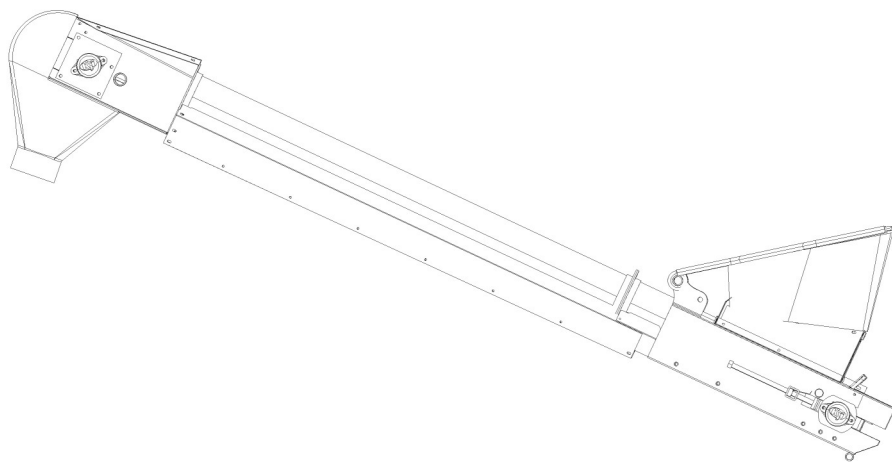




**CONVEYORS INC**

*Quality product moving quality product*

**Model 0806 Agco Conveyor  
Owner/Operator's Manual**



## Table of Contents

INTRODUCTION.....	3
LIMITED WARRANTY .....	4
SAFETY .....	5
ASSEMBLY .....	11
INSTALLATION .....	12
INSTALLING SAFETY SIGNS .....	13
OPERATION .....	16
MAINTENANCE.....	18
TROUBLESHOOTING .....	20
CONVEYOR BODY .....	22
LOWER END GROUP.....	24
UPPER END GROUP .....	26
CALLAPSIBLE HOPPER .....	28
GENERAL DIMENSIONS .....	29
SPECIFICATIONS.....	30
BOLT TORQUE.....	31
HYDRAULIC FITTINGS TORQUE.....	32

**Personnel operating or working around this equipment should read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment. Any misuse of the equipment may void the warranty.**

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## Introduction

Thank you for purchasing your new Model 0806 conveyor from KSi Conveyors. We are pleased to have you as a customer, and hope you will enjoy many years of productive service from our products and staff.

Please read and understand this manual before operating the equipment. Pay special attention to the safety information to protect yourself from harm. If you need information beyond what can be found in the manual, please give our friendly staff a call at 888 KSI-CONV.

# KSi SAFETY 1<sup>ST</sup>

Replace missing guards and shields  
**FREE OF CHARGE!**

KSi Conveyors are built to provide many years of dependable service to our customers through durable craftsmanship.

One of the most important aspects of KSi engineering is **SAFETY 1st** design throughout all product lines. At KSi safety is **NO ACCIDENT!**

That is why KSi is implementing its **SAFETY 1st** program. Should you ever need guards, shields, safety decals or owner/operator manuals, simply contact KSi and we will supply you with them **FREE OF CHARGE!**

If you need any of the above listed safety items or have safety questions, please contact KSi:

454 N State Route 49  
Cissna Park IL 60924  
Ph: 815-457-2403  
888-574-2668

## General Information

- A. KSi reserves the right to improve its product whenever possible and practical to do so. We reserve the right to change, improve and modify products at any time without obligation to make changes, improvements and modifications on equipment previously sold.
- B. When receiving merchandise, it is important to check the quantity of parts and their descriptions with the packing list enclosed with each package. All claims for freight damage or shortage must be made with the consignee within ten (10) days from the date of the occurrence of freight damage. The consignee should accept the shipment after noting the damage or loss.
- C. KSi does not make any guarantees on self cleanout or the cross contamination of seed of any kind for their conveyors, Manual cleanout will be required.

## KSi Conveyors 2 Year Limited Warranty

### 1 What Does This Warranty Cover?

KSi will warranty our equipment to be free from defects in material and workmanship under normal usage and conditions.

### 2 What Does This Warranty Not Cover?

The warranty does not cover equipment that has been damaged by:

- Normal wear and tear;
- Misuse, abuse, or accident;
- Failure to follow the operating instructions or maintenance protocols that we provided;
- Any improper or unauthorized repairs or modifications to the equipment; or
- Fire, flood, "acts of God," or other contingencies beyond our control.

### 3 How Long Does the Coverage Last?

The warranty period for new equipment lasts for 24 months after the delivery date.

### 4 What Will We Do to Correct Problems?

KSi will repair or replace the equipment covered by this warranty at no charge. Service trip and travel expenses will incur additional charges.

### 5 How Do You Get Service?

5.1 If something goes wrong with your equipment, call your Dealer or KSi Conveyors Parts & Services. Your dealer or KSi will ask for the equipment's serial number and a description of the problem. KSi will determine whether the equipment is covered under warranty.

5.2 If the problem can be resolved by providing a replacement part, your dealer or KSi will ship or deliver the part. Expedited services will incur additional charges. You may be required to return the defective equipment.

5.3 If the problem requires a service call, your dealer or KSi will schedule a service visit at a mutually convenient time. Expedited services will incur additional charges.

5.4 You will be invoiced for any service or parts provided if we determine that the equipment is not covered under this warranty or the problem was due to one of the disqualifying causes in Section 2.

### 6 What Will KSi Not Do?

KSi will not be liable for any amount that exceeds the amount you paid for the Equipment. However arising, we will not be liable for:

- Expenses incurred without our written authorization;
- Direct, indirect, incidental or consequential damages, such as the loss of anticipated profits or benefits;
- Loss or cross contamination of any seed, treatment fluid, or other materials used with the equipment; or
- Modifications or erection defects that create structural or storage quality problems.

<b>We make no warranty of merchantability or fitness for a particular purpose.</b>
--

### 7 How Does State Law Relate to This Warranty?

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

### 8 Who is Covered?

Only the original end user of the product is covered by this Warranty.

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## TIPS FOR SAFE OPERATION OF KSI CONVEYORS

This Safety Alert symbol means  
**ATTENTION BECOME ALERT! YOUR SAFETY IS INVOLVED**



The Safety Alert symbol identifies important safety messages on KSI conveyors and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

### Why is SAFETY important?

#### The Three Best Reasons

**Accidents Disable and Kill**  
**Accidents Cost \$\$**  
**Accidents Can be Avoided**

**SIGNAL WORDS:** NOTE THE USE OF SIGNAL WORDS **DANGER**, **WARNING** AND **CAUTION** WITH THE SAFETY MESSAGES. THE APPROPRIATE SIGNAL WORD FOR EACH MESSAGE HAS BEEN SELECTED USING THE FOLLOWING GUIDELINES:

**DANGER -** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

**WARNING -** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that exposed when guards are removed. It may also be used to alert against unsafe practices.

