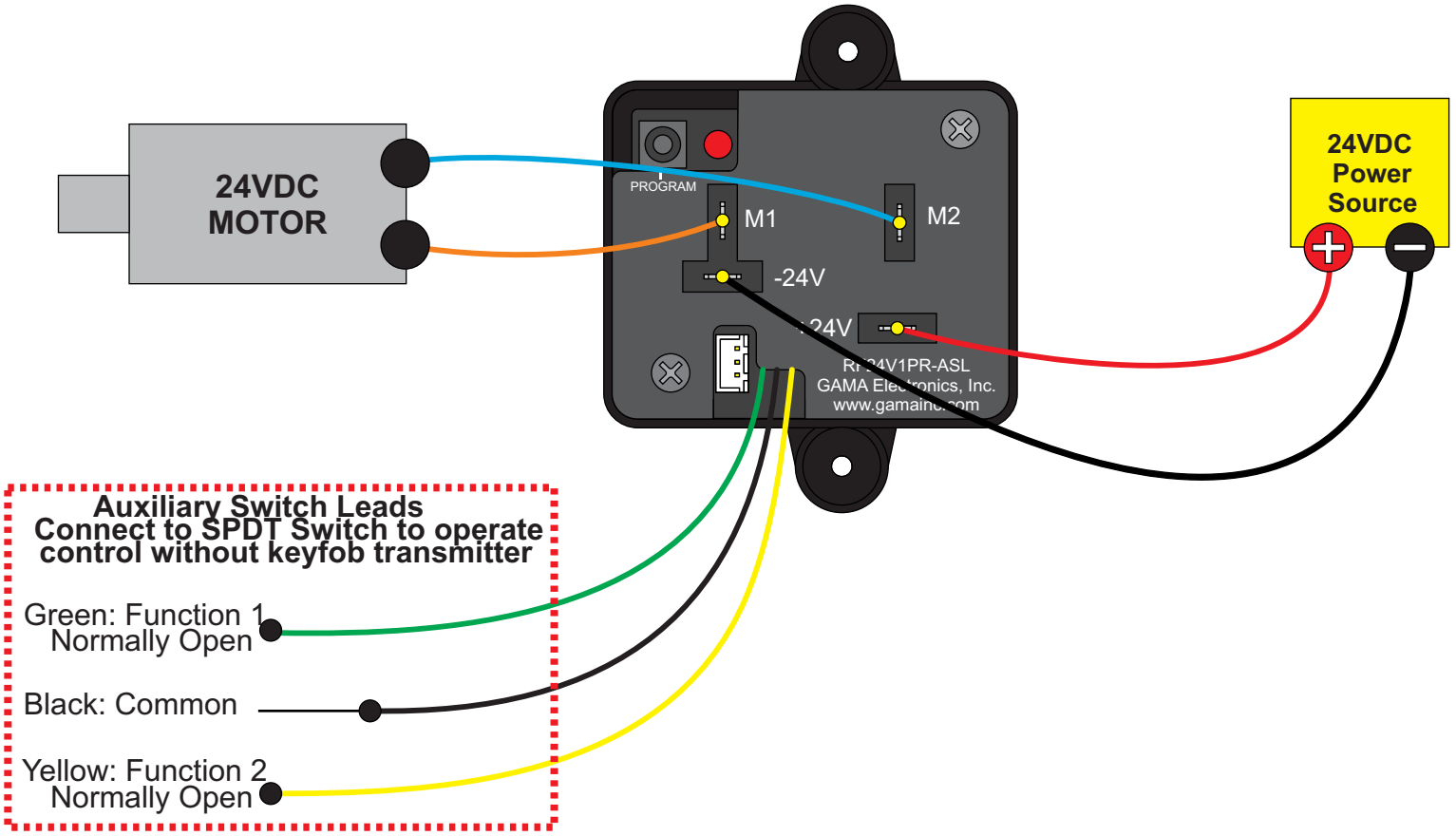
NOTE: ONCE THE LONG RANGE MODIFICATIONS HAVE BEEN MADE TO THE SYSTEM THEY CANNOT BE REVERSED.

To add long range functionality:

1. Plug long range antenna (Part number LRA-340) into the long range antenna jack.

2. Clip the Long Range Antenna Bypass Wire located underneath the panel (This will deactivate the internal antenna).

NOTE: It is recommended that you cover the exposed wires with RTV silicone sealant.



Troubleshooting

All remote-control systems shipped by GAMA Electronics are 100% functionally tested just prior to shipment.

If your RF remote control system does not work out of the box, stops working or functions intermittently please take the following steps to resolve common issues. Please note that you must be 2-3 feet away from the receiver when operating the remote control. Operating within 2-3 feet may result in no operation or intermittent operation.

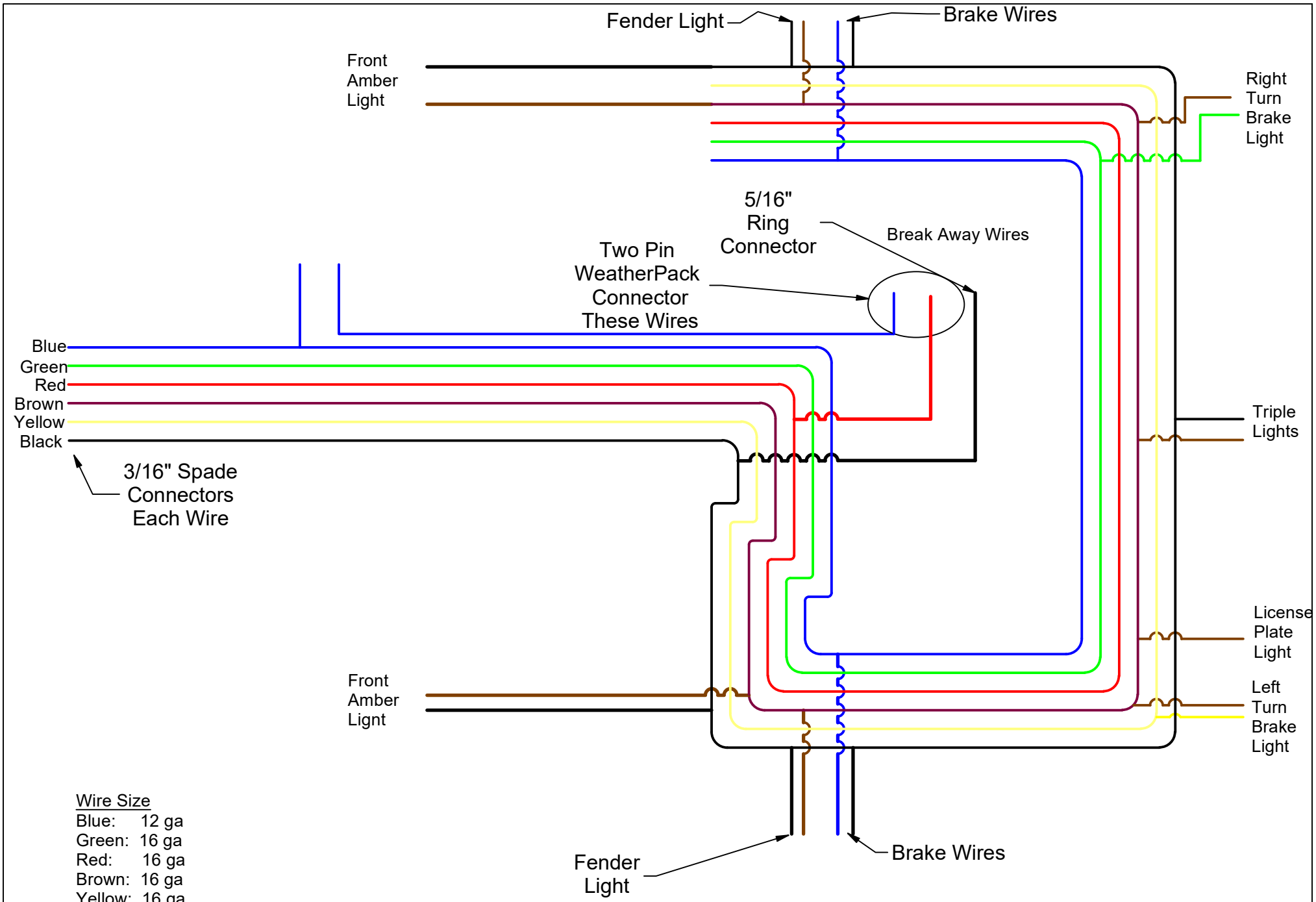
1. **Replace the A23 12V Battery in the transmitter**
   - The remote control can activate during shipping and drain the battery that is installed in the control. We send a replacement battery with the system if this occurs.

2. **Check the voltage supply at the receiver**
   - The receiver is designed to function at 21-28VDC. Voltage on the (+) and (-) terminals on the control should be within this range.

3. **Reprogram the remote control**
   - If the system is non-functional try to reprogram the remote control. The program may not have taken during the programming process or the program button may have been pressed. If the program button is pressed the memory of the remote controls programed to the receiver are erased.

4. **Listen and look for functionality on the receiver.**
   - The LED that is used for programming the system will illuminate when the receiver is activated. You will also hear a “click” when the internal relays engage. If you can see the LED illuminate and you hear the relay “click” the issue is most likely in the wiring or device being controlled.

5. **Add a long-range antenna**
   - If the receiver is in an area that is averse to the reception of an RF signal, such as near a motor or in a metal casing, a long-range antenna may solve the issue. Connect the antenna per the instructions on page 3 and mount the antenna in an exposed area away from any motor.



