

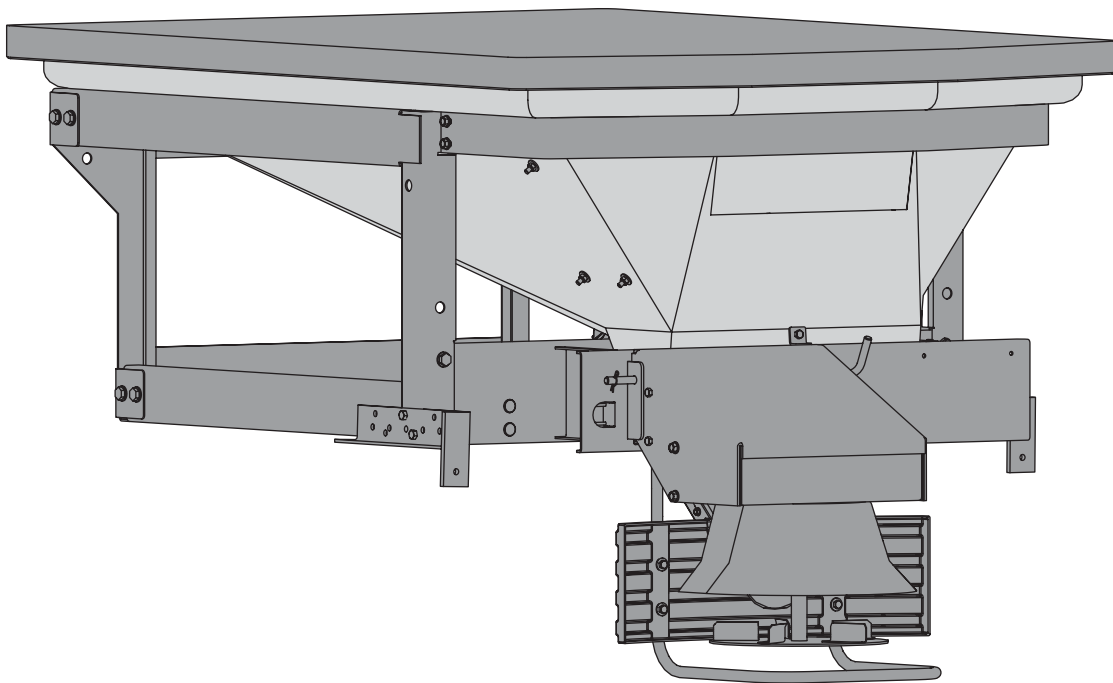
January 15, 2017
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Tornado™ LT Hopper Spreader

#78901

Installation Instructions



⚠ CAUTION

Read this document before installing
or operating the spreader.

These Installation Instructions are for WESTERN® Tornado LT Hopper Spreaders with
serial numbers 0000 and higher.

SAFETY

SAFETY DEFINITIONS

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious personal injury.

CAUTION

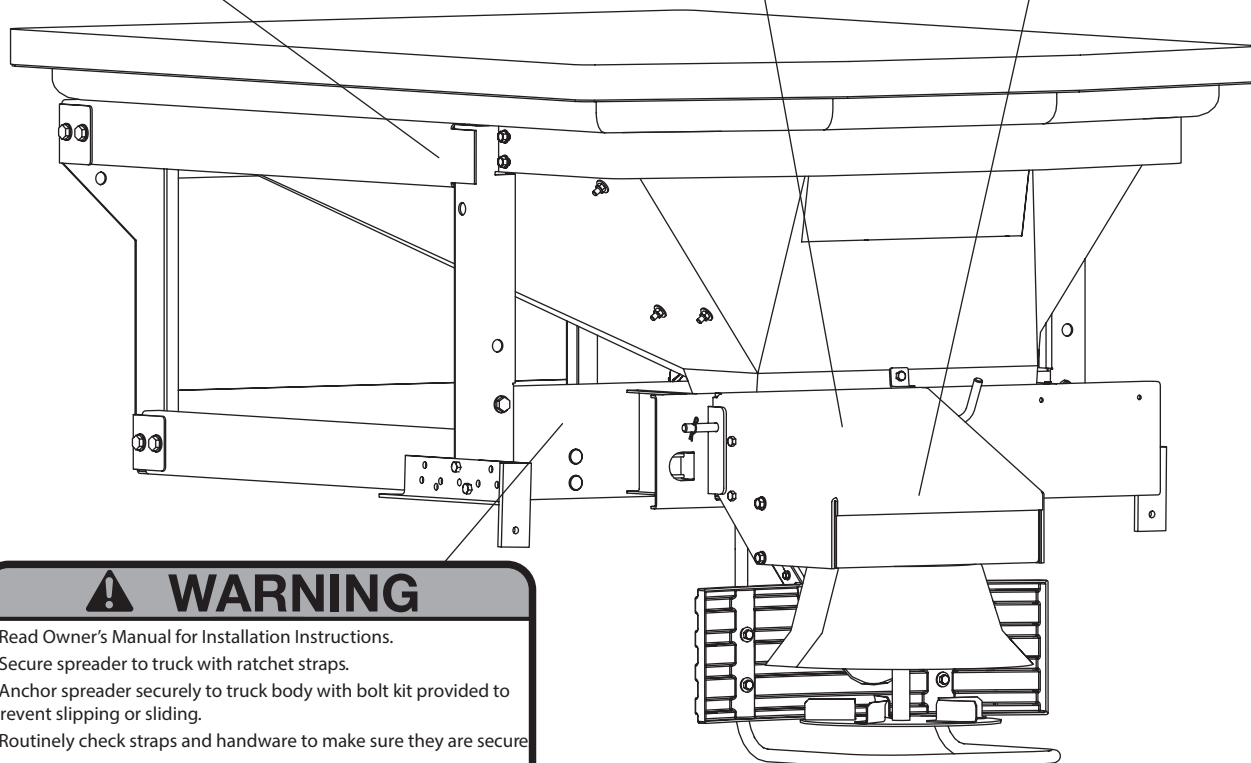
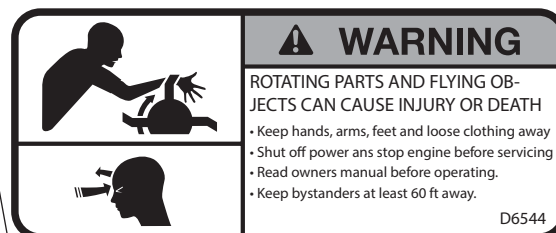
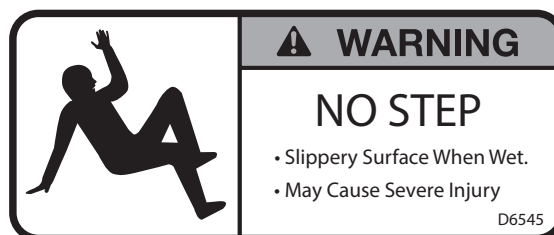
Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE: Indicates a situation or action that can lead to damage to your spreader and vehicle or other property. Other useful information can also be described.

