# GM 170


**WARNING** READ AND UNDERSTAND THIS MANUAL BEFORE OPERATING THIS EQUIPMENT

**UNSAFE OPERATION OR MAINTENANCE OF THIS EQUIPMENT CAN RESULT IN SERIOUS INJURY OR DEATH**

# OPERATOR'S MANUAL AND PARTS LIST

HSMFG0106

Manufactured By

H&S MANUFACTURING CO.,INC.

P.O. BOX 768 (715) 387-3414 FAX (715) 384-5463

MARSHFIELD, WISCONSIN 54449

# H&S GM 170
# OPERATOR'S & PARTS MANUAL

## CONTENTS

# WARRANTY

**H & S WARRANTY**

H & S Manufacturing Co., Inc. ("H & S") warrants this product to be free from defect in material and workmanship. Except as noted below, this warranty term is twelve (12) months from the date of delivery of the product to the original purchaser by an authorized H & S dealer. Under this warranty , H & S will repair or replace, at its option, any covered part which is found to be defective in material or workmanship during the applicable warranty term. In no case will the covered repair cost of a part or parts exceed the replacement cost of that part. Warranty service must be performed by H & S or a dealer authorized by H & S to sell and/or service the product involved, which will use only new or remanufactured parts or components furnished by H & S. This warranty includes approved parts and labor to fix the product but does not include, and the purchaser is responsible for, any service call and/or transportation of the product to and from the dealer's place of business, for any premium charged for overtime labor requested by the purchaser, and for any service work not directly related to any defect covered under this warranty. This warranty includes only those components of the product manufactured by H & S. Warranty for any component not manufactured by H & S including, but not limited to, engines, batteries, tires, rims, hydraulic motors, pumps, etc. are covered by the warranty, if any, provided separately by their respective manufacturers.

This warranty in all its parts, is extended solely to the original purchaser of the product, is terminated upon any subsequent transfer or sale from or by the original purchaser and extends no third party benefits or rights whatsoever.

The warranty term for any product used in any commercial, custom, for hire or rental application, is limited to six (6) months from the date of delivery of the product to the original purchaser by an authorized H & S dealer.

Polybonded (polyethylene and plywood) panels utilized in H & S Manure Spreaders are warrantied, to the original purchaser, to not wear through and the polyethylene overlay to not tear free of the plywood for the functional life of the spreader. This specific warranty on polybonded panels includes only replacement of any defective panel part without any allowance for labor beyond the terms of the general warranty (12 or 6 months), and is further limited to manure spreaders used to spread normal agicultural manure.

This warranty does not include: (1) Any product that has been altered or modified in ways not approved by H & S; (2) Depreciation or damage caused by normal wear, misuse, improper or insufficient maintenance, improper operation, accident or failure to follow the product Operator's Manual recommendations and product decal recommendations; (3) Normal maintenance parts and service; (4) Repairs made with parts other than those available from H & S or performed by anyone other than H & S or a dealer authorized by H & S to sell and/or service the product involved.

To secure warranty service the purchaser must report the product defect to a dealer authorized by H & S to sell and/or service the product involved within the applicable warranty term together with evidence of the warranty start date and make the product available to that dealer within a reasonable period of time.

**THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY.** H & S and the companies affiliated with it makes no warranties, representations, or promises, express or implied, as to the performance or freedom from defect of its products other than those set forth above and **NO IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS OR FITNESS FOR A PARTICULAR PURPOSE IS MADE. IN NO EVENT WILL THE DEALER, H&S OR ANY COMPANY AFFILIATED WITH H&S BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.** The **ONLY REMEDY** the purchaser has in connection with the breach of performance of any warranty on H & S products are those set forth above.

The selling dealer has no authority to make any representation or promise on behalf of H & S, or to modify the terms or limitations of this warranty in any way.

2/04

**FILL OUT AND MAIL IMMEDIATELY TO MAKE WARRANTY EFFECTIVE**

## WARRANTY REGISTRATION

Date of Purchase _____

Purchaser _____ Address _____

City _____ State _____ Zip _____

Product _____ Model# _____ Serial# _____

Dealer _____ Address _____

City _____ State _____ Zip _____

_____
Signature of Original Buyer

**IMPORTANT!**

Tear on dotted line, provide the information requested on the card. The H&S Warranty is valid **"only"** after this card is received and recorded at H&S Mfg. Co. Mail at once. No postage is required in the U.S.A.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

**BUSINESS REPLY MAIL**
FIRST CLASS MAIL Permit No.195 Marshfield, WI 54449

POSTAGE WILL BE PAID BY ADDRESSEE

**H&S Manufacturing Co., Inc.**
**PO Box 768**
**Marshfield, WI 54449-9963**

# H&S DEALER PRE-DELIVERY CHECK LIST

### AFTER COMPLETION, DEALER SHOULD REMOVE AND RETAIN FOR RECORDS

After the 170 Grinder-Mixer has been completely set-up, check to be certain it is in correct operating order before delivering to the customer. The following is a list of points to inspect. Check off each item as you have made the proper adjustments and found the item operating satisfactorily.

- ❑ Grinder-Mixer was not damaged in shipment. Check for dents and loose or missing parts. Report damage immediately to H&S Manufacturing Co., Inc.
- ❑ All bolts and fasteners are tight.
- ❑ Mixer has been correctly assembled according to instructions in this manual. Wheel nuts and all other fasteners are tightly secured.
- ❑ All grease fittings have been lubricated.The transmission and cyclonic reservoir are filled to proper levels. See Lubrication Chapter of this manual for details.
- ❑ Hydraulic pump, motors, hoses and fittings are properly attached.
- ❑ Guards and shields are secure.
- ❑ Screens fit properly into the mill and the mill cover closes and latches tightly.
- ❑ Wheels are properly mounted.
- ❑ Tires are inflated to 80 PSI (563 kpa).
- ❑ Belts are properly adjusted.
- ❑ Rear Drive Chain tension is properly adjusted. See Adjustment Chapter of this manual.
- ❑ Discharge auger door operates smoothly.
- ❑ Decals are in place and legible.
- ❑ Lights and wiring functioning properly if applicable.

**Connect the Mixer onto a proper horsepower 540 RPM or 1000 RPM (if applicable) tractor and attach the PTO. Connect the scale and lights if applicable. Run the Grinder-Mixer and make sure all components operate properly.**

- ❑ PTO guard turns freely.
- ❑ Hydraulic system does not leak under pressure.
- ❑ Electronic Scale (if provided) operates properly.
- ❑ Implement and all components are functioning properly.

(Remove Dealer File Copy At Perforation)

# H&S DEALER PRE-DELIVERY CHECK LIST(CONT.)

**AFTER COMPLETION, DEALER SHOULD REMOVE AND RETAIN FOR RECORDS**

## SWINGING INTAKE AUGER (SIA)(if applicable)

- ❑ Guards, shields, and attaching hardware are in place and properly secured.
- ❑ SIA lifting, locking and supporting mechanisms function correctly. Counter-balance spring and brake are properly adjusted. See Adjustments Chapter of this manual.
- ❑ Transport lock mechanism engages and disengages correctly. Safety locking clip is attached to the transport bracket.
- ❑ Hydraulic motor and speed control levers operate properly during operation.
- ❑ Decals are in place and legible.

_____
Model Number

_____
(Dealer's Name)

_____
Serial Number

_____ _____
(Signature of Pre-Delivery Inspector) (Inspection Date)

(Remove Dealer File Copy At Perforation)

## DEALER DELIVERY CHECK LIST

This check list that follows is an important reminder of valuable information that should be passed on to the customer at the time this machine is delivered.

Check off each item as you explain it to the customer.

This delivery check list, when properly filled out and signed assures the customer that the Pre-delivery service was satisfactorily performed.

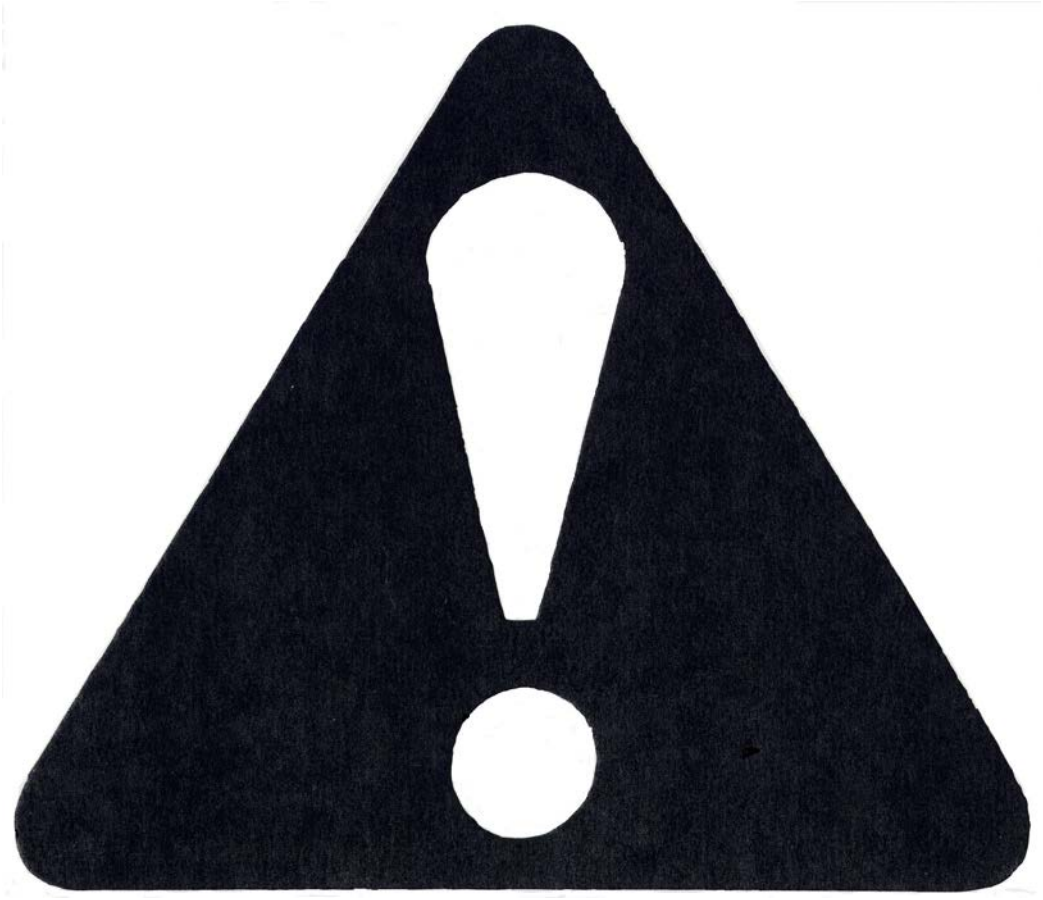
- ❑ Explain to the customer that the pre-delivery inspection was made.
- ❑ Explain to the customer all the safety precautions they must excercise when operating this unit.
- ❑ Explain to customer that regular lubrication is required for proper operation and long life of machine. Show customer the Lubrication Chapter of the Operator's Manual.
- ❑ Explain to customer that drain plugs must be installed before operating of grinder- mixer.
- ❑ Give the customer Operator's Manual and make sure they read and understand all operating and service instructions.
- ❑ Record model and serial number on this page and page 50 of this Manual.
- ❑ Have customer sign a completed "Warranty Registration," and mail it promptly.

Date Delivered _____ Dealer's Name _____

_____ By _____
Signature of Original Buyer

Note: Warranty is not valid until warranty card is completed and returned to H & S Mfg. Co., Inc.

## SAFETY INFORMATION



# BE ALERT!

## YOUR SAFETY IS INVOLVED.

**THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR PERSONAL SAFETY IS INVOLVED. TAKE TIME TO BE CAREFUL. REMEMBER: THE CAREFUL OPERATOR IS THE BEST OPERATOR. MOST ACCIDENTS ARE CAUSED BY HUMAN ERROR. CERTAIN PRECAUTIONS MUST BE OBSERVED TO PREVENT THE POSSIBILITY OF INJURY OR DAMAGE.**

**TRACTORS**
**This operator's manual uses the term "Tractor" when identifying the power source.**

# H & S MANUFACTURING CO. INC.

# SAFETY INFORMATION

## RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

## UNDERSTAND SIGNAL WORDS


A signal word- DANGER, WARNING, or CAUTION - is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs.

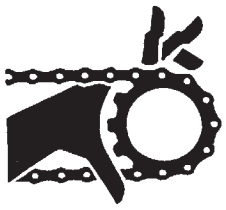

## FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual, and all safety signs on your machine. Follow all recommended precautions and safe operating procedures.

Keep signs in good condition. Immediately replace any missing or damaged signs.

# SAFETY INFORMATION

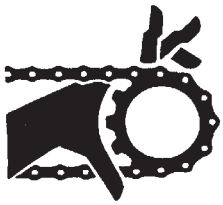
**⚠ WARNING**



DO NOT CLEAN
OR WORK ON THIS
MACHINE WITHOUT
FIRST DISENGAGING
POWER AND
SHUTTING OFF
TRACTOR ENGINE.
1494J

**⚠ DANGER**

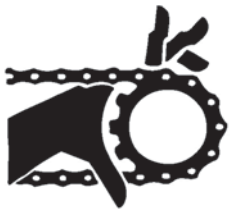
SHUT ENGINE COMPLETELY OFF BEFORE
ADJUSTING OR SERVICING MACHINE.
MACHINE MAY START UNEXPECTEDLY
FAILURE TO HEED THIS WARNING MAY RESULT
IN PERSONAL INJURY OR DEATH 3398C


1494A

**⚠ WARNING**

DO NOT OPERATE
THIS EQUIPMENT
IF THIS DECAL IS
EXPOSED.
REPLACE SAFETY
SHIELDS.

**⚠ WARNING**



DO NOT
REMOVE
SHIELDS

MOVING
PARTS
INSIDE
1494K

**H&S**

**GM 170**

82407

**⚠ DANGER**

ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY!

DO NOT OPERATE WITHOUT-

- ALL DRIVELINE, TRACTOR AND EQUIPMENT SHIELDS IN PLACE.
- DRIVELINES SECURELY ATTACHED AT BOTH ENDS.
- DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE.

1494L

**⚠ PULL TO STOP** 120-2177

**⚠ DANGER**

MAINTAIN SAFE CLEARANCE FROM ELECTRIC POWER LINES AND AVOID CONTACT WITH ANY ELECTRICALLY CHARGED CONDUCTOR.

CONTACT WITH ELECTRIC POWER SOURCES CAN RESULT IN ELECTRICAL SHOCK OR ELECTROCUTION.

FAILURE TO HEED THIS WARNING MAY RESULT IN SERIOUS INJURY OR DEATH.

