# AGISMILLTEC

## **S-Line Bucket Elevators**

## Permanent Handling Equipment Assembly, Operation, and Maintenance Manual

This manual applies to the following models:

LGDA-50, LGDA-100, LGDB-150, LGDB-200, LGDC-300





Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: 8210-30066 R0 Revised: October 2024 Original Instructions This product has been designed and manufactured to meet general engineering standards. Other local regulations may apply and must be followed by the operator. All personnel must be trained in the correct operational and safety procedures for this product. Use the sign-off sheet below to record initial and periodic reviews of this manual with all personnel.

Date	Employee Name and Signature	Employer Name and Signature

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## **1. Introduction**

Follow the instructions in this manual for safe use of this bucket elevator. Following proper operation and maintenance will help to keep the bucket elevator running in optimal condition.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. If any information in this manual is not understood or if you need additional information, please contact AGI or your representative for assistance.

This manual should be regarded as part of the equipment.

## **1.1. Serial Number Location**

The serial number location for your bucket elevator is shown in the figure below. Have the serial number ready when ordering parts or requesting service or other information. Record information in the table below for easy reference.

Model Number	
Serial Number	
Date Received	



↔ MILLTEC Machinery Pvt Ltd.
MACHINE NO : YEAR OF MFG : MACHINE TYPE :
¢

## 1.2. Intended Use

The bucket elevator is intended for use described throughout this manual and as specified on the approval drawing. Use in any other way is considered contrary to the intended use and is not covered by the warranty.

## 2. Safety

## 2.1. Safety Alert Symbol and Signal Words



This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

**Signal Words:** Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

DANGER Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.
 WARNING Indicates a hazardous situation that, if not avoided, could result in serious injury or death.
 CAUTION Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.
 NOTICE Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

## 2.2. General Safety Information

Read and understand all safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment.

• Only experienced personnel who are familiar with this type of assembly and installation should perform this work. Untrained assemblers/installers expose themselves and bystanders to possible serious injury or death.



- Do not modify the bucket elevator in any way or deviate from the instructions in this manual without written permission from the manufacturer. Unauthorized modification or methods may impair the function and/or safety. Any unauthorized modification will void the warranty.
- Use for intended purposes only.
- Follow a health and safety program for your worksite. Contact your local occupational health and safety organization for information.
- Contact your local representative or AGI Milltec if you need assistance or additional information.
- Always follow applicable local codes and regulations.

## 2.3. Belt and Bucket Safety

#### 

 Keep body, hair, and clothing away from moving belts and buckets.

• Lock out power before removing cover or inspection door.



## 2.4. Explosion Vent Safety

#### 

- Keep away from explosion vents during operation.
- Be aware of the location of all explosion vents for this equipment.

## 2.5. Rotating Parts Safety

#### 

- Keep body, hair, and clothing away from rotating shafts, pulleys, belts, chains, and sprockets.
- Do not operate with any guard removed or modified. Keep guards in good working order.
- Shut off and lock out power source before inspecting or servicing machine.

### 2.6. Strong Magnetic Fields

The bucket elevator could be equipped with strong magnets on the boot inlet.

WARNING To prevent serious injury or death.

- Stay clear! Can be harmful to pacemaker wearers and other medical implants.
- Keep tools and other metal objects away.

## 2.7. Lifting the Head Section

## A DANGER Crush Hazard

To prevent death or serious injury when assembling head section, do not lift the bonnet with any other component connected to it. Lifting with other components connected will cause the bonnet to fail and head assembly to fall.

## 2.8. Combustible Dust

▲ WARNING The bucket elevator has been designed for safe use in areas where hazards due to combustible dust may potentially occur. Help reduce the risk of a dust explosion by following the preventive measures below.









#### Control the dust:

- Clean grain to reduce fines.
- Use equipment to minimize breakage.
- Use a filtering system to capture dust.
- Use an air system to reduce dust.
- Spray edible mineral oil on the grain to reduce air-born dust when handling.
- Paint equipment that is in the interior of a facility with a coating that is slick, not allowing dust to accumulate.
- Clean up dust deposits after equipment operation.
- Enclose all equipment to keep dust from escaping.

#### Control the ignition source:

- Where applicable, use an electric motor rated for the dust classification area.
- Do not smoke in any potentially hazardous area.
- Use only explosion-proof lights and electric tools.
- Do not use anything around or inside the equipment that may produce a flame or sparks unless the air and equipment are free of dust. For example: Do not use a match/lighter, grinder, or power saw. Use brush-less electrical tools and explosion proof flash lights.
- Where possible, keep the work area wet such that dust cannot be dispersed in the air and smoldering processes from sparks cannot develop.
- Follow the maintenance schedule to keep equipment operating properly at low temperatures.
- Purchase replacement parts from the manufacturer or authorized dealer/distributor. Original manufacturers parts are designed with explosion proof features where applicable.

## 2.9. Fall Protection System Safety

- Ensure that the personal fall protection equipment meets the requirements of the applicable national and local codes.
- Follow all safety and user instructions provided by the personal fall protection equipment manufacturer during installation and use of this system.
- All users must be trained thoroughly in the safe use and limitations of the personal fall protection equipment. Misuse of this system could result in serious injury or death.
- Ensure that the fall protection system is inspected, tested and maintained in accordance with the manufacturer's recommendations.
- Inspect components before each use for wear, damage and other deterioration.
- If the fall protection system has been subjected to a fall arrest or impact force, all equipment used to arrest fall must be inspected and approved by the manufacturer or by a competent and/or qualified person prior to being used again. If any damage is detected, replace the equipment before resuming use.
- If a fall event should occur, immediately call emergency responders.



## 2.10. Platform Safety

- Check the platform working load. Do not overload. Contact AGI Milltec before adding any equipment to a platform.
- Close platform access door before and after working on the platform.

## 2.11. Drives and Lockout Safety

Inspect the power source(s) before using and know how to shut down in an emergency. Whenever you service or adjust your equipment, make sure you shut down the power source and follow lockout and tagout procedures to prevent inadvertent start-up and hazardous energy release. Know the procedure(s) that applies to your equipment from the following power source(s). Ensure that only 1 key exists for each assigned lock, and that you are the only one that holds that key. Ensure that all personnel are clear before turning on power to equipment.

### 2.11.1 Electric Motor Safety

#### **WARNING** Power Source

- Electric motors and controls shall be installed and serviced by a qualified electrician and must meet all local codes and standards.
- Ensure electrical wiring and cords remain in good condition; replace if necessary.

   Lockout
- The main power disconnect switch should be in the locked position during shutdown or whenever maintenance is performed.
- If reset is required, disconnect all power before resetting motor.





