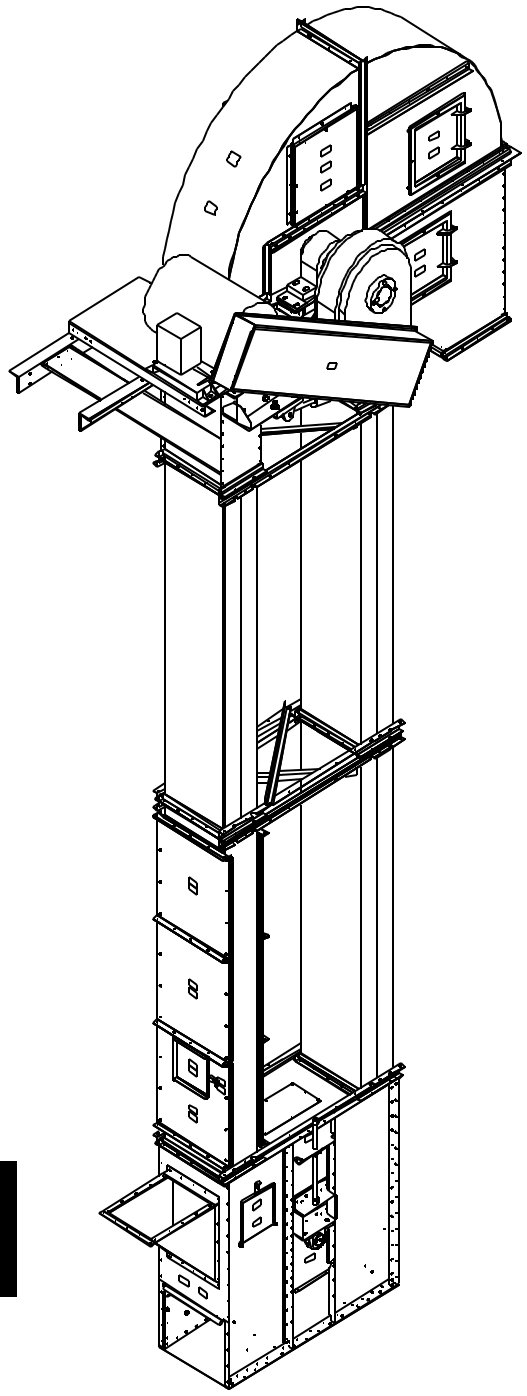
Bucket Elevator



Bucket Elevator

Series 2

Assembly Manual

PNEG-681

Rev. 3 6/4/01

PNEG-681

Table of Contents

Use of the Equipment Information page will help you identify your equipment in the case that you need to notify the company. For this reason, this information should be filled out and kept on record.

Equipment Information

Model Number: _____

Serial Number: _____

RPM: _____

Head Pulley Dia.: _____

Discharge Height: _____

Horsepower: _____

The GSI Group, Inc.
1004 East Illinois Street
P.O. Box 20
Assumption, IL 62510
USA
Phone: 217-226-4421
Fax: 217-226-4721

Date Purchased: _____

Dealer Name
and Phone Number: _____

_____

_____

Introduction

Thank you for your choice of our product, which has been designed to give you excellent performance and service for many years.

This manual covers general information on the your Bucket Elevator installation. We can not be responsible for the installation of this, or any other, bucket elevator. Due to the large variety of equipment features offered, we can not cover every aspect of installation with this manual. We offer suggested methods for installing bucket elevators. You should rely on your qualified contractor's experience and techniques.

General Safety Statements

The principal concern of the manufacturer is your safety and the safety of others associated with grain handling equipment. We encourage all personnel operating, installing or maintaining this equipment to read thoroughly through this manual before proceeding. It is the responsibility of the buyer to make this manual available to the person or persons involved with this equipment. Guards and safety labels have been installed prior to leaving the manufacturing plant. These devices are not to be removed, altered or defaced in any way. Alterations to the equipment may produce a very dangerous situation and may cause serious injury or death.

We recommend contacting your local power company, and having a representative survey your installation so the wiring is compatible with their system, and adequate power is supplied to your unit.

Safety decals should be read, and understood, by all people in the grain handling area. Safety decals have been affixed to the equipment to warn of danger to persons and of possible equipment damage. These decals must never be removed, tampered with, painted over or obscured in any way. If labels are damaged or become unreadable, replacement labels are available from the manufacturer.

If a decal is damaged or is missing contact:

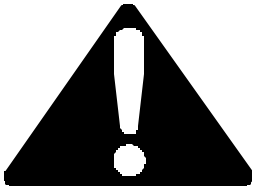
The GSI Group, Inc.
Material Handling
1004 East Illinois Street
P.O. Box 20
Assumption, IL 62510
USA
Phone: 217-226-4421
Fax: 217-226-4721

A free replacement decal will be sent to you. (Refer to DC number on the decal).

Use of the Equipment Information page will help you identify your equipment if you need to contact us. Keep this information on record.

SAFETY GUIDELINES

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting ***personal safety*** and ***preventing equipment problems***. It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidlines.To help you recognize this information, we use the symbols that are defined below.
Please read the manual and pay attention to these sections. Failure to read this manual and it's safety instructions is a misuse of the equipment and may lead to serious injury or death.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