1494P

**SHEAR BOLTS**

REMOVE BROKEN SHEAR
BOLT BEFORE REPLACING

112-11176

# SAFETY INFORMATION

**WARNING**

DO NOT OPERATE
THIS EQUIPMENT
IF THIS DECAL IS
EXPOSED.
REPLACE SAFETY
SHIELDS.

32597A

**WARNING**

**CRUSHING HAZARD**

**TO PREVENT SERIOUS INJURY OR DEATH:**

**KEEP HANDS AND BODY OUT OF HITCH AREA WHEN ATTACHING TOWING VEHICLE.**

**KEEP BODY CLEAR OF CRUSH POINT BETWEEN TOWING VEHICLE AND LOAD.**

**KEEP FEET AND LEGS CLEAR FROM UNDER TONGUE AREA IN CASE OF POSSIBLE JACK FAILURE.**

82602

**WARNING**

**HELP AVOID INJURY**

- READ & UNDERSTAND THE OPERATORS MANUAL PROVIDED WITH THIS MACHINE. IF MISPLACED CALL H & S MANUFACTURING AT **715-387-3414** WITH MODEL AND SERIAL NUMBER.
- UNDERSTAND ALL SAFETY WARNINGS AND FUNCTION OF CONTROLS.
- KEEP SAFETY DEVICES IN PLACE AND WORKING.
- KEEP YOURSELF AND OTHERS WELL CLEAR OF MOVING PARTS.
- DISCONNECT ALL POWER BEFORE SERVICING OR CLEANING THIS MACHINE.
- DO NOT EXCEED 20 MPH

72203A

**WARNING!**

**KEEP CHILDREN AWAY AT ALL TIMES!**

2495

**WARNING**

**DO NOT GO NEAR LEAKS**

- High pressure oil easily punctures skin causing serious injury, gangrene or death.
- If injured, seek emergency medical help. Immediate surgery is required to remove oil.
- Do not use finger or skin to check for leaks.
- Lower load or relieve hydraulic pressure before loosening fittings.

11599

82907A

**WARNING**

**STAY CLEAR OF DISCHARGE AUGER**

**DANGER**

**NO STEP-STAY CLEAR**

9194A

# SAFETY INFORMATION

**⚠WARNING**

**STAY CLEAR OF AUGER EXTENSION HINGE AREA**

82907B

**⚠DANGER**

82907H

**STAY CLEAR**

KEEP HANDS AND FEET AWAY FROM AUGER AT ALL TIMES FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH

**⚠DANGER**

**STAY CLEAR**

KEEP HANDS AND FEET AWAY FROM AUGER AT ALL TIMES FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH

82907C

**⚠WARNING**

**STAY CLEAR ROTATING PARTS INSIDE**

82907D

**⚠DANGER**

**NEVER ALLOW RIDERS ON THIS MACHINE**

82907L

**⚠WARNING**

**STAY CLEAR ROTATING AUGER BEHIND THIS PANEL**

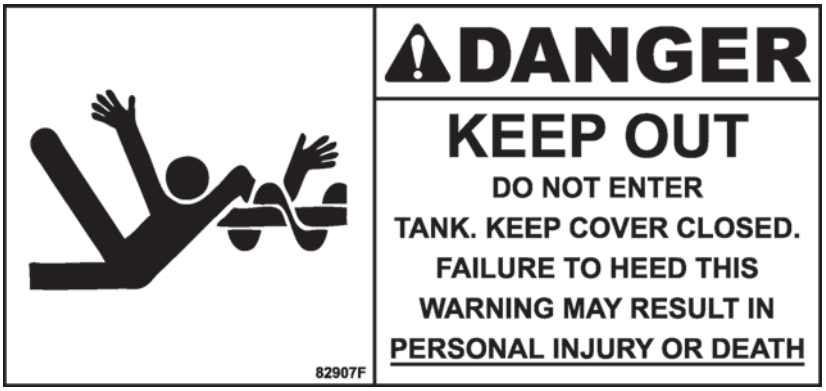
82907E

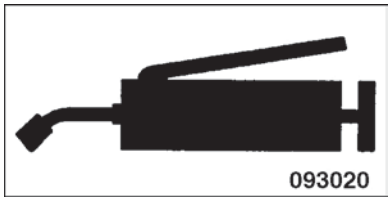
**OPEN** **CLOSE**

82907M

# SAFETY INFORMATION







135 85

125 75

115 65

105 55

95

**TRACTORS:**
**This operators manual uses the term "Tractor" when identifying the the power source.**

# WARNING

## TO PREVENT SERIOUS INJURY OR DEATH

BEFORE YOU ATTEMPT TO OPERATE THIS EQUIPMENT, READ AND STUDY THE FOLLOWING INFORMATION. IN ADDITION, MAKE SURE THAT EVERY INDIVIDUAL WHO OPERATES OR WORKS WITH THIS EQUIPMENT, WHETHER FAMILY MEMBER OR EMPLOYEE, IS FAMILIAR WITH THESE SAFETY PRECAUTIONS.

KNOW HOW TO STOP MACHINE BEFORE STARTING IT.

If the machine becomes clogged or for servicing, Stop the tractor engine, remove ignition key and allow all mechanisms to stop. Before cleaning or working on the machine, detach the PTO shaft, and completely disengage the tractor hydraulics.

**DO NOT** attempt to perform maintenance or repair with tractor running, PTO and hydraulic hoses connected to the tractor.

**DO NOT** step up on machine at any time while in operation.

**DO NOT** allow minors to operate or be near the machine.

**DO NOT ALLOW PERSONNEL OTHER THAN THE QUALIFIED OPERATOR NEAR THE MACHINE.**

**STAY CLEAR** of discharge auger when in operation.

Keep hands, feet, and clothing away from all moving parts when the Grinder-Mixer is in operation.

Loose or floppy clothing should not be worn by the operator.

Be sure the machine is clear of people, tools, and other objects before engaging PTO.

Do not step over PTO shaft: Stay clear of PTO at all times.

**NEVER** start the Grinder-Mixer until all guards and safety shields are secured in place.

Never operate Grinder-Mixer with a PTO speed greater than the recommended PTO RPM.

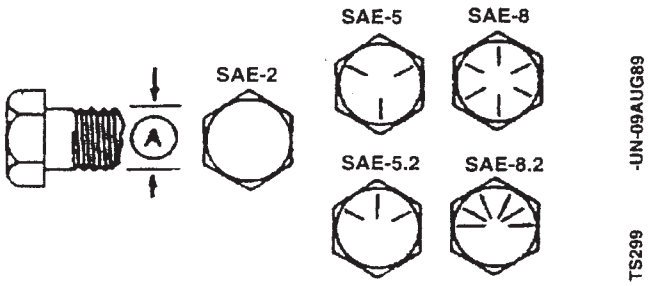
**STAY CLEAR** of hydraulic lines, they may be under extreme pressure or heat.

NEVER open or plug the water drain holes with the Mixer running.

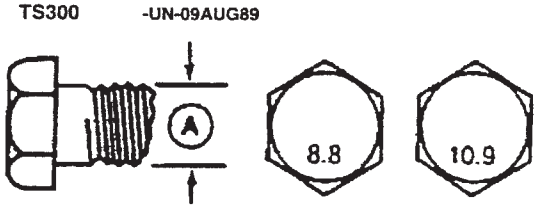
H&S Mfg. Co. always takes the operator and their safety into consideration and guards exposed moving parts for their protection. However, some areas cannot be guarded or shielded in order to assure proper operation. In addition, the operators manual and decals on the machine itself warn you of further danger and should be read and observed closely.

## Study The Above Safety Rules
## ATTENTION - BE ALERT - YOUR SAFETY IS INVOLVED

# CAP SCREW TORQUE VALUES




*Inch Cap Screw Head Markings*




*Metric Cap Screw Head Markings*

## INCH CAP SCREW TORQUE VALUES

| Bolt Diameter (A) | Wrench Size | Cap Screw Grade SAE 2 N-m | SAE 2 lb.-ft | SAE 5 N-m | SAE 5 lb.-ft | SAE 8 N-m | SAE 8 lb.-ft |
|---|---|---|---|---|---|---|---|
| 1/4" | 7/16" | 7 | (5) | 11 | (8) | 16 | (12) |
| 5/16" | 1/2" | 14 | (10) | 23 | (17) | 33 | (24) |
| 3/8" | 9/16" | 24 | (18) | 41 | (30) | 54 | (40) |
| 7/16" | 5/8" | 41 | (30) | 68 | (50) | 95 | (70) |
| 1/2" | 3/4" | 61 | (45) | 102 | (75) | 142 | (105) |
| 9/16" | 13/16" | 88 | (65) | 142 | (105) | 203 | (150) |
| 5/8" | 15/16" | 122 | (90) | 197 | (145) | 278 | (205) |
| 3/4" | 1-1/8" | 217 | (160) | 353 | (260) | 495 | (365) |
| 7/8" | 1-5/16" | 224 | (165) | 563 | (415) | 800 | (590) |
| 1" | 1-1/2" | 332 | (245) | 848 | (625) | 1193 | (880) |
| 1-1/4" | 1-7/8" | 665 | (490) | 1492 | (1100) | 2393 | (1765) |

## METRIC CAP SCREW TORQUE VALUES

| Bolt Diameter (A) | Wrench Size | Markings on Cap Screw Heads 8.8 N-m | 8.8 lb.-ft | 10.9 N-m | 10.9 lb.-ft |
|---|---|---|---|---|---|
| 5 mm | 8 mm | 6 | (4.5) | 9 | (6.5) |
| 6 mm | 10 mm | 10 | (7.5) | 15 | (11) |
| 8 mm | 13 mm | 25 | (18) | 35 | (26) |
| 10 mm | 16 mm | 50 | (37) | 75 | (55) |
| 12 mm | 18 mm | 85 | (63) | 130 | (97) |
| 16 mm | 24 mm | 215 | (159) | 315 | (232) |
| 20 mm | 30 mm | 435 | (321) | 620 | (457) |
| 24 mm | 36 mm | 750 | (553) | 1070 | (789) |
| 30 mm | 46 mm | 1495 | (1103) | 2130 | (1571) |

**CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.**

DO NOT use these values if a different torque value tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade. Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.

# PREPARING FOR OPERATION

## TRACTION CONNECTIONS

### PTO

Hook the Grinder-Mixer to the tractor drawbar, and attach the Grinder-Mixer PTO to the tractor PTO shaft locking it into position.

1. Maintain a straight alignment between the grinder-mixer and the tractor.
2. Maintain a 15-1/2" distance between the lock on the tractor PTO and hole on grinder-mixer hitch for a 540 RPM machine.
3. Maintain a 17" distance between the lock on the tractor PTO and hole on grinder-mixer hitch for a 1000 RPM machine.
4. Maintain a distance of 6"- 12" between the top of the tractor drawbar and the center of the tractor PTO. An 8" distance is standard.

### Hydraulics

The GM 170 requires a 4 hose hook-up; 2 hoses for the discharge auger lift, and 2 hoses for the discharge auger rotation.

## PREPARING MIXER

***** Properly lubricate the grinder-mixer, checking the transmission and cyclonic reservoir oil levels, and filling if necessary before operating the grinder-mixer.

* All drain plugs must be properly installed and secured.

* Follow the procedures outlined in the Operation Chapter of this manual for installing the mill screen.

* The tank lid and the discharge auger door must be closed and the cyclone cover must be open.

* Start the tractor, engage the PTO at idle speed and increase the rpm's until the grinder-mixer is running at the rated PTO speed. Begin the grinding process.

# SET-UP & ASSEMBLY

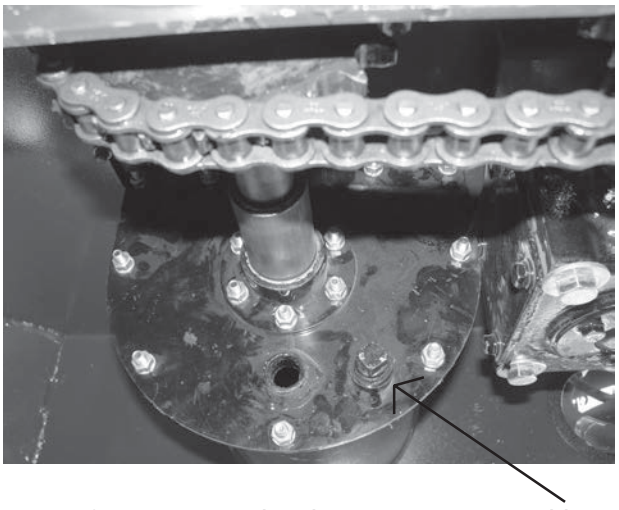
## WHEELS & TIRES

The Grinder-Mixer is shipped without the rims and tires installed on the axle hubs. Install the rims and tires, and torque the wheel nuts to 90 ft-lb (124 N-m). Inflate the 12.5L x 15 - 20 ply tires to 80 PSI (563 kpa).

## DRAIN PLUGS & DRAIN COVER

When the Grinder-Mixer is delivered, the drain plug on the back plate of the transfer auger will be in the storage position. See the diagram below for the storage position. When the GM 170 is ready for delivery, install the drain plug in the back plate of the transfer auger. If the mixer is equipped with a Swinging Intake Auger (SIA), the drain plug will also be in the storage position. Upon delivery, also install the drain plug in the drain hole in the bottom of the SIA attachment.

***IMPORTANT:*** Never open or plug the water drain holes with the mixer running.



Transfer Auger Drain Plug In Storage Position.

SIA Drain Plug In Storage Position.

## STORAGE

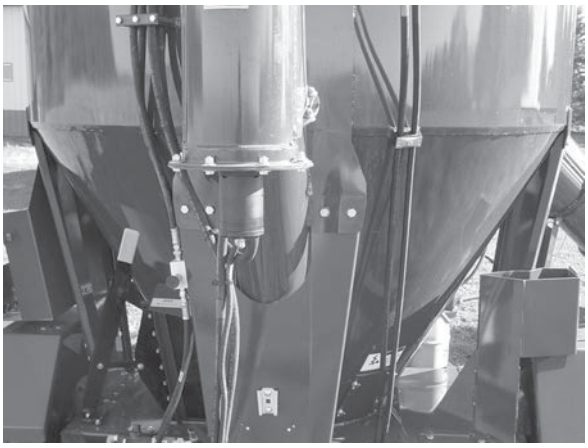
***IMPORTANT:*** *If the GM 170 is stored outside, the water drain holes must be left unplugged. Before the mixer is going to be operated, re-install the plugs. Before operating the mixer after a rain, check the several vulnerable areas for water accumulation. As necessary, drain the water before using the mixer.*

***NOTE:*** *After water has been drained from the mixer, it is advisable to run the GM 170 while empty for a period of time in an attempt to dry the mixer before grinding to eliminate any sticking of material and possible plugging.*

# TRANSPORTING

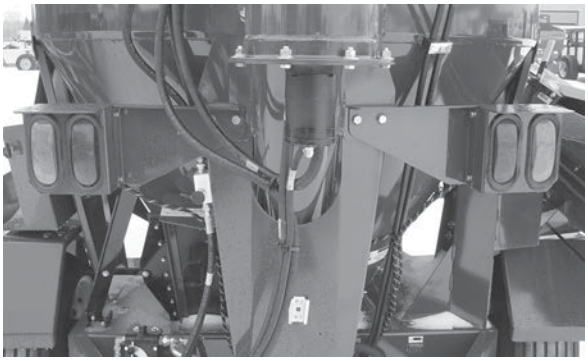
## SMV BRACKET & REFLECTORS

The grinder-mixer is equipped with a SMV bracket. Red reflector strips are located on the rear of the tank and on the SIA (if applicable).