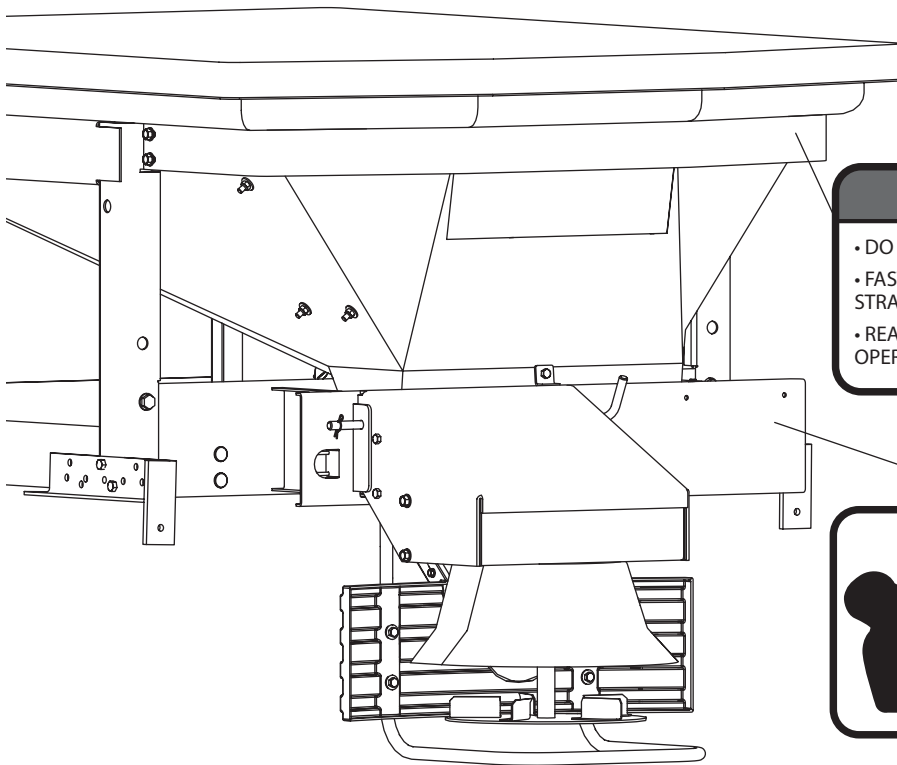
WARNING/CAUTION LABELS

Become familiar with and inform users about the warning and caution labels on the spreader.

NOTE: If labels are missing or cannot be read, see your sales outlet.



SAFETY



DANGER

- DO NOT REMOVE SPREADER WITH MATERIAL IN HOPPER
- FASTEN SPREADER DOWN WITH APPROVED RATCHET STRAPS AND BOLT KIT
- REAR FRAME LOCATOR BARS MUST BE IN PLACE BEFORE OPERATING VEHICLE

D6547



WARNING

- ROTATING AUGER CAN CAUSE
SERIOUS INJURY OR DEATH
- Keep arms, hands, and loose clothing away from auger.
 - Shut off control and unplug spreader before servicing.

D6335

SAFETY

SAFETY PRECAUTIONS

Improper installation and operation could cause personal injury and/or equipment and property damage. Read and understand labels and the Owner's Manual before installing, operating, or making adjustments.

WARNING

- Driver to keep bystanders minimum of 25 feet away from operating spreader.
- Before working with the spreader, secure all loose-fitting clothing and unrestrained hair.
- Before operating the spreader, verify that all safety guards are in place.
- Before servicing the spreader, wait for conveyor, auger, and spinner to stop.
- Do not climb into or ride on spreader.

WARNING



Overloading could result in an accident or damage. Do not exceed GVWR or GAWR ratings as found on the driver-side vehicle door cornerpost. See Loading section to determine maximum volumes of spreading material.

WARNING

Do not install the control for this product in the deployment path of an air bag. Refer to vehicle manufacturer's manual for air bag deployment area(s).

CAUTION

If rear directional, CHMSL light, or brake stoplights are obstructed by the spreader, the lights shall be relocated, or auxiliary directional or brake stoplights shall be installed.

CAUTION

During the hopper installation we recommend the addition of an OSHA compliant Backup Alarm. This alarm is required for OSHA governed employers.

CAUTION

- Do not operate a spreader in need of maintenance.
- Before operating the spreader, reassemble any parts or hardware removed for cleaning or adjusting.
- Before operating the spreader, remove materials such as cleaning rags, brushes, and hand tools from the spreader.
- Before operating the spreader, read the engine owner's manual, if so equipped.
- While operating the spreader, use auxiliary warning lights, except when prohibited by law.
- Tighten all fasteners according to the Torque Chart. Refer to Torque Chart for the recommended torque values.