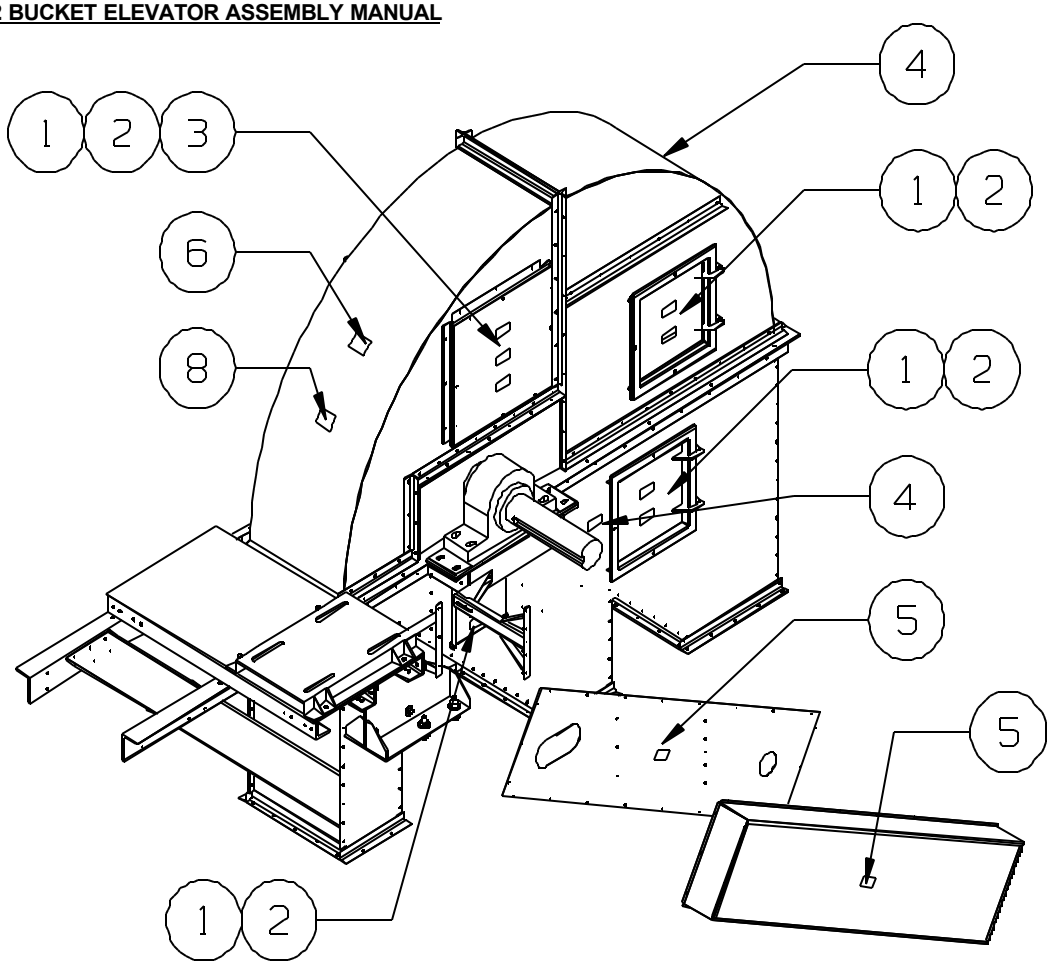
⚠ DANGER **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

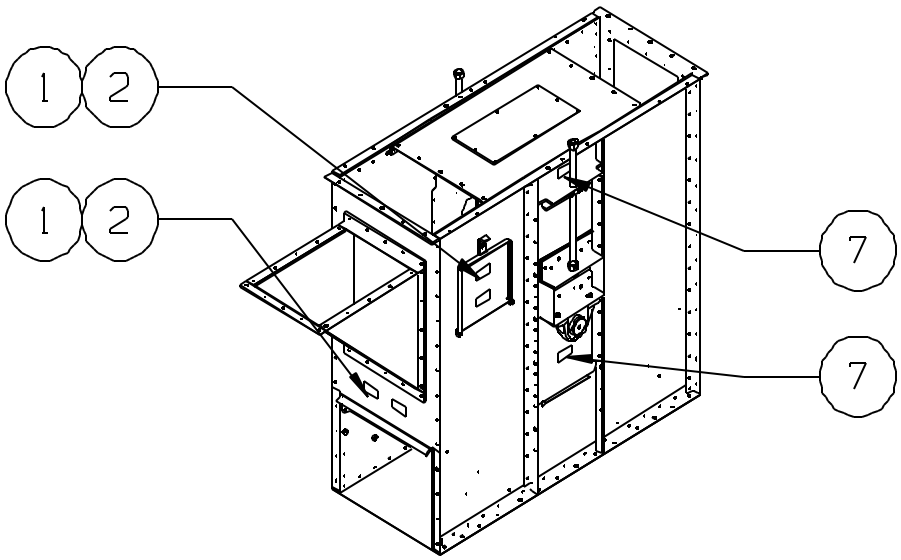
⚠ CAUTION **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION **CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE **NOTE** indicates information about the equipment that you should pay special attention to.



Head Section Decal Locations



Boot Section Decal Locations

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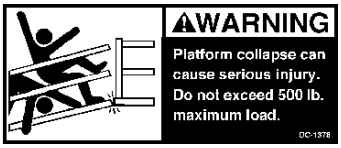

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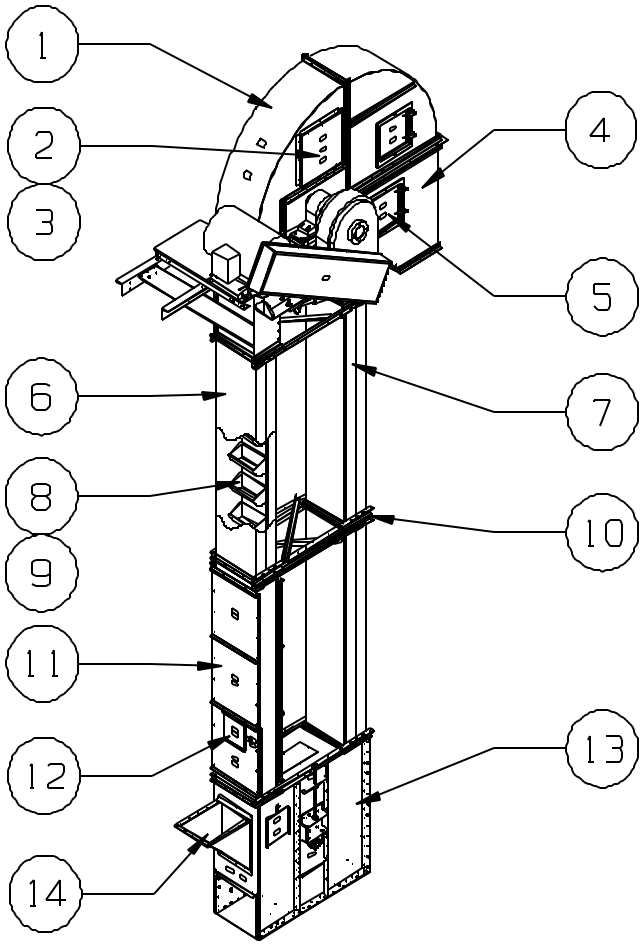
Decals