## TRANSPORT LIGHTING

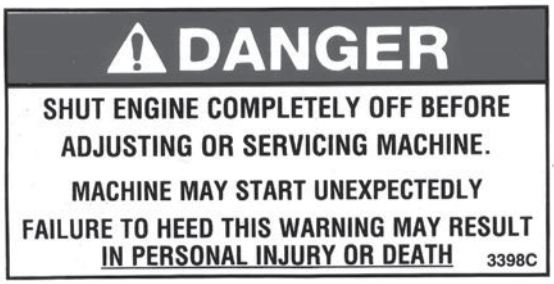
An optional highway transport lighting kit is available.



# OPERATION

## EMERGENCY SHUTDOWN

In an emergency or in case a foreign object enters the mill inlet, stop mixer operation immediately by disengaging the tractor PTO.




## GENERAL INFORMATION

Check entire unit carefully before first operation. Tighten bolts and set screws that might have come loose in shipping. Lubricate as explained in the Lubrication Chapter in this manual.

***NOTE:*** *These procedures must be done before grinding;*

*1.) Grinder mill door is closed.*

*2.) The collector cover is open,*

*2.)The tank lid is closed,*

*3.) The unloading auger shut-off door is closed.*

Operate the mixer on level ground for uniformity of mix. Maintain a straight-line alignment between the tractor and mixer to prolong the life of the drive line components.

Maintain the tractor rated PTO speed which produces a mill cylinder speed of 2700 RPM, to obtain the most efficient grind. Do not exceed a cylinder speed of 3000 RPM. Before grinding, the unloading auger shut-off door must be closed.

Add supplements after a small amount of feed has been ground, then dry granular materials.

***NOTE:*** *Do not grind feed with high moisture content. This may cause plugging. Abnormally damp crops will not feed or mix well.*

Grinding should be stopped when the feed in the windows begins to drop.

***IMPORTANT:*** *Overfilling the mixing tank will place unnecessary stress on the drive line components. Keep the tank lid closed and properly latched so that if the tank is accidentally overfilled, the lid can pop open and release the feed inside the tank.*

The two full-length windows on the tank are calibrated with numbers representing bushels of ground feed.

***NOTE:*** *Optional models of electronic scales are available for accurate weight measurements and rations.*

Stop the tractor and disengage the mill/blower drive sheave pin after grinding. Start the tractor and allow the mixer to continue running for several minutes to thoroughly mix the ground feed. Allow the mixer to continue running during transport, disengaging the PTO on corners or turns.

***IMPORTANT:*** *When transporting the mixer and mixing, disengage the tractor PTO before turning corners to prevent damage to the PTO driveline.*

# OPERATION (cont.)

## CAPACITY

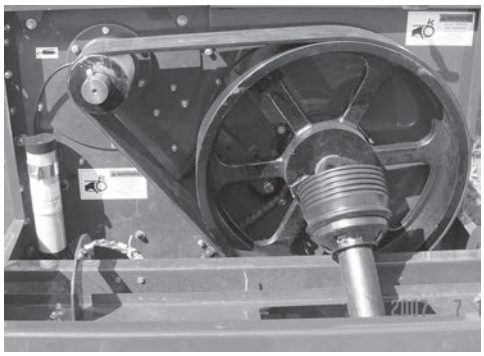

The GM 170 mixing tank capacity is 170 cubic feet or 135 bushels by volume. The tank will hold approximately 6000 to 7000 lbs of ground feed consisting of average weight corn, small grain and/or concentrates. More or less weight (per tank) is possible, depending upon whether the material that is being ground is lighter or heavier than average. Grinding capacity of the mill will vary due to the type of material being ground, the moisture content of the material, the size screen used, and the horsepower of the tractor used to operate the mixer.
The mixer is designated for operation by a 50 to 115 hp (28 to 86 kW) 540 RPM tractor or by a 50 to 145 hp (38 to 109 kW) 1000 RPM tractor.

## 540/1000 RPM PTO DRIVE

The H&S GM 170 grinder-mixer features a 540 drive as standard equipment for use with tractors up to 115hp (86kW).
An optional 1000 RPM drive is available for use with tractors up to 145hp (109 kW).

## MILL & BLOWER

### Drive Sheave

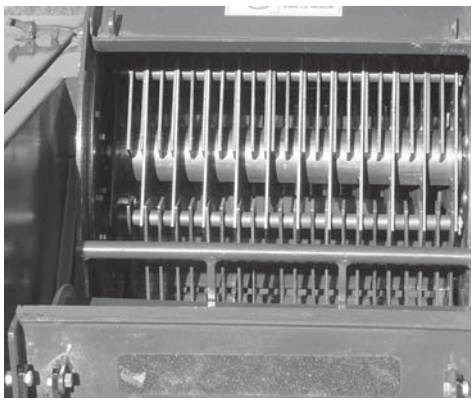


The mill/blower can be engaged or disengaged by the positioning of a pin on the sheave.

To disengage the mill/blower, grasp the pin handle, pull it forward and rotate it onto the L-shaped bracket.

***IMPORTANT:*** *When starting the Grinder-Mixer, engage the tractor PTO at a slow idle speed. Advance the throttle of the tractor to the rated PTO speed.*

### Mill & Blower Operation



Material enters the cylinder chamber through the mill inlet and is drawn into the cylinder by a vacuum below the cylinder. The vacuum below the cylinder is obtained by the physical location of the blower Inlet below the cylinder.

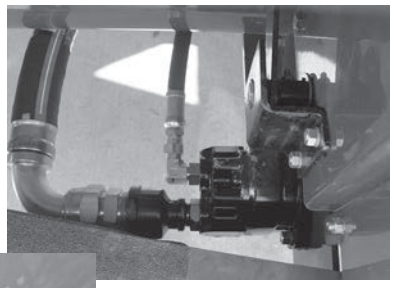
The 21” cylinder is composed of sixty-six swinging hammers which are equally divided among three rows around the cylinder. As the cylinder rotates at the recommended speed of 2700 RPM, the hammers grind the material and force it through the screen. Once through the screen, the ground material drops down to the transfer auger and is conveyed to the mixing tank. Light-weight chaff or dust is drawn into the blower inlet and forced by the blower up into the collector where it is refined and separated. Heavy particles are directed back down into the transfer auger and conveyed to the mixing tank.

# OPERATION (cont.)

## SELF-CONTAINED HYDRAULIC SYSTEM

### Hydraulic System

The mixer has a self-contained hydraulic system featuring hydraulic motor operated discharge augers and an optional hydraulic motor operated swinging intake auger attachment. The self-contained hydraulic system is composed of a pump, pressure relief valve, cyclonic reservoir and oil filter.



***Note:*** *When operating at cold temperatures, allow the hydraulic oil in the self-contained system to warm up at tractor idle speed with the PTO running prior to grinding.*

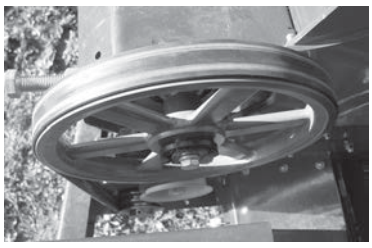
### Pressure Relief Valves

Pressure relief valves on the variable speed controls for the Swinging Intake Auger (SIA) if applicable, and discharge auger system provide overload protection for the hydraulic system. The relief valves will permit pressure build-up to a factory set value of 2800 PSI. The self-contained hydraulic system operating pressure range is normally 500 to 2000 PSI. If the SIA is stopped by a malfunction or overloading, the pressure will build up to the factory set cut-off pressure and the relief valve will open allowing oil to flow directly through the flow control and continue to the flow control for unloading augers which will continue to function. If one of the hydraulic motors of the unloading auger system is stopped by a malfunction of the component it is driving, the pressure will build-up to the factory set cut-off pressure and the relief valve will automatically stop flow throughout the entire hydraulic system. After the problem is corrected, the relief valve will automatically reset and restore oil flow to the system.


### Hydraulic Pump/Motor Drive

The GM 170 has a double sheave on the end of the main drive shaft which is connected by a double banded belt to the hydraulic pump.The pump is belt driven directly off the main drive shaft which is coupled by the telescoping drive to the tractor PTO shaft. Overload protection for the hydraulic pump is provided by a self-sdjusting spring tightener.

***IMPORTANT:*** *Stop mixer operation if drive belt slipping is detected.*



# OPERATION (cont.)

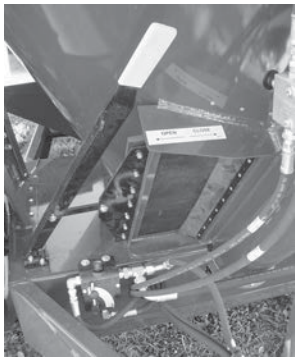
## Discharge Auger System

Ground feed from the mixing tank is discharged by an auger system consisting of three hydraulically motor driven augers that are connected in series so that all augers are synchronized as well as started and stopped together. If any motor malfunctions, the movement of material through the augers will stop immediately. The discharge auger unloads material to any point within a 300 degree radius. The length of the unloading auger is approximately 12 feet, without any extensions. By adding a 3' or 6' folding extensions, the length can be increased. A transport cradle is provided for holding the unloading auger in position during transport.

## Needle Valves

An adjustable needle valve is provided on each hose of the discharge auger rotation to control the speed of auger swing to provide smooth rotation. Needle valves are located at the rear of the machine by the hydraulic rotation motor. See the Adjustment Chapter of the manual for adjustment details.

## Discharge Auger Door & Variable Speed Valve



A variable speed valve with a pressure relief controls the hydraulic motors which operate at a single constant speed determined by the speed of the tractor PTO, or at a variable speed determined by the valve. A discharge auger shut-off door is provided to regulate the amount of feed passing into the discharge auger.

***NOTE:*** *Always activate the hydraulic variable speed control valve to engage the discharge augers before opening the discharge auger shut-off door. When the mixing tank has been unloaded, close the discharge auger shut-off door then shut-off the hydraulic variable speed control valve .*

# OPERATION (cont.)

## HYDRAULIC OPERATED ATTACHMENTS

### Swinging Intake Auger (SIA)

An optional hydraulic drive Swinging Intake Auger (SIA) attachment conveys material into the mill. The intake auger can be swung in and locked against the mixer tank support brace for transporting, or swung out and locked at any point. Operating height of the infeed hopper can be raised or lowered and held in position using the rope mechanism. The attachment is spring counterbalanced to help with lifting. The right portion of the infeed hopper folds in to reduce overall width for transporting.

### SIA Variable Speed Control Valve

Speed control handles are provided for regulation of the speed of conveyor auger rotation. Movement of any one of the three mechanically interconnected handles enables stopping and starting auger rotation as well as regulating the feeding rate of material being fed into the mill hopper. Two other convenience features on the SIA are an enclosed wind and grain shield, which is located over the discharge end of the SIA trough, and a water drain plug which is located in the bottom of the trough infeed hopper.


## GRAVITY FEEDER

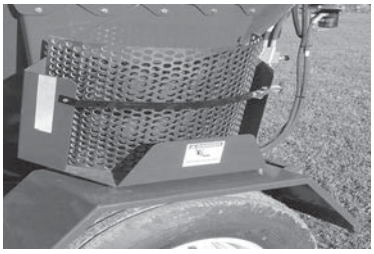
The standard equipment gravity feeder is a stationary hopper with no moving or running parts. Material to be ground is dumped into the hopper and slides directly into the mill inlet. A combination steel/rubber splash plate prevents the material which is being fed from being kicked out by the mill cylinder.

## MAGNETS

Two heavy-duty 4” x 18” magnets located in the gravity feed hopper remove any metal that may accidentally mix with the material entering the mill.

# OPERATION (cont.)

## SCREENS



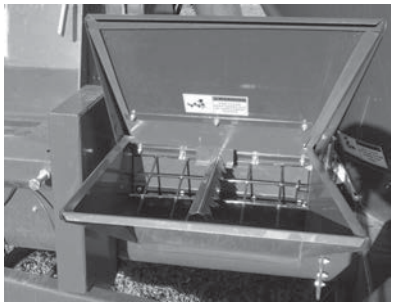
Uniformity of grinding is a factor of mill speed, condition of the hammers, and sharpness of the screen. The efficiency of the mill will also decrease if the holes of the screen are badly worn. If grinding fineness is deteriorating, the screen should be rotated to place the sharp holes edges against the direction of the cylinder rotation or the screen should be replaced. The GM 170 can be fitted with numerous screens that are available with various size holes to accommodate different material and grinding requirements. A screen storage rack is provided on the left side of the mixer.

***NOTE:*** *If a screen is correctly installed, it should fit tight against the mill throat plate and butt tightly against the mill frame hood sheet when the mill screen cover is closed and securely latched.*

The listing below are only suggested hole size recommendations for different materials;

| | | |
|---|---|---|
| Fine Grind | Small Grains; | 1/8”,3/16” |
| Medium Grind | Small Grains; | 3/16”,1/4”,5/16” |
| Coarse Grind | Small Grains; | 3/8”,1/2”,5/8” |
| Fine Grind | Shelled Corn; | 1/8”,3/16”,1/4”,5/16” |
| Medium Grind | Shelled Corn; | 3/8”,1/2”,5/8” |
| Coarse Grind | Shelled Corn; | 3/4”,1” |
| Fine Grind | Ear Corn; | 1/4”,5/16”,3/8” |
| Medium Grind | Ear Corn; | 1/2”,5/8” |
| Coarse Grind | Ear Corn; | 3/4”,1”, 1-1/4’,1-1/2” |

## SUPPLEMENT HOPPER



The cover on the supplement hopper is spring-loaded to hold it in either the open or closed position. A bag guard is provided to prevent containers from being accidentally drawn into the transfer auger. A flip-over bag breaker allows easy opening of supplement bags.