## 2.12. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when assembling, operating or maintaining the equipment.

• Safety Glasses



Wear safety glasses at all times to protect eyes from debris.

Coveralls



Wear coveralls to protect skin.

Hard Hat



Wear a hard hat to help protect your head.

#### Hearing Protection



Wear ear protection to prevent hearing damage.

## 2.13. Safety Equipment

• Fire Extinguisher



Provide a fire extinguisher for use in case of an accident. Store in a highly visible and accessible place.

#### • First-Aid Kit



Have a properly-stocked first-aid kit available for use should the need arise, and know how to use it.

## 2.14. Safety Decals

- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Replacement safety decals are available free of charge from your distributor, dealer, or factory as applicable.

### 2.14.1 Decal Installation/Replacement

- 1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
- 2. Decide on the exact position before you remove the backing paper.



Wear steel-toe boots to protect feet from falling debris.

Work Gloves



Wear work gloves to protect your hands from sharp and rough edges.

Fall Protection



Use a fall arrester or fall restraint when climbing or working at heights.

- 3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
- 4. Slowly peel 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 the decal backing paper.

### 2.14.2 Safety Decal Locations and Details

Replicas of the safety decals that are attached to the bucket elevator and their messages are shown in the figure(s) that follow. Safe operation and use of the bucket elevator requires that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.







## **3. Features**



ltem	Description	Item	Description		ltem	Description
1	Head	5*	Refill Inlet		9	Outlet
2	Spacer	6	Boot		10	Gear Unit
3	Sensor Box	7	Inspection Panel		11	Electric Motor
4	Inlet Hopper	8	Leg	1	12**	Explosion Panel

\*For 300 tph model

\*\*The AGI Milltec S-Line Bucket Elevators are equipped with explosion panels every 6 m to provide escape routes for flames and expanding gases, preventing the dangerous pressure build up in process equipment.

## 4. Site Preparation

A professional engineer must be familiar with the following sections to ensure that the site and installation are designed and prepared correctly.

Incorrect planning and preparation can result in serious injury and equipment failure. **WARNING** 

## 4.1. Site Layout

Proper planning can prevent equipment issues and unnecessary downtime.

The following list covers some important considerations for a bucket elevator site layout:

- When developing the site layout drawing, carefully consider the direction of discharge required at the head, depth of boot pit, side of boot to be fed (upside or downside), possible overhead obstructions, and maintenance access.
- Most free-flowing materials, including whole grains, feed best into the boot on the up-leg side. Feeds for light materials that tend to create dust feed best on the down-leg side.
- Elevator boots typically come with a boot inlet, which directs material into the elevator buckets. Any spoutings, transitions and other inlets that are installed on the bucket elevator must be designed to ensure that material is fed evenly to avoid forcing the belt to one side. Improper filling of the buckets will affect belt tracking, capacity, and longevity.
- Check the planned location for the elevator for clearance to other structures. Make sure that there is enough space to accommodate equipment maintenance and repair.

#### Important

Inadequate planning could result in premature wear and equipment failure.

**DANGER** Be aware of overhead electrical lines in the area where the system is being set up. Contact with electrical lines through the equipment could electrocute people working on the system components.

### 4.2. Foundation

The foundation for the bucket elevator must accommodate the loaded weight, wind load, soil bearing loads, moisture run-off. It should be designed based on allowable soil bearing loads.

It is recommended that the boot be anchored with drilled epoxy anchors or wedge type anchors.

Contact the responsible engineer of the project, concrete and structural drawings, or AGI Milltec for specific information.

## 4.3. Location of Spouting

#### **Connected Equipment**

The bucket elevator inlet and discharge openings are designed to connect to spouting or transitions from other equipment.

- It is critical that inlet spouting be designed so as not to cause side loading of the elevator, or restrict capacity in to the boot.
- It is critical that the discharge spouting be sized and designed so as not to restrict full capacity discharge of the elevator.
- Discharge spouting loads should not be supported by the bucket elevator head.

## 4.4. Dust Control

The bucket elevator is equipped with aspiration outlet to remove dust and other airborne particles generated during material handling process. It is the responsibility of the owner and/or installer to provide suitable and adequately-sized ductwork and dust collection system.

## 4.5. Lateral Support of Bucket Elevator

The bucket elevator is vertically self-supporting of its own weight. It cannot be used to support other structures such as distributors, cleaners, spouting, etc. The bucket elevator requires lateral support shown in the following table to resist wind and seismic loads. This loading is site specific and needs to be determined by the licensed structural engineer.

	Table 1.	Maximum Height and Distance Between	Frame Supports for	Self-Supporting Bucket Elevator
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SERIES	LGDA-50	LGDA-100	LGDB-150	LGDB-200	LGDC-300
Max. height, m	40	40	40	40	40
Max. distance between frame supports, m	7	7	7	7	9

### 4.6. Electrical Requirements, Controls, and Devices

- Electric motor and controls shall be installed and serviced by a qualified electrician and must meet all local codes and standards.
- Follow the electrical connection details provided on the motor nameplate to ensure reliable operation of the electric motor and electromagnetic brake.
- In the control panel, implement an interlock between the electromagnetic brake and electric motor to ensure the brake system is activated when the power to the motor is disabled.
- When providing power to the electric motor:
  - Place main power disconnect switches at a convenient location to permit ready access in case of an emergency.
  - Ensure that the motor is electrically grounded.
  - Provide appropriate electrical controls that meet all specifications of the bucket elevator.
  - Use an interlock when the bucket elevator is mechanically connected to other equipment.
- The following safety devices should be installed:
  - Overload protection for devices (shear pins, torque limiters, etc.) and no speed protection (zero-speed switches) to shut off power in the event of an incident that might cause the conveyor to stop operating.

- Emergency stop switches that are readily accessible.
- Signal devices to warn personnel of imminent start up, especially if started from a remote location.
- Bucket elevators are commonly equipped with devices listed below, and these may be required by local fire codes. AGI Milltec recommends these safety devices.

#### **Interlocking Devices**

There are various types of electrical devices for interlocking of bucket elevator with other equipment. An interlock shall be used on a bucket elevator that is connected to downstream or upstream equipment. If a downstream drag conveyor is plugged, or has its power disconnected, the bucket elevator feeding it should immediately have its power disconnected as well. Conversely, if the bucket elevator has a power disconnection, the conveyor feeding the bucket elevator must also be turned off immediately.

#### **Belt Rub Sensors**

Belt rub sensors detect belt misalignment that can lead to damage or excessive heat, and are located on the side of the boot and head casings. There are different types; some activate by contact, while others use a temperature sensor.



The heat generated from a misaligned belt rubbing against the casing can start a fire or create an explosion hazard. If triggered during normal operation of the elevator, the power to the elevator motor should be disconnected immediately.