CAUTION

Disconnect electric and/or hydraulic power and tag out if required before servicing or performing maintenance.

CAUTION



DO NOT leave unused material in hopper. Material can freeze or solidify, causing unit to not work properly. Empty and clean after each use.

NOTE: Lubricate grease fittings after each use. Use a good quality multipurpose grease.

FUSES

The electrical system contains several blade-style automotive fuses. If a problem should occur and fuse replacement is necessary, the replacement fuse must be of the same type and amperage rating as the original. Installing a fuse with a higher rating can damage the system and could start a fire. Fuse Replacement, including fuse ratings and locations, is located in the Maintenance section of the Owner's Manual.

SAFETY

PERSONAL SAFETY

- Remove ignition key and put the vehicle in park or in gear to prevent others from starting the vehicle during installation or service.
- Wear only snug-fitting clothing while working on your vehicle or spreader.
- Do not wear jewelry or a necktie, and secure long hair.
- Wear safety goggles to protect your eyes from battery acid, gasoline, dirt, and dust.
- Avoid touching hot surfaces such as the engine, radiator, hoses, and exhaust pipes.
- Always have a fire extinguisher rated BC handy, for flammable liquids and electrical fires.

FIRE AND EXPLOSION

WARNING

Gasoline is highly flammable and gasoline vapor is explosive. Never smoke while working on vehicle. Keep all open flames away from gasoline tank and lines. Wipe up any spilled gasoline immediately.

Be careful when using gasoline. Do not use gasoline to clean parts. Store only in approved containers away from sources of heat or flame.

CELL PHONES

A driver's first responsibility is the safe operation of the vehicle. The most important thing you can do to prevent a crash is to avoid distractions and pay attention to the road. Wait until it is safe to operate Mobile Communication Equipment such as cell phones, text messaging devices, pagers or two-way radios.

VENTILATION

WARNING

Vehicle exhaust contains lethal fumes. Breathing these fumes, even in low concentrations, can cause death. Never operate a vehicle in an enclosed area without venting exhaust to the outside.

BATTERY SAFETY

CAUTION

Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks, or lit tobacco to come near the battery. When charging or working near a battery, always cover your face and protect your eyes, and also provide ventilation.

- Batteries contain sulfuric acid, which burns skin, eyes, and clothing.
- Disconnect the battery before removing or replacing any electrical components.

NOISE

Airborne noise emission during use is below 70 dB(A) for the spreader operator.

VIBRATION









Operating spreader vibration does not exceed 2.5 m/s² to the hand-arm or 0.5 m/s² to the whole body.

SAFETY

TORQUE CHART

CAUTION

Read instructions before assembling.
Fasteners should be finger tight until instructed to tighten according to the Torque Chart. Use standard methods and practices when attaching spreader, including proper personal protective safety equipment.

Recommended Fastener Torque Chart					
Inch Fasteners Grade 5 and Grade 8					
Size	Torque (ft-lb)		Size	Torque (ft-lb)	
	 Grade 5	 Grade 8		 Grade 5	 Grade 8
1/4-20	8.4	11.9	9/16-12	109	154
1/4-28	9.7	13.7	9/16-18	121	171
5/16-18	17.4	24.6	5/8-11	150	212
5/16-24	19.2	27.3	5/8-18	170	240
3/8-16	30.8	43.6	3/4-10	269	376
3/8-24	35.0	49.4	3/4-16	297	420
7/16-14	49.4	69.8	7/8-9	429	606
7/16-20	55.2	77.9	7/8-14	474	669
1/2-13	75.3	106.4	1-8	644	909
1/2-20	85.0	120.0	1-12	704	995
Metric Fasteners Class 8.8 and 10.9					
Size	Torque (ft-lb)		Size	Torque (ft-lb)	
	 Class 8.8	 Class 10.9		 Class 8.8	 Class 10.9
M6 x 1.00	7.7	11.1	M20 x 2.50	325	450
M8 x 1.25	19.5	26.9	M22 x 2.50	428	613
M10 x 1.50	38.5	53.3	M24 x 3.00	562	778
M12 x 1.75	67	93	M27 x 3.00	796	1139
M14 x 2.00	107	148	M30 x 3.50	1117	1545
M16 x 2.00	167	231	M33 x 3.50	1468	2101
M18 x 2.50	222	318	M36 x 4.00	1952	2701
These torque values apply to fasteners except those noted in the instructions.					

LOADING

This Owner's Manual covers vehicles that have been recommended for carrying the hopper spreader. Please see your local dealer for proper vehicle applications.

CERTIFICATION

WARNING

New untitled vehicle installation of a spreader requires National Highway Traffic Safety Administration altered vehicle certification labeling. Installer to verify that struck load of snow or ice control material does not exceed GVWR or GAWR rating label and complies with FMVSS.

WARNING

Overloading could result in an accident or damage. Do not exceed GVWR or GAWR as found on the driver-side cornerpost of vehicle.

CAUTION



Read and adhere to manufacturer's ice-control material package labeling, including Material Safety Data Sheet requirements.

MATERIAL WEIGHTS

Material	Density		
	(lb/ft ³)	(lb/yd ³)	(kg/m ³)
Salt	80	2160	1282
Sand	100	2700	1602

Material densities are approximate and are based on dry, loose material. It is the responsibility of the operator to know the weight of the material to be spread and the vehicle carrying capacity.