***NOTE:*** *Liquids, such as molasses, should not be poured into the grinder-mixer.*

## TANK LID

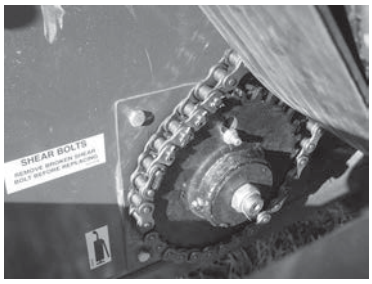
The lid on top of the mixing tank features spring-loaded latches which enables it to be forced open by overflowing material should the tank accidentally become filled beyond capacity.The tank lid will open, allowing the ground feed to spill-out to prevent damage to the mixing auger and drive components.

***IMPORTANT:*** *Stop mixer operation if the tank lid is forced open. Before restarting to grind or mix, the tank lid must be closed and the latches properly adjusted .*

# OPERATION (cont.)

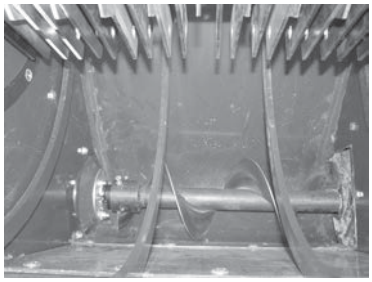
## OVERLOAD PROTECTION

### Main Drive




The GM 170 is furnished with a 5/16 x 1: Grade 5 shear bolt protecting the transfer auger drive shaft, transmission and mixing auger. When the shear bolt fails, the transfer auger and mixing auger will stop turning. Check the rear chain tightener for proper tension if this bolt shears.

### Transfer Auger



The transfer auger shear bolt is accessible only through the mill cover. This shear bolt protects the auger flighting. The transfer auger will stop rotating even though the auger/transmission drive shaft will continue to rotate if this shear bolt fails.

***IMPORTANT:*** *Stop mixer operation when either shear bolt fails.*

## UNPLUGGING

***IMPORTANT:*** *When plugging is detected, stop mixer operation.*

### Mill, Mill Drive and Mixing Tank

Overfeeding of the mill and/or the mill inlet can result in plugging, thus slipping of the miller/blower drive belt, shearing of either the auger/transmission shear bolt, or the transfer auger shear bolt. Abnormal crop conditions would include crops with high moisture content or crops that are too light or bulky which would not feed properly.

### Overfeeding

If plugging develops from overfeeding, the tractor will choke down and even stall. To remove the plugging proceed as follows:

1. Shut the tractor off, remove key, disengage the PTO, detach the PTO and hydraulic hoses from the tractor.
2. Shut off the feeder attachment.(If applicable)
3. Open the mill screen cover, remove the screen and allow the material to fall down into the transfer auger or remove material if the transfer auger is overloaded, close mill cover.
4. Disengage the mill/blower drive sheave pin.
5. Start the tractor and engage the PTO at slow speed to convey the material into the Tank.
6. Shut the tractor off and disengage the PTO.
7. Open the mill screen cover, replace the mill screen, close mill cover, engage the mill/blower drive sheave pin, and restart the tractor and PTO.
8. Bring the mill up to proper running speed and restart the feeder attachment(if applicable). If the condition of the crop remains the same, reduce the feeding speed to avoid overfeeding.

# OPERATION (cont.)

## BLOWER INLET & OUTLET

***NOTE:*** *The collector cover must always be open while grinding.*

Plugging in the blower inlet or outlet can be seen by the abnormal amount of dust particles in the air around the top of the collector, and/or the visible presence of dust in the mill throat area and/or a reduced air discharge at the top of the collector. If plugging is detected, proceed as follows:

### Blower Inlet

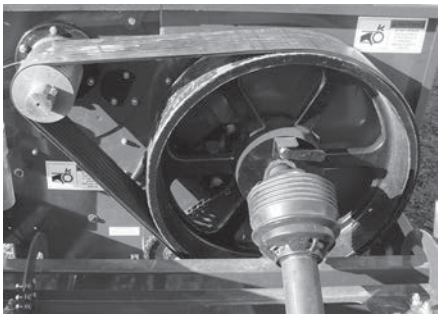
1. Stop the tractor engine, remove ignition key, allow all mechanisms to stop and disengage PTO.
2. Open the mill screen cover and remove the screen.
3. Inspect the blower inlet opening and remove any build-up.

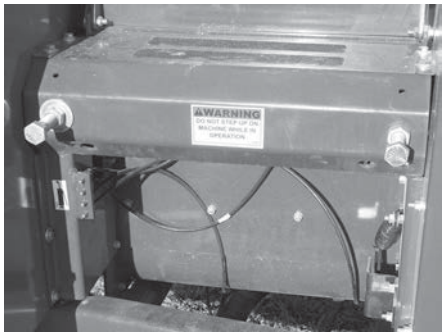
### Collector

4. If there is no air coming out the top of the collector, the plugging is in the discharge side (blower outlet). Remove and clean out the tube connected to the blower outlet. Climb the ladder and check the inside of the collector. If the cyclone is plugged, remove the pipe below the cyclone and dislodge the plugging material.
5. After the plugging has been removed, replace the screen, close and latch the mill screen cover and attempt to resume grinding.

# OPERATION (cont.)

## MILL/BLOWER DRIVE BELT SLIPPAGE






Overload protection for the mill and blower components is provided by an 8 “A” section drive belt, which connects the mill/blower driven sheave to the drive sheave. The mill and blower will gradually slow down without much reduction in tractor PTO speed if plugging develops from mill/blower drive belt slippage, and stop turning the mill/blower drive shaft if plugging or breakdown occurs in the mill or blower areas. Follow steps 1 through 8 from the previous page to remove the plugging. After the plugging has been removed, shut the tractor off, disengage the PTO, and adjust the drive belt tension to the proper tension(see Adjustment Chapter). Re-start the tractor and PTO, bring the mill cylinder up to proper operating speed and resume grinding.

***IMPORTANT:*** *Stop mixer operation if drive belt slipping is detected.*

## SHEAR BOLTS

Blockage in the mixer may cause the tractor to stall. Shut down the tractor and mixer, disconnect the PTO, and proceed as follows:

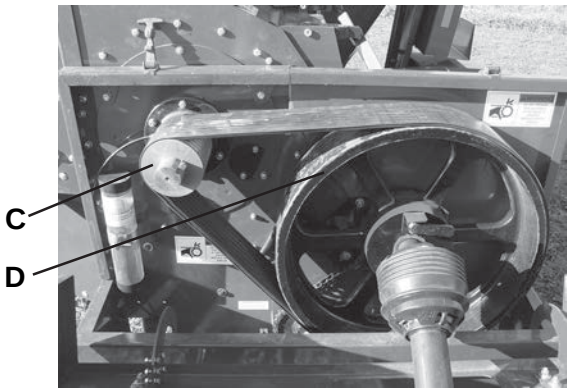
1. Open the mill screen cover and clean material out of the mill/cylinder and transfer auger area.
2. Check the auger/transmission shear bolt to determine if it has sheared. Rotate the mill drive sheave by hand to turn the sprocket, shaft and transfer auger. If the shaft does not turn, follow the shear bolt replacement procedures according to the Service Chapter in this manual.
3. If the transfer auger does not turn, the transfer auger shear bolt has failed. Refer to the Service Chapter in this manual for shear bolt replacement information.
4. After the shear bolts have been replaced, attempt to rotate the entire assembly. If rotation, in either direction, is not possible, proceed to step 5. If the sprockets and transfer auger turn but the mixing auger does not turn, proceed to step 6.
5. Check for a broken chain, drive sprocket or driven sprocket or for sheared keys which hold the sprockets. Replace any damaged parts.
6. If the items in step 5 are not at fault, remove the transmission drive chain and attempt to rotate the transmission input shaft. If the input shaft turns freely, internal transmission component failure is probable. Remove the transmission and take it to your nearest dealer for repair.

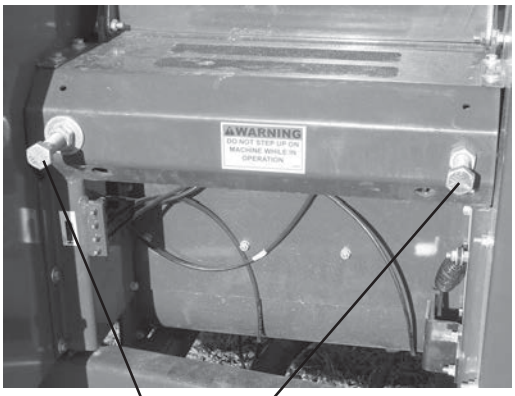
After the cause of the plugging has been corrected, restore all components, guards and shields before resuming operation according to the Service Chapter in this manual.

# ADJUSTMENTS

## MILL/BLOWER DRIVE

The combination mill/blower driven sheave is connected from the main drive sheave by an 8" “A” section banded drive belt. Adjusting bolts are provided to align the drive sheave with the driven sheave as well as to adjust the drive belt tension.




### Sheave Alignment

To align the combination mill/blower driven sheave with the driven sheave, proceed as follows:

1. Loosen both of the bolt/nut (A & B) assemblies on the main drive shaft.
2. Place a straightedge across the faces of both sheaves (C & D) to check alignment.
3. Adjust the nut on the left bolt assembly (A) and the bolt on the right side assembly (B) to bring the drive sheave into alignment with the driven sheave.
4. After proper alignment is obtained, check and adjust drive belt tension.

### Belt Tension

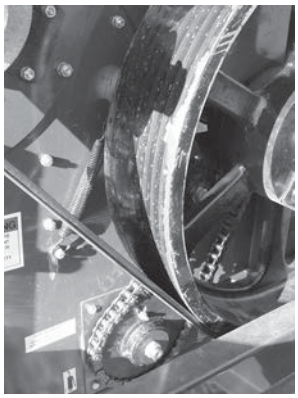
To adjust mill/blower drive belt tension, proceed as follows:

1. Check the drive belt tension initially by measuring the amount of belt deflection at the midway point between the sheaves while applying a 60 lb. of force at the midway point.
2. Adjust the nut on the left bolt assembly (A) clockwise to decrease deflection (increase tension) and adjust the right side bolt assembly (B) an equal number of turns counterclockwise to keep drive sheave in alignment with driven sheave. Adjust both sides until the deflection measures 3/8" (10 mm).
3. After proper tension is obtained, check for correct sheave alignment, retighten the lock nut on the right side bolt.

**NOTE:***A new drive belt should be adjusted for an initial tension of 3/8" (10 mm) deflection with an applied pressure of 80 lb. (360 N). Refer to the Service chapter of this manual for new belt installation procedures.*

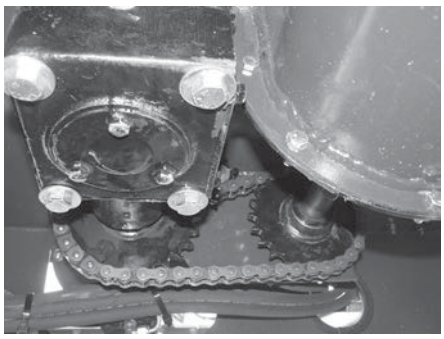
# ADJUSTMENTS (cont.)

## FRONT DRIVE CHAIN



The transfer auger/transmission shaft is driven by a sprocket which is connected by the front drive chain to a sprocket on the main drive shaft. The front chain tension is self-adjusted by a spring-loaded idler and does not require adjustment. The chain should be inspected periodically for signs of wear.

## TRANSMISSION DRIVE (REAR) DRIVE CHAIN

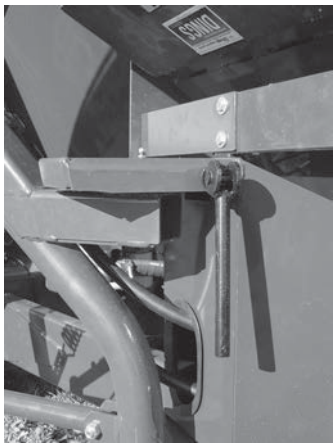


The transmission input sprocket is linked by the rear drive chain to a sprocket on the end of the transfer auger drive shaft. Chain tension can be adjusted by appropriate positioning of an idler sprocket which is attached to an adjustable bracket. Access to the idler and bracket is obtained from under the machine. Chain tension should be adjusted and maintained at a ¼" (6 mm) deflection on the strand of chain opposite the idler sprocket.

**NOTE:** *Rear chain tension should be checked periodically and properly adjusted to prevent wear and excessive noise.*

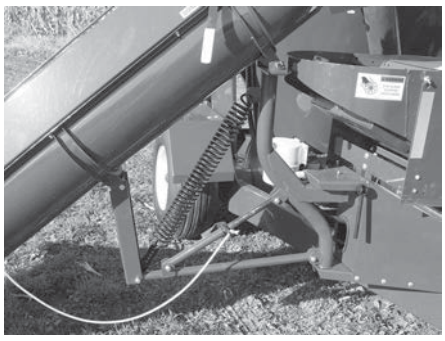
## SWINGING INTAKE AUGER ATTACHMENT

### SIA Brake Tension



A brake lever adjusts the hold and horizontal position of the swinging intake auger attachment. The brake mechanism consists of a cam-type lever-activated mechanism which is connected to a band around the attachment pivot. An adjustment bolt on the opposite end of the lever, can be turned in to tighten, or out to loosen the band around the pivot. The bolt should be adjusted so when the brake lever is at a right angle to the pivot, there is not binding or restriction when the auger is swung. When the brake lever is straight out, there should be tight clamping around the pivot and the auger is firmly held in place.

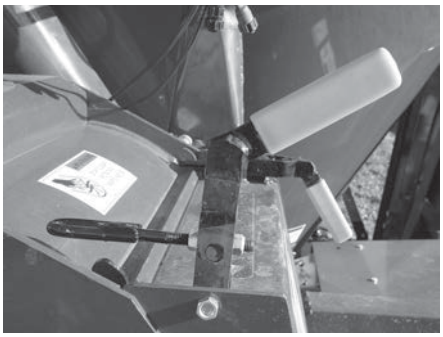
### SIA Counterbalance Spring Tension



The Swinging Intake Auger (SIA) attachment is spring counterbalanced to facilitate lifting the attachment. There are multiple holes in the spring attachment bracket to select the appropriate SIA lift tension. The spring should provide enough tension to conveniently raise the SIA and still allow the SIA to remain stationary when the intake hopper end is lowered to the ground.

# ADJUSTMENTS (cont.)

## MILL SCREEN COVER LATCHES



Over-center handle latches are used to secure the mill cover tightly closed while the mill is being operated.

Lock nuts on the bolts of the latches are used to adjust latching tension. This tension should be adjusted and maintained so that some force has to be applied on the handles to lock and unlock them. Both latch mechanisms should be adjusted equally.

## NEEDLE VALVES

An adjustable needle valve is provided on each hose of the discharge auger rotation to control the speed of auger swing to provide smooth rotation. Needle valves are located at the rear of the machine by the hydraulic rotation motor. Unlock the set screw on the valve - adjust each valve by dialing it left or right to decrease or increase auger rotation speed. After the speed has been set, lock the set screw down.