1. Bonnet
2. Pressure Relief Panel (one each side)
3. Head Pulley
4. Lower Head Section
5. Inspection Door
6. Up Leg Trunking
7. Down Leg Trunking
8. Belt
9. Buckets
10. Tie Angles
11. Inspection Section
12. Inspection Door
13. Boot Section
14. Upside Hopper (Downside Hopper optional)



Receiving Inspection

Carefully inspect the shipment for damage as soon as it is received. Verify that the quantity of parts or packages actually received corresponds to the quantity shown on the packing slip. Any discrepancies should be clarified immediately. One or more cartons containing the fasteners required for assembly are included with the shipment. Report any damage or shortage to the delivering carrier as soon as possible. The manufacturer's responsibility for damage to the equipment ends with acceptance by the delivering carrier. Refer to the bill of lading. Save all paperwork and documentation furnished with any of the elevator components.

Pre-Installation Preparation

Our Bucket Elevators are designed to be vertically self-supporting when erected but must be supported or guyed against wind loads.

NOTE: The elevator has not been designed to support other equipment such as cleaners, distributors or spouting. Separate structures must be provided for any accessory equipment.

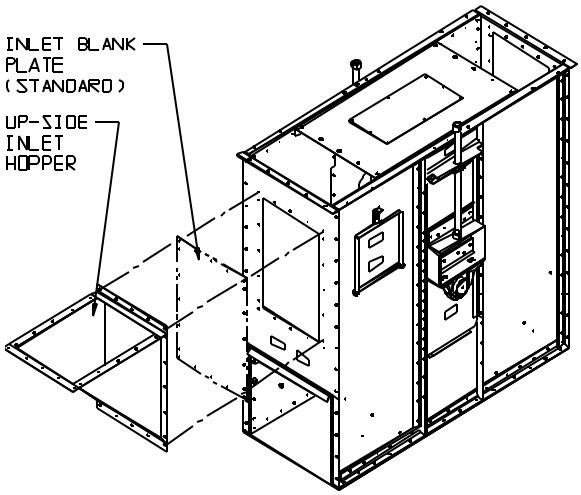
The manufacturer is the vendor of the elevator and certain of its optional accessories only and does not assume responsibility for the installation recommendations contained within this manual. The installation recommendations contained within this manual are for consideration only. The user or installer must consult a civil or structural engineer regarding the design, construction and supervision of the entire installation, including the elevator foundation and the guying cable and/or bracing system.

The MOST IMPORTANT preparations are retaining a licensed engineer to plan the installation and a qualified millwright or contractor to erect the elevator and the accompanying equipment and structures.
Bucket Elevator Foundation

The bucket elevator foundation must be designed by a qualified civil engineer and installed by a qualified contractor. Consideration should be given to live loads, dead loads, wind loads, and soil bearing loads. Attention should also be given to ensure proper moisture run-off on the top of the base

Boot Section

Prior to boot installation on the foundation, examine entire boot for any damage or loose hardware. Do not attempt to install if parts are damaged.

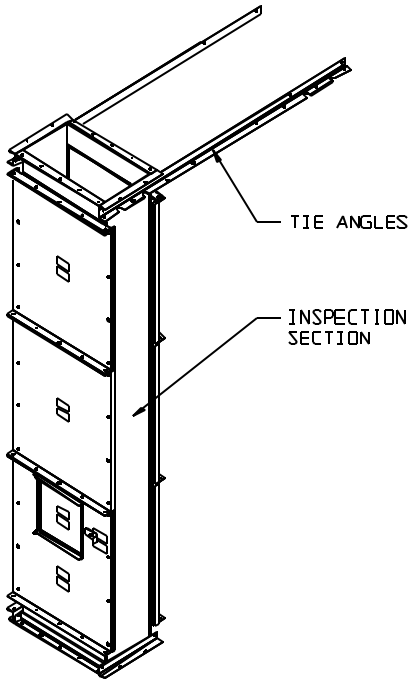


Boot sections are pre-assembled at the factory, however Boot Inlet Hoppers are typically shipped separately. Take time now to identify the up and down side of the boot, as proper positioning is critical. The boot inlet section can be installed either as an up-leg or a down-leg inlet. You will note that the up-leg inlet position is approximately six (6") inches higher than the down-leg side. By removing the nuts and blank-off plates from the studs, the boot inlet hopper can be attached.

There are a variety of ways to anchor and level the boot section. It is our recommendation to shim to the perimeter, then secure with hold-downs, and finally grout the base. Whatever technique is used it is important that the boot be level and plumb, being checked periodically throughout the installation process, to insure proper elevator erection. After boot is set in place, level in all directions prior to anchoring. Use anchor bolts and mounting brackets (not supplied) to secure boot to foundation.

Inspection Section

The inspection section of your Bucket Elevator has been designed for ease in installation and maintenance. The removable panels are versatile and can be installed in any order. This design allows for the inspection doors to be installed at various positions determined, of course, by the installer. Typically, the inspection section is located on the up-leg side as the first trunking section located directly above the boot.



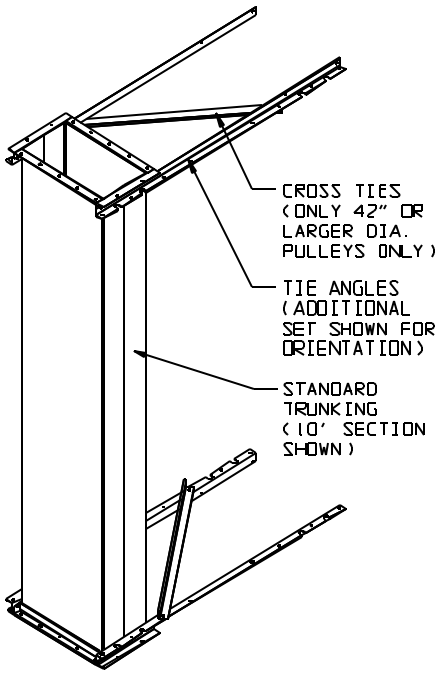
NOTE: This type of installation will vary and will depend on your configuration and application.