Wire Size

Blue:	12 ga
Green:	16 ga
Red:	16 ga
Brown:	16 ga
Yellow:	16 ga
Black:	14 ga

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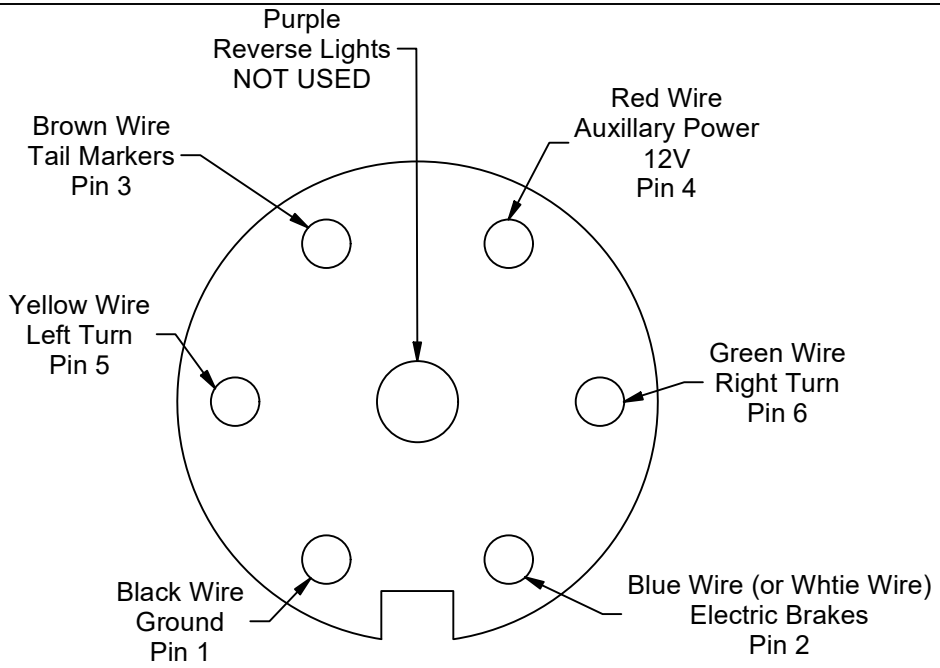
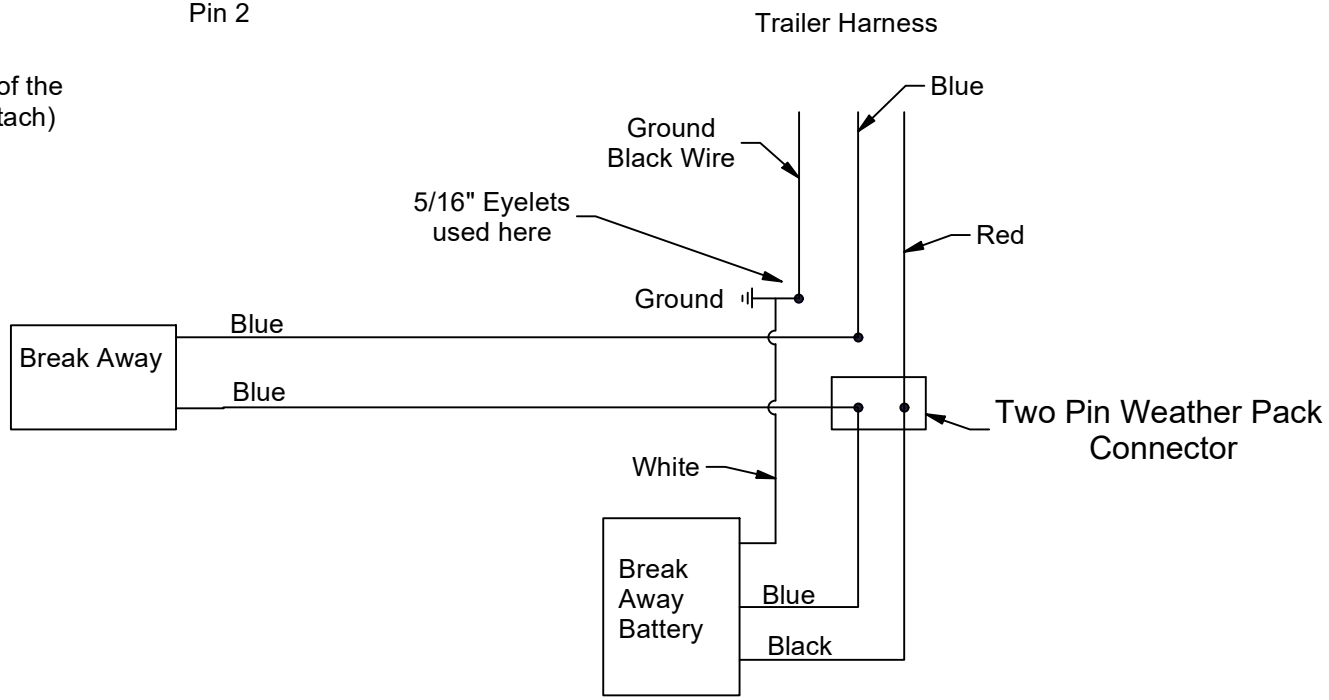
Trailer Wiring with Break Away Brakes



View is looking at the rear of the trailer plug (where wires attach)



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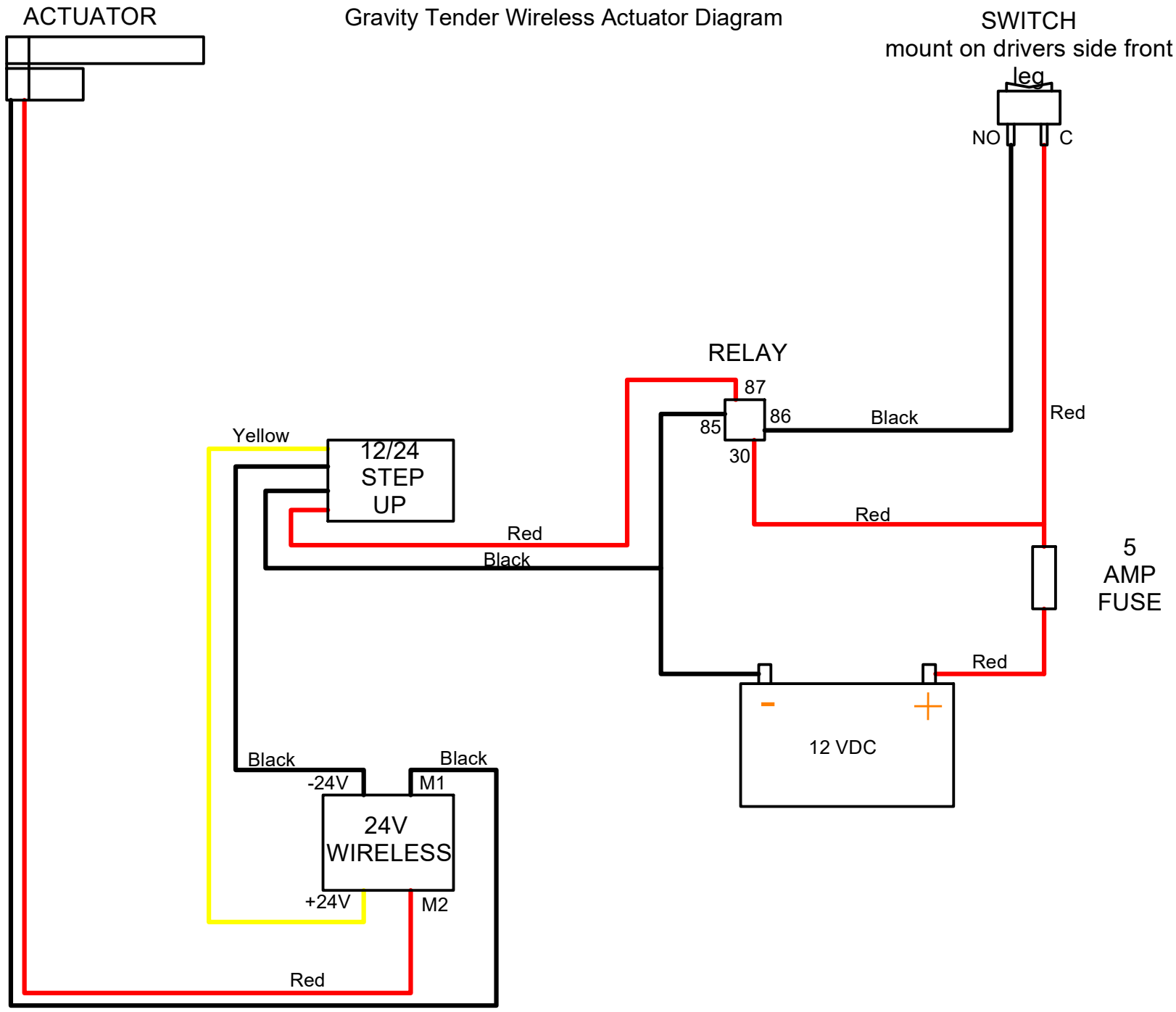
Gravity Tender Wireless Actuator Diagram