## TANK LID

The tank lid on top of the mixing tank is designed to be self-unlatching in the event that the mixing tank accidentally becomes overfilled. The latching mechanism should be properly adjusted by the latch nut to maintain proper tension on the lid to keep it closed and weather-tight, but still allow it to be forced open from the inside of the tank by overflowing material. If the latch handle can be pulled straight up approximately ½" (12 mm), completely compressing the spring, tension is correct.

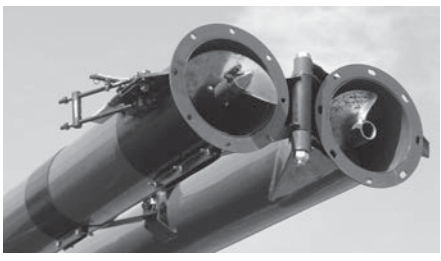
**IMPORTANT:** *The latch springs should never be completely compressed when the handle is all the way down or the lid will not open during over filling.*

## 12' DISCHARGE AUGER

### Transport Cradle

The unloading auger must always be moved to and set into the transport cradle before the mixer is transported. If the auger does not set in the cradle, adjust the stop bolt on the vertical rotating auger at the rear of the machine.

### 3' & 6' Discharge Auger Extensions



The 3' and 6' discharge auger extensions fold back and lock into position with a safety lock pin. If the main pin does not line up with the hole on the bracket of the standard 12' auger, loosen the bolts and adjust the bracket.

# LUBRICATION

## GENERAL INFORMATION

**IMPORTANT:** *The GM 170 must be properly lubricated, the transmission and cyclonic oil reservoir must be filled to the proper oil levels before it can be operated.*

**IMPORTANT:** *Catch and dispose of fluid per local waste disposal regulations whenever service is performed on hydraulic components (valves, cylinders, hoses, etc.) or transmission.*

## TRANSMISSION OIL LEVEL

**NOTE:** *Check the fluid level in the mixer transmission periodically by removing the plug located on the transmission. Requirements: 1-1/2 U.S. Pints (0.7 liters) of SAE #140 Gear Lube.*

Check the transmission occasionally for oil drips and dust accumulation around the seals. Oil drips or dust accumulation indicate that seals are leaking.
Water is present in the oil if the oil is tan in color and foams excessively. Drain and replace the lubricant immediately.

**NOTE:***Fill the transmission gearbox to the bottom of the inspection plug hole - Do not overfill!*

## OILING

Lubricate all drive chains every 5 hours using a good grade of lubricant at the intervals of operation listed. Spray the entire chain on the center of the rollers. Lubricate the chains after grinding when they are warm.

## CYCLONIC OIL RESERVOIR

Check the cyclonic oil reservoir daily. Oil level should be between Max/Min level marks. Fill as needed using Exxon Nuto H46 or Equivalent.

.

# LUBRICATION (cont.)

## GREASING

**NOTE:** *Grease all fittings at the intervals of operation listed, before and after storing the unit, and as otherwise listed. Use a good grade of Lithium-base grease.*

Wipe dirt from the fittings before greasing to prevent the dirt from being forced into the bearing or pivot. Grease should come out around the shaft on sleeve type bearings. To minimize dirt build-up, avoid excessive greasing.

## GREASE FITTING LOCATIONS

**Grease Every 10 hours (or Daily)**

1. Telescoping PTO Drive (3 zerks)
2. Front & Rear Mill Bearings - (2 zerks - remote in Grease Bank under main shaft shield)
3. Main Shaft Slider Bearings - (2 zerks - remote in Grease Bank under main shaft shield)
4. Transfer Auger Front Bearing(1 zerk - under mill cover on front of auger)
5. Transfer Auger Rear Bearing(1 zerk - remote on rear of frame)
6. Transmission Main Bearing(1 zerk - remote on rear of frame)
7. Top of Mixing Auger(1 zerk - under top of tank cover)
8. Unloading Auger Rotating Pivot/Collar(4 zerks - 2 on the top of the collar & 2 on the bottom of the collar)
9. Unloading Auger Vertical Pivot/Collar(4 zerks - 2 on each side of the pivot)
10. Unloading Augers(2 zerks - 1 on the top of vertical section auger & 1 at the end of the auger discharge spout)
11. Flywheel (1 zerk - under front main cover)

**Attachments - As Applicable**

11. SIA Upper Pivot Bearing(1 zerk)
12. SIA Lower Pivot Bearing(1 zerk)

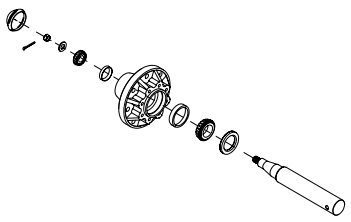
**Grease Each Time a Bolt is Sheared or at least Once a Year**

13. Auger/Transmission (Main) Shear Device(1 zerk - under front main cover)
14. Transfer Auger Shear Device(1 zerk - under mill cover)

## WHEEL BEARING LUBRICATION, CLEAN & RE-PACK INSTRUCTIONS

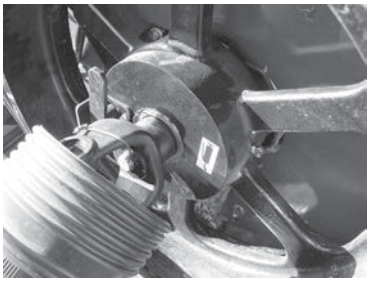
**Grease wheel bearings as needed depending on amount of travel.**

Annually disassemble and clean parts in a solvent. Pack bearings with a high grade grease. Reassemble, and tighten nut until a slight drag is felt when wheel is turned. Back nut off and insert cotter pin into first hole that you see as you back the nut off, bend cotter pin over and re-install cap.



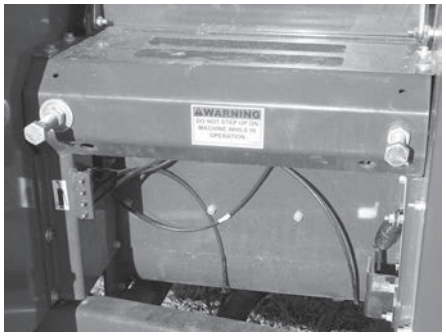
# LUBRICATION (cont.)

Telescoping PTO Drive (3 zerks)

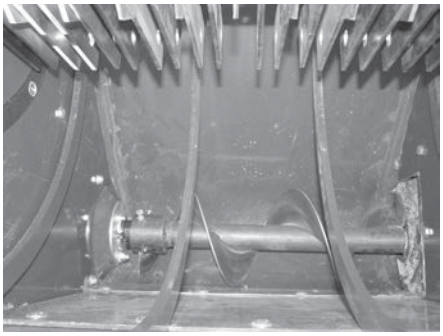


Flywheel (1 zerk)


Auger/Transmission Main Shear Bolt-(1 zerk)

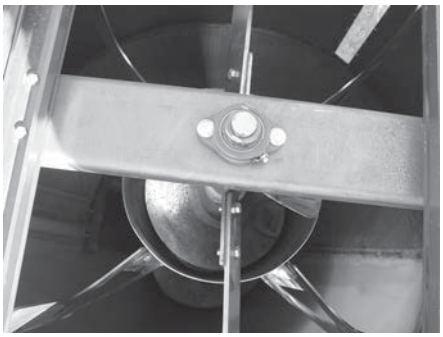



Front & Rear Mill Bearings (2 zerks - remote in Grease Bank under main shaft shield)
Main Shaft Slider Bearings (2 zerks - remote in Grease Bank under main shaft shield)



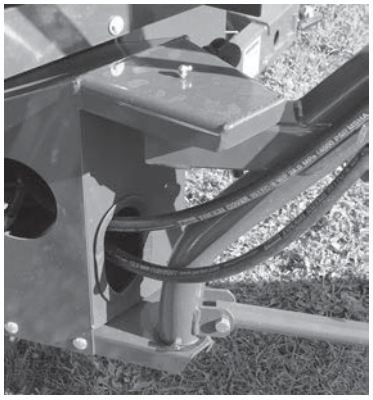
Transfer Auger Front Bearing & Shear Hub (under mill cover, 1 zerk on front bearing, and 1 zerk on transfer auger shear hub)

Transfer Auger Rear Bearing (1 zerk - remote on rear of frame)
Transmission Main Bearing (1 zerk - remote on rear of frame)

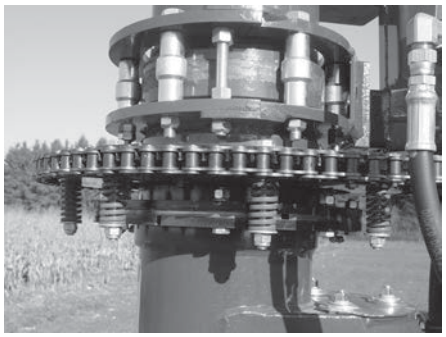


Top of Mixing Auger (1 zerk - under top of tank cover)

Unloading Auger-(1 zerk on the top of vertical section auger and 4 zerks on vertical auger pivot.)

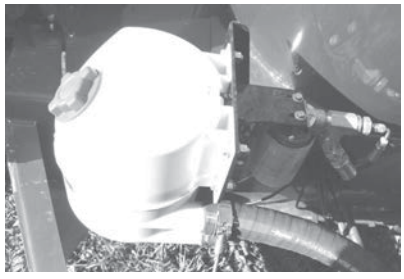


SIA Upper Pivot Bearing (1 zerk)
SIA Lower Pivot Bearing (1 zerk)



Unloading Auger Pivot/Collar (4 zerks - 2 on the top of the collar & 2 on the bottom of the collar)

Unloading Auger-(1 zerk at the end of the auger discharge spout)



Oil level should be between Max/Min level marks

# SERVICE

## HYDRAULIC SYSTEM

### Hydraulic Pump Sheave Alignment

The hydraulic pump drive and driven sheaves must be maintained in correct alignment and be tightly secured at all times.

### Hydraulic Pump Belt Tension

Overload protection for the hydraulic pump is provided by a self-adjusting spring tightener that requires no adjustment. The idler pulley must be properly positioned to keep the belt aligned with the sheaves.

### Cyclonic Hydraulic Reservoir

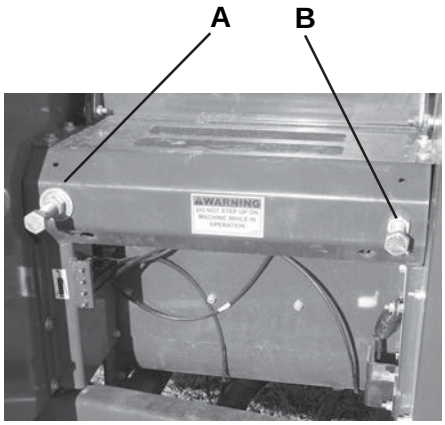
The oil filter should be replaced once a year or every 75 hours of operation, whichever comes first. The oil should be drained and replaced every two years or every 150 hours of operation, whichever comes first. Keep oil filled to proper level.

## MILL/BLOWER DRIVE

### Belt Replacement

To replace the mill/blower drive belt, perform the following steps:

1. Disengauge PTO, shut-off tractor and remove key.
2. Release front drive chain tension.
3. Loosen both of the bolt/nut (A & B) assemblies on the main drive shaft.
5. After tension is released, remove the old belt and replace with a new Belt.
6. Adjust the new belt tension per the Adjustment Chapter of this manual. After tension is properly adjusted, re-connect the front drive chain idler bracket spring.



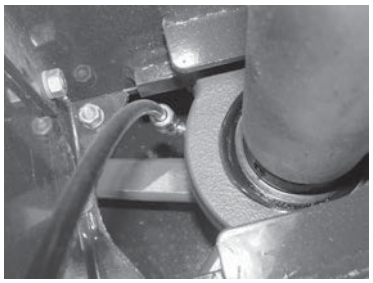

**IMPORTANT:** *The mill/blower drive belt will deteriorate more rapidly if improper tension is applied. Uneven sheave alignment will result in uneven belt stretch. Improper mill/blower belt tension will produce excessive pressure on the mill/blower bearings and cause premature bearing failure.*

# SERVICE

## MAIN DRIVE SHAFT BEARINGS

Main drive shaft bearings are greased by 2 of the remote zerks in grease bank under the step by the mill cover. For bearing replacement, follow steps 1-5 from the previous Belt Replacement section in this chapter. Then:

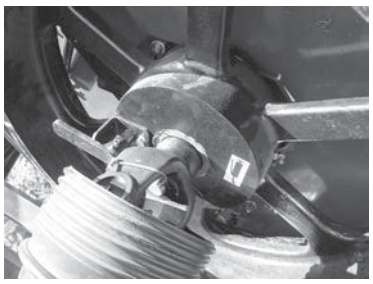
1. Remove the hydraulic motor belt shield.
2. Release the spring tension on the hydraulic motor drive belt.
3. Remove the hydraulic drive pulley on the end of the main shaft.
4. Remove the drive chain to the transfer shaft.
5. Remove the PTO.
6. Remove the flywheel and flywheel clutch.
7. Remove the back left flywheel shield.
8. Remove remote grease lines from bearing blocks.
9. Remove main driveshaft cover with shaft and bearings.
10. Remove shaft and bearings from cover.
11. Loosen set screws and remove bearings.
12. Install new bearings and tighten set screws.
13. Re-install components in reverse order.
14. The bolt securing the PTO to the shaft should be tightened to seat the bearings. Then back the bolt out and tighten to 6-10 inch lbs. of torque. Secure the bolt with wire to PTO yoke.



### Engaging Pin

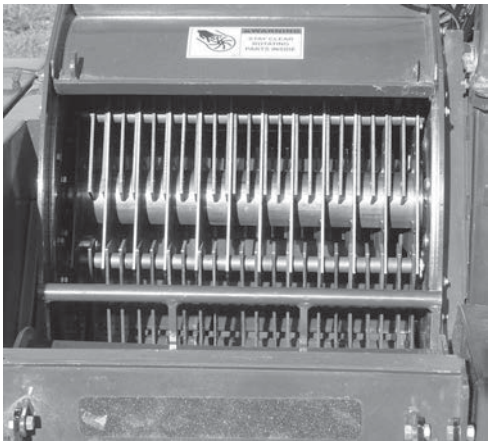
The pin used to engage and disengage the mill/blower drive sheave should be checked periodically for excessive wear or improper seating. Excessive wear on the pin or the hole in the hub that the pin engages, could result in the pin accidentally disengaging in the middle of mill and blower operation. Both components should be replaced if worn.

**IMPORTANT:** Do not start the PTO until the pin is positively engaged. Using the PTO to engage the pin will cause premature pin failure.



# SERVICE

## MILL HAMMER ROTATION OR REPLACEMENT



To maintain maximum grinding efficiency, the mill hammers should be rotated before wear radius measures ¼" (6 mm). Mill hammers are designed to be conveniently removed and rotated through 4 positions, before they require replacement. The hammers should be replaced when all four corners are worn to ¼" (6 mm) radius.