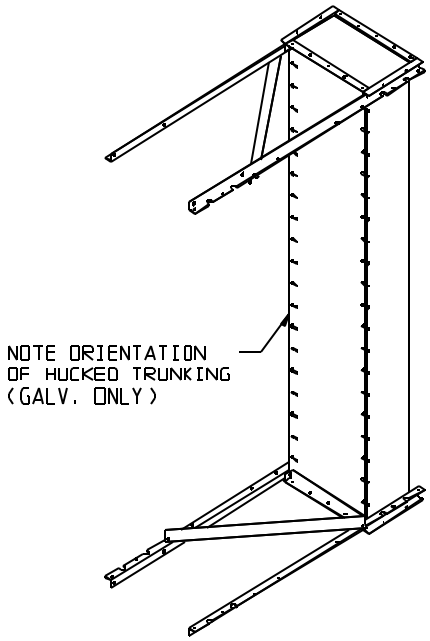
Along with the inspection section you will receive an installation hardware package and two (2) tie-angles. Additionally, on units containing 42" diameter pulleys and larger a cross tie on the legs will be included.

Standard Trunking

Trunking is manufactured in our jigging system, so any sequence can be used for erection. It is important to note for single row bucket belt widths up to and including 150', 12 gauge trunking construction is standard. For single row bucket belt widths that are 155' or greater, 10 gauge trunking construction sections have been supplied in addition to the standard 12 gauge construction. All multiple row bucket belt widths are of a 10 gauge construction, regardless of height. Trunking comes complete with the appropriate hardware packages and two (2) tie angles. As with other units containing 42" diameter or larger pulleys, a cross tie for the legs should also be included.

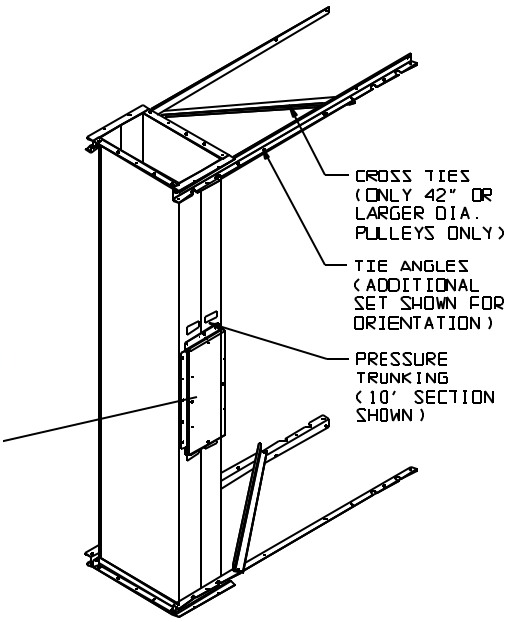
NOTE: 10 gauge construction trunking sections are to be installed as lower sections. Check packing list for specific quantities.





Pressure Relief Trunking

Pressure Relief Trunking is standard trunking that has been modified to include two panels specifically designed for pressure relief. These panels will be located on the short sides of the trunking directly opposite of each other and centered on ten foot (10') sections of trunking. Included with the mounting hardware will be two (2) tie-angles. As with other systems utilizing 42" diameter and larger pulleys, there will be a cross-tie located on the legs.



NOTE: This unit requires special attention to the relief panel. This area must be inspected for damage to the panel, frame and particularly the hardware. *DO NOT INSTALL TRUNKING IF THERE IS ANY APPARENT DAMAGE OR DEFECT.*

IMPORTANT! Removal of all shipping bolts in the Pressure Relief Panels are required before operating any bucket elevator

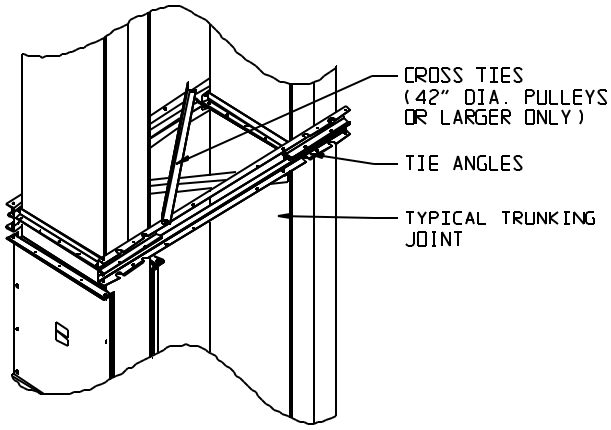
Trunking Installation

Prior to any trunking installation inspect for damage to equipment. Immediately repair or replace defective item(s). It is very important to locate a level suffice area in order to correctly assemble the trunking sections.

Section together to make double trunking. Attach tie angle to single trunking as shown. Also if 42" diameter or larger install cross-tie angle. Multiple sections can be ground assembled. (we suggests no more than thirty (30) linear feet at any time). Caulk all mating companion angle surfaces to insure water and dust resistance.