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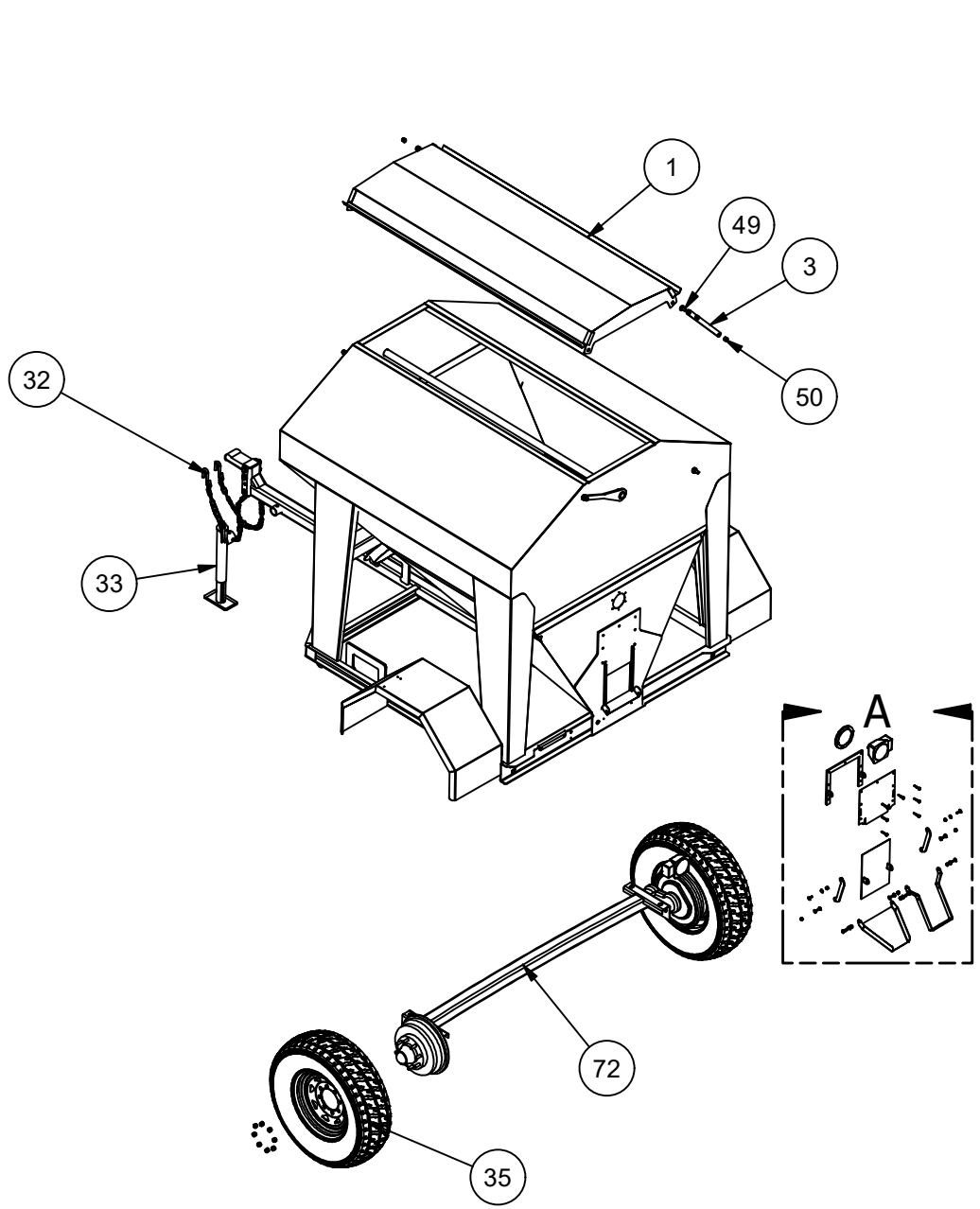
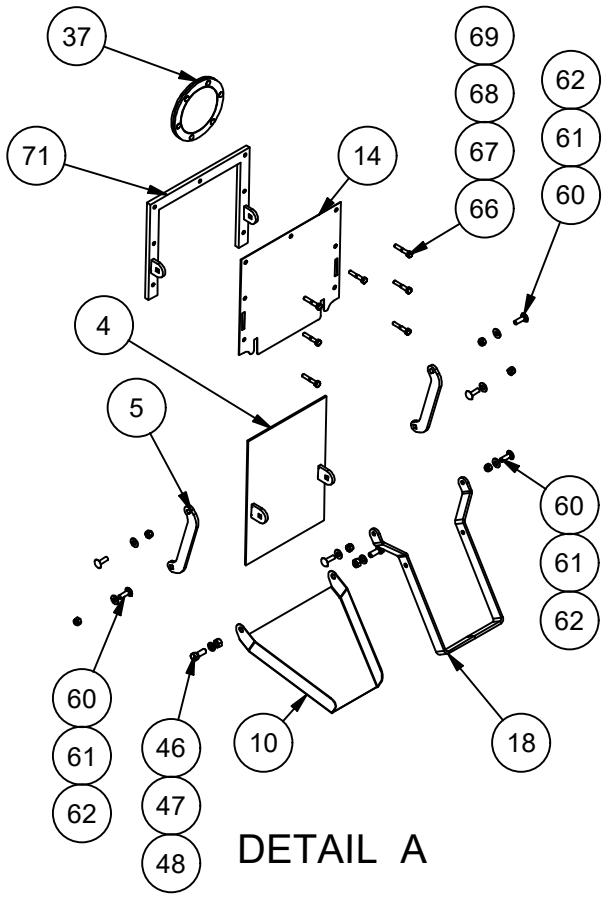
Parts Diagrams





The rear and the side discharge gates use the same parts. If you have a side discharge model, please use the above part numbers when ordering replacement parts.

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Gravity Tender Parts List

Gravity Tender Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GT-CP-A001	Lid Weldment
2	1	GT-CP-A002	Lid Handle Weldment
3	2	GT-CP-P009	Lid Link Arm
4	1	GT-CP-A003	Gate Weldment
5	2	GT-CP-P018	Gate Link
10	1	GT-CP-P020	Chute Folding
14	1	GT-CP-P024	Gate Cover
17	1	GT-CP-A004	Bucket Weldment
18	1	GT-CP-A005	Gate Handle Weldment
28	1	TR3005	Driver Side Rear Tail Light
29	1	TR3004	Curb Side Rear Tail Light
31	1	TR1595	Safety Chain
33	1	TR1600	Top Wind 2K Jack 10"
35	2	TR1085	16" Tire and Rim
36	22	N1/2NY	1/2 Std NC Nylock Nut
37	1	GT-CP-A010	Window Flange Assembly
46	4	B3/8x1.0	Hex Bolt
47	4	W3/8L	Lock Washer
48	4	N3/8N	Hex Nut
49	4	B1/2x1.25CB	Carriage Bolt

Gravity Tender Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
53	2	N1/2L	Lock Nut
54	4	W1/2F	Plain Washer
55	2	B1/2x1.5	Hex Bolt
60	6	W/5/16NY	Nylon Washer
61	6	B5/16x1.0CB	Carriage Bolt
62	6	N5/16NY	Nylock Nut
66	7	B1/4x1.5	Hex Bolt
67	7	W1/4F	Plain Washer
68	7	W1/4LW	Lock Washer
69	7	N1/4N	Hex Nut
70	1	S4805	4" Rubber Latch
70.1	1	S4808	Bent Catch
70.2	1	S4809	Rubber Latch Mount
71	1	GT-CP-A009	Gate Frame
72	1	TR1060	6K Torsion Axle
73	1	TR1800	Battery Breakaway

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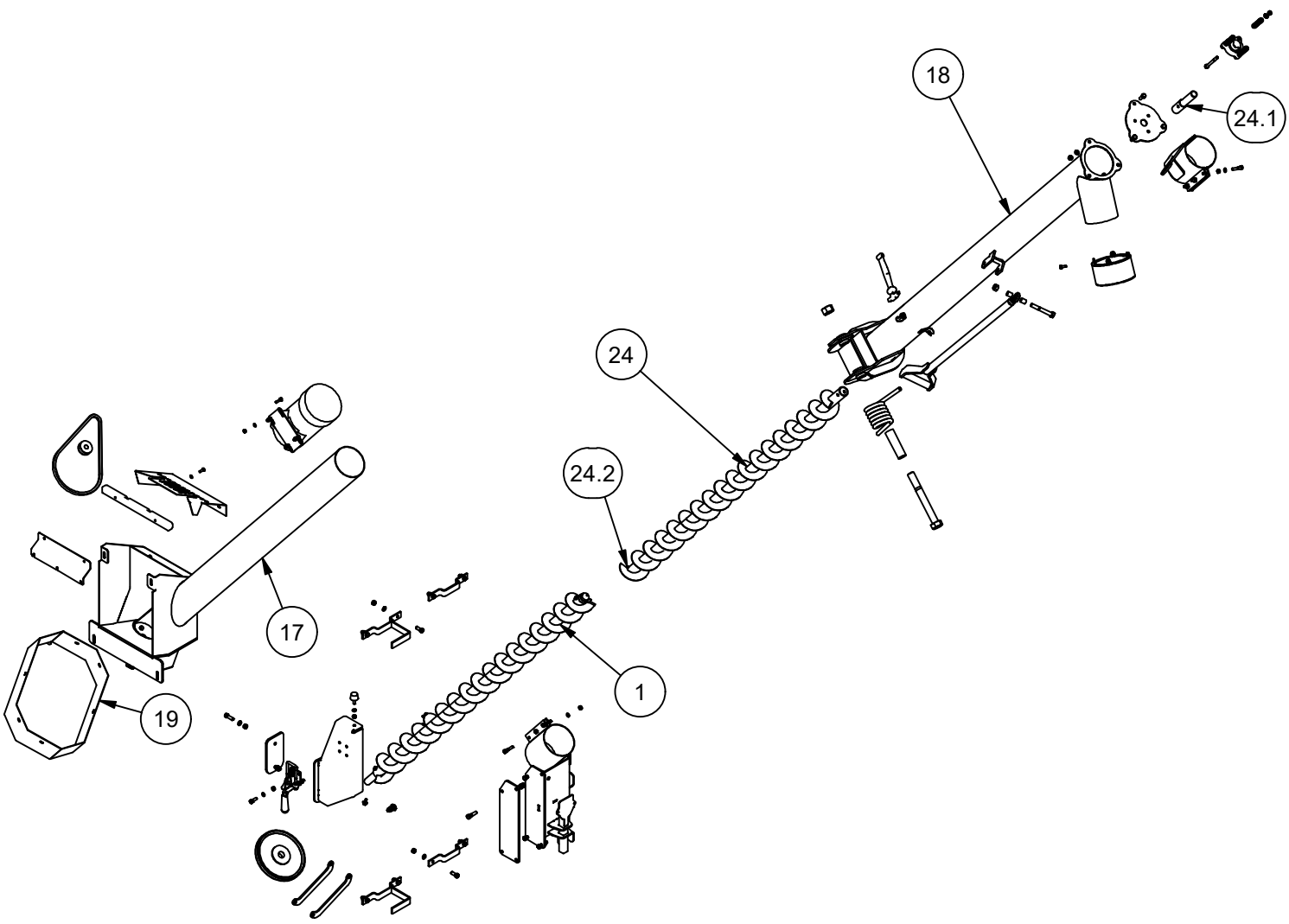
GRAVITY TENDER 5 INCH AUGER ATTACHMENT