#### Shaft Speed Sensor

Shaft speed sensor is installed on the boot assembly to detect shaft rotation. It is important to configure this sensor to align with the geared motor's RPM.

#### **Plug Sensors**

A plug (obstruction) inside the bucket elevator can be caused by a number of different problems (excessive feed of product, impediments to exit of product, internal spillage, broken internal components, or foreign objects). Various devices can be used to detect plugs in a system, including vibrating rods, rotating paddles, and touch sensors. If a plug event is detected in the elevator head, power should be disconnected immediately, and the issue causing the plug identified. The elevator should not be restarted, until the plug is cleared, and it is understood how it happened (and prevented).



## **5. Pre-Installation**

## 5.1. Approval Drawing

An approval drawing from AGI Milltec is provided with the bucket elevator. Use the approval drawing when assembling/installing as it contains specific information about component placement and locations.

## 5.2. Before Unloading the Shipment

- 1. Check if the loads have shifted or have been damaged during transport.
- 2. Inspect all sides of the shipment for any visible signs of damage. Look for dents, misaligned flanges and shafts. Take photos of the damaged components on the truck.
- 3. If components are damaged or missing, note these on the delivery receipt and immediately report missing or damaged parts to the manufacturer and freight company.

## 5.3. Unload the Shipment

- 1. Determine the appropriate area for unloading the shipment.
- 2. Make sure the area is clear before unloading.
- 3. Unload the bucket elevator parts on a solid and clean flat surface.

**CAUTION** Use proper unloading and lifting techniques to prevent injury or component damage.

#### Important

- Keep top-heavy components secured to the shipping skid. Stabilize top-heavy components during handling.
- Do not place forks or chockers under the explosion panel. Incorrect lifting can induce pressure to the panel.
- Handle the explosion panels with extreme care. Do not stack, bump, or place explosion panels in contact with other components to avoid bending, flexing, denting and distortion. Damage to the explosion panels may compromise their structural integrity.
- Do not remove the nylon strip locking the leg sidewall and explosion panel to avoid premature deployment.
- 4. Thoroughly inspect components for any damage.
- 5. Compare the packing slip to the shipment and confirm all items have arrived.
- 6. Report missing or damaged parts to AGI Milltec or your representative. Report immediately to receive proper credit and so missing parts can be shipped quickly. Take pictures of shipments after unloading if there are any damaged parts.

#### Important

Do not assemble or install damaged components.

## 5.4. Product Storage

If storing components before installation, follow the instructions below to prevent dirt and moisture accumulation, damage, or injury. Damage to components resulting from improper storage is not covered by warranty.

- 1. Place components on wood blocks 6" to 8" off the ground. Do not place directly on ground.
- 2. Place leg sections on an area with a good drainage.
- 3. Place top-heavy components on a stable base and secure.
- 4. Cover the head assembly and boot section.
- 5. Store motors and gearboxes indoors in a clean, dry, and vibration-free environment. For long term storage, refer to the component manufacturer's storage requirements.
- 6. Store explosion panels in a clean and dry storage area.
- 7. Do not stack or place explosion panels in contact with other components.
- 8. Store hardware boxes indoors.

## 5.5. Before You Begin

Before you assemble the bucket elevator:

- Familiarize yourself with all the sub-assemblies, components, and hardware that make up the equipment.
- Have all parts and components on hand, and arrange them for easy access.
- Separate the hardware (bolts, nuts, etc.) and lay them out into groups for easier identification during assembly.

## 6. Assembly

## 6.1. Assembly Safety

#### • Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.

- Do not stand on, under, or near any component that is not secured.
- Always have two or more people assembling the bucket elevator.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.
- Install the equipment in accordance with applicable local codes and regulations.
- All installation and servicing operations are to be carried out by qualified technicians.
- All electrical connections shall be made by a qualified electrician and must meet the applicable local codes and regulations.
- When assembling in a pit, make sure that there is adequate ventilation.

### 6.2. Lifting and Moving

- Be aware of the weather conditions. Watch for winds and lightning. If any of these are present, do not perform a lift.
- Plan a safe access and escape route to perform the installation.
- Ensure that all lifting and moving operations are properly planned, organized and carried out by a competent person.
- Use appropriate lifting equipment and make sure that they are inspected to ensure safety.
- Plan the lift with the crane operator to ensure a safe lift.
- Inspect rigging equipment before each lift.
- Confirm that all rigging equipment has enough capacity to perform a lift.
- Make sure you have safe and secure access to disconnect the crane for each lift.
- Be aware of your surroundings. Watch for overhead power lines and other obstacles.
- Take care to prevent damage when moving components. Spreader bars with slings are the recommended support method for lifting. An unsupported span of trunking should be no longer than 30 feet.
- Never lift an elevator component with only one support point. When choosing support points for heavy items such as drives or motors, consider the weight of an item in relation to load balance and its bending effect.
- Never lift the bonnet with any other component connected to it. Lifting with other components connected will cause the bonnet to fail and head assembly to fall.

## ▲ WARNING The lifting bracket located on the top of the head section cover is for removing the bonnet from head section only. Do not attempt to lift the entire head section with this cover lifting bracket.

#### Figure 1. Head Section





## 6.3. Installing Standard Accessories and Sensors

Install the accessories as shown in the following illustrations. Refer to the approval drawing for specific bolt size.

#### **Outlet Hopper**



#### **Inlet Hopper**



#### Refill Inlet(For 300TPH Bucket Elevator)



#### Sensors

Install the sensors by following the manufacturer's instructions and ensuring all requirements are met.





## 6.4. Installing the Boot Section

The boot section is shipped fully assembled and ready to install.

- 1. Set the boot on a foundation according to the pre-planned requirements.
- 2. Boot must be level and plumb. Place stainless steel shims directly under the mounting plates to level the boot in all directions as required.
- 3. Anchor the boot to the foundation through mounting plates at the base of the boot assembly. Once the boot has been anchored, verify the top flanges of the boot are level.

#### Figure 2. Typical Boot Section



### 6.5. Assembling the Leg Sections, Platforms, and Stairs

The following instructions are a general method. For approval on other methods of assembly, contact AGI Milltec.

1. Arrange the leg sections in the order in which they will be installed. Refer to the approval drawing.

Note

- Make sure that the legs and flanges are straight and square.
- Only install the leg sidewalls with explosion panels in the designated leg sections once the bucket elevator is erected.
- 2. Attach a crane to the top end of the first section assembly.
- 3. Caulk all flanges to ensure water and dust resistance.
- 4. Lift the first section of the leg above the boot section and lower slowly to ensure the mounting holes of the leg line up with the top flange of the boot assembly.
- 5. Connect the leg to the boot. Tighten the bolts evenly to prevent leg from twisting.