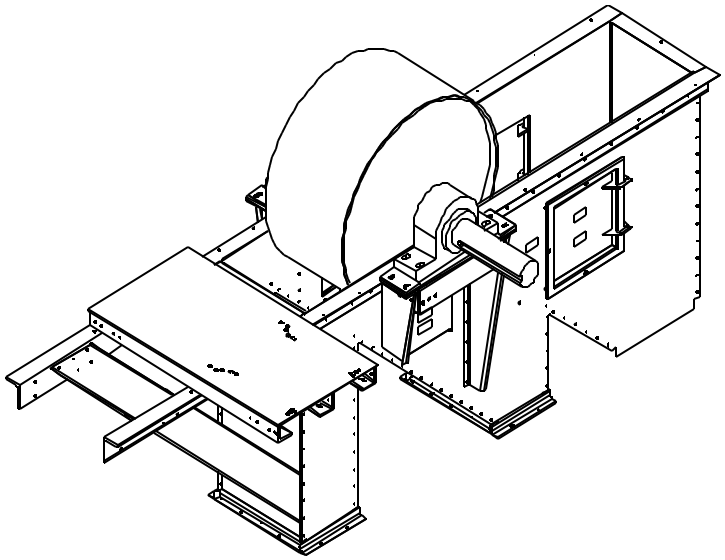
It is important to maintain plumb and square trunking in all directions. Guying the trunking is recommended after each is installed and plumb in all directions. It is recommended that these levels be checked throughout the legging installation process. It is equally important to insure that all connecting hardware is secure.

NOTE: The attachment bolt holes in the tie angles are intentionally tight for the ½" dia. Bolts. This is to aid for more precise plumbing of the trunking. Do not drill out attachment hole. If bolts are hindered going through hole, thread bolts through to reduce chances of damaging threads.



Lower Head Section

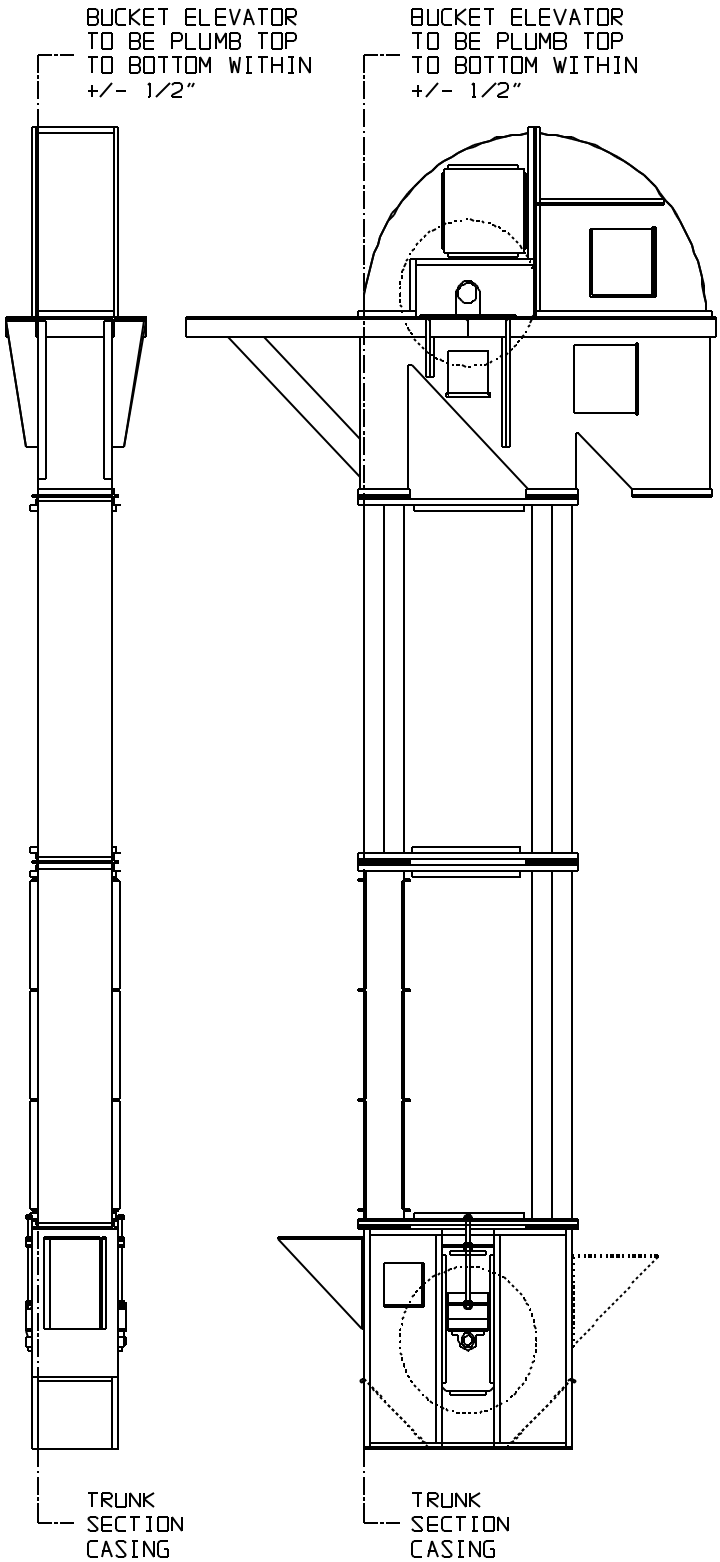
The Bucket Elevator Lower Head Section is primarily assembled at the factory, with the installation hardware included. The drive is shipped separately from the Lower Head Section. It is again important to inspect all parts for damage and to insure that hardware is secure.



WARNING: SECURE ALL DOORS PRIOR TO HOISTING LOWER HEAD.

Plumbing

To ensure proper bucket elevator plumbness, set up two transits, one in each direction. Refer to the figure below for proper tolerance in elevator erection.