DETERMINING VEHICLE PAYLOAD

1. Install the hopper spreader and optional equipment according to the instructions.
2. Install or attach any other equipment that will be on the vehicle while the hopper spreader will be in use (step bumper, trailer hitch, snowplows, etc.). Fill gas tanks.
3. Obtain the Gross Vehicle Weight Rating (GVWR), Front Gross Axle Weight Rating (FGAWR) and Rear Gross Axle Weight Rating (RGAWR) from the certification label located inside the driver-side door jamb or door.
4. With the occupants in the truck for normal hopper spreader operation, weigh the vehicle to obtain gross vehicle weight (GVW).
5. Subtract the GVW from the GVWR to determine the available material payload.
6. Obtain the weight per cubic yard (lb/cu yd) of the desired material. Divide the weight into the payload to determine the maximum volume of material that can be carried.
7. Compare the maximum volume to determine the maximum height of the material in the hopper spreader.
8. Fill the hopper with the material to the calculated height. Reweigh the vehicle with occupants and verify the GVW, Front Gross Axle Weight and Rear Gross Axle Weight are less than the vehicle's ratings.
9. Repeat Steps 6–8 for each type of material.

MOUNTING THE SPREADER

MOUNTING SPREADER

NOTE: Periodically throughout the snow and ice control season, verify mounting devices are secure.

⚠ WARNING

Spreader shall be bolted to vehicle frame. Do not rely on the tie-down chains or straps alone to hold spreader in vehicle.

⚠ CAUTION

Before lifting, verify hopper is empty of material. The lifting device must be able to support the spreader's weight.

1. Remove the tailgate from the pickup bed.
2. Load the spreader onto the truck bed.
3. Mount the chute to the deflector using the supplied hardware kit.

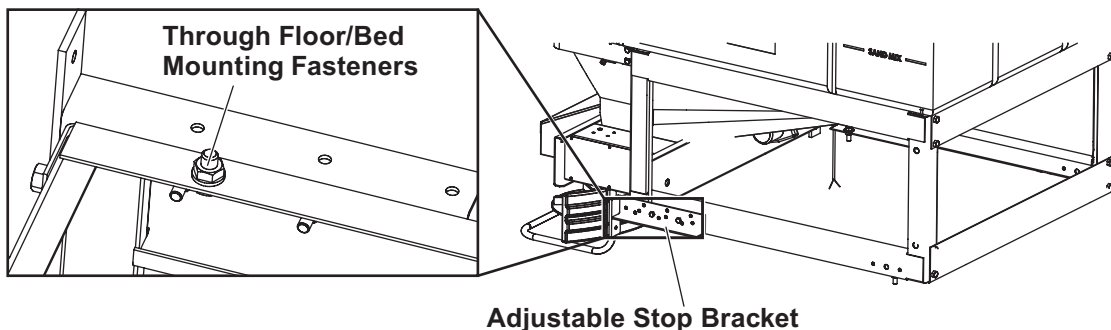
4. Mount the chute/deflector assembly to the spinner assembly with supplied hardware to form the drive assembly.
5. Mount the drive assembly to the spreader with a bent pin and secure with a hairpin cotter.
6. Slide the spreader forward until the deflector/chute assembly makes contact with the vehicle. Then, slide spreader back approximately 1" to allow proper clearance.

⚠ CAUTION

Before drilling holes, check to be sure that no vehicle wiring or other components could be damaged.

7. Install stop bars using supplied hole patterns (see illustration below). To achieve the best position, you may need to drill additional holes in the bracket in order to properly position the spreader.

If there are interferences, relocate the holes, making sure there are at least two forward and two rearward of the front to back centerline.



MOUNTING THE SPREADER

8. Once the spreader is positioned front to back, center it left to right. Looking at the inside front and rear corner of the lower frame area, you will notice four holes in the bottom of the frame. Using a paint pen or similar marking device, mark hole locations.

⚠ CAUTION

Before drilling holes, check to be sure that no vehicle wiring or other components could be damaged.

9. Drill holes at the marked locations.

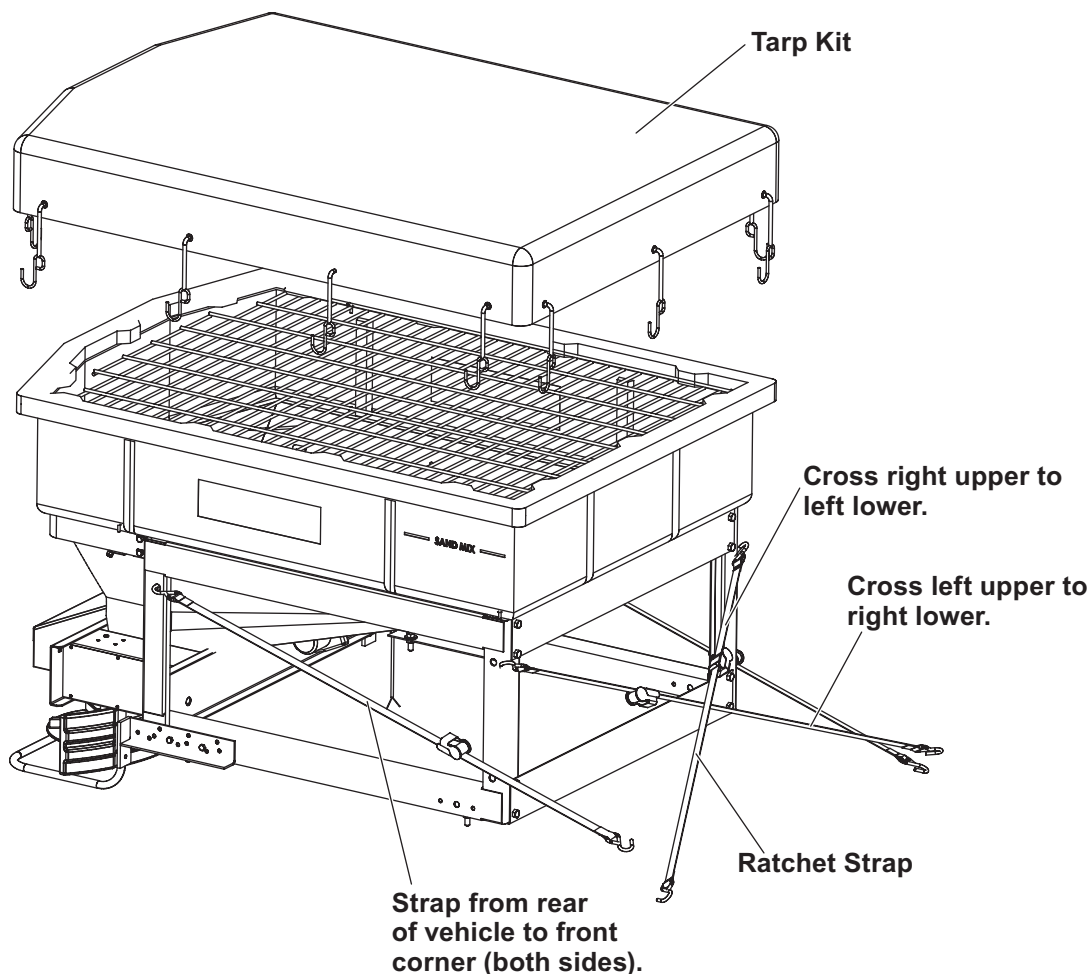
NOTE: Pay special attention when drilling or clamping dissimilar metals to aluminum bodies. Galvanic corrosion can occur if not handled properly. Contact vehicle manufacturer for recommended attachment practices.