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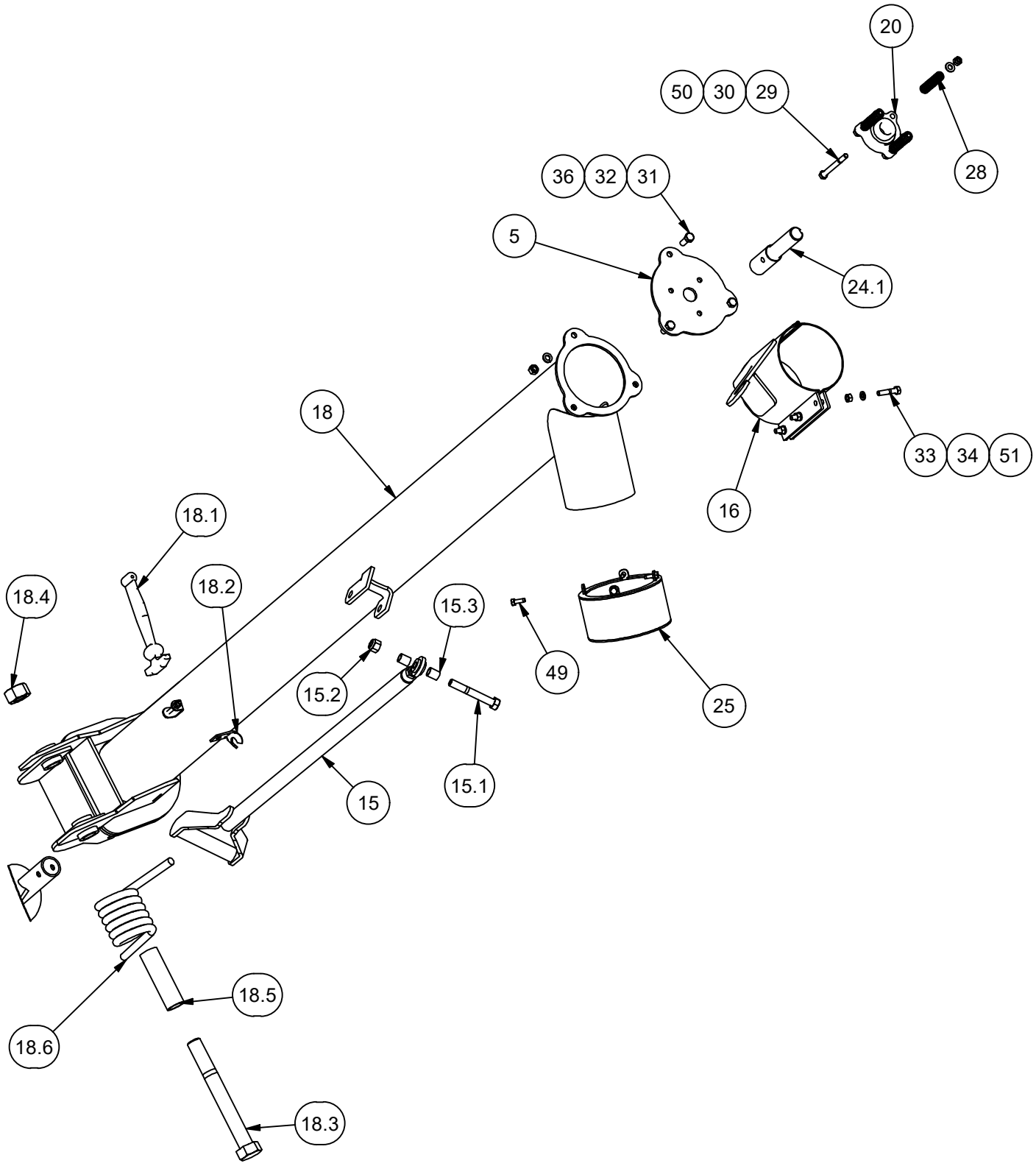
GRAVITY TENDER 5 INCH AUGER ATTACHMENT - UPPER AUGER



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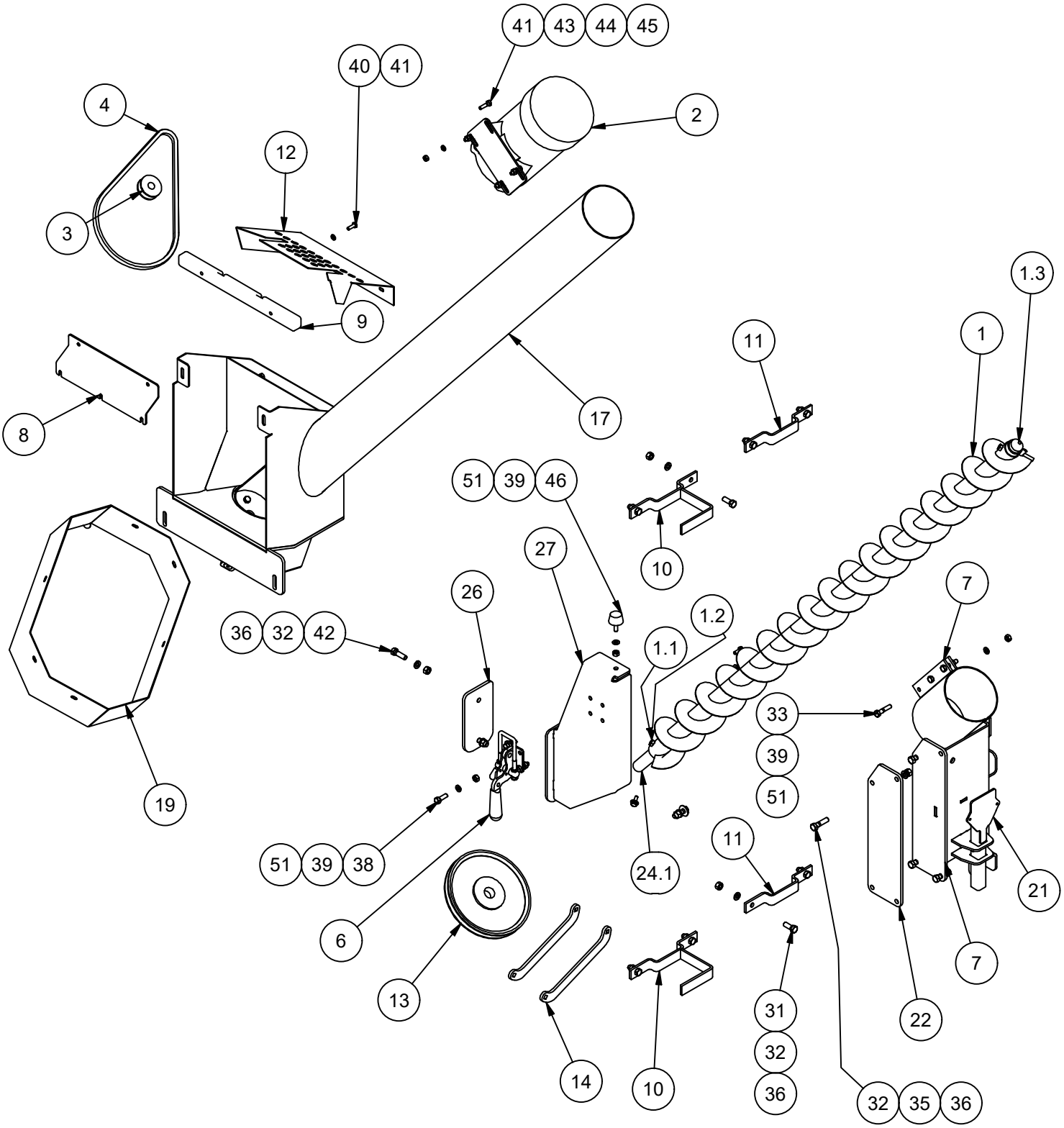
GRAVITY TENDER 5 INCH AUGER ATTACHMENT - LOWER AUGER