The mill cylinder contains 3 rows with 22 hammers in each row. To remove a row of hammers, rotate the cylinder to the position where the row of hammers to be removed lines up with the access hole in the left side of the mill housing. With the access hole cover removed, pull the cotter pins out of the ends of the hammer rod and pull the rod out through the access hole.

**NOTE:** *Use a catch pan or install a small screen below the rod for the hammers and spacers to drop into as the rod is being pulled out.*

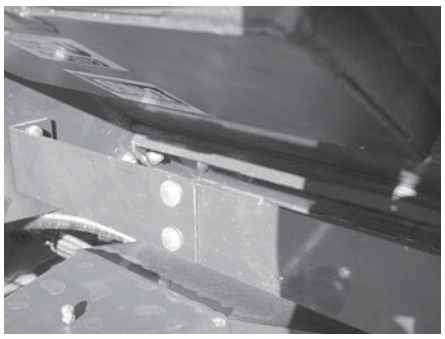
**IMPORTANT:** *Hammers and spacers must be replaced in proper sequence with respect to the appropriate row on the cylinder. When the hammers are rotated they should always be rotated in the same direction to maintain a balanced cylinder. All 3 rows of hammers should be rotated at the same time or replaced at the same time.*

After the hammer rod is replaced and all of the hammers and spacers have been replaced, secure the rods in place with a new 3/16 x 1-1/4" cotter pins. Spread the points and bend them around the rod. Replace the access hole cover.

## MILL THROAT PLATE

The mill throat plate must be properly adjusted to hold the screen in place when the mill screen cover is closed and latched. Adjust the throat plate position with the 2 bolts on each side of the mill housing. To adjust the throat plate;

1. Disengauge PTO and shut-off tractor.
2. Open the mill screen cover and install a screen into the screen support.
3. Loosen, but do not remove the 4 adjustment bolts and position the throat plate toward the bottoms of their mounting slots, then partially tighten the bolts.
4. Close the mill screen cover while forcing the screen against the throat plate.
5. Before latching the cover, tightly secure the 4 adjustment bolts to lock the throat plate position.



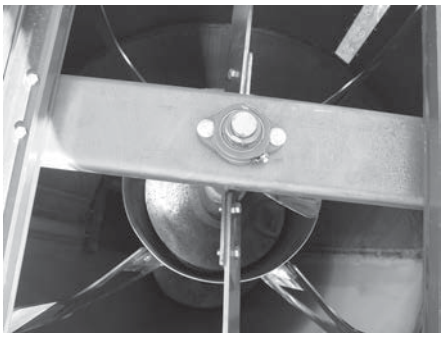
**NOTE:** *The throat plate position should be adjusted regularly to maintain proper mill/screen operation and cover latching, and to prevent material from dropping out the bottom of the mill.*

# SERVICE

## MIXING AUGER & TUBE

The mixing auger should be centered inside the tube at all times. Adjustment bolts are provided on the 4 supports which hold the tube for aligning and centering it around the auger. Access to the adjustment bolts and removing the mixing auger is gained through the tank lid opening in the top of the tank. The auger can be removed as follows:

1. Disengauge the PTO, shut-off tractor and remove key.
2. Open the tank lid, loosen the bearing set collar and remove the bearing from the auger shaft.
3. Remove the top bearing bracket from the tank cover.
4. Remove the 2 paddles from the auger.
5. Remove the 4 supports from the tube.
6. Remove the tube and then the auger through the tank lid.



To replace the mixing auger or install a new auger, reverse the procedure of removal. After all components are replaced, the tube must be correctly centered around the auger and tightly secured.

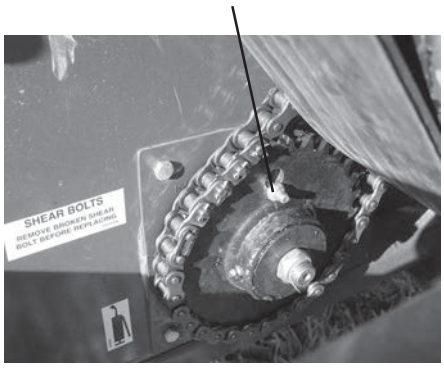
## SHEAR BOLTS

### Main Shear Bolt

The main shear bolt located on the driven sprocket on the front end of the transmission drive shaft, protects the drive shaft, transmission and mixing auger. If the shear bolt fails, the transfer auger and mixing auger will also stop rotating. In case of an overload, the head of the bolt will shear off and stop shaft rotation. To replace the main shear bolt, proceed as follows:

**IMPORTANT:** *Use only a 5/16 x 1: grade 5 shear bolt.*

1. Disengauge the PTO, shut-off tractor and remove key.
2. With the shifter pin engaged, rotate the mill/blower sheave by hand to align the keyhole in the sprocket with the slot in the shear flange. After proper alignment is obtained, disengage the shifter pin.
3. Turn the lock nut on the shear bolt flush and insert the bolt head through the keyhole and into the slot. Move the bolt down into the narrower portion of the keyhole.
4. Tighten the lock nut to fix the bolt position.
5. Grease the fitting on the sprocket to prevent the mechanism from seizing.



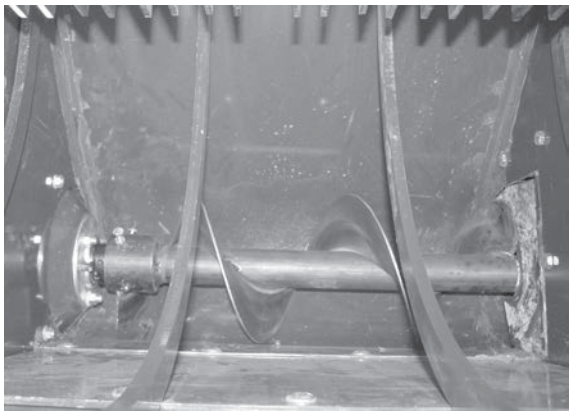

**IMORTANT:** *Remove the cause of the shear bolt failure before resuming operation. Grease the fitting on the sprocket any time a bolt is sheared.*

# SERVICE

## Transfer Auger Shear Device

The transfer auger shear bolts are accessible only through the mill cover. This shear bolt protects the transfer auger flighting. If the shear bolt fails, the transfer auger will stop rotating even though the mixing auger and transmission drive shaft will continue to rotate.

**NOTE:** *Two shear bolts are provided on the shear hub, but only one bolt serves as shear protection; the second bolt is provided so that one of the Bolts is always accessible for service regardless of where the auger stops after the bolt shears.*



To set the shear bolt in the correct driving position, proceed as follows:

1. Disengauge the PTO, shut-off tractor and remove key.
2. For access to the shear bolt, open mill cover door and remove the material in the bottom of the transfer auger.
3. Loosen the accessible shear bolt lock nut.

**NOTE:** *If the gap between the bolt head and the shear hub is less than 1/8" (3 MM), the bolt must be replaced. Use only a ¼ x 1: grade 5 shear bolt stored on the inside of the front cover.*

4. Attempt to turn the bolt clockwise. If it does not turn, the cavity is not under the bolt and the shaft will have to be rotated 90 degrees.
5. With the cavity under the shear bolt, turn the bolt clockwise 3 full turns or about 5/32" (8 mm). This will place the shear bolt in the correct driving position.

**IMPORTANT:** *Do not turn the shear bolt less than or more than 3 full turns to insure the correct driving position. Do not readjust the other shear bolt.*

6. Tighten the lock nut and grease fitting on the hub to prevent the mechanism from seizing.

After the cause of the shear bolt failure is corrected and the bolt has been replaced, place the mill/blower engaging pin in the engaged position and rotate the flywheel by hand checking the intake auger for rotation before attempting to resume grinding.

7. Close the mill cover door and resume operation.

**IMPORTANT:** *When restarting the tractor, place the throttle at idle before engaging the PTO.*

# SERVICE

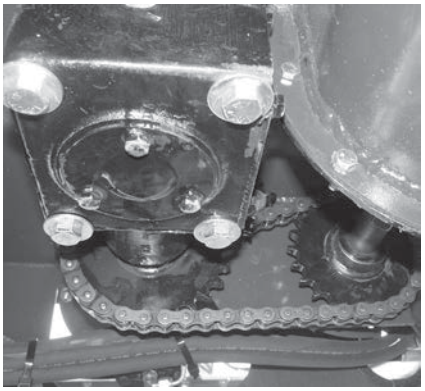
## TRANSMISSION

The GM 170 transmission can be removed from the mixer for taking it to the dealer for internal component service.

Internal component repairs and replacement should only be attempted by (or under the direction of) an authorized H&S Manufacturing Dealer.

To remove the transmission from the mixer;

1. Release the drive chain tension and uncouple the chain.
2. Remove the remote grease fitting.
3. Remove the 4 cap screws that secure the transmission to the underside of the tank support.
4. Repair transmission.
5. Replace the transmission in reverse order of removal.
6. Adjust drive chain tension following details in the Adjustments Chapter.



**NOTE:** *Check the transmission oil level periodically.*

## UNLOADING AUGER

If the Unloading Auger becomes plugged, proceed as follows:

1. Disengage the PTO, shut-off tractor and remove key.
2. Shut the unload auger door and turn off the variable speed control valve.
3. Loosen the set collar on the top of the vertical auger. Remove the bolts which secure the motor mounting plate to the vertical unloading auger. Slide the auger and motor down, loosen the set screw which secures the motor and auger. Remove the auger and material.
4. If plugging is in the first or last unloading augers, attempt to rotate the auger with a wrench to clear the augers.
5. After the plugging material has been removed, replace the auger and re-install the motor and resume unloading.

**NOTE:** *If the plugging is due to an improperly attached extension, check and correct before attempting to resume unloading.*

## TIRES & WHEELS

Check the Tire pressure after every 50 hours of operation. Tires should be inflated to 80 PSI (563kpa). Wheel lugs torque should also be checked after every 50 hours of operation and tightened to 90 ft-lb (124 Nm) torque.

# OPTIONAL FEATURES & ACCESSORIES

## ELECTRONIC SCALES & COMPONENTS

### Model: Digi-Star EZ 2000

An optional factory installed Digi-Star EZ 2000 scale is available for accurate weight measurement. The 3-point Weighbar System features 3 modes, Net,Tare and Gross.

### Model: Digi-Star EZ 3200 w/External Horn

An optional factory installed Digi-Star EZ 3200 scale is available with all the features of the EZ 2000, plus an external horn, and has the capability for entering rations.

## SWINGING INTAKE AUGER (SIA)

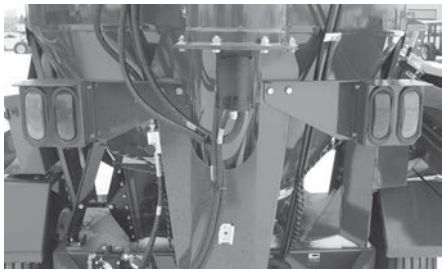
An optional Swinging Intake Auger(SIA) with a variable speed control is available for the GM 170.

## FENDER SET

A fender set is available and consists of 2 fenders, 4 fender support angles and attaching hardware. Installation instructions are packaged with the kit of parts.

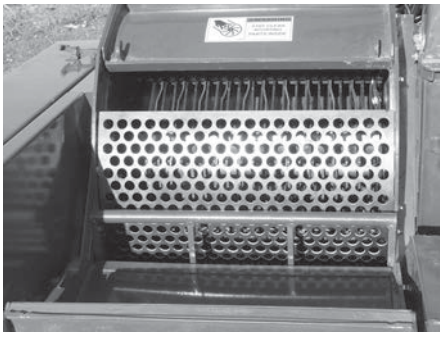
## TRANSPORT LIGHTING

An optional highway transport lighting kit is available.



## SCREENS

12 sizes of screens are available. Sizes include:
1/8”, 3/16”, 1/4”, 5/16”, 3/8”, 1/2”, 5/8”, 3/4”, 1”, 1-1/4”, 1-1/2’, & 2”.



# OPTIONAL FEATURES & ACCESSORIES

## UNLOADING AUGER EXTENSIONS

### 3' Folding Auger Extension


The 3' folding discharge auger extension kit consists of a 3' length of auger which is attached on a pivoting mounting bracket to the end of the 12' unloading auger.

**NOTE: The 3' folding auger extension must be folded back and locked in position for transport.**

### 6' Folding Auger Extension


The 6' folding discharge auger extension kit consists of a 6' length of auger which is attached on a pivoting mounting bracket to the end of the 12' unloading auger.

**NOTE: The 6' folding auger extension must be folded back and locked in position for transport.**

# TROUBLESHOOTING

**NOTE:** *This Troubleshooting Chapter presents problems, causes and suggested remedies beyond the extent of loose, worn or missing parts and it was developed with the understand that the machine is in otherwise good operating condition.*

## MILL & MIXER DRIVE

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| PTO Shaft vibrates excessively. | Improper tractor hook-up | Adjust hook-up. |
| | Tractor being operated at an angle. | Align tractor straight-away with Grinder-Mixer. |
| | PTO shaft bent. | Replace PTO shaft. |
| | PTO shaft bearings worn. | Replace bearings |
| Mill/Blower doesn't turn. | Mill Engaging Pin not engaged or improperly engaged. | Engage Pin. |
| | Mill/Blower drive belt slipping. | Adjust belt tension. |
| Mixing Auger doesn't turn. | Transmission shear bolt sheared. | Replace bolt and correct cause of bolt failure. |
| | Front drive chain disconnected. | Repair or replace chain. |
| | Transmission rear drive chain disconnected. | Repair or replace chain. |
| | Sprocket key sheared. | Replace key. |
| | Transmission gear key sheared. | Replace key. |
| | Broken shaft. | Replace shaft. |
| Transfer Auger doesn't turn. | Transfer auger shear bolt sheared. | Replace bolt and correct cause of bolt failure. |
| | Front drive chain is broken or disconnected. | Repair or replace chain. |

# TROUBLESHOOTING

## MILL

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| Decreased or low capacity | Mill not operating at the recommended RPM speed. | Adjust tractor throttle to proper RPM speed. |
| | Mill loses speed as material enters it. | Adjust Mill/Blower sheave alignment and/or drive belt tension. |
| | Screen worn. | Rotate or replace screen. |
| | Blower inlet plugged. | Unplug. |
| Excess vibration. | Uneven flow of grain into the mill. | Transfer grain into the mill as smoothly as possible. |
| | Excess RPM. | Operate at 540 RPM. |
| | Mill bearings worn or defective. | Replace bearings. |
| | Hammers missing or broken. | Replace hammers. |
| | Blower unbalanced. | Remove, balance & replace. |
| Excessive dust. | Blower inlet plugged. | Check & unplug. |
| | Collector covered. | Uncover collector while operating. |
| Material not ground to desired size. | Incorrect screen being used. | Change screen diameter to correct size. |
| | Mill speed too high or low. | Adjust to correct RPM speed. |
| Material will not flow through mill hopper. | Mixer is sloped towards the feeding side. | Reposition mixer on level ground. |
| | Material too damp. | Adjust slope of intake hopper. |
| | Material too light or bulky. | Adjust slope of intake hopper. |

## UNLOADING

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| Tank won't unload or stops unloading. | Bridging in tank. | Shut-off mixer and tractor, break up bridging by probing through the access doors. |
| Tank unloads too slow. | Discharge slide is not open all the way. | Open slide up more. |

# TROUBLESHOOTING

## HYDRAULICS

**Note:** In troubleshooting a self-contained hydraulic system, it is necessary to isolate the pump from the hydraulic motors to determine which unit is malfunctioning. A worn pump or motor will both give the same system indication. Run a pressure and flow check on the pump first to make sure that it is performing within the operating specifications, then check the motor for the correct specifications. Oil flow must be checked at the rated PTO speed. Flow should be 9.2 GPM at 1000 PSI.

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| Discharge augers do not turn. | Variable speed flow control valve in off position. | Turn variable speed flow control valve on. |
| | Pump defective. | Replace pump. |
| | Hydraulic motor defective. | Replace or repair hydraulic motor. |
| | Hydraulic pressure too low. | Check for restriction in hydraulic lines. |
| | Foreign object lodged in auger. | Remove foreign object. |
| Difficult to engage or disengage variable speed control valve. | Variable speed control valve defective. | Replace variable speed control valve. |
| Pump will not turn. | Belt out of grooves. | Realign sheaves and adjust belt tension. |
| | Belt does not have proper tension. | Replace idler tension spring or properly position idler. |
| | Pump defective. | Check oil flow and replace pump if necessary. |
| | Return line blocked or restricted. | Remove blockage and replace oil and filter if dirty. |
| Pump squeals during start up. | Oil too heavy/cold. | Allow oil to warm up or switch to a recommended lighter oil. |
| | Oil level in reservoir too low. | Add oil to bring between min/max indicator levels. |
| Augers operating slow. | Improper oil flow. | Pump squeals during start up. |
| | Plugged oil filter. | Replace filter. |
| | Hydraulic pump defective. | Replace hydraulic pump. |
| | Variable speed control valve not open all the way. | Open variable speed control valve more. |
| | Hydraulic motor defective. | Repair or replace hydraulic motor. |
| | Oil too thin. | Replace with heavier oil. |
| | Not enough oil flow to hydraulic pump. | Change oil filter, replace oil with new oil and fill to proper level. |

# TROUBLESHOOTING

## HYDRAULICS

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| Tank unloads slow. | Insufficient oil flow to motors. | Increase tractor RPM speed. |
| | Plugged oil filter. | Replace filter. |
| | Hydraulic pump defective. | Replace hydraulic pump. |
| | Variable speed control valve not open all the way. | Open variable speed control valve more. |
| | Hydraulic motor defective. | Repair or replace hydraulic motor. |
| | Oil too thin. | Replace with heavier oil. |
| | Not enough oil flow to hydraulic pump. | Change oil filter, replace oil with new oil and fill to proper level. |
| | Loose connection to the motor. | Check and tighten connection. |
| None of the motors operate. | Pump not being driven. | Check sheaves and belt for malfunction. |
| | Hydraulic pump defective. | Replace hydraulic pump. |
| | Discharge auger variable speed control valve relief pressure set too low. | Check pressure to valve, if pressure is low adjust to factory setting or replace if it will not adjust. |
| Discharge auger variable speed control valve will not engage or disengage. | Variable speed control valve defective. | Replace varible speed control valve. |
| Swinging Intake Auger (SIA) attachment will not operate. | SIA variable speed control in the off position. | Check mechanical linkage controls and open valve. |
| | SIA variable speed control valve relief pressure set too low. | Check pressure to valve, if pressure is low adjust to factory setting or replace if will not adjust. |
| Auger in SIA turns in the wrong direction. | Motor connections crossed. | Switch hoses connections to change direction of motor rotation. |

# TROUBLESHOOTING

## HYDRAULICS

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| SIA turns too slow. | Excessive or wet grain. | The higher the moisture content and weight of the material that is being conveyed, the more power it takes. Adjust the variable speed control valve to allow more oil to the hydraulic motor. |
| | Not enough oil flow to hydraulic pump. | Change oil filter, replace oil with new oil and fill to proper level. |
| | Hydraulic pump defective. | Replace hydraulic pump. |
| | Hydraulic motor defective. | Repair or replace hydraulic motor. |
| | SIA relief valve pressure set too low. | Check pressure to valve, if pressure is low adjust to factory setting or replace if will not adjust. |
| | Not enough oil flow to hydraulic pump. | Change oil filter, replace oil with new oil and fill to proper level. |
| | SIA auger partially plugged. | Remove plugging material. |
| | SIA pressure relief valve doesn't function properly. | Check pressure to valve, if it will not adjust to the factory setting, replace the valve. |

# DECAL PLACEMENT

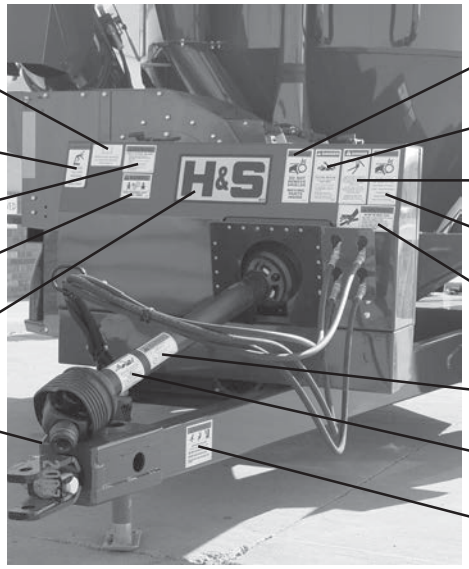
Your H&S 170 Grinder-Mixer was manufactured with operator safety in mind. Located on GM 170 are various decals to aid in operation, and to warn of danger or caution areas. Pay close attention to all the decals on your Grinder-Mixer.

**DO NOT REMOVE ANY OF THESE DECALS. IF DECALS ARE LOST, DAMAGED, OR IF YOUR GRINDER-MIXER IS REPAINTED, REPLACE DECALS.**
**REMEMBER: DECALS ARE FOR YOUR PROTECTION AND SAFETY.**

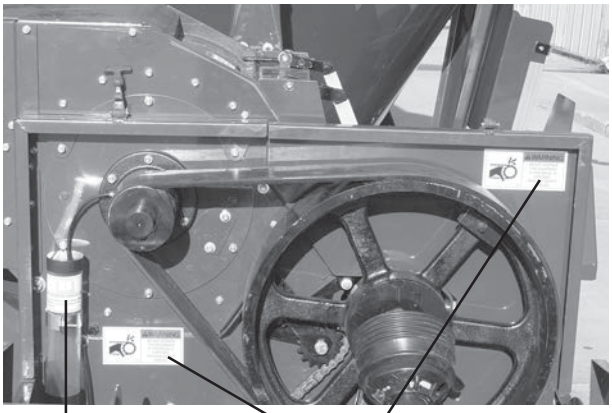
Listed below are the decals on your 170 Grinder-Mixer. These decals may be ordered individually by part number, or by ordering as a complete set.

| Part Number | Description |
|---|---|
| 112-11176 | Shear Bolts - Remove broken shear bolt before replacing |
| 120-2177 | Pull to Stop |
| 1494A | Do not operate this equipment if this decal is exposed. Replace safety shields |
| 1494J | Do not clean or work on this machine without first disengaging power |
| 1494K | Do not remove shields - moving parts inside |
| 1494L | Rotating driveline |
| 093466 | Operate only with 540 RPM PTO |
| 1494P | Maintain safe clearance from electrical power lines |
| 2595 | Keep children away at all times |
| 9194A | No step - stay clear |
| 11599 | Do not go near leaks |
| 32597A | Do not operate this equipment if this decal is exposed. Replace safety shields |
| 72203A | Help avoid injury - Read and understand the operators manual |
| 82407 | H&S GM 170 |
| 82602 | Crushing Hazard |
| 82907A | Stay clear of discharge auger |
| 82907B | Stay clear of auger extension hinge area |
| 82907C | Stay clear - Keep hands and feet away from auger at all times |
| 82907D | Stay clear - Rotating parts inside |
| 82907E | Stay clear - Rotating auger behind this panel |
| 82907F | Keep out - Do not enter tank - Keep cover closed |
| 82907G | Stay clear - Keep hands out of supplement hopper |
| 82907H | Stay clear - Keep hands and feet away from auger at all times |
| 82907I | Do not step up on machine while in operation |
| 82907J | Operator’s manual is located behind this shield |
| 093366 | Keep Operator’s Manual Here |
| 82907K | Cyclone cover - Open/Close |
| 82907L | Never allow riders on this machine |
| 82907M | Discharge auger door - Open/Close |
| 093020 | Grease zerk decal |
| B12 | H&S decal |
| GM-A | 95 -135 bushel decal |
| GM-B | 55 - 85 bushel decal |
| 5696D | Disengage |
| 5696E | Engage |
| ZX21 | Red paint - Gallon |
| ZX22 | Red paint - Quart |
| ZX23 | Red paint - Pint |
| ZX79 | Red paint - Spray Can |
| | Red Reflector |
| | Amber Reflector |