10. Install and tighten all four cap screws.

11. Install the four ratchet straps as shown below.

NOTE: It is important for safety that this strapping method be used as the standard mounting procedure.

12. Connect the spreader power cord to vehicle main power plug mounted at the rear of the vehicle (refer to installation instructions for wiring instructions).



WIRING AND HARNESS INSTRUCTIONS

WIRING INSTRUCTIONS

1. Take the harness assembly and route from the rear of the vehicle to the front. Route the harness along the frame and attach to the frame holes and frame supports.

It is not recommended to attach to fuel or brake lines for obvious reasons. Do not route close to exhaust system or engine. Even though the hopper spreader uses high temperature wiring, it still could melt under extreme heat and short the spreader electrical system, as well as the vehicle electrical system.

2. Mount rear plug on bumper using supplied fasteners. Locate plug toward the center of the bumper to reduce the amount of debris the tires will throw to the rear.

NOTE: Apply a small amount of dielectric grease to the plug. Try to mount plug facing upward to help keep plugs tightly sealed.

3. Secure harness from the rear to the front using heavy duty cable ties or frame clips along the frame, and lighter duty cable ties everywhere else.

⚠ CAUTION

Before drilling holes, check to be sure that no vehicle wiring or other components could be damaged.

4. Lay out harness portion that connects to the battery along the fire wall and fender well. Do not connect power leads to battery yet. Drill a 3/4" hole in the fire wall or use existing access hole for the control portion of the harness. Route the connector and harness through the hole.

Be sure to check the area on the other side of the fire wall to make sure you are not going to drill into the vehicle harness or a control module. Generally, either side of the steering wheel is a good location to place the hole.

5. Connect power leads to the battery: Red POSITIVE (+), Black NEGATIVE (-). Always connect to the primary battery if using a dual battery system. Secure loose loom to any other large or medium vehicle harness with medium duty cable ties to secure wiring harness.

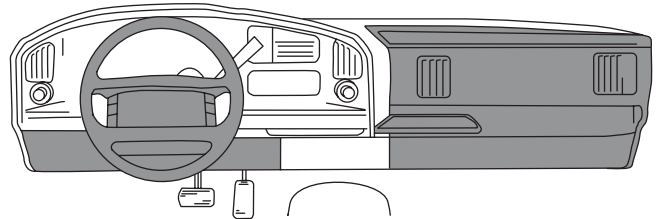
NOTE: If adding an inline fuse, use a 60 amp slow blow (time delay) or a 60 amp relay.

Vehicle Control Harness Installation

When choosing a location for your control, it should be mounted within easy reach of the vehicle operator and not restricting access to vehicle controls or vehicle instrumentation. Do not mount the control in areas prohibited by the vehicle manufacturer for crash worthiness. See the vehicle's body builder's book, owner's manual or service manual for details. The shaded areas in the illustration below show the most commonly restricted areas.

⚠ CAUTION

Do not alter, modify or install additional components in shaded areas shown below. Failure to comply may interfere with airbag deployment or cause injury to operator in an accident.



1. Install control bracket to control using nylon and steel washers and cap screws.
2. Connect the harness to the back of the control and mount to a suitable location. Cable tie loose control harness and move to the engine compartment. Do not mount close to any heater vents.
3. Push the ON/OFF switch on the control to check for power. After power has been confirmed, push the ON/OFF switch again to turn OFF. The electrical portion of the installation is complete.

NOTE: Use dielectric grease on all electrical connections.