Note

All bolts should be installed from the top, pointing downward, for the complete leg assembly.

- 6. Refer to the approval drawing provided and assemble the remaining leg sections by:
  - lifting into place individually, OR

• assembling on the ground, not exceeding three sections at a time, approximately at 30 ft (9 m). Lift the assembled sections as shown in Figure 3.

#### Important

- During lift, support the bottom section. Keep it off the ground (if possible) at all times, until the entire section is in the vertical position.
- Use a guide rope to help guide sections in place.

#### Figure 3. Lifting Multiple Sections



7. Connect two successive leg sections and install a spacer plate between opposing legs. Use M8x16L hex head bolts and M8 nuts.

Figure 4. Connecting the Leg Sections and Installing a Spacer Plate



8. Frequently check that the leg casing is level and straight during assembly.

#### Important

Leg assembly must be plumbed to less than 1/8" before installing the next section.

9. After erecting the bucket elevator, install all leg sidewalls with explosion panels according to the following instructions.

A WARNING Handle the explosion panels with extreme care. Make sure that explosion panels do not bump with any obstacles. Damage to the explosion panels may result in improper component function, potentially resulting in property damage or personal injury.

a. Attach the leg sidewalls to the bucket elevator. Ensure the explosion panels are positioned as shown in the figure below.



b. Tighten the explosion door bolts to the specified torque of 1.13 N·m. Do not use an electric tool for this procedure. Use a wrench and socket with a manual ratchet.



Over torquing the bolts can cause damage to the relief washers. A damaged washer must be replaced.

#### Important

The relief washers are very fragile and are designed to release under a certain pressure.

c. After installing the leg sidewall, cut away and remove the nylon strip that locks the sidewall and explosion panel in place.

10. Install the inspection panels at the designated locations specified in the approval drawing.

Figure 5. Typical Inspection Panel Installation



11. Attach the stair, handrail, landing platform, and elevator support, as shown in the AGI Milltec approval drawings.





12. Attach leg and platform bracing/guying (if required) to the structure. Refer to the approval drawing provided and assemble as shown.

## 6.6. Installing the Head Section

The head section must be carefully installed and leveled to ensure safe and proper operation of the bucket elevator. Refer to the approval drawing for the position of the head section.

The head section may have been shipped assembled with a drive and motor or unassembled depending on the bucket elevator configuration.

If the head section was **shipped unassembled**, refer to Lifting Head Section Components Individually on page 28.

If the head section was shipped assembled, refer to Lifting a Pre-Assembled Head Section on page 29.

Have all tools and equipment ready before starting the lift procedure.

#### Lifting Head Section Components Individually

- 1. Confirm that lifting equipment will support the component.
- 2. At the crane hook install a master ring. This ring will allow multiple cables to be attached.

#### Important

Master rings come with a variety of sizes and capacities and must be certified for lifting. Install all cables to the crane hook master ring.

3. Start lifting the unit and stop when the assembly is approximately 6" from the ground.

**WARNING** Keep the load balanced when lifting. Never lift an unbalanced load.

- 4. Assess the situation.
- 5. Caulk all flanges to ensure water and dust resistance.
- 6. Ensure all hardware is secure and tight.

#### Note

Hardware may have come loose during shipping.

- 7. Lift and position the components.
- 8. Ensure the mounting holes line up precisely.

#### Lifting a Pre-Assembled Head Section

For lifting a bucket elevator head with a drive and a motor installed, it is recommended to use five leg (slings) set up. Four of those legs should be the same length and the fifth one should have adjustable length.

- 1. Confirm that lifting equipment will support the component.
- 2. At the crane hook install a master ring. This ring will allow multiple cables to be attached.

#### Important

Master rings come with a variety of sizes and capacities and must be certified for lifting. Install all five cables to the crane hook master ring.

- 3. Install four cables of equal length to the head lift lugs.
- 4. Install a fifth adjustable cable to the drive and motor.

#### Note

The motor/drive is heavy and located to the side, the fifth cable will support it and keep the head assembly level.

5. Prior to lifting, verify all hardware is secure and tight.

#### Note

Hardware may have come loose during shipping.

- 6. Slowly start lifting the head assembly and motor/drive.
- 7. Lift just off the ground and the four equal cables are tensioned. Be careful, at this point the unit can be unsteady.
- 8. Adjust the fifth cable and tension the cable to a point that all five cables have equal tension.
- 9. Start lifting the unit and stop when the assembly is approximately 6" from the ground.

**WARNING** Keep the load balanced when lifting. Never lift an unbalanced load.

#### 10. Assess the situation.

a. If the unit is hanging level, install a tag rope and proceed with lifting.

#### Note

The tag rope will help to stabilize the load during lifting.

- b. If the unit is not level, re-adjust the fifth cable until the drive/motor is level and equal tension, then proceed with lifting.
- 11. Caulk all flanges to ensure water and dust resistance.
- 12. Lift the head section above the head platform and lower slowly to ensure the mounting holes line up precisely with the top flange of the leg assembly. Use M8x20L hex head bolts and M8 nuts.
- 13. Tighten the bolts evenly to prevent the legs from twisting.

#### Figure 7. Installing the Head



### 6.7. Plumb the Bucket Elevator

Leave the crane attached and plumb the bucket elevator by either using a plumb line or a transit. Each method is described below.

#### Important

The bucket elevator must be plumbed to less than 1/8" deviation or excessive wear of components can occur.

#### **Plumb Line Method**

1. Remove the head cap and drop a plumb line inside the up-leg casing to the boot. Do not allow the line weight to touch the bottom of the boot.

- 2. Suspend the plumb line on a piece of wood or metal, which will not roll, placed across the top of the head housing.
- 3. Measurement from the plumb line to side and end of casing housing at the inspection door must be the same measurement taken at the top of the leg. Make all adjustments and then anchor connections before removing the plumb line so that a final check may be made.





#### **Transit Method**

- 1. If a transit is used, plumb from side-to-side and from front-to-rear.
- 2. Take as many sightings as necessary (90° apart) to plumb the bucket elevator.

### 6.8. Installing the Belt into Bucket Elevator

#### **Before Installation**

Before installing the belt and buckets, fabricate two pieces of steel angle to connect the rope/cable to the belt. These pieces are used to pull the belt over the head shaft and to splice the belt.

1. Cut the steel angle to match the width of the belt.

- 2. Drill holes on one face of the steel angle that matches the spacing of the holes in the belt (used for attaching the buckets).
- 3. Drill a hole in the opposite face and install an eyebolt.