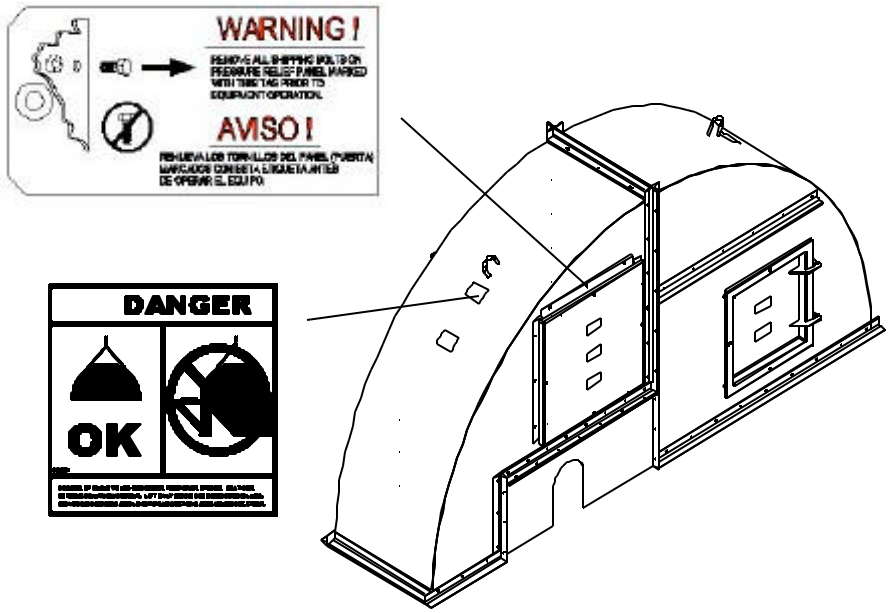


Head Bonnet Section

The Bonnet has been designed in two piece construction to allow the front (Discharge) side to slide forward and clamp in place for maintenance to the belt, buckets, pulley, etc. The rear (up-leg) side bonnet included factory installed pressure relief panels. These panels should be carefully inspected for damage including screws and washers. Pressure relief vent door should not be altered in any way except to remove shipping bolts. Motor mount and torque arm will need to be adjusted to fit your drive package per supplied detail.

WARNING! Bonnet section 'U' lugs are for lifting bonnet section alone only, DO NOT LIFT BONNET AND LOWER HEAD SECTION TOGETHER!

WARNING! REMOVE SHIPPING BOLTS PRIOR TO OPERATION OF ELEVATOR LEG.



Belting, Buckets and Splicing

The belt for your elevator leg has been specifically chosen based on leg height, grain, weight, pulley diameter, etc. It has been pre-punched to accommodate special buckets on specific spacing.

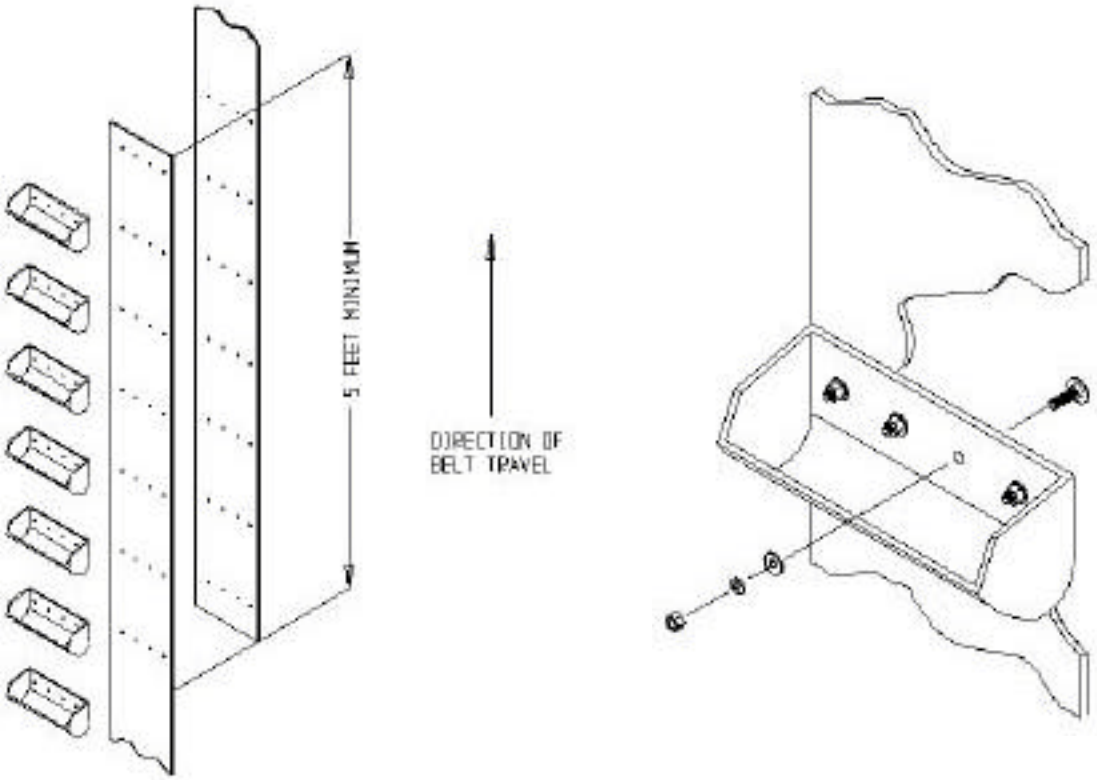
The most important criteria when choosing an installation technique is to choose one that is safest for you. Installing the belt can be accomplished several different ways. Prior to installing the belt, the boot pulley should be raised to it's upper most point to allow for proper belt tensioning. On shorter installations, first assembling the buckets to the belt may be less time consuming. However, the additional weight of the buckets and connecting hardware make the belt more difficult to handle.

One of the methods used to install belts is to feed the belt up through the inspection section, over the head pulley, feeding through the Down-Leg, around the boot pulley, and back up to the splice.

IMPORTANT! *To prevent the belt from rolling over the top, anchor the upper end securely.*

Upon connecting the ends of the belt together a winching device such as a Come-a-Long may be required. The recommended splice technique is achieved by overlapping the belts or the bar splice. When lap-splicing, draw a 5' minimum of the belt coming up from the bottom of the boot, over belt hanging down from head.

An alternative method, the bar splice (not included) is usually accomplished by turning the ends of the belt out and affixing the manufactured bar splice components per the manufacturer's recommendations. Lacing and



other specific types of belt splicing are not recommended. Please consult the factory or your contractor if in question.

Buckets are attached to belting using elevator bolts pushed through the belting back side, through the elevator bucket, a flat (fender) washer, a lock washer, and a nut. Secure bucket by tightening nut to slightly indent belt back with bolt head. (See diagram)

CAUTION! *Do not over tighten bolts! Torque requirements are 50 inch pounds for 1/4" bolts, 96 inch pounds for 5/16 bolts, and 180 inch pounds for 3/8" bolts. Overtightening can lead to breakage.*

IMPORTANT! Recheck bolts for correct torque after initial start up and periodically thereafter.