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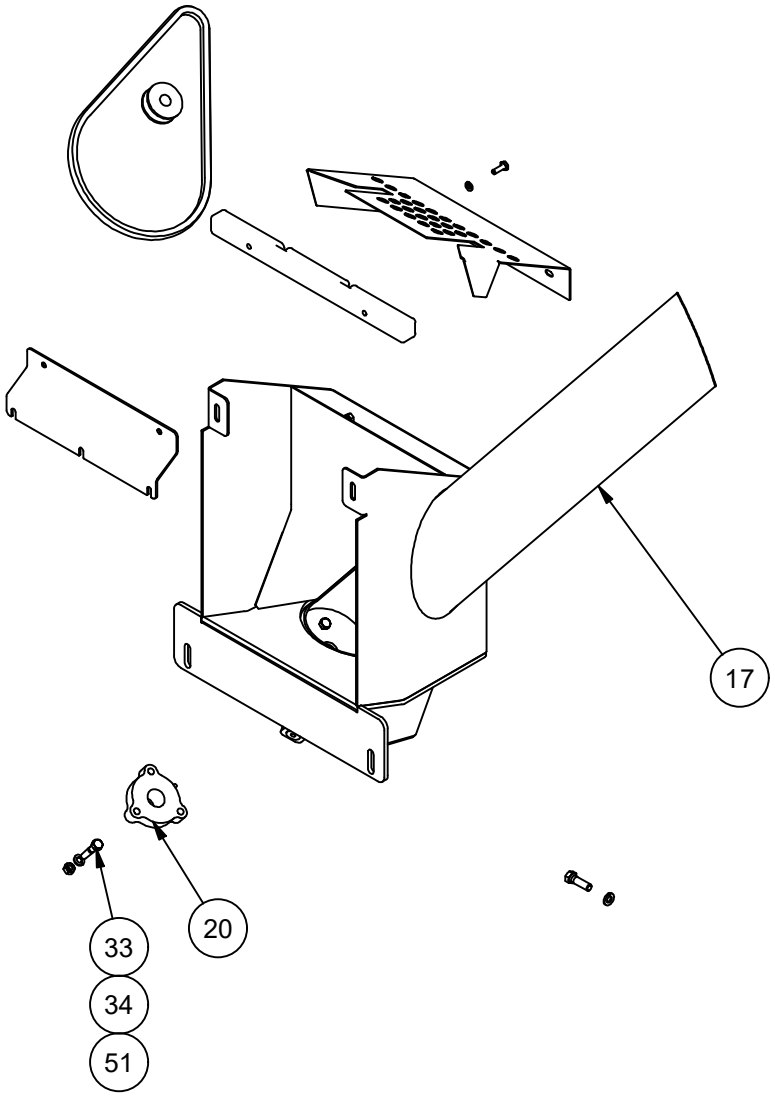
LOWER AUGER BEARING



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5 INCH AUGER PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GT-CP-A006	BOTTOM AUGER
1.1	4	B5/16X2.0	HEX BOLT
1.2	4	N5/16L	LOCK NUT
1.3	1	S1001	MALE FOLDING CONNECTOR
2	1	GB2014	12V MOTOR - 1800 RPM
3	1	P1050	2" X 5./8" SINGLE SHEAVE
4	1	S4907	GRAVITY TENDER BELT
5	1	GT-CP-P028	TOP AUGER BEARING MOUNT PLATE
6	2	S4803	HOLD DOWN CLAMP
7	1	GP-CP-A002	CORD WRAP BRACKET
8	1	GT-CP-P124	THREE LIGHT PANEL
9	1	TR3007	LED THREE LIGHT BAR
10	2	GT-CP-A047	LADDER TIE DOWN
11	2	GT-CP-P161	LADDER TIE DOWN
12	1	GT-CP-P034	COVER BRACKET
13	1	P1045	8" SINGLE GROOVE SHEAVE
14	2	GT-CP-P032	EXTENDED GATE LINK
15	1	GT-CP-A020	24" HANDLE ASSEMBLY
15.1	1	B1/2X3.5	HEX BOLT
15.2	1	N1/2NYL	NYLOCK NUT
15.3	2	ST-CP-P0047	SPACER
16	1	GT-CP-A008	HOLD DOWN HOOK WELDMENT
17	1	GT-CP-A012	BOTTOM AUGER WELDMENT
18	1	GT-CP-A015	TOP AUGER CHUTE WELDMENT
18.1	1	S4806	7' RUBBER LATCH
18.2	1	S4810	ANCHOR
18.3	1	B1X8.5	HEX BOLT
18.4	1	N1L	LOCK NUT
18.5	1	GT-CP-P031	SPACER
18.6	1	SP4005	SPRING
19	1	GT-CP-A013	PULLY COVER WELDMENT
20	2	BR905	AUGER BEARING
21	1	GT-CP-A041	ELECTRONICS MOUNT
22	1	GT-CP-P157	CORD WRAP
23	1	GT-CP-A017	BOTTOM AUGER CLAMP
24	1	GT-CP-A019	TOP AUGER FLIGHTING
24.1	1	CT-CP-P010	TOP AUGER ADAPTER SHAFT
24.2	1	S1015	FEMALE FOLDING CONNECTOR
25	1	GT-CP-A021	TRANSITION WELDMENT
26	1	GT-CP-P106	BOLT DOWN, AUGER HOLD DOWN
27	1	GT-CP-A004	AUGER HOLD DOWN BRACKET

5 INCH AUGER PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
28	3	SP4007	SPRING
29	3	N5/16NY	NYLOCK NUT
30	3	B5/16X3.5	HEX BOLT
31	11	B3/8X1.0	HEX BOLT
32	19	N3/8N	HEX NUT
33	12	B5/16X1.5	HEX BOLT
34	12	N5/16N	HEX NUT
35	4	B3/8X1.5	HEX BOLT
36	19	W3/8L	LOCK WASHER
37	3	B5/16X1.25	HEX BOLT
38	8	B5/16X1.0	HEX BOLT
39	12	N5/16N	HEX NUT
40	5	B1/4X0.75	HEX BOLT
41	9	W1/4L	LOCK WASHER
42	2	B3/8X1.25	HEX BOLT
43	4	B1/4X1.0	HEX BOLT
44	4	N1/4N	HEX NUT
45	4	W1/4F	FLAT WASHER
46	1	S4804	RUBBER FOOT
47	2	B3/8X1.25	HEX BOLT
48	2	W3/8F	FLAT WASHER
49	4	B1/4X0.75ST	SELF TAPPING SCREW
50	6	W5/16F	FLAT WASHER
51	24	W5/16L	LOCK WASHER

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Axles and Components

SAFETY NOTICE

Providing safe dependable operation of your axle(s) and related components is important. This manual provides basic procedures for service and repair using established industry standards. There are many variations in procedures to repair and maintain the axle and its related parts; however, it is not possible to provide you with all the detail for various service procedures. Refer to your trailer manufacturer's owner's manual for any specific warnings and procedures that may relate to the safety and maintenance of your trailer. If these procedures are not clear to you or if you are unsure you should contact a trailer repair facility who has a trained axle repair technician for advice or repair.

New Axle Setup and Adjustments

Wheels	Re-torque wheel nut torque requirements on new trailers at 50 miles. See page 16 for torque rates.
Brakes	Adjust at 3,000 miles.
Tire Pressure	See tire manufacturers recommendations.
Brake Controller Settings	Refer to Brake Controller manufacturers recommendations

BRAKES

Your trailer electric brakes are actuated by an electric magnet which is modified by an electrical impulse from the brake controller. The trailer brakes will apply smoothly and slightly ahead of the truck brakes if all the brake components are installed and connected properly. The brakes are activated with the electrical impulse from the controller to the magnets which, when in contact with the armature plate will apply the pressure to the primary shoe and will engage the secondary shoe much like hydraulic brakes on a passenger vehicle. As brake pressure (applied by the driver) is increased the electrical flow to the magnets increases the pressure between the brakes and drums to meet the braking requirements of the driver.

Electric brakes have been used on a variety of trailers for many years and offer many benefits to the driver. Please refer to the brake controller information provided by the installer of your towing vehicle for procedure and operation of the controller.

DOUBLE CHECK!

- Make sure your controller is installed according to the manufacturer's recommendations.
- Make sure that the proper brake controller adjustments have been made to correctly engage the tow vehicle brakes and the trailer brakes to work together to providing safe and comfortable braking.
- Make sure that the brakes have been properly seated by applying the brakes repeatedly and lightly for about 20 to 25 times at a low speed (under 25 miles per hour) to begin the "seating in" of the brake to the brake drum components. Do this in a safe and low traffic area for everyone's safety.

Below is a view of the 10” and 12” brakes used on your trailers axle(s), depending on your trailer and manufacturer’s specifications

Right Hand 10” Electric Brake

Left Hand 12” Electric Brake

ELECTRIC BRAKE MAINTENANCE

Your trailer brakes should be adjusted between 250 to 300 miles after all of the brake components have seated. Since driving conditions and areas vary you should re-check brakes adjustments at a minimum of 3,000 miles.

CAUTION

Do not place jack on axle or springs. Use jack stands to secure trailer.

ADJUSTMENT PROCEDURE

1. Make sure your trailer is on a level surface and is free of any potentially dangerous items.
2. Jack up the trailer and secure with jack stands. Make sure you are using the trailer manufacturer’s procedure for jacking and safely supporting the trailer until the tire and wheel are clear of the ground surface.
3. Find the adjusting hole cover and remove it from the backing plate.
4. Use a brake adjusting tool to adjust the star wheel (of the adjuster) and expand the brakes until the brake shoes are sufficiently expanded so that the tire and wheel will not easily rotate.
5. Now move the star wheel in the opposite direction until you can feel a little resistance from the brake and replace the hole cover.
6. Carefully lower the tire to the ground.
7. Repeat this procedure for all wheels making sure to adjust all brakes at the same time.