#### Note

This eyebolt will secure a rope/cable to the belt while pulling the belt over the head shaft.

#### Installation

1. Raise the boot pulley to its highest take-up position, see Figure 9.

#### Figure 9. Belt Take-Up Adjustment



- 2. Remove the head cover cap and drop a strong rope or cable (rated for the load) down the up-leg casing until the end can be removed through the inspection duct.
- 3. Drop the other end of the rope or cable down the down-leg casing and thread the rope or cable around the boot pulley and bring it out the inspection duct. See Phase 1 Figure 10.
- 4. Attach the fabricated steel angle to the belt and then attach the rope/cable to the steel angle. See Phase 2 Figure 10.
- 5. Pull the belt up the up-leg casing to the head pulley and thread the belt around the boot pulley and bring it out the inspection duct opening. See Phase 3 Figure 10.

#### Important

Keep the belt centered as it passes over the head pulley.

#### Figure 10. Installing Belt





#### Splicing the Belt

- 1. Raise the boot pulley to its highest position using the take-up rods on each side of the boot.
- 2. Pull the leading end of the belt around the boot pulley so that it overlaps the trailing end.
- 3. Install the second steel angle on the trailing end of the belt.
- 4. Secure a come-along to the eyebolts of the steel angles.
- Pull the belts together until the slack is removed from the belt around the boot pulley. See Phase 4 Figure 10.
- 6. Cut the belt according to the manufacturer's instructions to ensure it is square.
- 7. Splice the belt as shown in Figure 11.

#### Figure 11. Splice Details



## 6.9. Installing the Buckets

All buckets are installed on site. The following instructions outline the installation process for their secure attachment to the conveyor belt.

1. Remove the inspection panel.

The buckets are installed by accessing the belt through the inspection duct.

- 2. Insert the bucket bolts through the back side of the belt. Refer to the approval drawing for specific hardware sizes.
- 3. Slide the bucket over the bolts and secure with nuts.

#### Figure 12. Installing the Buckets



4. Tighten the nuts from left to right on the first bucket (or set of buckets). For the next bucket (or set of buckets), tighten the nuts from right to left. Keep alternating until all buckets are installed.

#### Important

Tighten the nuts until the head of the bolt is set in the belt. Do not overtighten. A speed wrench is recommended. If an impact wrench is used, ensure the bolt is not tightened to the point of fracturing. Refer to Figure 13.

#### Figure 13. Bucket Bolts



## 6.10. Adjusting the Throat Plate

- 1. Before replacing the head cover cap, check the adjustment of the throat plate in the elevator head section.
- 2. Adjust the throat plate to provide a minimum clearance of 3–4 mm between the throat plate and the bucket tip.

#### Note

The configuration shown may vary for individual installations, however the concept will be the same.

#### Figure 14. Typical Throat Plate Adjustment



## 6.11. Tensioning and Aligning the Belt

#### Initial Belt Tensioning — Prior to Start-Up

This procedure describes the initial tensioning and alignment of the belt, it will be necessary to tension and align the belt again after startup.

- 1. Lock out power to the bucket elevator.
- 2. Tighten the belt by adjusting the boot pulley using the take-up rods. Adjust the take-up rods no more than 1" at a time.



#### Important

Alternate from side to side, maintaining the boot pulley as close to level as possible.

3. Continue to tension the belt until it becomes difficult to contact the front of the trunk casing with the buckets when pulling on the belt.

#### **Belt Tensioning — Elevator Running Empty**

Once the initial tensioning is completed, run the bucket elevator empty to continue setting the belt.

#### Important

Check the following before starting the bucket elevator for the first time:

- oil level in the gear unit
- motor rotation
- 1. Start the bucket elevator and observe the belt as it passes over the pulleys.

#### Note

The belt and the buckets should not be touching any part of the housing.

- 2. If the belt is running towards the edge of the pulley, immediately turn off the motor. Correct the belt alignment, see Belt Alignment on page 38.
- 3. If the belt is aligned and not slipping, then the belt is sufficiently tensioned.
- 4. Carry out the final belt adjustment when the entire installation is complete and material can be conveyed, see Final Belt Tensioning Elevator Running at Full Capacity on page 38.

#### Note

Many factors such as condition of pulley lagging, belt type, bucket size and spacing, dampness, etc. will affect the actual required tension for your leg. The "ideal tension" is the lowest tension at which the belt will not slip under normal operating conditions.

#### Final Belt Tensioning — Elevator Running at Full Capacity

- 1. Start the bucket elevator.
- 2. Slowly feed material to the leg.
- 3. Adjust the take-ups equally and in small amounts to keep the belt centered as the load is increased.

#### Important

Maintain proper feeding of the boot inlet for even bucket fill. If side loading occurs this may cause uneven bucket fill and can create material build up between the pulley and belt. This will make it harder to track the belt and adds excessive tension to head and boot components and belt.

4. If the belt is slipping, tighten the take-up.

#### Note

The weight of the material will stretch the belt, requiring more tension to keep the belt from slipping on the head pulley.

- 5. Adjust the belt alignment, if needed. See Belt Alignment on page 38.
- 6. After several complete belt revolutions, verify that the boot shaft is always turning and the belt is always tracking on the center of the head and boot pulleys.

#### Note

If the belt stretches beyond the adjustment range of the tensioning system, shorten the belt and the continue with the belt tensioning process.

#### **Belt Alignment**

If the belt is not running at the center of the pulley, make small adjustments to the head and boot pulleys to correct belt alignment.

- 1. Observe the belt tracking and identify the direction of misalignment.
- 2. Adjust the boot pulley.
  - a. If the belt is running to the right side of the pulley, adjust the take-up rod at the left side. Loosen the locknut and adjust the take-up rod by a 1/16" increment to lower the bearing at the left side.
  - b. If the belt is running to the left side of the pulley, adjust the take-up rod at the right side. Loosen the locknut and adjust the take-up rod by a 1/16" increment to lower the bearing at the right side.
  - c. Tighten the locknut and run the belt again.
  - d. Observe the belt alignment. If needed, repeat the above steps until the belt tracks properly.
  - e. After the adjustment is complete, make sure that the locknuts are tightened.
- 3. Adjust the head pulley.
  - a. Loosen the bearing housing on the side opposite of the direction of misalignment.
  - b. Place shims behind the bearing housing.

#### Important

Make sure the shim size is nearly equal to the area of the pillow block so as not to concentrate stress on a small area of the bearing housing.

- c. Tighten the bearing housing bolts and run the belt again.
- d. Observe the belt alignment. If needed, add or remove shims until the belt tracks properly.
- e. After the adjustment is complete, make sure that the bearing housing bolts are tightened.
- 4. If belt misalignment persists, check the possible causes in the Section 9. Troubleshooting on page 47.