WIRING AND HARNESS INSTRUCTIONS

HARNESS DUST COVER

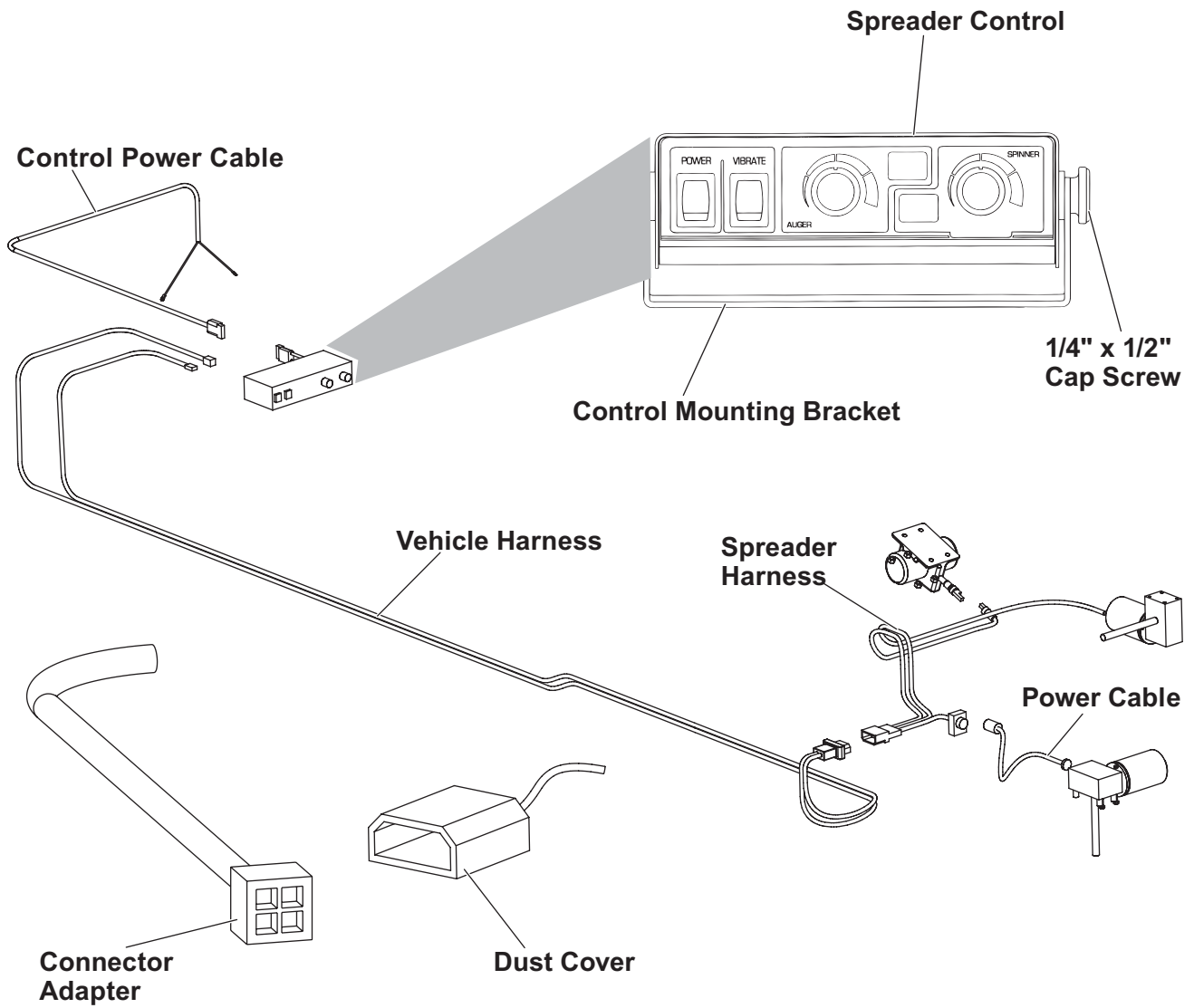
Install the dust cover as shown in the Harness Wiring Diagram on the following page.

NOTE: In the off season, remove control and put in a cool, dry place. The interior summer temperatures could damage circuit board and void warranty.

NOTE: Do not modify harness length. Any modifications will void warranty.

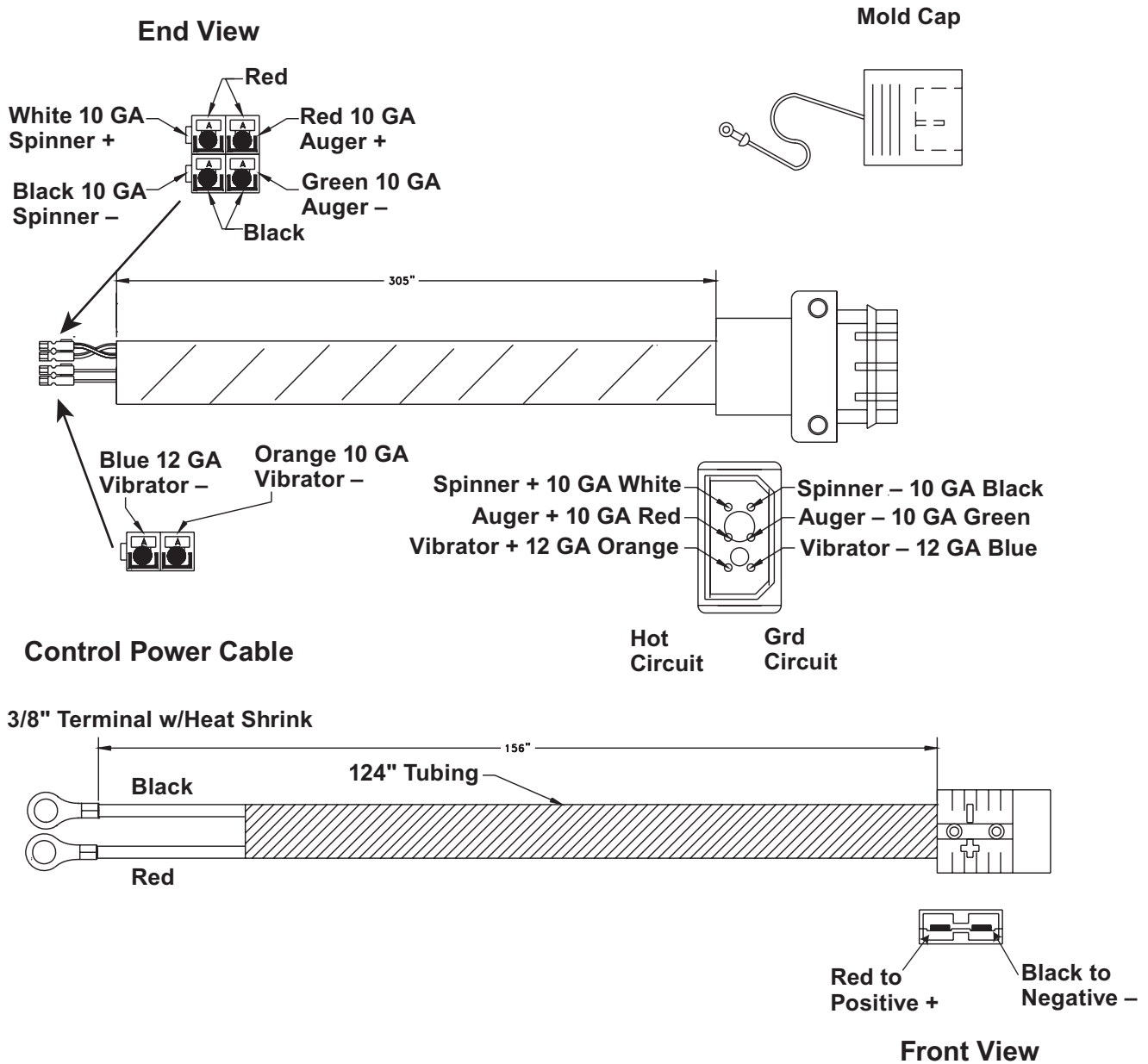
- All external connections must have dielectric grease.
- Read lead labels before attaching to power source or ground.
- No other devices may be spliced into wiring harness.
- Any repairs to wiring harness must be done with heat shrink butt connectors.
- If inline fuse is installed, use a 60 amp maxi fuse or circuit breaker.