Troubleshooting Guide for Electric Brakes

Dragging Brakes	• Check for defective controller. • Check for corroded brake assembly. • Check for weak or broken brake shoe return spring. • Check for worn or damaged lever arm between magnet and brake shoe. • Check for improper controller installation.
Noisy Brakes	• Check brake adjustment. • Check for worn brake shoes. • Check for contaminated brake linings. • Check for weak or broken brake shoe return springs. • Check for bent backing plate. • Check wheel bearing adjustment. • Check for worn or damaged wheel bearings. • Check for worn or damaged magnets.
Inoperative Breakaway System	• Check for dead or weak 12-volt battery, on trailer. • Check all wiring and connections. • Check breakaway switch. • If only one brake is operating, check other magnets.
No Brakes	• Check for defective circuit breaker. • Check for open or shorted circuit. • Check for properly wired system including a good ground between towing vehicle and trailer. • Check brake adjustment. • Check for worn or defective magnet(s). • Check for a damaged or worn connector between towing vehicle/trailer. • Check that controller is installed correctly and functioning correctly.
Intermittent or Surging Brakes	• Check for out-of-round brake drums. • Check for properly wired system, including a good ground between towing vehicle and trailer • Check for defective magnet or wiring. • Check for loose/worn wheel bearings.
Ineffective or Weak Brakes	• Ensure trailer is not overloaded. • Check for loose or corroded connections. • Check for properly wired system. • Check for a shorted circuit. • Check for worn or defective magnet. • Check brake adjustment. • Check for bent backing plate flange. • Check for contaminated brake linings. • Check brake system wiring. • Check for worn, damaged brake linings. • Check for weak or broken brake shoe return spring. • Check for worn brake drums. • Check that correct controller is installed. • Check for improper controller installation.

Grabbing or Locking Brakes	• Check for contaminated brake linings. • Check for weak or broken brake shoe return spring. • Check for rust on armature plate or brake drum. • Check for improper controller installation.

ELECTRICAL

VOLTAGE MEASUREMENT PROCEDURE

To measure voltage, connect the voltmeter to both magnet wire leads while the towing vehicle is connected and the engine is running to insure accurate readings. The voltage should begin at O as the controller is increased slowly to approximately 12 volts. If the controller does not produce this voltage control refer to your brake controller trouble shooting and information manual. The lower reading will provide smoother braking while the higher may produce sharp or severe braking.

AMPERAGE MEASUREMENT PROCEDURE

Amperage is the electrical current flowing in the brake system while the magnets are energized. Make sure of your ammeter's rating to prevent damage to meter. An easy place to check the amperage is at the output wire from the brake controller to the brakes. Disconnect this (blue) wire and put the ammeter in series into this line. Please refer to the following chart.

Individual amperage draw can be measured at the magnet by inserting the ammeter in the line of the magnet you wish to check. Disconnect one of the wire leads from the wire magnet and attach the ammeter between the two wires. Reconnect the wires when completed.

Brake Size	Amps To Magnet	2 Brakes	4 Brakes	6 Brakes
7 x 1-1/4	2.5	5.0	10.0	15.0
10 x 2-1/4	3.0	6.0	12.0	18.0
12 x 2	3.0	6.0	12.0	18.0
12 x 3-1/2	3.0	6.0	12.0	18.0

There are several possible reasons that may cause voltage variations. Listed below are the most probable.

- Poor electrical connections.
- Open circuits
- Broken wires or incorrect wire size.
- Brake controller malfunction.
- Electrical problems can also be caused by bare wires, defective controllers or shorts in the magnet coil.

Locating the source of a short circuit should be done by checking individual sections. Should you find the amperage reading drops to zero after disconnecting the trailer, then the short is in the trailer. If the amperage is high after all of the magnets are disconnected, the short is somewhere in the trailer wiring.

Please note that the majority of electrical brake complaints can be traced to the controller. Refer to your brake controller manual to insure your controller is correctly adjusted and that the connections are in compliance with the manufacturer's specifications.

HUBS, DRUMS AND BEARINGS

Rockwell American bearing configuration uses industry standards forbearing sets (bearings & cones) and hubs. This standard of using tapered roller bearings helps to reduce the axial end play provided at assembly and is essential to performance of the bearings life. The bearings are packed with lithium base grease. Your axles may be equipped with the Rockwell American Posi-lube system which provides for lubricating the hubs at a special grease fitting. This option allows grease to flow through specially machined axle spindles, which have been drilled to allow the grease to be passed from the fitting to the inner bearing and back out through the outer bearing.

BRAKE DRUM INSPECTION

The brake drum surface should be inspected for scoring or excessive wear. If the wear is greater than .020" oversized it should be resurfaced. If the drum has worn out of round by more than .015" it should be re-machined. If wear or scoring is more than .090." the hub and drum assembly will have to be replaced. The armature surface (which contacts the magnet) needs to be inspected for uneven wear or scoring. Drums can be resurfaced removing no more than .030" and should be to 120 micro inch finish. In the event you need to turn the drums or resurface the armature it is recommended that you replace the magnets at the same time.

Special notes

- Make sure the inside of the hub cavity is carefully cleaned and free of any contamination following turning and before reassembly.

HUB INSPECTION REMOVAL, REPLACEMENT AND ADJUSTMENTS

A. Removal of Hub

1. Remove wheel
2. Remove grease cap
3. Remove cotter pin or bend tang washer on Posi-Lube
4. Unscrew the spindle nut counter clockwise
5. Remove spindle washer
6. Remove hub from spindle

B. Seal Inspection and Replacement

1. Seals should be replaced each time the hub is removed.
2. Pry the seal out of the hub with a screwdriver.
3. Tap new seal into place.

C. Bearing Maintenance, Adjustments, and Replacement

1. Inspect for corrosion and wear.
2. If any rust or wear exists on the bearing then remove and replace.
3. If bearings are found to be in good condition, then cleaning and repacking the grease is all that is needed.
    a. Note: Do not spin bearings with compressed air.
4. Hand pack each bearing individually using a premium lithium base wheel bearing grease.
5. Reinstall the hub, reversing the procedure above using the bearing adjustment procedures below.
6. If you have the Posi–Lube system, refer to the "Posi-Lube Lubrication Procedure".

D. Bearing Adjustment

1. Feel and Drag Method

Tighten slotted nut until hub drags slightly when rotated. (Rotating the hub while tightening the nut seats the bearing.) Loosen the slotted nut 1/6 turn (1 hex) to align nut slot with the cotter pin hole. Wheel should turn freely. Insert new cotter pin through nut and spindle. If necessary loosen, never tighten, nut to align slot with the hole in the spindle. Bend one leg of cotter pin over the end of the spindle and the other leg over the nut. Tap legs slightly to set. Cotter pin must be tight. If equipped with Posi-Lube, bend tang back into position.

2. Torque Wrench Method

Make sure nut is loose. Tighten nut with torque wrench to an initial torque of 50 ft. lbs. Loosen nut from initial torque and finger tighten. Insert new cotter pin through nut and spindle. If equipped with Posi-Lube, reset tang. If necessary loosen, never tighten, nut to align slot with the hole in the spindle. Bend one leg of cotter pin over the end of the spindle and the other leg over the nut. Tap legs slightly to set. Cotter pin must be tight.

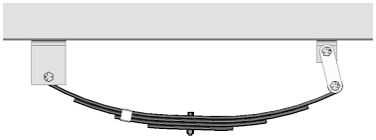
POSI-LUBE LUBRICATION PROCEDURE

Posi-Lube Lubrication Procedure

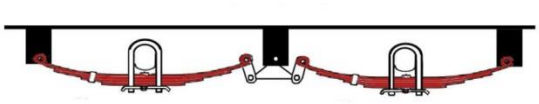
1. Remove the rubber cap at end of the grease cap.
2. Using a standard grease gun place the tip onto the grease fitting at the end of the spindle.
3. Pump the grease into the fitting as you continue pressure you will notice the old grease coming out at the cap. When you begin to see the new grease, remove the gun and clean off any excess and replace the rubber cap.

Rockwell American SUSPENSION SYSTEMS

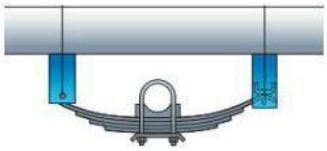
Single Axle
Double Eye Spring



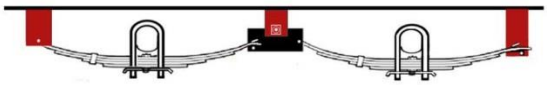
Tandem Axle
Double Eye Spring



Single Axle
Slipper Spring



Tandem Axle
Slipper Spring



We also provide your suspension systems as well as the axle assemblies. These components are designed to perform a number of tasks to provide your trailer with the best and smoothest towing possible. The above drawings offer a view of single and tandem axle assemblies in both the double eyed and slipper spring versions. Your axle undercarriage may be equipped with double eye leaf springs or slipper leaf springs depending on the manufacturer's specification. Double eye leaf springs have eyes at both ends of the spring and have special bushings to protect them from wear. They do not need lubricating. Slipper leaf springs have an eye at only one end which is also fitted with a special bushing to protect them from wear. The trailing end of the spring is designed to slide against the rear hangers. Either of these suspensions will provide you with comfortable trouble free towing, but as with any mechanical parts, they should be inspected periodically depending on usage at recommended intervals of 6 months or 5,000 miles whichever comes first. Should you find excessive wear in the hanger components you should have them replaced by a qualified technician. Should you find excess wear, in any of the attaching parts bolts, nuts, bushings, broken or worn out springs, you should replace them and torque attaching bolts to the following standards as shown below.