#### Figure 15. Belt Alignment

HEAD PULLEY



## 7. Operation

For optimal operation, follow these safety precautions, checklists, and instructions.

## 7.1. Operation Safety

- MWARNING Keep away from rotating and moving parts, including the elevator buckets, drive components, shafts, and bearings.
  - Keep away from explosion vents during operation.
  - Always operate with guards, covers, and shields in place.
  - Have another trained person nearby who can shut down the equipment in case of accident.
  - Keep the work area clear of bystanders.
  - Keep the work area clean and free of debris.
  - Ensure maintenance has been performed and is up to date.

## 7.2. Pre-Start Inspection Checklist

Before starting the bucket elevator for the first time, check and verify the following:

- bucket elevator is plumb.
- guy cables (if equipped) are fastened securely and under tension.
- braces securing the elevator to its supporting structure are fastened properly. •
- set screws in the head assembly and boot are tight and have not come loose during shipping or installation. .
- head and boot shafts are level.
- throat plate is properly adjusted.
- interior of the elevator contains no foreign material or obstructions.
- bearings and drives are lubricated according to manufacturer's service instructions. Insufficient or excessive lubricant will cause high operating temperatures.
- vent cap is installed on the gear box
- all safety devices such as guards, covers, doors, hatches, explosion vents, sensors, and interlocks and safety controls are installed correctly and functioning properly.
- sensors and interlocks tested to ensure operating as expected and designed.
- motor conduit cover is in place, if applicable.
- all electrical equipment is installed according to the national electrical code and / or local safety codes.
- all equipment connected to the inlet and the outlet is installed and securely fastened.
- You have the following documents:
  - installation and lubrication manual for bearings
  - assembly and operating manual for motor(s)
  - assembly and operating manual for gear unit(s)

### 7.3. Start-Up and Break-In

Make sure that all operators know the location of the emergency shut-off devices and know how to activate them.

1. Start the bucket elevator motor initially with several short jogs, gradually lengthening in duration without material.

#### Important

Verify that the belt and buckets are free to move and not touching the housing.

- 2. Start the motor fully and listen carefully for any abnormal noise or operations. SeeSection 9. Troubleshooting on page 47 or contact AGI Milltec if any problems occur.
- 3. Check for proper head and boot pulley belt centering and alignment. To correct a misaligned belt, refer to Section 8. Maintenance on page 44.

Note

- Belting will normally stretch during initial operation and will expand and contract under varying conditions of temperature and humidity. Tension the belt as required during the first weeks of operation to prevent the head pulley from slipping.
- Belting manufacturers allow tolerances of 2% 3% in initial stretch, or 24 in 36 in (600 mm 900 mm) in every 100 ft (30 m) of belting. After frequent belt tightening during the first weeks, reduce the belt length via belt re-splice if required. For detail on splicing, refer to Section 6. Assembly on page 19.
- 4. If operating for the first time, run the bucket elevator empty for 24 hours as a break-in period. Look for unusual increase in bearing temperature, unusual noises, or drive misalignment. Do not leave the bucket elevator running unattended.
- 5. After stopping the bucket elevator, lock out all power and ensure the intake and discharge are clear and that nothing impedes material flow in any way.

A WARNING Failure to lock out power can cause severe injury.

6. Restart the bucket elevator and gradually begin feeding material. Gradually increase feed rate to full capacity.

#### Important

Do not overload the bucket elevator. Do not exceed or modify the bucket elevator speed, capacity, material density, or rate of flow. Keep the flow of material uniform and continuous.

- 7. When operating at full capacity, check for:
  - proper belt tracking
  - slippage of the pulley
  - back legging (material falls down the bucket elevator)
  - correct filling of the buckets
  - electrical current draw on the motor
- 8. Stop the material feed and allow the bucket elevator to empty. Lock out power supply. Check all bolts and all alignments. Re-align as necessary and tighten all bolts.
- 9. If the bucket elevator will remain shut down a long time, run it until all material completely clears out. This is particularly important when the material tends to harden, become more viscous or sticky, or spoils if allowed to stand for a period of time.

## 7.4. Emergency Shutdown

To shut down the bucket elevator in an emergency situation, shut down the power source and stop the flow of material to the elevator. Lock out power before correcting the problem.

## 7.5. Re-starting a Plugged Bucket Elevator

If the bucket elevator plugs (during inadvertent shut down, during emergency shutdown, or from other cause), lock out power and remove all material in the intake and boot. The geared motor is equipped with braking mechanism that engages automatically when power is cut to the motor.

A WARNING Failure to lock out power can cause severe injury.

NOTICE

Starting the bucket elevator when the boot is full can damage components, ensure it is fully clear of material before re-starting.

Open the covers slowly to prevent rapid discharge of material from the boot. If some of the trunking also filled, remove the covers at higher locations first, if possible.

**WARNING** When opening the covers, prevent rapid material outflow entrapment. When openings are in a confined space, pit, or basement, the risk is greater. Always work with a second person when clearing a plugged bucket elevator. Never risk material entrapment. Do not open the cover. AGI Milltec recommends using a vacuum truck or other equipment. If needing assistance, contact AGI Milltec.

Inspect the boot for damage, including the take-up rods, bearings, and inspection doors.

Check the head section as well. When the bucket elevator plugs, some components may shift including bearings, shafts, pulleys, etc. Check the head pulley and belt at the head section as well for burn marks. Assess the damage before restarting or consult with AGI Milltec or your representative for assistance.

Clear the intake and boot of all material. Then restart the bucket elevator.

#### Important

The bucket elevator may be safely restarted if the buckets remain full. A full boot will prevent restart.

## 7.6. Extended Shutdown

Before extended shutdown (beyond one month), perform the following:

- Remove all materials from the bucket elevator and check that the surface coatings are in good condition.
- Lubricate and protect all bearings and drives according to the manufacturer's instructions.
- Start the elevator every two weeks.
- Coat shafts with a rust preventative oil.
- Perform inspection and service instructions contained in this manual before start-up.

## 8. Maintenance

Proper maintenance will improve safety, efficiency, and will keep the bucket elevator operating reliably.

## 8.1. Maintenance Safety

**WARNING** • Keep components in good condition. Follow the maintenance procedures.

- Ensure the service area is clean, dry, and has sufficient lighting.
- Do not modify any components without written authorization from the manufacturer. Modification can be dangerous and result in serious injuries.
- Shut down and lock out power before maintaining equipment.
- All electrical maintenance must be performed by a gualified electrician in accordance with all applicable local codes and standards.
- After maintenance is complete, replace all guards, service doors, and/or covers.
- Use only genuine AGI Milltec replacement parts or equivalent. Use of unauthorized parts will void warranty. If in doubt, contact AGI Milltec or your local dealer.