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

**1. General Safety Statements.**

- A. KSi's principal concern is your safety and the safety of others associated with grain handling equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.
- B. As the owner and/or operator it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment or are in the area. Safety precautions may be required from the personnel. Avoid any alteration to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.
- C. This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.
- D. Untrained operators subject themselves and other to serious injury or death. NEVER ALLOW untrained personnel to operate this equipment.
- E. Keep children and other unqualified personnel out of the working area at all times.
- F. NEVER start equipment until ALL persons are clear of the work area.
- G. Be sure ALL operators are adequately rested and prepared to perform all functions of operating this equipment.
- H. Keep hair, loose clothing , and shoestrings away from rotating and moving parts. Never wear loose fitting clothing when working around conveyors.
- I. NEVER allow any person intoxicated or under the influence of drugs or alcohol to operate the equipment.

## **1. General Safety Statements (cont.)**

- J. NEVER allow anyone inside a bin, truck, or wagon which is being unloaded by a conveyor. Flowing grain can trap and suffocate in seconds.
- K. Make sure someone is nearby who is aware of the proper shutdown sequence in event of an accident or emergency.
- L. NEVER work alone.
- M. ALWAYS think before acting. NEVER act impulsively around the equipment.
- N. Make sure ALL equipment is locked in position before operating.
- O. Keep hands and feet away from the conveyor intake and other moving parts.
- P. NEVER attempt to assist machinery operation or to remove trash from the equipment while in operation.
- Q. NEVER drive, stand, or walk under the equipment.
- R. Use caution not to hit the conveyor when positioning the load.
- S. Use ample overhead lighting after sunset to light the work area.
- T. ALWAYS lockout ALL power to the equipment when finished unloading the bin.
- U. Keep the area around intake free of obstacles such as electrical cords, blocks, etc. that might trip workers.

## 2. Emergency Shutdown Sequence.

See Emergency Shutdown on page 16 under the operation section.



**A pinch point is any place on the equipment which can injure the operator.**

## 3. Pinch Points.

- A. Components of this equipment have sharp edges which can scrape and/or cut an operator.
- B. A moving conveyor can sever an operator's limb or even kill.

## 4. Shields and Guards.

- A. Always keep all shields and guards in place during operation.
- B. Missing shields for guards can be replaced for free by contacting KSi.

### **BEWARE OF ELECTRICAL HAZARDS**

**Electricity can kill! Use extreme caution around electrical components.**

**Have your electric company check the transformer and lead wires to be sure they are large enough to handle the additional load of the motor.**

**Electrical wiring should be done by a qualified electrician and all components shall comply with applicable provisions of National Fire Protection Association Standard NFPA No. 70, American National Standard Inst. ANSI-C1 or with the requirements of the authority of having local jurisdiction.**

**KSi assumes no responsibility for the electrical wiring used with this machine.**

**KSi will not be liable for failure of the equipment due to poor or improper electrical power installation.**

**Wires which are too small deliver insufficient voltage causing the motor to overload or burn out.**

**Improper or inadequate wiring can kill or cause fires.**

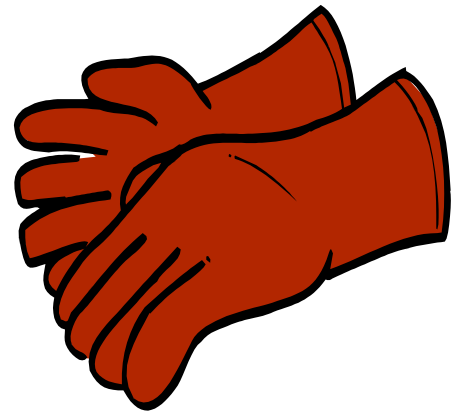
**All electrical devices used on this machine shall be arranged to operate in a "fail safe" manner, that is, if power failure or failure of device occurs, a hazardous condition must not result. This means, the machine must not restart by itself after a power failure etc. when power returns.**

**A means to lock out power must be provided at time of installation to prevent inadvertent starting of the equipment.**



## 5. Personal Protective Equipment- P.P.E.

- A. The proper personal protective equipment should be worn at all time.
- B. Always wear safety glasses when in the work area.
- C. Proper footwear should be worn during the installation process, as well as any maintenance functions.
- D. It is recommended to wear protective gloves during the installation process, as well as any maintenance functions. It is recommended to wear them also when removing any covers.
- E. The operator should never wear jewelry.
- F. Loose fitting clothes should not be worn around moving parts on conveyors or equipment. Any clothing that becomes loosened should be tucked in tightly.
- G. Loose or dangling shoe strings should be tucked in.
- H. Long hair should be tied up and/or back.



## 6. Operator Qualifications.

A. The User/Operator must be competent and experienced to operate the equipment. Anyone who works around conveyors must have good common sense in order to be qualified. These persons must also know and meet all other qualifications, such as:

1. Any person who has not read and/or does not understand all operation and safety procedures is not qualified to operate any conveyor systems.
2. Certain regulations apply to personnel operating power machinery. Personnel under the age of 18 years may not operate power machinery, including conveyors. It is your responsibility, as owner and/or supervisor, to know what these regulations are in your area or situation.
3. Unqualified or incompetent persons are to remain out of the work area.
4. O.S.H.A. (Occupational Safety & Health Administration) regulations state:  
“At the time of initial assignment, and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be, involved.” (Federal Occupational Safety & Health Standards for Agriculture. Subpart D, Section 19287.57 (a) (6).

B. As a requirement of OSHA, it is necessary for the employer to train the employee in the safe operating and safety procedures for this conveyor. We included this sign-off sheet for your convenience and personal record keeping. All unqualified persons are to stay out of the work area at all times. It is recommended that another qualified person who knows the shutdown procedure is in the area in an event of an emergency. A person who has not read this manual and understands all operating and safety instructions is not qualified to operate this machine.

Date	Employee's name (printed)	Employee's Signature
	1.	
	2.	
	3.	
	4.	
	5.	
	6.	
	7.	
	8.	
	9.	
	10.	
	11.	
	12.	
	13.	
	14.	
	15.	
	16.	
	17.	

---

## Assembly of Conveyor Belt

### Squaring One End of Belt

Lay a framing square along a straight edge of the belt to make a cut line on the back side of the belt. Cut belt along this line using a utility knife. If the belt has uneven edges, create an average centerline, and square off of this line. **A clean, straight, square cut is required for the belt to run true on the pulleys.**

### Installing Belt Splice

1. Center and press the fastener strip on the belt.
2. Press the Application Tool on the center of fastener strip with the cam lever in the “up” position.
3. Lower cam lever. Strike staple driver on each staple until staple clinches on Application Tool anvil.
4. Raise cam lever and move tool to outer edge of belt.
5. Clinch staples. Repeat until all staples are complete.
6. Place the splice over a piece of flat steel and clinch each staple with a hammer. Turn belt over and peen staple ends flush with surface of fastener strip.
7. Bend fastener strips until they break apart.