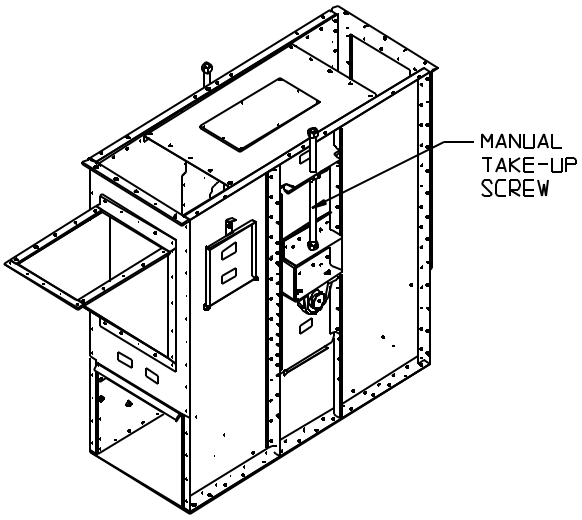
Remove any slack in belt after splice connection by lowering boot pulley. It is important that the boot pulley and shaft are checked and maintained to be horizontally level.

CAUTION! Do not over tighten belt, as this will decrease the life of the belt.

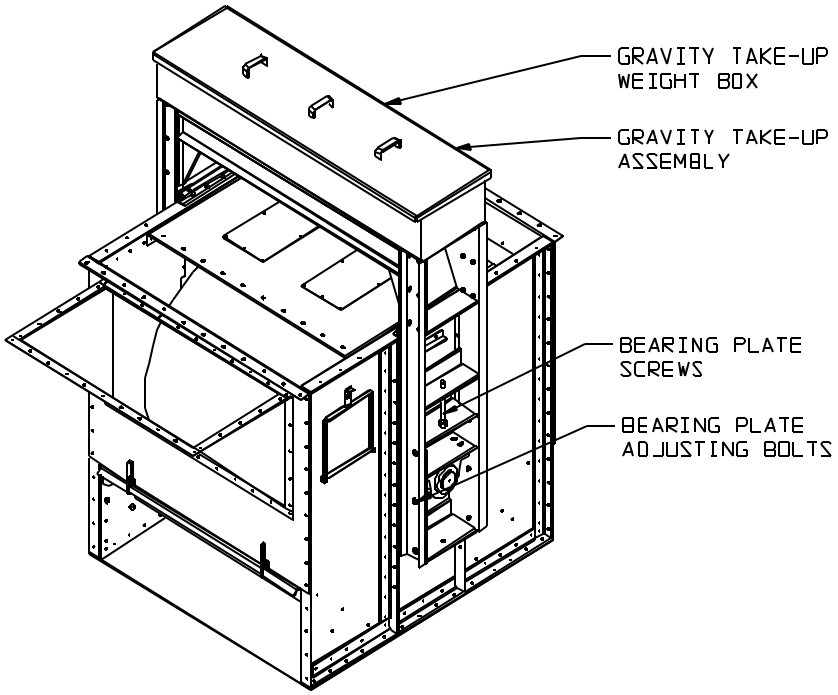
For manual screw take-ups, turning the take-up screws on each side of the boot controls the boot pulley position. After adjustment, be sure to lock each take-up screw in position with the locknut provided.

For gravity take-ups, weight provides the tensioning method. In some cases no additional weight in the weight box may be needed because the weight of the belt, cups, weight box assembly and boot pulley assembly may provide adequate tensioning in the belt to eliminate slippage at the head pulley. When adding additional weight, use maximum increments of 100 pounds and make sure the weight is equally distributed from side to side for proper belt tracking. The bearing plate adjustment screws are used to level the boot pulley after any needed weight is added. Loosen the bolts attaching the channels of the weight frame assembly to the bearing plate assembly before adjusting the bearing screws. After adjustments have been made, retighten bolts and snug the bearing plate adjustment screw locknuts.

NOTE: Lowering the bearing plate to which the belt is tracking towards on the boot pulley should cause the belt to track back towards the center of the pulley. Inversely, raising the bearing plate to which the belt is tracking away from will achieve belt centering as well.



(48"(26") BOOT SECTION SHOWN)



(48"(60") BOOT SECTION SHOWN)

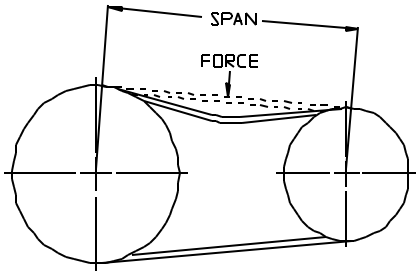
Drives and Lubrication

WARNING! Gear reducers are typically shipped without lubricating oil. Fill only with lubricant as specified by the manufacturer. This information can be found in the Owners Maintenance Manual shipped with the gear reducer. Install the vent plug per reducer manufacturer's recommendations. Bearings are pre-lubricated from the manufacturer and do not require any service upon initial installation. To ensure proper operation the bearings should be lubricated on a regular schedule and are best lubricated while rotating, until a thin film of grease appears at the seal. Contact the factory if you have questions on proper greasing.

Drive Belts

Belts are designed to fit loose upon installation. Tensioning of belts to an acceptable level is accomplished through the Motor Mount Adjustable Slide Base. Proper tension is 1/64" of deflection per, one (1") inch of sheave centers on one side of belt, centered between sheaves.

NOTE: *Too much tension shortens belt life. Check belt tension frequently during the first 24-48 hours of operation.*

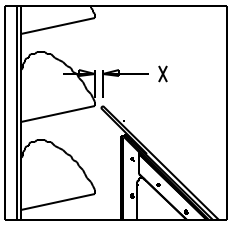


Belt Guards

All drive packages include a belt guard. The belt guard must be installed anytime the elevator leg is in operation. Check for clearances between all moving parts and the belt guard. Lock-out power source anytime work is being performed requiring belt guard removal.