CAUTION

Make sure the trailer is raised and supported according to the manufacturer's requirements before beginning any repairs of the trailer.

SUSPENSION TORQUE REQUIREMENTS

U-Bolt	**Torque**
3/8"	30-50 ft. lbs.
7/16"	45-70 ft. lbs.
½"	45-70 ft. lbs.
9/16"	60-85 ft. lbs.
Shackle Bolt	**Torque**
7/16"	45-70 ft. lbs.
9/16"	Not torqued, snug fit to allow parts to move easily. The lock nut is used to position parts.

Caution

If the above maintenance procedures are not applied, there could be serious damage to the components possibly resulting in physical injury and or damage to property.

To perform undercarriage modifications please carefully follow the recommendations as follows:

1. Raise and support the trailer until it is clear of the ground.
2. When the trailer is securely supported place a block under the axle close to the end which will be repaired. You need to secure only the axle tube in order to remove and replace the part you want to replace. If your trailer has two axles you will need to support both axle tubes.
3. Disassemble the attaching parts (U-bolts, nuts, and the links).
4. Remove the eye bolts and the springs and place them clear of your working area.
5. If needed remove the spring bushings and replace with new ones.
6. Use the reverse order to reinstall your components.

Special note: The fittings that attach the springs to the chassis mounts are designed specially to be wear resistant and should not be lubricated.

THE EQUALIZER TORSION AXLE

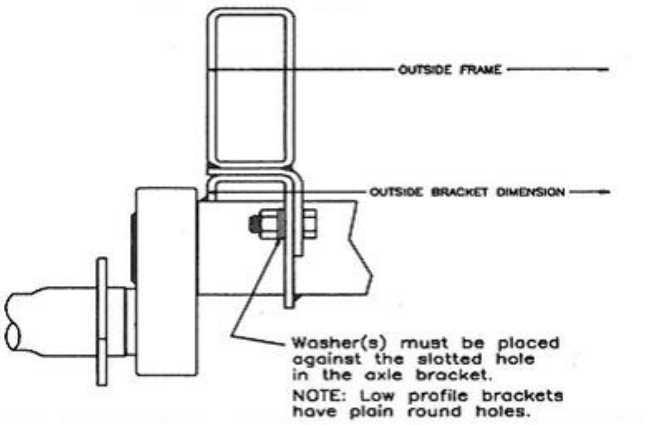
Your trailer may be equipped with our Equalizer axle(s). The Trailer manufacturer specifies their use according to individual engineering requirements. Each spindle is attached to a trailing arm which rocks up and down during road shock. This movement is transferred to a steel inner bar within the axle beam. Rubber cords then absorb the shock from the twisting inner bar.

THE BENEFITS

Superior Performance

The independent action provides greater control and stability which makes towing the trailer much easier. Wheel vibration is absorbed by the rubber cords.

Side Mount Installation



Side mount hangers should be welded to frame with three (3) ¼" fillet welds, 2-1/2" long on each side of the hanger and a fillet weld on each end. Welds should meet the quality standards of the American Welding Society, D1.1 Structural Welding Code.

Wheel Attachment and Torque Requirements

Patriot Equipment would like to reiterate the extreme importance of properly matching your axles, wheels, and tires when specifying or replacing your trailer wheels. It is of equal importance that you apply and maintain proper wheel mounting torque on your trailer axle. Please follow the wheel selection, torque requirement, and torque sequence guidelines that follow.

Wheel Selection

Wheels are a very important and critical component of your running gear system. When specifying or replacing your trailer wheels it is important that the wheels, tires, and axle are properly matched. The following characteristics are extremely important and should be thoroughly checked when replacement wheels are considered.

1. **Bolt Circle:** Many bolt circle dimensions are available and some vary by so little that it might be possible to attach an improper wheel that does not match the axle hub. Be sure to match your wheel to the axle hub, bolts circle, hub pilot and wheel mount surface to hub face. Also, confirm that proper studs stick out.
2. **Capacity:** Make sure that the wheels have enough load carrying capacity and pressure rating to match the maximum load of the axle tire and trailer.

3. **Offset:** This refers to the relationship of the center line of the tire to the hub face of the axle. Care should be taken to match any replacement wheel with the same offset wheel as originally equipped. Failure to match offset can result in reducing the load carrying capacity of your axle.
4. **Rim Contour.**

CAUTION

Replacement tires must meet the same specifications as the originals. Mismatched tires and rims may come apart with explosive force and cause personal injury to yourself and others. Mismatched tires and rims can also blow out and cause you to lose control and have an accident which can result in serious injury or death.

CAUTION

Do not attempt to repair or modify a wheel. Even minor modifications can have a great effect. Do not install a tube to correct a leak through the rim. If the rim is cracked, the air pressure in the tube may cause the pieces of the rim to explode with great force and can cause serious injury or death.

Torque Requirements

You should always consult with the wheel manufacturer to determine the appropriate torque level for your wheels. It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque is a measure of the amount of tightening applied to a fastener (nut or bolt) and is expressed as length times force. For example, a force of 90 pounds applied at the end of a wrench one foot long will yield 90 Ft Lbs. of torque. Torque wrenches are the proper method to ensure torque is applied correctly to a fastener.

CAUTION

Wheel nuts or bolts must be tightened and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheels from your axle, which can lead to an accident, personal injuries or death.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60 degrees or 90 degrees). The proper procedure for attaching your wheels is as follows:

1. Start all nuts/bolts by hand to prevent cross threading.
2. The tightening should be done in stages;
    a. Initially snug (10 ft-lb) the nuts/bolts to align and seat the wheel to the hub, in the order described in the torque sequence diagram below.
    b. Tighten the nuts/bolts performing the wheel torque sequence below.
3. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 10 miles, 25 miles and again at 50 miles. Check periodically thereafter, THIS IS VERY IMPORTANT.
4. Wheel nuts are designed to have full thread engagement with the wheel stud. Wheel stud threads should be visible outside the wheel nut. There will be varying amounts of thread stick out depending on variables such as center disc thickness and nut thickness. In general, there should be approximately three threads visible past the end of the nut.

Replacement Parts

Magnet Replacement Kits

Brake Size	Magnet Kit Number	Wire Color	Brake Mtg. Nut Torque (Ft.-LBS)
7 x 1-1/4	K71-57	White	45-70
10 x 2-1/4	PPBM10E	Green	45-70
12 x 2	PPBM12E	White	25-50
12 x 3-1/2	4738-23	Orange	60-90

Brake Shoe Replacement Kits

Brake Size	Single Kit (1 Brake)
7 x 1-1/4	K71-45
10 x 2-1/4	PPDSL10E
12 x 2	PPBSL12E
12 x 3-1/2	Right side 4737-3, left side 4737-4

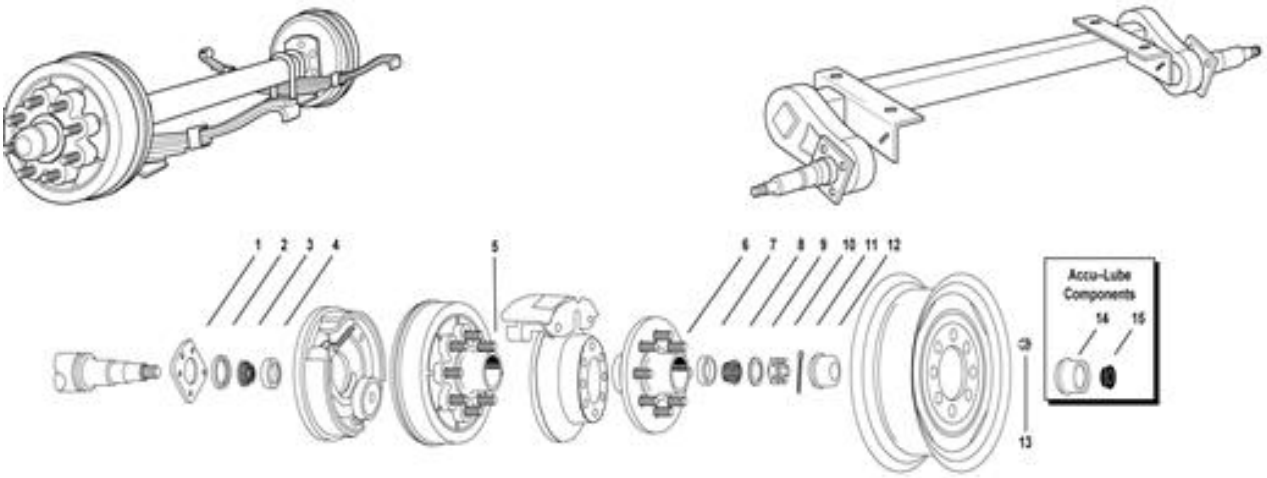
Bearing Replacement Cups and Cones

Brake Size	Hub	Cup	Cone
7 x 1-1/4	4 or 5 Bolt	L-44610 Inner And Outer	L-44649 Inner and Outer
10 x 2-1/4	5 or 6 Bolt	L-68111 Inner L-44610 Outer	L-68149 Inner L-44649 Outer
12 x 2	6 Bolt	25520 Inner 15245 Outer	25580 Inner 15123 Outer
12 x 2	8 Bolt	25520 Inner 14276 Outer	25580 Inner 14125A Outer
12 x 3-1/2	8 Bolt	25520 Inner 02420 Outer	25580 Inner 02475 Outer

Seal Replacement

Brake Size	Hub	Seal
7 x 1-1/4	4 or 5 Bolt	12192TB
10 x 2-1/4	5 or 6 Bolt	171255TB
12 x 2	6 or 8 Bolt	22333TBN
12 x 3-1/2	8 Bolt	22333TBN Grease 370219A Oil