### Installing Belt into the Conveyor

1. Remove the Tail End Door Assembly.
2. Slide a fish tape from the discharge end to the tail end of the conveyor. Pull a rope with a belt splice back through the conveyor. Fasten the conveyor belt to the rope splice, and pull the belt into the top of the conveyor with the rope.
3. Using the fish tape, pull the bottom side of the belt through the conveyor. **Make sure the belt is free of extra twists before pulling it in.**
4. Check to see that the idler is all the way forward (toward the drive end).
5. Pull the belt up tight at the discharge end and cut off the excess length so that there is 1/2” of overlap after the end is squared.
6. Follow the procedure above for installing the second belt splice.
7. Insert the hinge pin. Crimp the pin washers on the ends of the pin using pliers.
8. Tighten the belt tensioning bolts TO 23 FT-LBS. so that each side is adjusted equally.
9. Re-assemble the tail end Door Assembly.

---

## Tracking the Belt

1. Basic rule: *the belt moves toward the end of the roller that it contacts first.*
2. Rollers must be square with the housing and parallel to each other.
3. Belt tension must be great enough to prevent slippage. Tension to 23 ft-lbs. on adjustment bolts.
- 1.



**CAUTION:** Make sure everyone is clear of machine before running.

5. Run the conveyor. Check to see that the belt runs centered on the drive roller. Turn off the machine. Adjust drive roller if necessary.



**WARNING:** Do not run the machine while adjusting. Failure to heed may result in personal injury or death.

6. To adjust drive roller, loosen the four nuts on the bearing holder plate, and the jam nut on the threaded adjuster. Retighten after adjusting is complete.



**CAUTION:** Make sure everyone is clear of machine before running.

7. Run the machine for two minutes. Make sure belt runs centered on drive pulley.
8. Open the Tail End Door to view the idler.
9. Run the machine. Check to see that the belt is running centered on the idler roller. Turn the machine off.



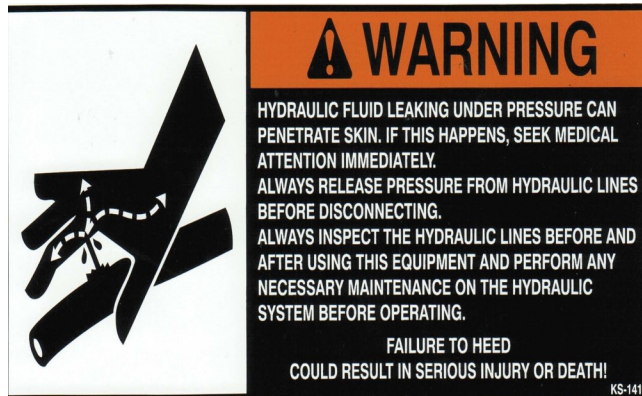
**WARNING:** Do not run the machine while adjusting. Failure to heed may result in personal injury or death.

10. If adjustment is necessary, adjust the tensioning bolts on the idler housing to 23 ft-lbs torque.
11. Check adjustment by running the machine. Make sure belt runs centered on idler pulley. The clearance between the belt and the housing should be the same on both sides.
12. Close the Tail End Door when complete.

## Installing Safety Signs

The Safety Decals listed below are included with the conveyor, the following pages show the location of the decals on the conveyor. Inspect all decals and replace any that are worn, illegible, or missing. Contact your dealer or the factory to order replacement decals.

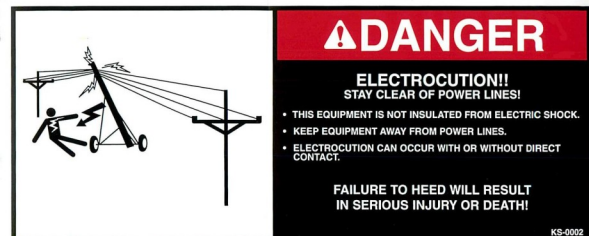
KS-0001



KS-1419



KS-0002

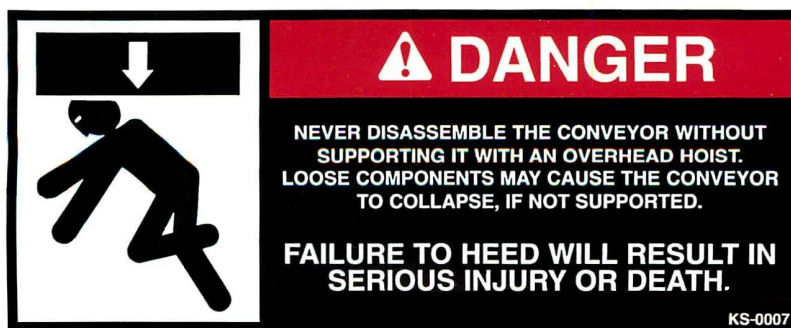




KS-0008



KS-0007





KS-0006



KS-0030



## 1. Operation Recommendations.

- A. One person must be in a position to monitor the operation of the conveyor at ALL times. That person should visually inspect the conveyor before and during operation and be alert to any unusual vibrations, noises, and loosening of any fasteners.
- B. For smoother startups, keep the conveyor from starting totally full.
- C. In cold weather, run empty conveyor for five minutes to warm up belt. Otherwise, do not operate the conveyor empty for long periods of time.
- D. You must “break-in” the conveyor when it is new and at the beginning of each season. Refer to step 3 for instructions..
- E. Make sure the drive end is empty before shutting down the conveyor.



**Do not stop or start the conveyor under load because the belt has a tendency to slip on the drive pulley, especially if the belt and tube have not become well polished.**

## 2. Emergency Shutdown.



**IMPORTANT: Do not stop and restart the conveyor when it is fully loaded. This may damage the conveyor.**

- A. If you have to immediately shutdown the conveyor under load, **be sure to disconnect and lockout the power source.**
- B. Remove as much grain as possible from the hopper and the conveyor before restarting.
- C. **Never** attempt to restart the conveyor when it is full.
- D. When as much grain as possible has been cleared from the hopper and the conveyor, reconnect the power source and clear the remaining grain gradually.



**Be certain to close ALL clean-out and inspection doors in the main conveyor hopper before operating.**

**The operator should not add power before viewing the entire work area and checking that ALL personnel are clear of the designated work area.**

**The operator should be alert to any unusual vibrations or noises that might indicate the need for service or repair during the initial startup and break-in period.**

**The operator should regulate the grain flow to the main conveyor by controlling the amount of grain fed into the hopper. Avoid plugging the main conveyor by overfeeding the hopper.**

**Be certain that all safety shields and devices remain in place during operation.**

**Ensure that hands, feet, and clothing are kept away from moving parts.**

**Stop the motor and lockout the power source whenever the equipment must be serviced or adjusted.**



**3. Startup and Break-In**

- A. Any conveyor that is new or has set idle for a season needs to go through a “break-in” period.
- B. Engage the Conveyor at a slow RPM to minimize shock loads.
- C. Do not allow the conveyor belt to “load up” at a low speed. If this occurs, high torque must be used to turn the belt and this can damage the conveyor.
- D. Run the conveyor at partial capacity until several hundred bushels of grain have been conveyed and the belt and tube are polished.
- E. Retighten belt to restore original belt tension.
- F. When the belt and tube are polished and smooth, slowly work up to the recommended speed and run the conveyor at full speed.



NEVER perform maintenance on the conveyor unless all safety shields are in place. Replace any that are damaged or lost. Do not clean, adjust, or lubricate any part of the machine while it is running.

## 1. Conveyor Belt Adjustment

Belt tension and tracking will need periodic adjustment. Follow the guidelines under “Tracking the Belt” to make adjustments.

# IMPORTANT

**BELT ALIGNMENT and BELT TENSION should be checked periodically. BELT damage will occur if alignment or tension has not been maintained. BELT tension should be 23 ft. lbs. of torque on adjustment bolts. BELT should be tracked to be centered on the idle and drive roller.**

KS-0014



## 2. Conveyor Belt Care

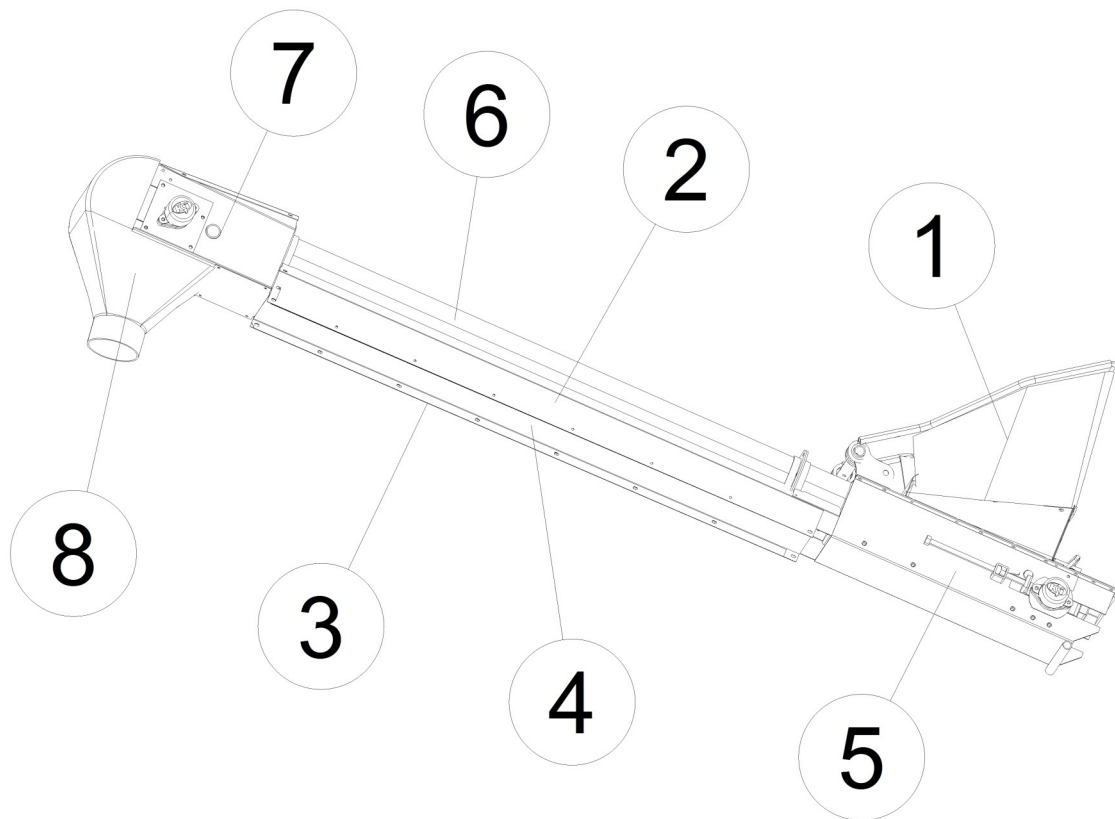
- A. It is recommended that the conveyor belt be washed off and the tail end be cleaned out at the end of the season. This will help prevent material residue from building up and causing damage to the belt.

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Problem	Possible Cause	Solution
<b>1. The conveyor is vibrating.</b>	A. Damage can occur to the belting, causing a noise. Damage usually is caused from foreign material being run through the conveyor.	A1. It may be necessary to remove the belting for inspection.
	B. The belt is not tracking in the center of the conveyor.	B1. Track the belt.
<b>2. Capacity is too low.</b>	A. There may not be enough grain reaching the conveyor.	A1. Make sure the intake has not bridged over, restricting flow. The belt needs to be covered to achieve maximum capacity.
	<del>B. Conveyor belt is moving too slow.</del>	<del>B1. Check the belt speed. Low capacity will result from speeds slower than recommended.</del> B2. Belt needs tightening.
<b>3. The conveyor plugs.</b>	A. The conveyor may be “jamming” because too much grain is reaching the conveyor.	A1. Decrease the amount of grain the conveyor is gathering.
	B. The grain may be wet.	B1. If wet grain or other hard to move materials is being conveyed, reduce the amount of grain being fed into hopper. B2. On electric drive unit check motor wiring or a higher hp motor is needed.
	C. The conveyor may be jammed with foreign material.	C1. Remove any foreign material in the conveyor.
	D. The discharge end may be plugged.	D1. Unplug any plugs at the discharge end of the conveyor.
	E. Pulley has spun out and burned the belt in two.	E1. Cut and resplice the belt, An additional piece of belting may be required.
		E2. Tighten and retrack the belt.

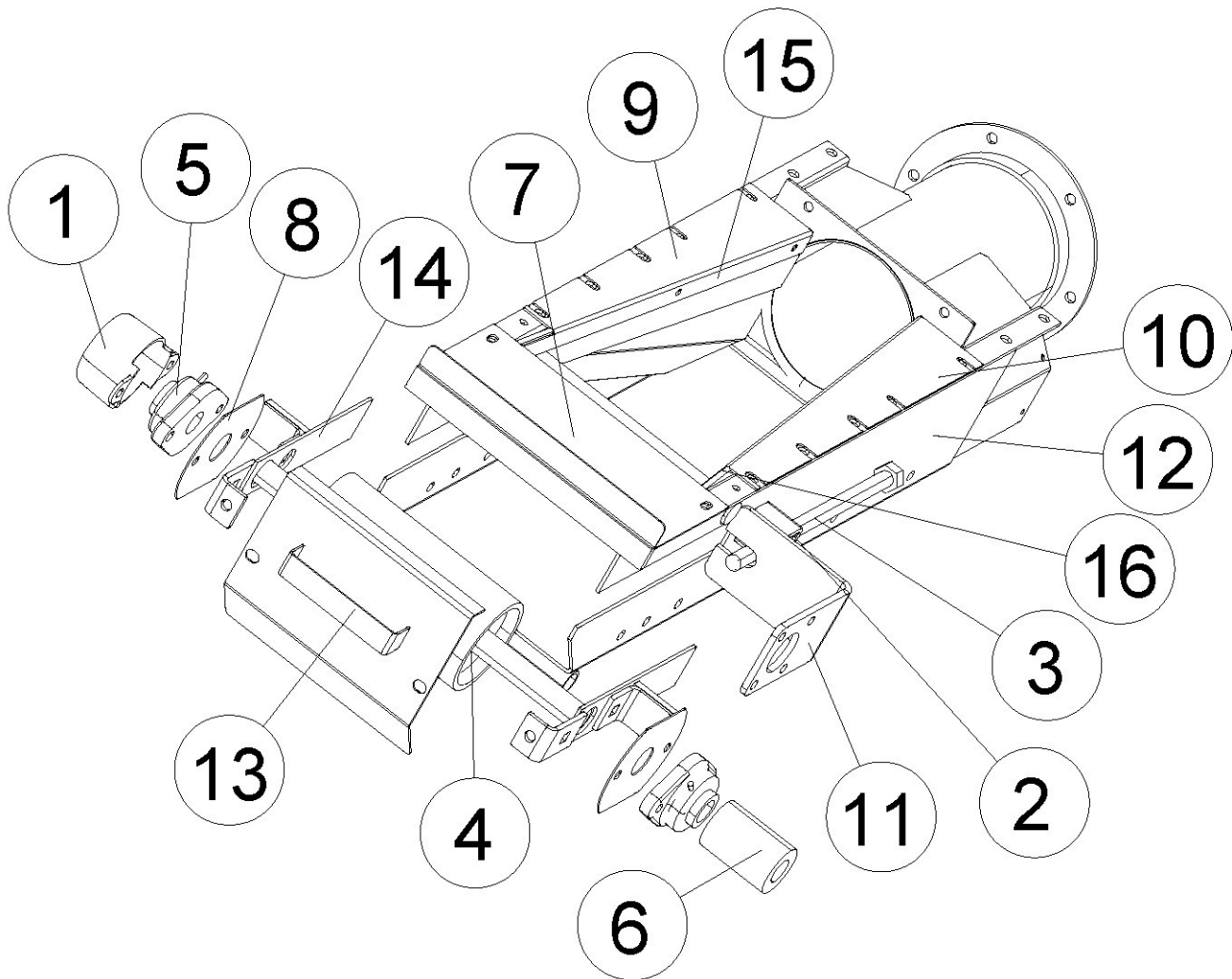
<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
<b>4. Cleated belt is slipping or loose.</b>	A. Belt tension too low.	A1. Tension belt to 23 ft-lbs. on the adjustment bolts.
	B. Belt is extremely dirty.	B1. Clean traction side of belt.
<b>5. Cleated belt is rubbing side of housing or cleats are coming loose or wearing.</b>	A. Belt misaligned.	A1. Align belt so it tracks center of idle and drive rollers.
<b>6. Seed damage is occurring.</b>	A. Belt misaligned.	A1. Align belt so it tracks center of idle and drive rollers.
	B. Belt speed is too slow.	B1. Assure proper belt speed: 21 revolutions of belt per Minute.
	C. Worn brush.	C1. Replace brush.

**080609-03  
AGCO CONVEYOR ASSEMBLY**



ITM	QTY	PART NO.	NAME
1	1	60112-03-PB	HOPPER AS., COLLAPSIBLE
2	1	60420-07-PB	SHIELD, SIDE (UPPER) LH
3	1	60420-08-PB	SHIELD, SIDE (UPPER)
4	1	60433-03-PB	PAN, UPPER
5	1	65020-13-PK	END GROUP, LOWER
6	1	65037-01-PB	TUBE AS. (9 FT)
7	1	65050-07-PK	END GROUP, UPPER
8	1	65192-01	SPOUT, MOLDED
*	1	65171-02	BELT AS. 9'
*	1	60122-01-PB	SIDE, HOPPER EXT LH
*	1	60122-02-PB	SIDE, HOPPER EXT RH
*	1	60122-03-PB	END, HOPPER EXT
			* ITEM NOT SHOWN

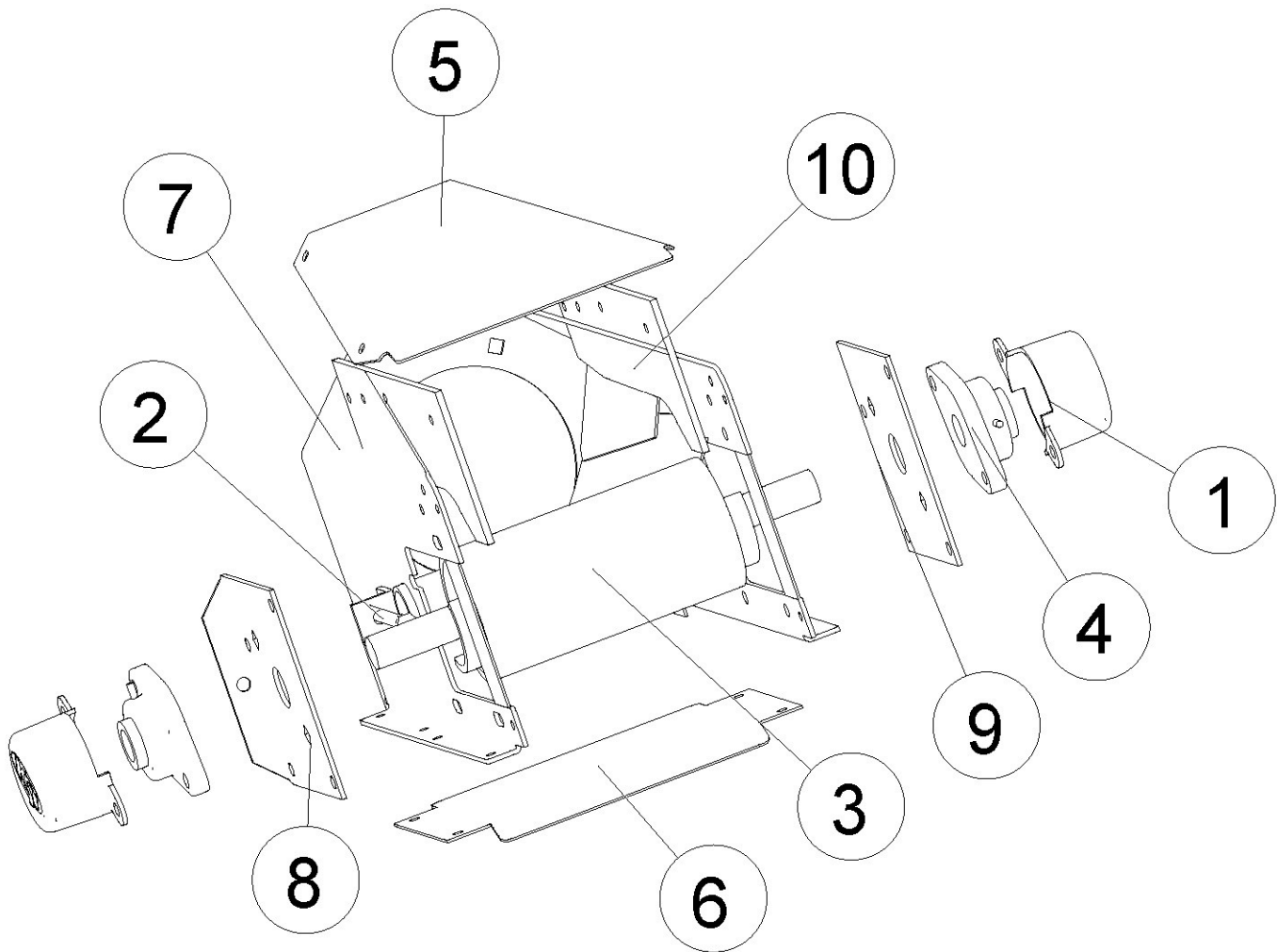
**65020-13-PK  
LOWER END GROUP**





ITM	QTY	PART NO.	NAME
1	1	23150-04	COVER, 1" BEARING
2	2	24114-01	NUT, SQUARE (5/8)
3	2	24115-01	SCREW, TENSIONING (5/8")
4	1	24333-00	DRUM AS., TOP
5	2	24336-01	BEARING HOLDER
6	1	24473-01	COUPLER
7	1	60370-02-PB	COVER
8	2	60480-01-PB	PLATE, BEARING
9	1	60590-01-PB	BRACKET, FLAP
10	1	60590-02-PB	BRACKET, FLAP
11	1	60741-01-PB	MOTOR MOUNT (HYD)
12	1	65010-00-PB	LOWER HOUSING AS.
13	1	65090-01-PB	DOOR AS.
14	2	65100-00-PB	SLIDE AS.
15	1	65140-01	BOTTOM FLAP
16	1	65140-02	BOTTOM FLAP

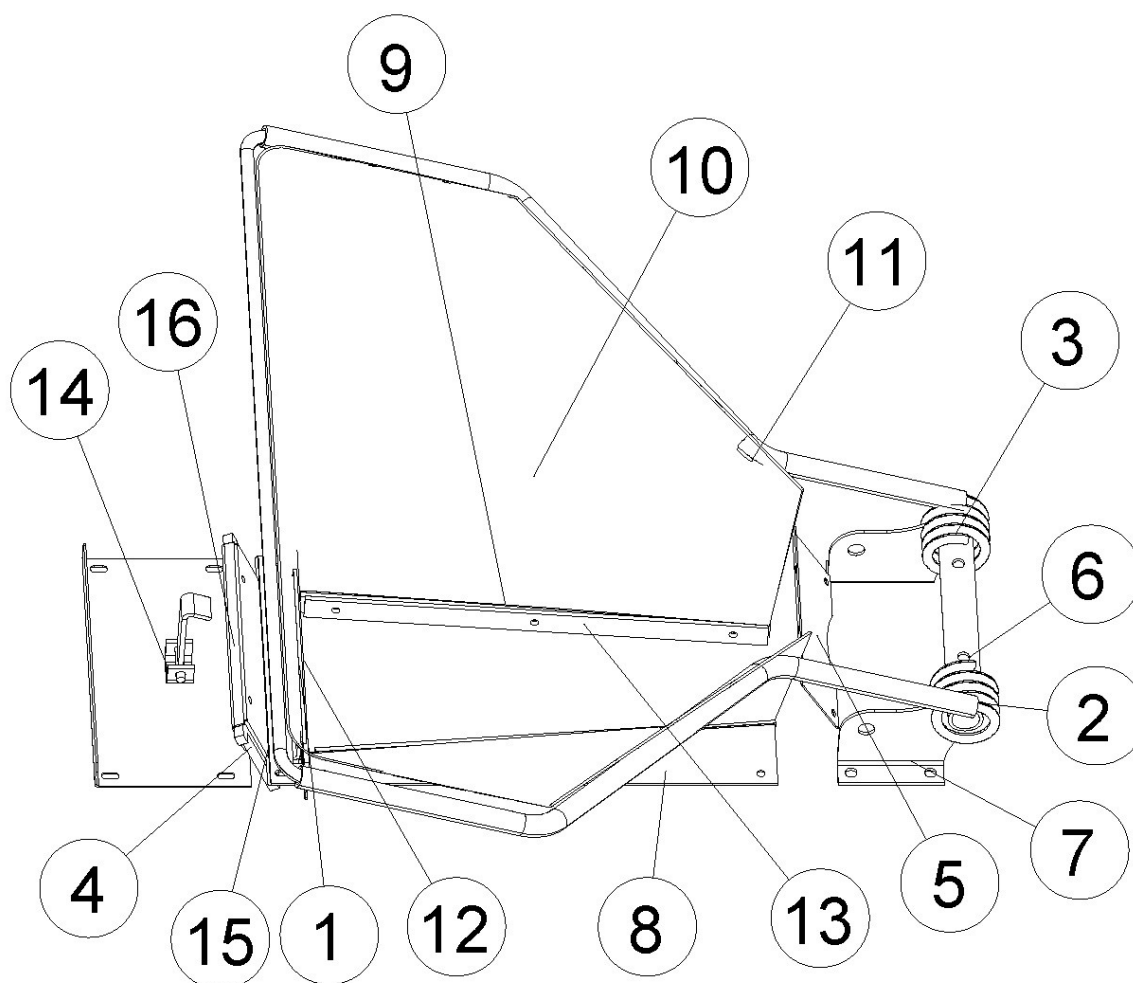
**65050-07-PK  
UPPER END GROUP**



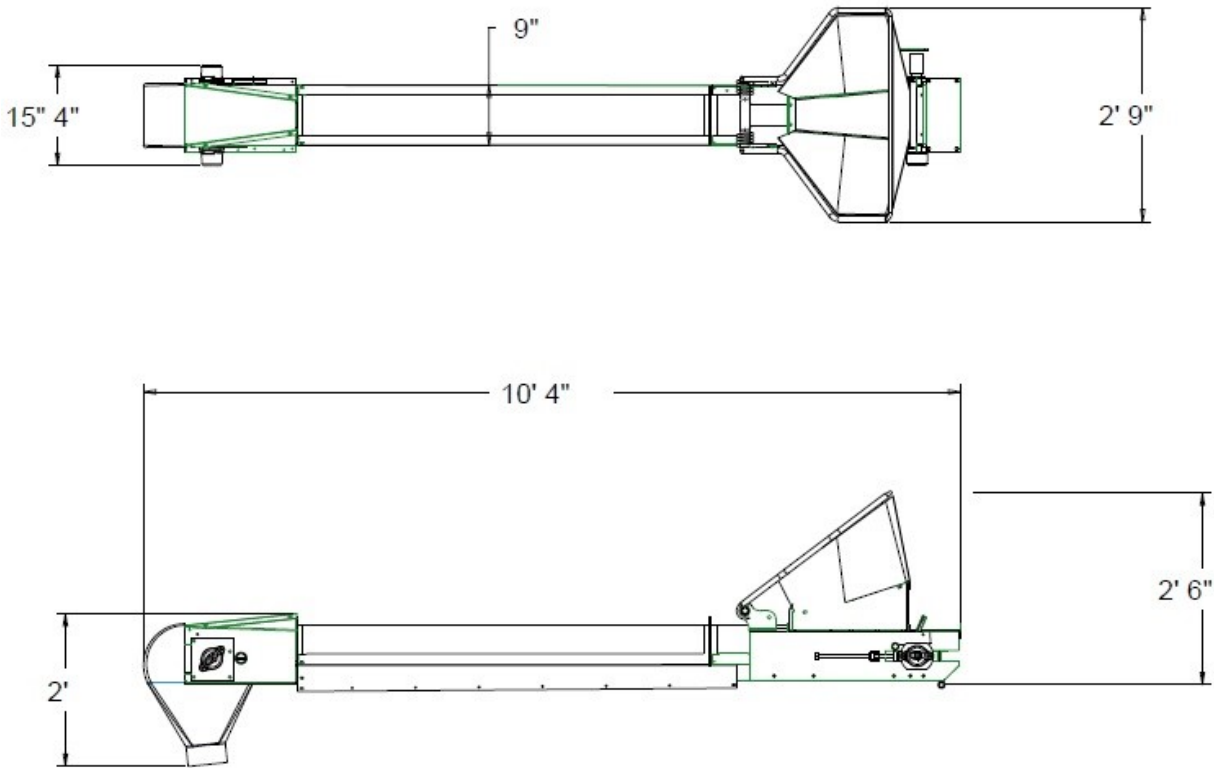
ITM	QTY	PART NO.	NAME
1	2	23150-04	COVER, 1" BEARING
2	1	24208-01	TAP BOLT (3/8 X 5)
3	1	24334-00	DRUM AS.
4	2	24336-01	BEARING, 1"
5	1	60140-01-PB	TOP COVER
6	1	60340-01-PB	BOTTOM COVER
7	1	65040-00-PB	UPPER HOUSING AS.
8	1	65070-00-PB	BEARING HOLDER AS. (LH)
9	1	65080-00-PB	BEARING HOLDER AS. (RH)
10	2	65130-01	6" TOP FLAP

### 60112-03-PB COLLAPSIBLE HOPPER GROUP

ITM	QTY	PART NO.	NAME
1	1	23122-05	BRUSH FLAP, 6"
2	1	24159-03	SPRING, LH
3	1	24160-03	SPRING, RH
4	1	24363-01	BRUSH (6")
5	1	60068-01-PB	SHIELD, HOPPER
6	1	60114-00-PB	TUBE & BRACKET AS.
7	1	60114-03-PB	BRACKET
8	1	60115-01-PB	BRACKET, CANVAS (LH)
9	1	60115-02-PB	BRACKET, CANVAS (RH)
10	1	60117-01	CANVAS, ZIPPERED
11	1	60118-00-PB	HOOP AS.
12	1	60119-01-PB	PLATE, CLAMPING
13	2	60121-01-PB	PLATE, CANVAS
14	1	60370-00-PB	COVER, TOP W/HOLD DOWN
15	1	60380-00-PB	BRUSH/FLOWGUARD SUPPORT
16	1	60380-03-PB	CLAMP, BRUSH



GENERAL DIMENSIONS



## Specifications

### 1. Capacity

A. The capacities of conveyors varies greatly under varying conditions. The following factors play a role in the performance of the conveyor:

- Speed of belt
- Moisture content
- Amounts of foreign matter
- Methods of feeding
- Different materials

B. Under normal conditions, capacity is 500 bu/hr.

### 2. Length

9ft

### 3. Drive Unit

Hydraulic Motor

### 4. Belt

Width: 8 in.

Surface: 1.25" cleats

### 5. Speed

Standard belt speed is 400 FPM (feet per minute).

or

-21 revolutions of belt per minute.

**Bolt torque specifications**

Proper torquing of bolts, cap screws, studs, and nuts is very important when assembling or installing any component on a machine. The chart below lists bolt torques for most popular sizes of bolts. The chart also applies to tightening studs or tightening nuts. Refer to the chart whenever a bolt must be tightened on a machine.

Two columns of figures are shown for each type of bolt, dry and lubricated. The “dry” column would cover bolts as the come from the package or bolts with no external lubrication applied. The second column covers bolts externally lubricated with oil, white lead, anti-seize, graphite, etc. This column should also be used to tighten bolts that are being loctite applied.

Diameter No. Threads	Grade 8				Grade 5			
	Dry Torque		Lub. Torque		Dry Torque		Lub. Torque	
	lbf-ft	N-m	lbf-ft	N-m	lbf-ft	N-m	lbf-ft	N-m
4-40	12	1	9	1	8	0.9	6	0.6
6-32	23	2	17	1	16	1	12	1
8-32	41	4	31	3	30	3	22	2
10-24	60	6	45	5	43	4	32	3
1/4-20	144	16	108	12	96	10	75	8
	lbf-ft	N-m	lbf-ft	N-m	lbf-ft	N-m	lbf-ft	N-m
5/16-18	25	33	18	24	17	23	13	17
3/8-16	45	61	35	47	30	40	23	31
7/16-14	70	94	55	74	50	67	35	47
1/2-13	110	149	80	108	75	101	55	74
9/16-12	150	203	110	149	110	149	80	108
5/8-11	220	298	170	230	150	203	110	149
3/4-10	380	515	280	379	260	352	200	271
7/8-9	600	813	460	623	420	583	320	433
1-8	900	1,220	680	922	640	867	480	650
1 1/8-7	1,280	1,735	960	1,301	800	1,084	600	813
1 1/4-7	1,820	2,467	1,360	1,844	1,120	1,518	840	1,139
1 3/8-6	2,380	3,227	1,780	2,413	1,460	1,979	1,100	1,491
1 1/2-6	3,160	4,284	2,360	3,200	1,940	2,630	1,460	1,979

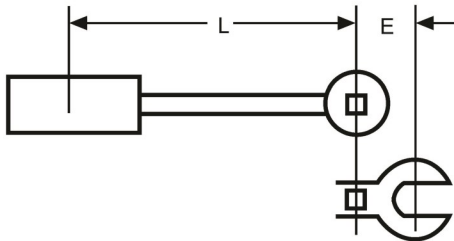
## Tightening and Torque Recommendations for Hydraulic Couplings

The art of making leak-proof connection with hydraulic couplings is to tighten the couplings properly at the time of installation. An overtightened coupling may be just as apt to leak as an under-tightened coupling. Over-tightening a coupling may result in overstressing and/or cracking.

The torque values in the following tables give the minimum and maximum torque recommendations. The minimum value will create a leak-proof seal under most conditions. Applying torque values greater than the maximum recommendation will distort and/or crack the fitting. Values listed in SAE J514 are for qualification testing only and should not be used as the basis for setting up torque values for a production environment. These need to be established based on the coupling manufacturer's recommendations.

When tightening couplings, make sure that the hose does not twist on the adapter. Twisting will shorten hose life and scar the sealing surfaces of swivel type couplings (JIC, 45°, etc.), which can create leaks. For straight couplings, use a torque wrench on the hex, swivel, nut and a standard, box, wrench on the stem hex. Bent tube couplings can be restrained by holding onto the ferrule. When a crowsfoot wrench is used with a torque wrench, adjustments to the torque readings must be made otherwise overtightening will occur. The distance E, as shown below, from the center of the drive socket to the center of the crowsfoot must be added to the torque value reading.

The following equation can be used to make these adjustments:



Actual Torque =  $\frac{E+L}{L} \times (\text{Torque Wrench Reading})$ , where

- L is in inches
- E is in inches
- Torque is in lb.-in., lb.-ft, or Newton-Meters

An example of using this equation is shown below:

Torque wrench reading = 45 lb.-ft.

E = 1.5 inches

L = 12 inches

Actual Torque =  $\frac{1.5+12}{12} \times (45) = 50.6 \text{ lb.-ft}$

This example shows that the actual torque is approximately 10% higher than the reading indicates. All torque recommendations are based on dry threads. If oil or thread sealant is used, the maximum recommended torque values could be decreased by as much as 25%.

We do recommend lubricating all O-rings prior to insertion into flange head and ORS grooves. This will minimize the possibility of nicking the O-ring when it is installed. The torque values obtained from tightening pipe threads can vary considerably, depending on the conditions of the threads. Adequate sealing can occur at values much lower than the maximum values listed in the chart. However, the minimum torque values must be used to obtain adequate sealing.



## Coupling & Adapter Installation Torque Recommendation — Continued

For 37° & 45° (Machined or Flared) and MegaSeal®

Size		Steel				Brass			
Dash	Fractional (In.)	Ft. Lbs. Min.	Ft. Lbs. Max.	Newton-Meters Min.	Newton-Meters Max.	Ft. Lbs. Min.	Ft. Lbs. Max.	Newton-Meters Min.	Newton-Meters Max.
-4	1/4	10	11	13	15	5	6	6-3/4	9
-5	5/16	13	15	18	20	7	9	10	13
-6	3/8	17	19	23	26	12	15	17	20
-8	1/2	34	38	47	52	20	24	27-2/3	33
-10	5/8	50	56	69	76	34	40	46-1/3	55
-12	3/4	70	78	96	106	53	60	72-1/3	82
-16	1	94	104	127	141	74	82	100-1/2	111
-20	1-1/4	124	138	169	188	75	83	101-1/2	113
-24	1-1/2	156	173	212	235	79	87	107	118
-32	2	219	243	296	329	158	175	214	237

For Flat-Face "O" Ring Seal (Steel)

Size		Ft.-Lbs.		Newton-Meters	
Dash	Fractional (In.)	Min.	Max.	Min.	Max.
-4	1/4	10	12	14	16
-6	3/8	18	20	24	27
-8	1/2	32	40	43	54
-10	5/8	46	56	60	75
-12	3/4	65	80	90	110
-14	7/8	65	80	90	110
-16	1	92	105	125	240
-20	1-1/4	125	140	170	190
-24	1-1/2	150	180	200	245

For SAE O-Ring Boss (Steel) & Gates Adapterless

Size		Ft.Lbs. Working Pressures 4,000 psi (27.5 Mpa) and below		Newton-Meters Working Pressures 4,000 psi (27.5 Mpa) and below		Ft.Lbs. Working Pressures Above 4,000 psi (27.5 Mpa)		Newton-Meters Working Pressures Above 4,000 psi (27.5 Mpa)	
Dash	Fractional (In.)	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
-3	3/16	—	—	—	—	8	10	11	13
-4	1/4	14	16	20	22	14	16	20	22
-5	5/16	—	—	—	—	18	20	24	27
-6	3/8	24	26	33	35	24	26	33	35
-8	1/2	37	44	50	60	50	60	68	78
-10	5/8	50	60	68	81	72	80	98	110
-12	3/4	75	83	101-1/2	113	125	135	170	183
-14	7/8	—	—	—	—	160	180	215	245
-16	1	111	125	150	170	200	220	270	300
-20	1-1/4	133	152	180	206	210	280	285	380
-24	1-1/2	156	184	212	250	270	360	370	490

For BSP 30° Inverted Cone

Size		Ft.-Lbs.		Newton-Meters	
Dash	Fractional (In.)	Min.	Max.	Min.	Max.
-2	1/8	7	9	9	12
-4	1/4	11	18	15	24
-6	3/8	19	28	26	38
-8	1/2	30	36	41	49
-10	5/8	37	44	50	60
-12	3/4	50	60	68	81
-16	1	79	95	107	129
-20	1-1/4	127	152	172	206
-24	1-1/2	167	190	226	258
-32	2	262	314	355	426

For DIN 2353 12°, 30° and Universal Inverted Cone

Size		Ft.-Lbs.		Newton-Meters	
Light Series Tube O.D. (mm)	Heavy Series Tube O.D. (mm)	Min.	Max.	Min.	Max.
-6	—	7	15	10	20
-8	—	15	26	20	35
-10	-8	18	30	25	40
-12	-10	22	33	30	45
-14	-12	26	37	35	50
-15	-14	30	52	40	70
—	-16	30	52	40	70
-18	—	44	74	60	100
-22	-20	59	89	80	120
-28	-25	74	111	100	150
—	-30	74	162	150	220
-35	—	133	184	180	250
-42	-38	148	221	200	300

Maximum Recommended Torque for Dry NPTF (Tapered) Pipe Threads\*

Size	Ft.-Lbs.	Newton-Meters
-2	20	25
-4	25	35
-6	35	45
-8	45	60
-12	55	75
-16	65	90
-20	80	110
-24	95	130
-32	120	160

**\*NOTES:**

- The torque values obtained from tightening pipe threads can vary considerably depending on thread condition. Adequate sealing can occur at values much lower than the maximum values listed above. Only enough torque to achieve adequate sealing should be used.
- When using a male tapered pipe thread with a female straight or parallel pipe thread, maximum values are 50% of those listed in the table.
- If thread sealant is used, maximum values shown should be decreased by 25%.

For 4-Bolt Flange Connections

Bolt Size	Line Size	Torque Nm	Torque Lb-Ft
.31	-8	23	17
.38	-12	35	26
.44	-16	58	43
.50	-20	88	65
.63	-24	176	130
.75	-32	298	220

- The 4-bolt flange seal is a face seal. The shoulder which contains the seal must fit squarely against the mating surface and be held there with even tension on all bolts.
- Torque values apply to plated bolts and bolts with light engine oil.
- Lubricate o-ring with a light oil (SAE 10W or 20W) before assembly.
- Finger tighten all four bolts making sure the flange and fitting shoulder are started square.
- Tighten all bolts evenly by partially tightening each bolt as shown in the figure below and repeating the sequence until all bolts are tightened to the specific torque in the table.