Final Checks and Start-up

Adjust the throat plate in the head discharge so there is about 1/4" clearance between it and edge of the buckets on the lap splice.



IMPORTANT! Check clearance at the lap splice. Do a final check of all parts to be sure all hardware is tight and no foreign objects or tools are left inside elevator. Check all guards, inspection doors, and removable plates to be sure they are in place and secure. Tighten the take-up screws on the boot evenly to tighten the belt on the pulley, keeping bottom pulley level, and work from side to side in small amounts until belt is tight. Rotate by hand or carefully jog drive to check for proper rotation, clearance and operation of entire unit. Make any adjustments necessary. Jog minimum of one complete revolution of belt. If no problems exist, carefully run elevator while checking all aspects of operation of the unit.

Tracking of the belt is very important for optimum results. To correct any tracking problems first adjust the boot bearing plates. Adjust the take up screws downward on the side that the belt is tracking toward. If this does not correct the problem or if the belt is tracking properly on the boot pulley but not the head pulley, further adjustments to the head pulley may be required.

The bearing side that the belt is tracking toward may need to be shimmed to compensate. After loosening the head bearing bolts that go thru the head angle, use the jacking screws to raise the bearing. A full shim is placed under the bearing base, jack screws are backed off and the bearing mounting bolts are retightened. Use thin shims to make small adjustments until the belt tracks properly.

Once you are sure everything is complete and all adjustments are made and proper lubrication is done, run the elevator for an initial break-in WITHOUT load for several hours. Look and listen for any irregularities before running any material through the unit. Recheck all moving parts and adjust as needed. The final tension of the belt is done under load.

Maintenance

The belt will stretch after installation and may need further adjustment. Expect some stretching during the first few weeks of operation. On manual take-up boots, belt tension should be maintained by turning the boot take up screws slowly and evenly to maintain proper tracking. When the screw adjustment is completely used, the belt will have to be re-spliced. Good belt tension is critical for proper traction on the pulley and optimum performance.
Regularly scheduled maintenance will ensure long life and safe operation of the unit.

Routine maintenance checks may include general wear, loose nuts and bolts, electrical wiring, contacts, switches, misalignment, guy wire inspection, bearing seals and lubrication and oil content for gearbox.

THE COMPANY AS THE MANUFACTURER WARRANTS ALL PRODUCTS MANUFACTURED BY THE COMPANY TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USAGE AND CONDITIONS FOR A PERIOD OF TWENTY-FOUR MONTHS AFTER RETAIL SALE TO THE ORIGINAL END USER OF SUCH PRODUCTS. THE COMPANY'S ONLY OBLIGATION IS, AND PURCHASER'S SOLE REMEDY SHALL BE FOR THE COMPANY, TO REPAIR OR REPLACE, AT IT'S OPTION AND EXPENSE, PRODUCTS THAT, IN IT'S SOLE JUDGMENT, CONTAIN A MATERIAL DEFECT DUE TO MATERIALS OR WORKMANSHIP. ALL DELIVERY AND SHIPMENT CHARGES TO AND FROM THE COMPANY'S FACTORY WILL BE PURCHASER'S RESPONSIBILITY. EXPENSES INCURRED BY OR ON BEHALF OF THE PURCHASER WITHOUT PRIOR WRITTEN AUTHORIZATION FROM AN AUTHORIZED EMPLOYEE OF THE COMPANY SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER. EXCEPT FOR THE ABOVE STATED EXPRESS LIMITED WARRANTIES, THE COMPANY MAKES NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH (i) PRODUCT MANUFACTURED OR SOLD BY THE COMPANY OR (ii) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF THE COMPANY REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCT OR PRODUCTS.

IN NO EVENT SHALL THE COMPANY BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR BENEFITS. PURCHASER'S SOLE AND EXCLUSIVE REMEDY SHALL BE LIMITED TO THAT STATED ABOVE, WHICH SHALL NOT EXCEED THE AMOUNT PAID FOR THE PRODUCT PURCHASED. THIS WARRANTY IS NOT TRANSFERABLE AND APPLIES ONLY TO THE ORIGINAL PURCHASER. THE COMPANY SHALL HAVE NO OBLIGATION OR RESPONSIBILITY FOR ANY REPRESENTATIVE OR WARRANTIES MADE BY OR ON BEHALF OF ANY DEALER, AGENT OR DISTRIBUTOR OF THE COMPANY.

THE COMPANY ASSUMES NO RESPONSIBILITY FOR FIELD MODIFICATIONS OR ERECTION DEFECTS WHICH CREATE STRUCTURAL OR STORAGE QUALITY PROBLEMS. MODIFICATIONS TO THE PRODUCT NOT SPECIFICALLY COVERED BY THE CONTENTS OF THIS MANUAL WILL NULLIFY ANY PRODUCT WARRANTY THAT MIGHT HAVE BEEN OTHERWISE AVAILABLE.

THE FOREGOING WARRANTY SHALL NOT COVER PRODUCTS OR PARTS WHICH HAVE BEEN DAMAGED BY NEGLIGENT USE, MISUSE, ALTERATION OR ACCIDENT. THIS WARRANTY COVERS ONLY PRODUCTS MANUFACTURED BY THE COMPANY. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. THE COMPANY RESERVES THE RIGHT TO MAKE DESIGN OR SPECIFICATION CHANGES AT ANY TIME.

PRIOR TO INSTALLATION, PURCHASER HAS THE RESPONSIBILITY TO RESEARCH AND COMPLY WITH ALL FEDERAL, STATE AND LOCAL CODES WHICH MAY APPLY TO THE LOCATION AND INSTALLATION.

Employer/Employee Training Sign Off Sheet

The manufacturer is making every effort to warn, guard, and educate the consumer when using the various kinds of equipment that we manufacture. We have included this sign off sheet for you and your staff to use in the training process on installation and operation of the equipment described in this manual. Read the entire manual, sign off, and date on chart below.

T H E G S I G R O U P

1004 East Illinois Street
Assumption, Il 52510-0020