HARNESS WIRING DIAGRAM



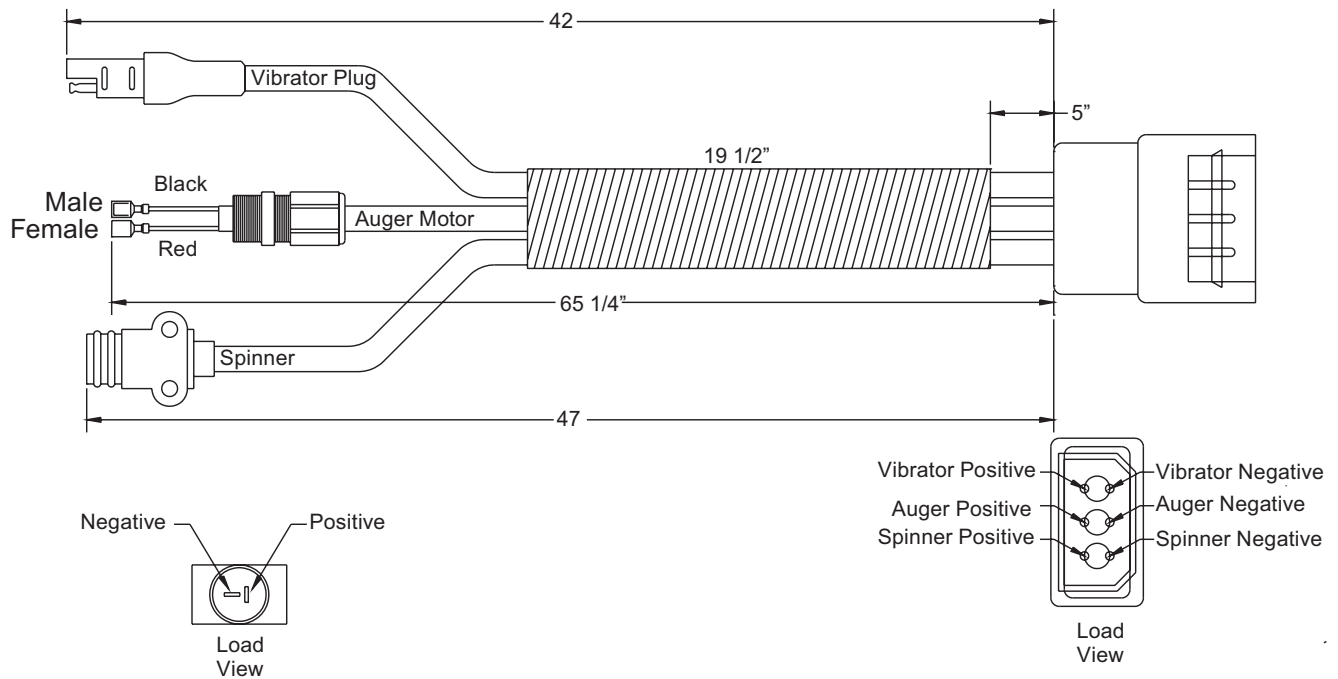
HARNESS DIAGRAM

Vehicle Harness

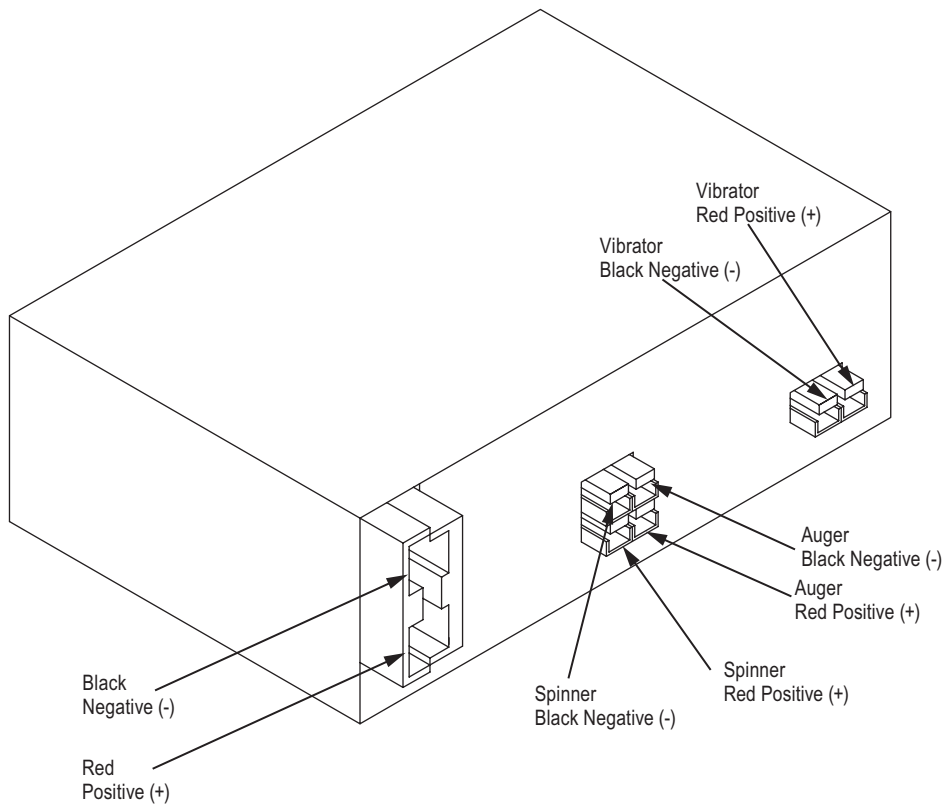


HARNESS DIAGRAM

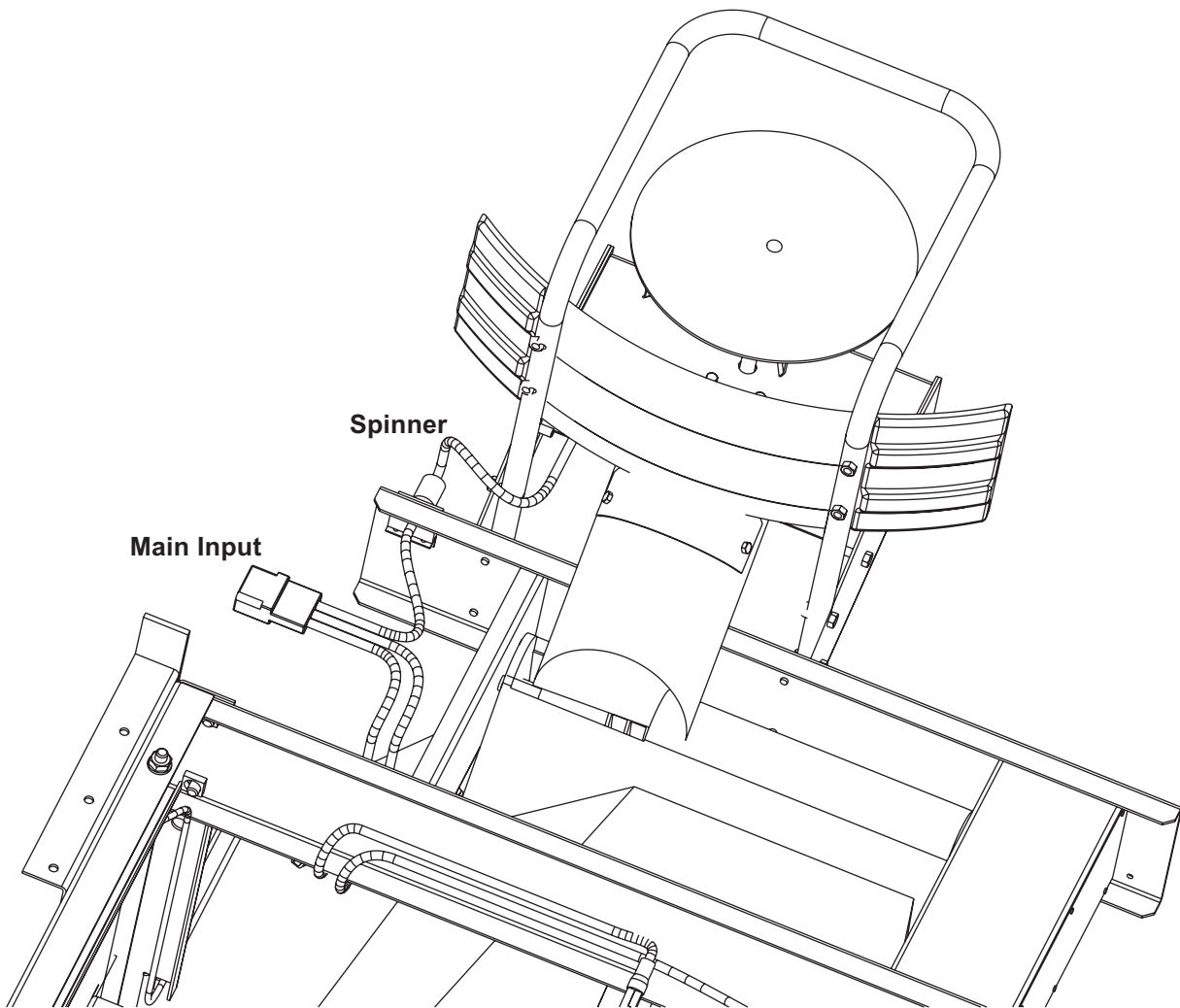
Spreader Harness



Control



ELECTRICAL ROUTING



Auger and Vibrator (not supplied on drawing)

FINAL ADJUSTMENTS

FINAL CHECKLIST

- ☐ Verify dielectric grease is applied to all electrical connections.
- ☐ Verify wire harnesses and battery cables are properly secured away from hot or moving parts.
- ☐ Verify vehicle battery cable has sufficient ground clearance when spreader is removed from truck.



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