### 8.2. Maintenance Procedures

- 1. Check the gearbox breather: Clean the gearbox breather to prevent pressure build-up in the reducer and leakage. Replace as needed.
  - Desiccant breather: Replace the desiccant breather when the drying agent has reached its maximum adsorption capacity. Silica gel turns from blue to pink in the presence of water and turns from blue to brown (or dark blue, yellow, or orange) in the presence of oil molecules or mist.
  - Autovent plug: Check that the plug releases built-up air pressure from inside the gearbox at approximately 2 psi during operation and closes tightly when the reducer cools along with the air inside the reducer.
  - Thermally Reactive Advanced Protection (T.R.A.P.) breather: Flashes red to indicate change out is needed (when installed with electronic indicator), or bright red band shows when restriction limit is reached (when installed with mechanical indicator).
- 2. Check the gearbox oil level: The shaft mounted gear reducer is lubricated by an oil reservoir in the housing. The correct amount of oil is important to the proper operation of the reducer. Too much oil may cause leakage or overheating. Too little oil may cause overheating or damage to the internal parts. Refer to the gear reducer's maintenance instructions for a list of recommended lubricants and oil change periods.
- 3. Check the bearings: All bearings used on the bucket elevator are anti-friction, ball, or roller type pillow blocks. Check the bearing's maintenance instructions for the type of grease and the lubrication intervals. The frequency of lubrication depends on several conditions such as hours of operation, temperature, moisture, speed, and contaminants. When lubricating, the bearing manufacturer recommends that you add grease slowly and use a sufficient volume to purge the bearing of old lubricant. It is preferable to rotate the bearings during lubrication where good safety practice permits.
- 4. Check the bucket elevator belt tension: Tension the belt as required to prevent slippage on the head and boot pulleys. If the take up system cannot tension the belt further, disconnect the belt at the splice and retension using a come-a-long or other tensioner device.

- 5. Check the bucket elevator belt alignment: The belt should be running in the center of the pulleys.
- 6. Check and tighten all bucket bolts: After the first week of operation and regularly afterward.
- 7. **Inspect the condition of the belt and buckets:** Check for loose/broken bolts, damaged buckets (replace damaged and missing bucket or bolt). Check general belt condition and belt splice. Inspect splice connections after 20 30 hours of operation.
- 8. Check the buckets: Occasionally check for wear or damage.
- 9. Check the casing, doors and gates: Occasionally check for damage, wear and alignment.
- 10. **Inspect the head pulley rubber lagging:** Inspect the lagging frequently and replace when worn to 50% of its original thickness.
- 11. **Check the alignment of the head and boot pulleys:** Check pulley alignment within the bucket elevator housing. Check for loose bearings, pulley bushing not holding tightly onto the shaft, and housing distortion.
- 12. Check the throat plate wiper: Ensure that the throat plate wiper is close to the leading edge of the bucket.
- 13. Check the bucket catchers: Occasionally check for any foreign objects.
- 14. Check the air vents: Periodically remove the accumulated dust.
- 15. Check the fasteners: Check bolts, nuts, set screws occasionally for tightness.
- 16. Check the magnets: Periodically remove the debris from the magnet.

#### Important

Read manufacturer's instructions and safety precautions before performing magnet maintenance.

17. **Check the explosion panels:** Check for excessive dust around each explosion panel as this could indicate that one or more relief washers have failed even in the absence of an explosion event. Inspect each panel for any damage. If no damage is found, replace the bolts and washers. Use only AGI Milltec-supplied parts. See Section 8.3 – Replacement Parts on page 46.

#### Note

The maintenance interval for explosion panels varies depending on the operating environment, type of commodity, and equipment run time. Determine the maintenance interval that suits your specific operating conditions.

18. Check the safety decals: Make sure all of the decals are in place and are readable. Replace as necessary.

## 8.3. Replacement Parts

#### **Ordering Replacement Parts**

Call 1(800) 425-8431. Provide the following information.

- Equipment to repair sales order number.
- Part number and paint color, when applicable. Refer to the installation drawing (if this bucket elevator came with an installation drawing), packing list, or invoice.
- Priority level of the order.
- Your name, complete mailing address, and phone number.



## 9. Troubleshooting

Find causes and solutions to common problems that can be encountered.

MARNING Shut down and lock out all power sources before diagnosing any of the causes or attempting any of the solutions below.

The following section covers some causes and solutions to some of the problems that may be encountered.

If there is a problem that is difficult to solve, even after having read through this section, please contact your representative or AGI. Have this manual and the serial number available.

Problem	Cause	Solution		
Bucket elevator will	Electrical problem.	Contact Electrician to repair.		
not start.	Incorrect motor or breaker size.	Check and replace.		
	State of another component prevents the elevator from starting.	Check electrical interlocking system.		
	Misaligned motor/drive coupler.	Adjust or replace.		
	Boot excessively plugged with material or obstruction in boot.	Lockout power and remove obstruction.		
	Reducer failure.	Replace component.		
	Motor failure.	Replace motor.		
	Overheated or damaged brake coil.	Replace brake coil.		
	Interlock mechanism between the brake coil and motor is not functioning properly.	Check the interlock mechanism. Ensure that it is properly connected.		
Discharge problems or back legging (material falling down the up or down side casing).	Throat plate missing.	Install new throat plate.		
	Throat plate is out of adjustment.	Check for the plate condition and adjust if necessary.		
	Incorrect head shaft rpm.	Check the drawing for the correct drive ratio, consult AGI Milltec representative.		

Problem	Cause	Solution
	Obstruction in head.	Inspect head for foreign materials.
		Check for missing buckets. Replace missing buckets.
Discharge problems or back legging (material	Obstruction in distributor or spouting.	Inspect distributor and spouting. Correct condition as required.
down side casing).	Buckets being overfilled.	Check bucket elevator rpm.
		Check the capacity of the feeding equipment.
	Spouting size too small for elevator capacity.	Use the correct size spouting. Re-examine the engineering design, consult AGI
	Spouting angle is too shallow for product.	Mintec.
	Spouting has a sharp bend that restricts the flow.	
	Bucket loose.	Tighten all bucket bolts securely.
	Damaged buckets.	Replace as required. Determine cause of damage.
	Elevating light material.	Reduce speed up to 15%. Buckets may need to be replaced with perforated buckets, consult AGI Milltec representative.
	Belt loose.	Tighten take-up screws or re-splice the belt as required.
	Air locked.	Ventilation at the boot or bucket venting may be needed, consult AGI Milltec representative.
		Check the air vents and remove any buildup.
		Check the dust collection system.
		If there are no existing vents:

Problem	Cause	Solution
		<ul> <li>install vents in the bins being loaded, consult bin manufacturer</li> </ul>
		<ul> <li>install vents in the elevator head, consult AGI Milltec representative</li> </ul>
Low capacity.	Head shaft speed is too slow.	Check pulley speed.
Low capacity.	Head shaft speed is too slow.	Check the drawing for the correct drive ratio, consult AGI Milltec representative.
	Feed conveyor is running too slow or is obstructed.	Check conveyor speed. Correct as required. Remove any obstructions.
	Baffle plate in the pit hopper adjustment is set too low.	Raise baffle plate.
	Obstruction in the boot or the feeding boot is in the wrong location.	Clean boot and remove any obstructions. Check recommendations for locations of inlet hoppers.
	Missing buckets.	Replace buckets.
	Elevating light material.	Use perforated buckets.
	Air lock.	Install vents in the bins being loaded, the elevator head or boot.
	Spouting size and inclination is incorrect.	Check recommendations for sizing and slope.
	Belt is loose.	Check for slippage. Check head pulley for lagging and replace if worn.
	Buckets are damaged or caked with material.	Visually inspect, clean, or replace damaged buckets.
Bearing gets hot or bearing failure.	Material getting into the bearing.	Add or upgrade seal to keep material out of bearing.
	Bearing has been over- lubricated or under- lubricated.	Consult bearing manual's maintenance schedule and greasing intervals.
	Boot and head shafts are misaligned.	Check pulley alignment within the bucket elevator housing, contact AGI Milltec representative.

Problem	Cause	Solution	
	Too tight bearing seal.	Enlarge seal opening or replace seal.	
Belt not tracking in the center of the head	Head pulley not level.	Place shims under pillow block bearings to level pulley.	
pulley.	Pulley has no crown.	Replace pulley.	
Belt not tracking in the	Head pulley is worn.	Replace with new lagging kit.	
pulley.	Failed bearings.	Replace defective bearing on the head shaft.	
	Leg has a back leg roll.	Adjust belt tracking with vertical movement of bearing.	
Belt not tracking in the center of the boot pulley.	Boot pulley is improperly adjusted.	Adjust take-up screws on the boot to level the pulley and align belt in center of pulley.	
	Failed bearings.	Replace defective bearing on the boot shaft.	
	Possible materials build up on pulley.	Clean pulleys or use winged pulley at the boot.	
	Grain flow pushing the buckets.	Install a baffle to direct grain flow into the buckets.	
Bucket bolts pull through belt or belt	Bucket bolts not tight.	Frequently inspect and tighten the bucket bolts.	
tears at bolt holes.	Inadequate belt construction for bolt holding.	Replace the belt with the proper design.	
	Obstruction in casing or	Remove the obstruction.	
	Insufficient clearance.	Check the belt for proper tracking and align pulleys if required.	
		Check casing for proper bucket clearance.	
	Plugged boot.	Clean out boot.	
	Lump size or weight in buckets increased from	Change feed design in boot to handle larger lumps.	
	original design.	Change to heavier belt.	

Problem	Cause	Solution		
Excessive belt slippage or burning.	Head pulley lagging worn or loose.	Replace with factory recommended lagging.		
Excessive belt slippage or burning.	Belt has stretched.	Adjust belt tension with boot pulley. Adjust take up screws, or re-splice the belt.		
Belt surface wearing excessively on bucket side.	Material down legging and getting between the bucket and belt.	Change speed to affect better discharge.		
	Fine abrasive material between the bucket and belt.	Install rubber washers or bucket pads between the bucket and belt.		
	The cover gauge is too light or improper belt quality.	Upgrade the belt.		
Belt breaks.	Lumps dropping between belt and boot pulley.	Use winged boot pulley.		
	The operating tension is higher than maximum allowable working tension of belt.	Replace belt with correct design.		
Caking on buckets.	Wet or powder type material.	Material is too wet.		
	Inadequate ventilation	Add vents, consult AGI Milltec representative.		
Damaged buckets.	Belt loose.	Tighten take-up screws or re-splice belt as required.		
	Casing bowed and catching.	Re-plumb as required.		
	Obstruction in the elevator.	Repair or remove.		
	Buckets too large for casing.	Replace with proper size.		
	Belt not running smooth.	May require special splice.		
Excessive wear on pulley side of cover.	Abrasive material between belt and boot pulley.	Clean out boot.		
	Belt slips at head pulley.	Replace worn lagging.		

Problem	Cause	Solution	
		Adjust take-up screws to increase belt tension.	
	The cover gauge is too light or improper belt quality.	Upgrade belt.	
Build up on boot pulley.	Powder or sticky material	Winged boot pulley required.	
Excessive vibration.	Foreign matter in boot.	Lockout power and remove obstruction.	
	Flooded boot pit.	Check sump pump.	
	Excessively tight belt.	Reduce tension on belt.	
	Excessively loose belt.	Tighten belt.	
	Loose or broken buckets.	Tighten or replace buckets.	
	Buckets hitting throat plate.	Adjust throat plate position.	
	Misaligned elevator head and boot shaft.	Check pulley alignment within the bucket elevator housing, contact AGI Milltec representative.	
	Elevator is not adequately braced.	Contact AGI Milltec for assistance.	
	Belt hitting inside of casing when casing is not plumb.	Contact AGI Milltec for assistance.	
Moisture inside the	Damaged door seals.	Check door seals, replace if damaged.	
elevator.	Loose bolted connections.	Check fasteners, and tighten as necessary. Replace, if damaged.	

## **10. Specifications**

## 10.1. Capacities (t/h)

Model	LGDA-50	LGDA-100	LGDB-150	LGDB-200	LGDC-300
Wheat	50	100	150	200	300

## **11. Appendix**

## 11.1. Bolt Torque

Table 2 provides the correct torque values for various bolts. The bolt diameter is measured to the outside of the threads. When tightening all bolts, tighten the nut on the bolt to the torque specified in the table, unless otherwise specified. Do not replace or substitute bolts, nuts, or other hardware that is of lesser strength than the hardware supplied by the manufacturer.

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

Tabl	e 2.	Metric	: Bolt	t Torque
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	8.8		10.9	
Bolt Diameter	(N·m)	(ft·lb)	(N·m)	(ft·lb)
M3	0.5	0.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710

#### MILLTEC is an AGI Brand.

AGI is a leading provider of equipment solutions for agriculture bulk commodities including seed, fertilizer, grain, and feed systems with a growing platform in providing equipment and solutions for food processing facilities. AGI has manufacturing facilities in Canada, the United States, the United Kingdom, Brazil, South Africa, India and Italy and distributes its products globally.



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