Axle Parts



Axle Parts							
Axle Size	Axle PN	Hub	Grease Seal	Inner Bearing	Inner Race	Outer Race	Outer Bearing
3500#	TR1040	5 on 4.5	171255TB	L-68149	L-68111	L-44610	L-44649
6000#	TR1060	8 on 6.5	2233TBN	25580	25520	14276	14125A
7000#	TR1074	8 on 6.5	22333TBN	25580	25520	14276	14125A
8000#	TR1095	8 on 6.5	22333TBN	25580	25520	02420	02475
10000#	-	8 on 6.5	CR27438	28580	28521	25520	25580
12000#	TR1080	8 on 6.5	CR31281	39590	39520	JM205110	JM205149
16000#	TR1092	8 on 275 mm	CR31281	39590	39520	JM205110	JM205149

Axle Parts							
Axle Size	Spindle Washer	Spindle Nut	Cotter Pin	Grease Cap	EZ Lube Cap	Rubber Plug	Cone Wheel Nut
3500#	4753	TR1045	4755	TR1041	TR1044	RP-100	4756
6000#	4753	TR1065	TR1070	TR1064	TR1072	TR1072-1	4756
7000#	4753	4754-12	4755	1605-PL	-	RP-100	4756
8000#	4753	4754-12	4755	1605-PL	-	RP-100	4756-1
10000	4798	4797	CP-3	12011-1	-	-	568216
12000#	47128	47127	CP-3	12011-1	-	-	568216
16000#	47128	47127	CP-3	12011-1	-	-	WN7516PTFEC

Axle Parts			
Axle Size	Brake Drum Back Plate	Brake Drum w/ Bearings/Seal	Brake Set Up
3500#	TR1042 (L, R, 2-1/4"?)	TR1043	-
6000#	TR1062 (L or R)	TR1063	TR1061
7000#	4704-L/4704-R	92865A-1	-
8000#	4739-L/4739-R	90865-GP	-
10000#	4739-L/4738-R	99865-OBE	
12000#	4741-L/4741-R	912865-OBE	-
16000#	4741-L/4741-R	916810-OBE	-

Axle Parts	
Description	Part Number
1/2" Stud 6k Axle	TR1073
9/16" Stud 6K Axle	TR1074
1/2-20 Lug Nut	TR1075
9/16-18 Lug Nut	TR1076

Axle Parts	
Description	Part Number
1/2 Stud & Nut	TR1085-1
12 x 2" Brake Pad	TR1071

Minden Machine Shop Inc.
1302 K Road Minden, NE
800-264-6587 / 308-832-0220

California Proposition 65

The Safe Drinking Water and Toxic Enforcement Act of 1986 (California Proposition 65, commonly known as Prop 65) applies to companies doing business in the State of California. The regulation is administered by the Office of Environmental Health Hazard Assessment (OEHHA) and mandates that no person in the course of doing business shall knowingly expose any individual to a chemical known to the State of California to cause cancer and/or reproductive toxicity without first giving clear and reasonable warning to individuals. If the business can prove that the exposure level poses no significant risk to the end consumer no warning is necessary.

Minden Machine Shop, Inc. is providing the information below to educate about the chemicals that are or could be found in the products that Minden Machine Shop, Inc. produces or uses in their products.

Material	Chemical	CAS #	Cancer, Reproductive Harm or Both?
Cast Iron	Nickel	7440-02-0	Cancer
	Arsenic	7440-38-2	Both
	Cobalt	7440-48-4	Cancer
	Lead	7439-92-1	Both
Steel	Nickel	7440-02-0	Cancer
Stainless Steel	Nickel	7440-02-0	Cancer
Paint Finishes	Carbon Black	1333-86-4	Cancer
	Toluene	108-88-3	Reproductive Harm
	Lead	7439-92-1	Both
Rubber Compounds	Acrylonitrile	107-13-1	Cancer
	Butadiene	106-99-0	Both
	DEHP	117-81-7	Both
EPDM	Carbon Black	1333-86-4	Cancer
Petroleum	Cadmium	----------	Both
Petroleum	Isoprene	78-79-5	Cancer

Additional information on Proposition 65 can be obtained by visiting the State of California's Proposition 65 website:
https://oehha.ca.gov/proposition-65/about-proposition-65

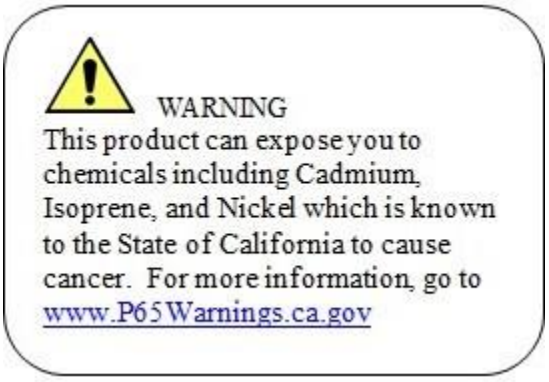
Summary of Proposition 65 requirements:
https://oehha.ca.gov/proposition-65/general-info/proposition-65-plain-language

Clear and reasonable notice requirements:
https://oehha.ca.gov/proposition-65/crnr/notice-adoption-article-6-clear-and-reasonable-warnings

Chemicals and substances regulated by Proposition 65:
https://oehha.ca.gov/proposition-65/proposition-65-list

Proposition 65 Laws and Regulations:
https://oehha.ca.gov/proposition-65/law/proposition-65-law-and-regulations

Minden Machine Shop, Inc. has placed this decal on our products to alert the user to the possible exposures.



Minden Machine Shop Inc
LIMITED WARRANTY

Minden Machine Shop Inc warrants all products manufactured by it to be free of defect in material and workmanship for a period of one (1) year from the date of purchase.

This Minden Machine Shop Inc. warranty does not cover:

1. Parts and accessories supplied by Minden Machine Shop Inc. but manufactured by others. Minden Machine Shop Inc. will facilitate the other manufacturer warranty for the benefit of the purchaser but will not be bound thereby (example: augers, motors, trailers, tanks, etc.).
2. Products that have been altered by anyone other than a Minden Machine Shop Inc. employee or are used by the purchaser, for purposes other than what was intended at time of manufacture or used in excess of the "built specifications".
3. Products that are custom manufactured by Minden Machine Shop Inc. utilizing the purchaser's design which deviates from Minden Machine Shop Inc. normal production line manufactured or customized features of the products.
4. Malfunctions or damages to the product from misuse, negligence, customer alteration, accidents or product abuse due to incoming material or poor material flow ability or lack of required performance or required maintenance (e.g., poor material flow ability caused by incoming wet fertilizer or hot soybean meal, etc).
5. Loss of time, inconvenience, loss of material, down time or any other consequential damage.
6. Product use for a function that is different than designed intent (e.g., storing soybean meal in grain bin, unacceptable material in the bin such as hot bean meal when product originally designed for other application, etc).
7. Minden Machine Shop Inc is not responsible for any equipment that this product is attached to or mounted on.

To activate this warranty, the purchaser must make contact in writing with Minden Machine Shop Inc. with in one (1) year of date of purchase. After contact, Minden Machine Shop Inc. has the right to determine the cause and qualify the legitimacy of the claim. Minden Machine Shop Inc., upon acceptance of a warranty claim, shall have a reasonable time to plan any repair or replacement and may affect repair or replacement out of its factory or through contract with a local repair service. If a purchaser after warranty notice is made, chooses to make the repair itself, Minden Machine Shop Inc. must approve any expenses before they are incurred to be responsible for customer reimbursement. Minden Machine Shop Inc. shall be liable on a warranty claim for repair or replacement of any defective products and this is the purchaser's sole and exclusive remedy. Minden Machine Shop Inc. will not be liable for any other or further remedy including claims for personal injury, property damage or consequential damage. The law of the Sate of Nebraska shall govern and any such claim and any issues with regard to the same shall be resolved in the Nebraska District Court for the county of Kearney.

RETURN OF MERCHANDISE

Merchandise may not be returned without written approval from the factory. All returns must have a return authorization number. Obtain this number before the return and show it on all return items. A 15% restocking charge is made on merchandise returned. Returned merchandise must be shipped pre-paid.

RECEIVING MERCHANDISE AND FILING CLAIMS

When receiving merchandise it is important to check both the number of parts and their description with packing slip. The consignee must make all claims for freight damage or shortage within 10 days from the date of delivery.

When the material leaves the factory it becomes the property of the consignee. It is the responsibility of the consignee to file a claim on any possible damage or loss. Please list your preferred routing on purchase orders.

MODIFICATIONS

It is the policy of Minden Machine Shop Inc. to improve its products whenever possible and practical to do so. We reserve the right to make changes, improvements and modifications at any time without incurring the obligation to make such changes, improvements and modifications on any equipment sold previously.

WARRANTY REGISTRATION

To register equipment, or file a claim, copy and paste the words on this page into an email or word document, fill out the appropriate information completely, and email it to larry@mindenmachine.com with the subject as EQUIPMENT WARRANTY, or fill it out and fax it to 308-832-1340.

Dealer Information: Not Applicable, check here: [ ]
Dealer Name:
Address:
City:
State:
Zip Code:
Phone #:
Email:

End User Information:
Purchaser:
Address:
City:
State:
Zip Code:
Phone #:
Email:

Equipment:
Serial #:
Date Of Purchase: / /

Equipment:
Trailer Model Number:
Trailer VIN Number:
Date Of Purchase: / /
Dealer Name:

TIRE IDENTIFICATION NUMBERS

QTY	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												

Please return within 14 days of purchase

CLAIM FILE

Defect: