

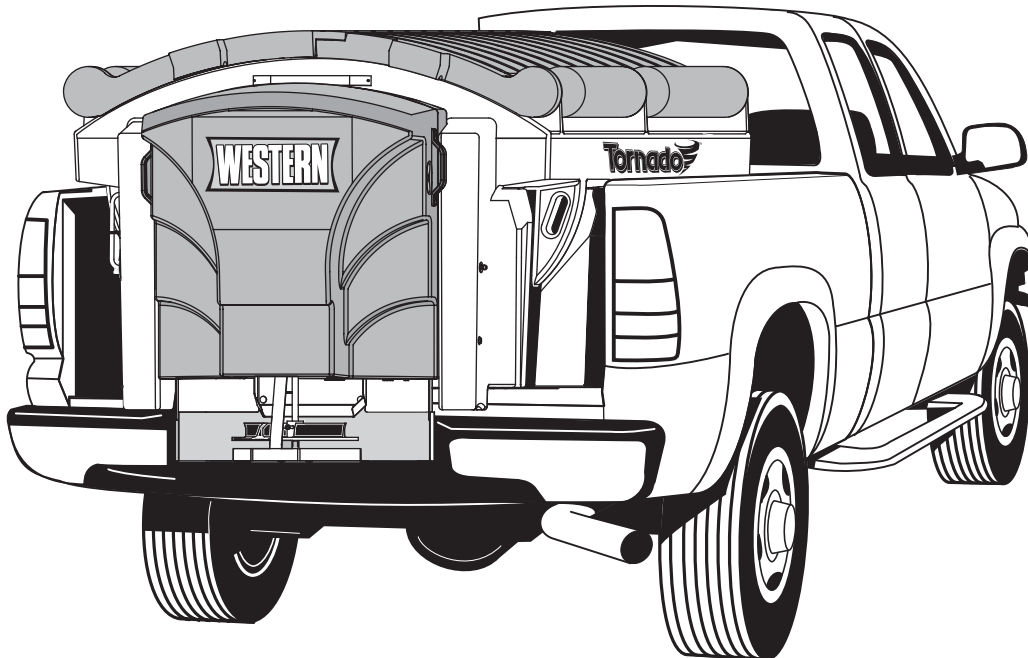
January 15, 2017
Lit. No. 94214, Rev. 01



Tornado™ Hopper Spreader 24V DC

#78318, 78321, 78324

Installation Instructions



⚠ CAUTION

Read this document before installing
or operating the spreader.

These Installation Instructions are for WESTERN® Tornado Hopper Spreaders with serial numbers beginning with 120927 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

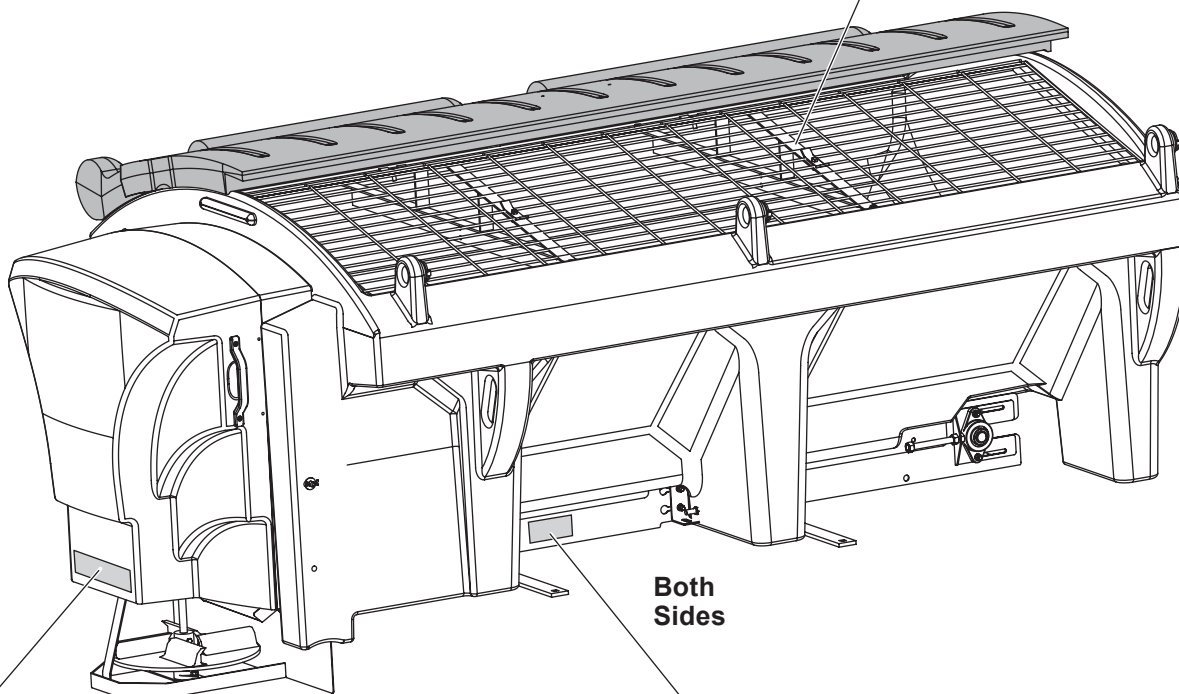
Become familiar with and inform users about the warning and caution labels on the spreader.

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

CAUTION

Do not lift spreader by this member. Lifting here could cause personal injury and property damage.

67272



Both
Sides



WARNING

- DO NOT exceed GVWR or GAWR with spreader and load.
- Turn spreader OFF before filling, adjusting or cleaning.
- Bystanders to stay a minimum of 25 feet away from operating spreader.
- DO NOT climb into or ride on spreader.
- Keep hands, feet and clothing away from moving conveyor and spinner.



CAUTION

- Read Owner's Manual before operating or servicing spreader.
- Empty and clean spreader after every use.

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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 (7.6 m) 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 (N·m)		Size	Torque (N·m)	
	 Grade 5	 Grade 8		 Grade 5	 Grade 8
1/4-20	11.4	16.2	9/16-12	148	209
1/4-28	13.1	18.5	9/16-18	164	232
5/16-18	23.6	33.3	5/8-11	203	287
5/16-24	26.0	36.9	5/8-18	230	325
3/8-16	41.8	59.1	3/4-10	365	510
3/8-24	47.5	67.0	3/4-16	403	569
7/16-14	67.0	94.6	7/8-9	582	822
7/16-20	74.8	105.6	7/8-14	643	907
1/2-13	102.1	144.3	1-8	873	1232
1/2-20	115.2	162.7	1-12	954	1349

Metric Fasteners Class 8.8 and 10.9

Size	Torque (N·m)		Size	Torque (N·m)	
	 Class 8.8	 Class 10.9		 Class 8.8	 Class 10.9
M6 x 1.00	10.4	15.0	M20 x 2.50	441	610
M8 x 1.25	26.4	36.5	M22 x 2.50	580	831
M10 x 1.50	52.2	72.2	M24 x 3.00	762	1055
M12 x 1.75	91	126	M27 x 3.00	1079	1544
M14 x 2.00	145	200	M30 x 3.50	1515	2095
M16 x 2.00	226	313	M33 x 3.50	1990	2849
M18 x 2.50	301	431	M36 x 4.00	2647	3662

These torque values apply to fasteners except those noted in the instructions.

LOADING

These instructions cover vehicles which 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



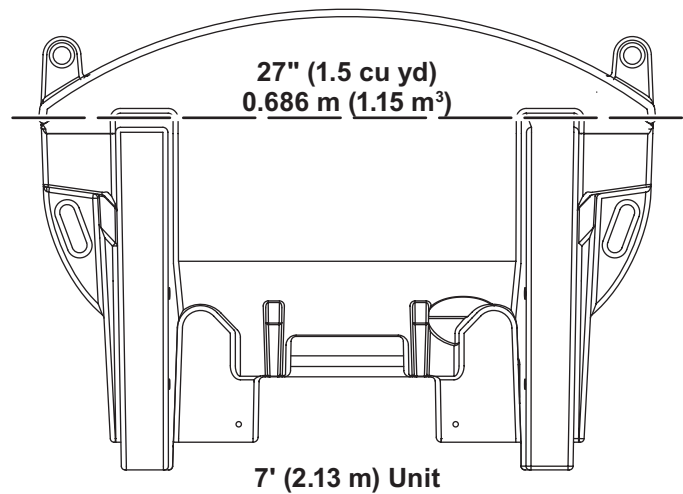
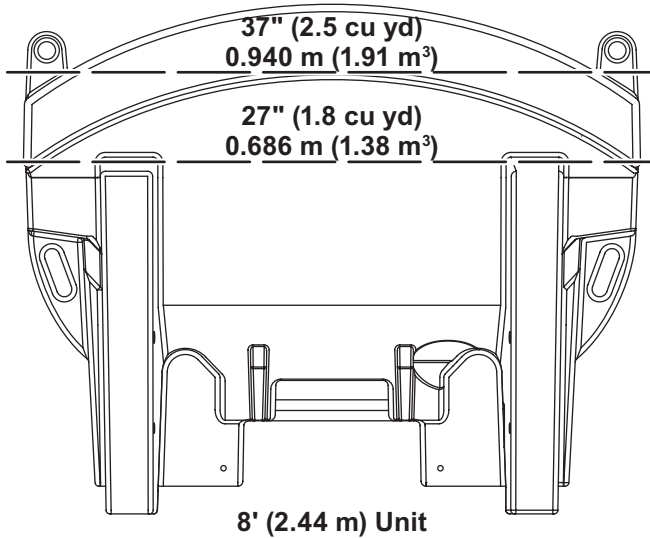
Read and adhere to manufacturer's ice-control material package labeling, including Material Safety Data Sheet requirements.

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.

LOAD VOLUME



SPREADER SPECIFICATIONS

Spreader Description	Overall Length in (m)	Empty Weight lb (kg)	Capacity Struck cu yd (m ³)	Overall Width in (m)	Overall Height in (m)
Regular Capacity 7' (2.13 m) Hopper Body Double-Wall Poly	108 (2.74)	591 (268)	1.5 (1.15)	63 (1.6)	44 (1.12)
8' (2.44 m) Hopper Body w/o Collar Double-Wall Poly	117 (2.97)	660 (299)	1.8 (1.38)	63 (1.6)	44 (1.12)
8' (2.44 m) Hopper Body w/ Collar Double-Wall Poly	117 (2.97)	734 (333)	2.5 (1.91)	63 (1.6)	51 (1.30)

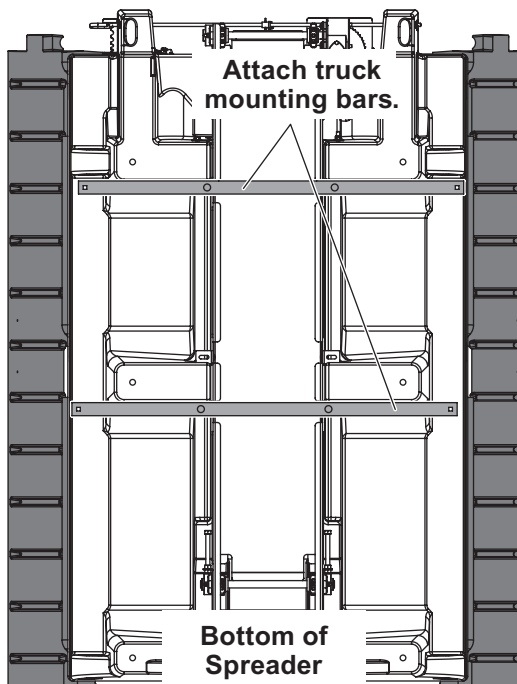
MOUNTING THE SPREADER

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

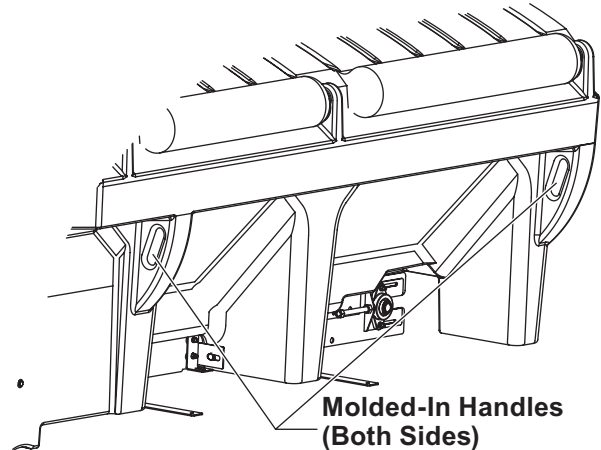
⚠ CAUTION

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

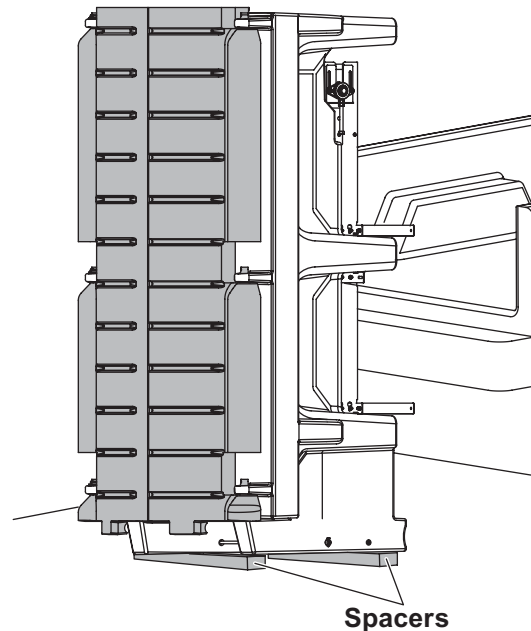
1. Remove the chute from the inside of the hopper:
 - a. Unlatch the rubber straps located at the rear of the lids near the handles.
 - b. Remove the screens.
 - c. Remove the screen supports.
 - d. Remove the chute and replace the screen supports and screens.
 - e. Close the lids and latch the rubber straps.
2. Remove the tailgate from the truck.
3. Attach the truck mounting bars to the sill brackets:
 - a. Measure the width between the wheel wells.
 - b. If needed, cut one or both of the supplied bars to the correct length.
 - c. Attach them to the sill brackets using the supplied hardware as shown.



4. The spreader can be moved into the truck bed either by lifting the spreader by the four molded-in handles located on the corner legs or by sliding the spreader into the truck bed from the ground.



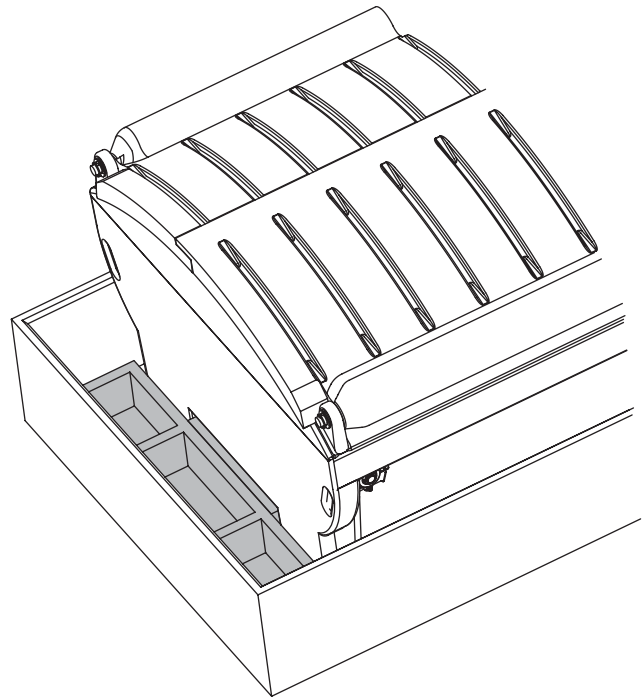
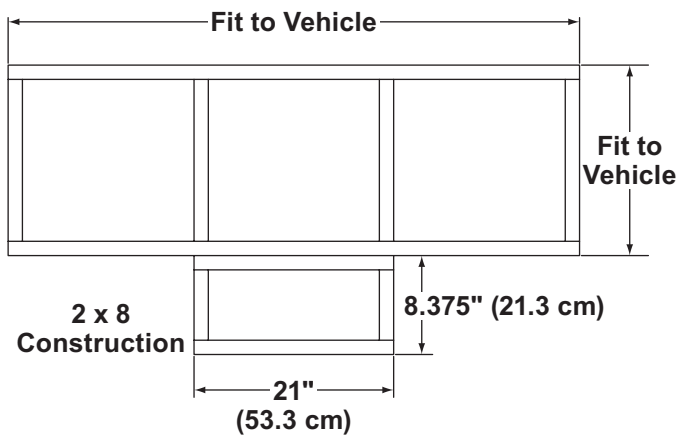
5. To lift the spreader into the truck bed from the ground, stand the spreader up on the feet at the rear of the spreader on top of two spacers at least 2" (5.1 cm) off the ground. The chute must be removed.



6. Position spreader on its feet at the rear of the truck.
7. Tip the spreader toward the truck until the sill rests on the rear edge of the truck bed.
8. Lift the rear of the spreader and slide it into the truck bed. Two or more people are recommended for this task.

MOUNTING THE SPREADER

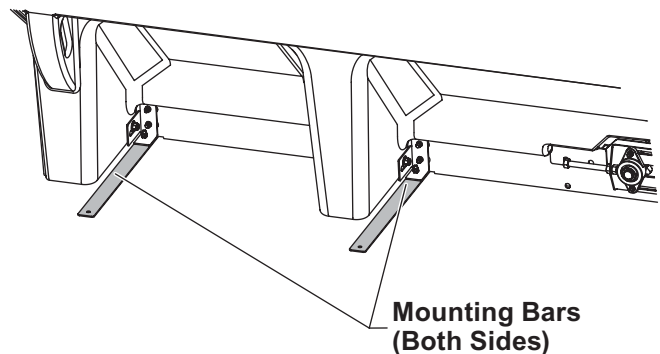
9. Center the spreader in the truck.
10. Remove the cable tie holding the wire harness to the conveyor chain. Connect the vehicle side harness to the hopper side harness.
11. To assemble the chute to the spreader:
 - a. Select the height for the chute assembly. The upper chute position is typically used for pickup truck installations.
 - b. Lift the chute onto the feed gate actuator bar and slide it down into place.
 - c. Align the holes in the hopper body with the threaded inserts in the chute, and install the pins to secure the chute to the hopper body.
 - d. Connect the spinner motor wiring harness.
12. Measure the distance from the front of the truck bed to the end of the front of the sill and make a spacer to place between the end of the sill and the front of the truck bed. **Failure to install this spacer could result in damage to the spreader.**



⚠ WARNING

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

13. Bolt the spreader to the truck frame through the mounting bars attached to the sill. Use 1/2" hardware as required by the vehicle application. If the bars are not directly over the truck box supports, the truck bed must be braced to the frame to prevent buckling or deforming the truck bed.



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.

WIRING AND HARNESS INSTRUCTIONS

WIRING INSTRUCTIONS

To properly wire the hopper spreader, please adhere to the following recommended installation sequence.

1. Install the vehicle battery cable and control harness included with the spreader per the following instructions.
2. Install the cab control using the instructions included with the cab control.

Vehicle Battery Cable Installation

1. Before beginning this installation, remove the battery cables from the vehicle battery.
2. Using the 1/4" x 3/4" cap screws, flat washers, and locknuts, mount the fuse holder near the vehicle battery so the 22" (55.9 cm) battery cable can be installed from the POSITIVE (+) battery terminal to the fuse holder. Install the fuse into the fuse holder and hand tighten nuts.

NOTE: Accessory 50" (127 cm) or 90" (229 cm) cables may be installed in place of the standard 22" (55.9 cm) cable for applications requiring a longer vehicle battery cable.

3. Attach one end of the 22" (55.9 cm) battery cable to the fuse holder so the ring terminal is on top of the fuse; replace the lock washer and nut.
4. Lay out a path for routing the vehicle battery cable from the rear of the truck bed to the vehicle battery. Make sure the battery cable avoids any hot, sharp, or moving parts of the truck. Routing may vary from truck to truck.
5. Route the vehicle battery cable as laid out in Step 4.
6. Using cable ties, secure the battery cable to the truck. Verify the harness cannot drop onto the road when it is disconnected from the spreader.
7. Attach the vehicle battery cable red wire to the other fuse holder stud so the ring terminal is on top of the fuse; replace the lock washer and nut.
8. Torque the fuse holder nuts to 106–159 in-lb (12–18 N·m) and snap the fuse holder cover into place.

9. Attach the other end of the 22" (55.9 cm) battery cable to the POSITIVE (+) battery terminal.
10. Attach the vehicle battery cable black wire to the NEGATIVE (–) battery terminal.

NOTE: When using the accessory 50" (127 cm) or 90" (229 cm) battery cables, connect the black wire from the vehicle battery cable to a ground bolt on the vehicle frame or the engine. Clean away any paint or dirt to ensure a good ground connection.

Vehicle Control Harness Installation

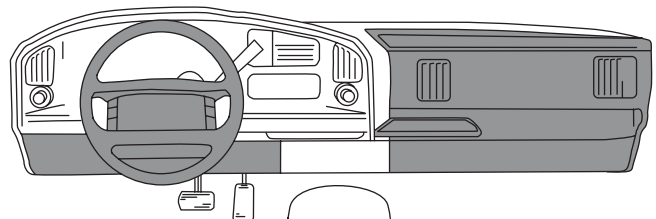
All spreaders are shipped from the factory with the spreader harness wired to the motor and spreader module.

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.

NOTE: Use dielectric grease on all electrical connections.



1. Lay out a path for routing the vehicle control harness from its attachment point on the vehicle battery cable into the cab of the truck. Make sure the path avoids any hot, sharp or moving parts of the truck. Routing will vary from truck to truck.

WIRING AND HARNESS INSTRUCTIONS

2. Mount the 24V resistor assembly to a flat metal surface or cable tie in an area with good air flow.
3. Connect the 4-pin connector from this assembly to the 4-pin connector on the vehicle control harness.
4. Identify a convenient location for the cab control that can be reached by the harness.

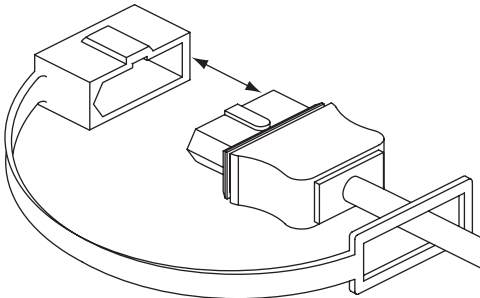
⚠ CAUTION

Before drilling any holes, check both sides of the material for any wires, fuel lines, fuel tanks, etc. that may be damaged by drilling.

5. Drill a 5/8" (1.6 cm) hole in the fire wall so the vehicle control harness can reach the desired cab control location.
6. Insert a rubber grommet into the hole.
7. Route the harness as laid out in Step 1.
8. Secure the vehicle control harness to the truck.
9. Attach the red connector to a switched accessory circuit.
10. Connect the cab control to the vehicle control harness according to the instructions supplied with the control.

HARNESS PLUG COVER

Install the plug cover as shown.



CENTER HIGH-MOUNTED STOPLIGHT (CHMSL) INSTALLATION

1. Lay out a path for routing the CHMSL vehicle harness from its point of attachment to the spreader to the location of the OEM tap. If no OEM tap is provided, make sure to tap in after the first OEM splice from the stoplight switch in the CHMSL circuit.

Make sure the CHMSL vehicle harness avoids any hot, sharp, or moving parts of the truck. Routing will vary from truck to truck.

2. Route the CHMSL vehicle harness as laid out in Step 1.
3. Secure CHMSL vehicle harness to truck.
4. At CHMSL wire tap on host vehicle, connect CHMSL vehicle harness red wire to host vehicle CHMSL tap wire using special butt splice provided.
5. If the License Plate Light Kit is not installed, coil and cable-tie the brown wire away from hot, sharp, or moving parts.

LICENSE PLATE LIGHT KIT INSTALLATION (OPTIONAL ACCESSORY)

Connect the CHMSL vehicle harness brown wire to the host vehicle park light circuit using the butt splice provided.



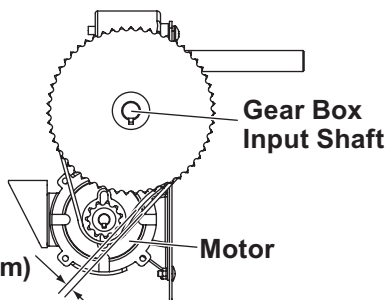
FINAL ADJUSTMENTS

CHAIN TENSION

NOTE: Overtightening the chain may result in damage to the motor or gear box bearing.

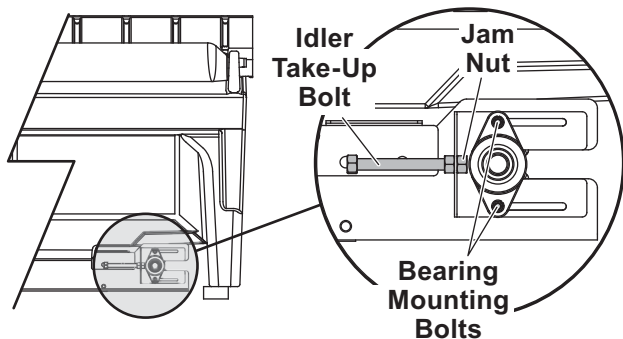
To adjust chain tension:

1. Loosen the bolts that hold the drive motor.
2. Slide the motor to increase or decrease the chain tension.
3. After adjusting the motor, tighten the bolts. The chain should deflect 1/4" (6.35 mm) between the sprockets.



CONVEYOR PINTLE CHAIN TENSION

1. Periodically check the conveyor chain tension. The spreader should be out of the vehicle. To check the tension, measure 20"–24" (51–61 cm) in from the rear edge of the sills. Push up on the chain with your hand. The conveyor chain should lift up 1"–3" (2.5–7.6 cm) off the conveyor chain guide.
2. If the slack is greater than 3" (7.6 cm), loosen the two bearing mounting bolts on each side of the conveyor idle roller on cab end of hopper.
3. Loosen the jam nut on one of the take-up bolts, then tighten (clockwise) the take-up bolt one full revolution. Repeat evenly on the other side.



FINAL CHECKLIST

- ☐ Verify gear case oil level is level with fill hole.
- ☐ Verify correct motor-to-gear box sprocket alignment and chain tension.
- ☐ Verify correct spinner motor shaft to spinner shaft alignment.
- ☐ Verify correct conveyor tension and alignment.
- ☐ 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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