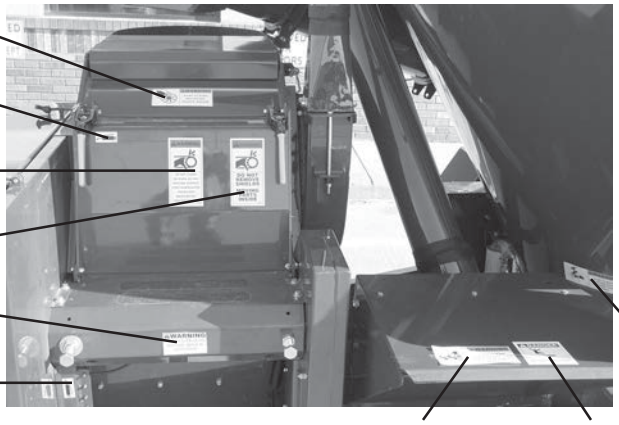
# DECAL PLACEMENT



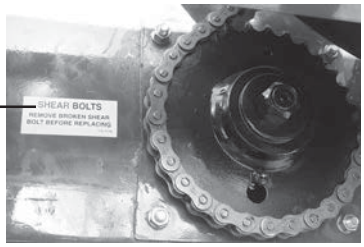




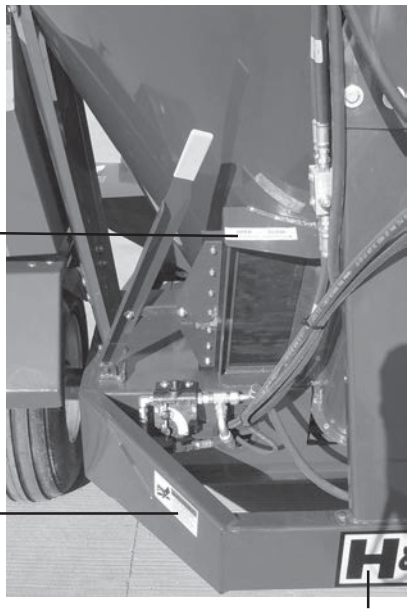


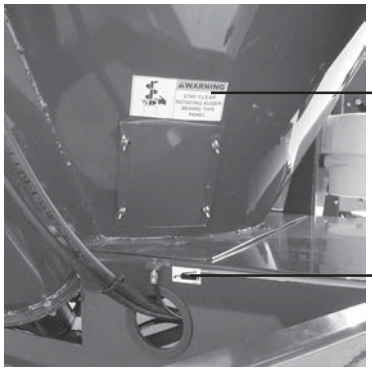


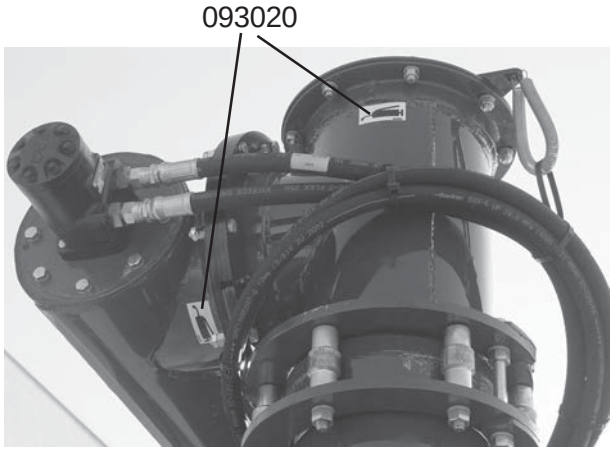




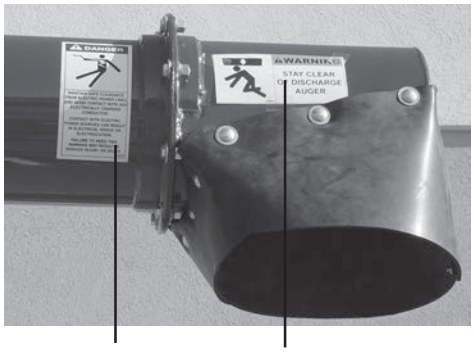
# DECAL PLACEMENT

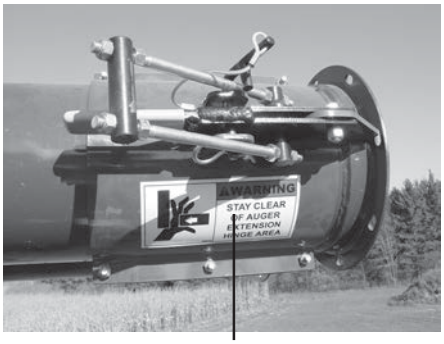


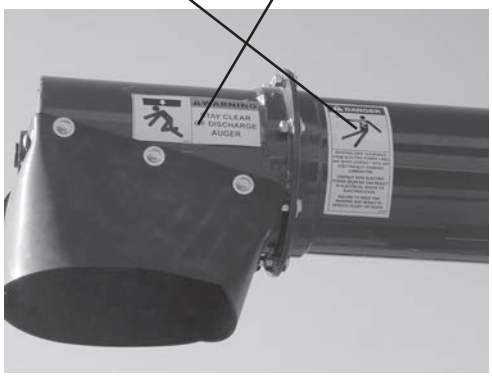



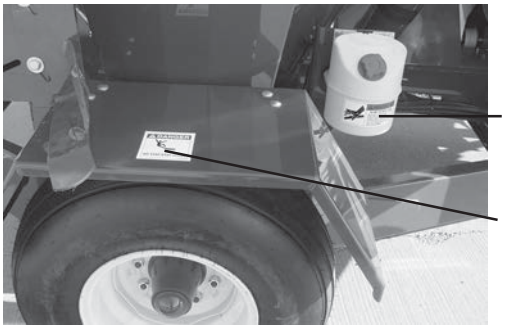




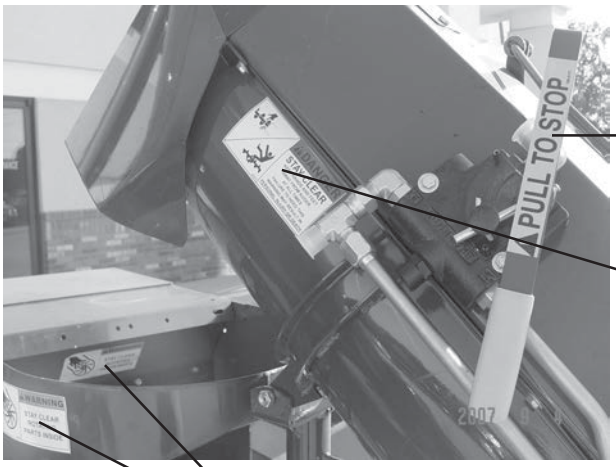



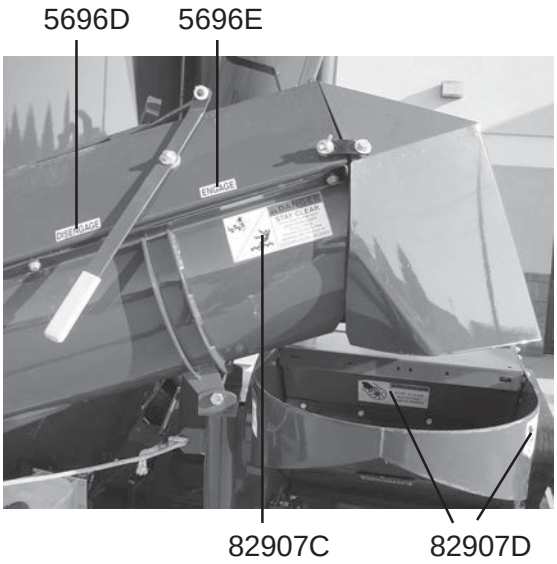
# DECAL PLACEMENT

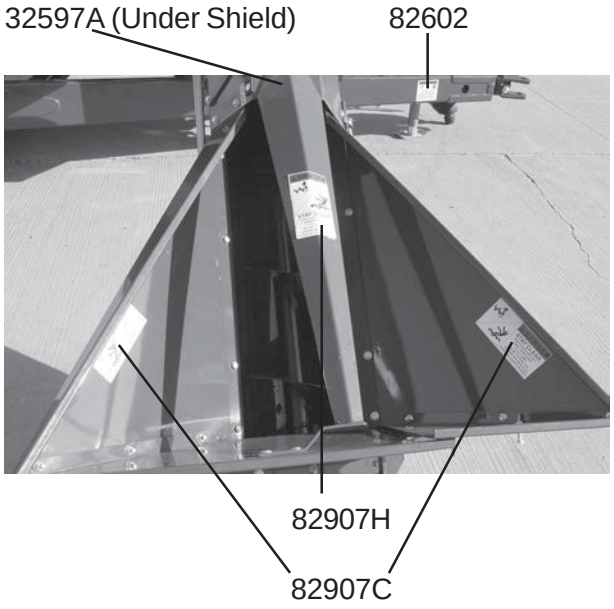










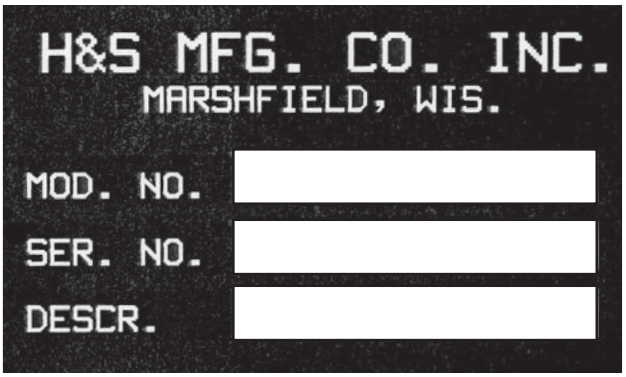
# INSTRUCTIONS FOR ORDERING PARTS

All service parts should be ordered through your authorized H & S dealer. They will be able to give you faster service if you will provide them with the following

1. Model & Serial number is located on the main frame.
2. All reference to left or right apply to the machine as viewed from the rear.
3. Parts should not be ordered from illustration only. Please order by complete part number.
4. If your dealer has to order parts - give shipping instructions:

   VIA truck - large pieces (please specify local truck lines)

   VIA United Parcel Service (include full address)




PLEASE RECORD NUMBERS FOR YOUR UNIT FOR QUICK REFERENCE

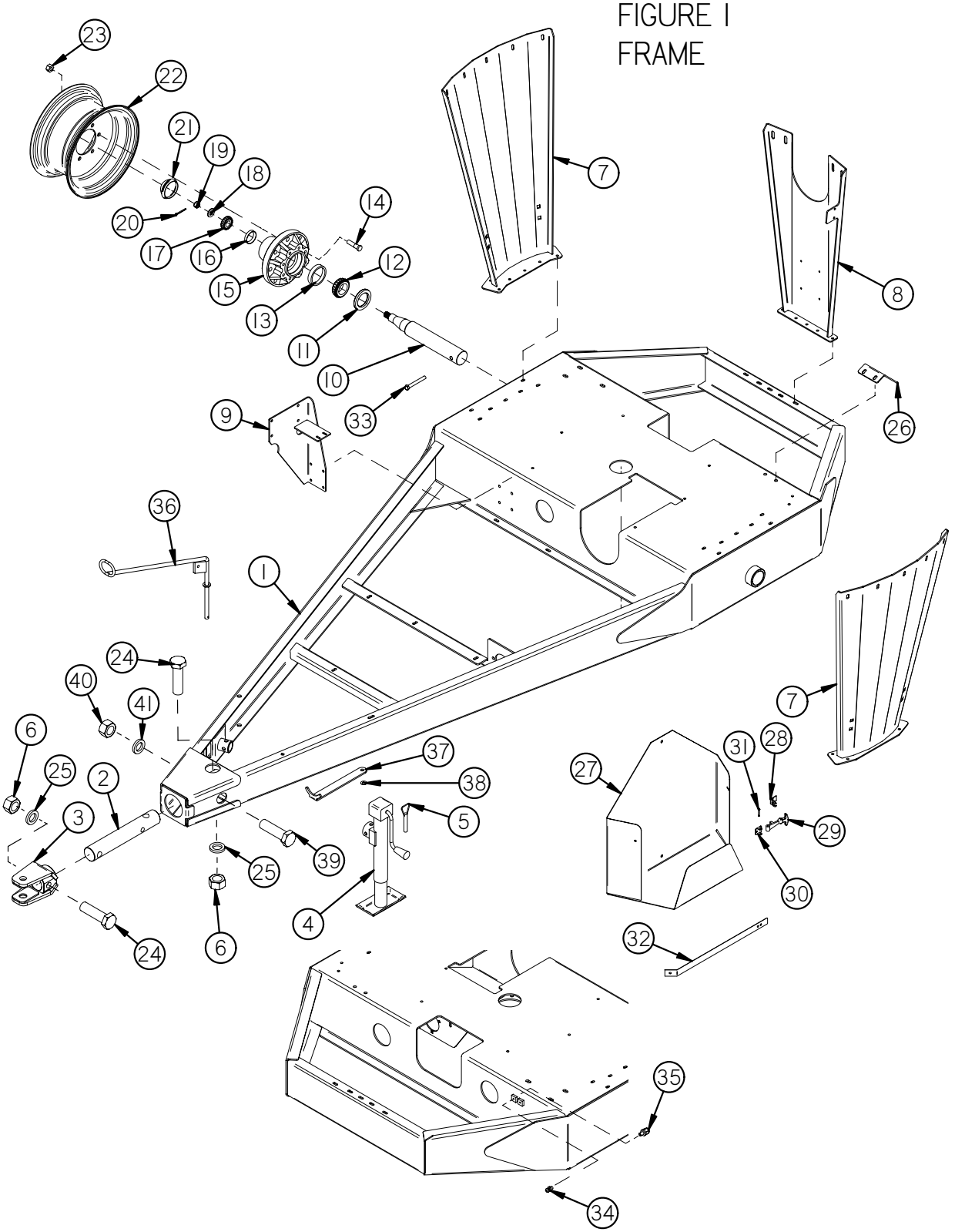
**ABOUT IMPROVEMENTS**

H&S IS CONTINUALLY STRIVING TO IMPROVE IT'S PRODUCTS

We must therfore, reserve the right to make improvements or changes whenever it becomes practical to do so without incuring any obligation to make changes or additions to the equipment previously sold.

# SERVICE & PARTS NOTES

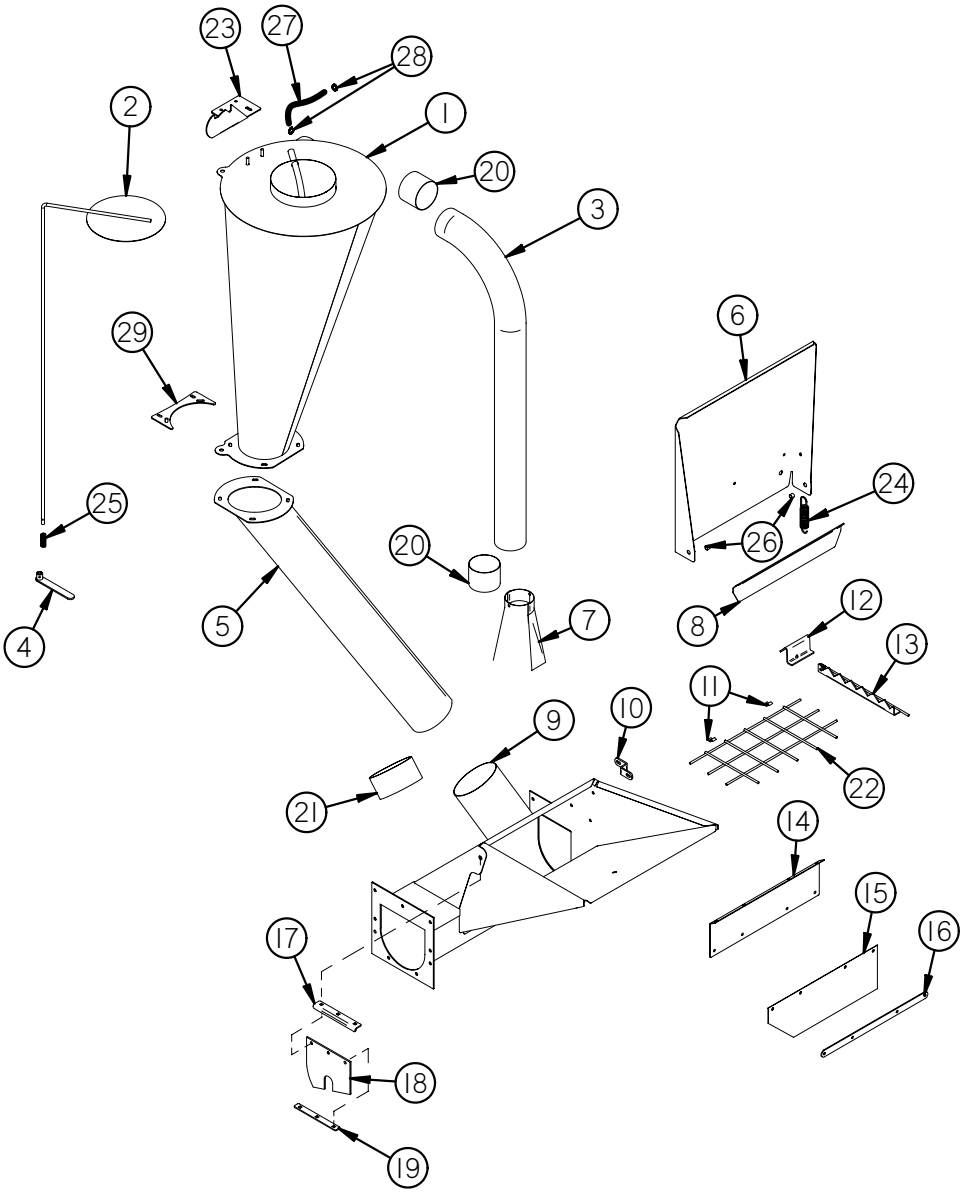
FIGURE 1
FRAME



# Figure 1
# Frame

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM72 | Frame |
| 2 | GM73 | Hitch Shaft |
| 3 | GM74 | Hitch |
| 4 | GM396 | Jack |
| 5 | 12N13 | Jack Pin & Chain |
| 6 | T151 | 1" Nut |
| 7 | GM76 | Tank Side Support |
| 8 | GM77 | Tank Back Support |
| * | F97 | SMV Bracket |
| 9 | GM78 | Oil Tank Bracket |
| 10 | GM79 | Spindle |
| 11 | B90 | Seal |
| 12 | B91 | Inner Bearing |
| 13 | B91A | Inner Race |
| 14 | 26G5A | Stud 5/8"-18 |
| 15 | 26G4A | Hub (821) |
| 16 | B94A | Outer Race |
| 17 | B94 | Outer Bearing |
| 18 | B4 | Washer |
| 19 | B3 | Nut |
| 20 | B31 | Cotter Pin |
| 21 | B2 | Hub Cap |
| 22 | RG73 | Wheel (W-51350) |
| * | GM394 | Tire (15 X 12.5L 20 Ply) |
| 23 | 26G6A | Lug Nut 5/8"-18 |
| 24 | GM80 | 1" x 5" GR 5 Bolt |
| 25 | DWM171 | 1" Lock Washer |
| 26 | GM397 | Flow Control Bracket |
| 27 | GM398 | Screen Holder |
| 28 | X193 | Latch Keeper |
| 29 | X192 | Rubber Latch |
| 30 | X194 | Latch Mounting Bracket |
| 31 | X195 | Latch Pin |
| 32 | GM399 | Screen Holder Strap |
| 33 | B10 | 1/2" x 4" GR. 5 Bolt |
| 34 | G89 | Grease Zerk (#1641) |
| 35 | GM424 | 1/4"-28 Grease Line Adapter |
| 36 | GM440 | Grinder Hose Holder |
| 37 | 42N2 | PTO Holder |
| 38 | 42N3 | Spring (MB1000-035) |
| 39 | GM183 | 3/4" X 4-1/2" GR 5 Bolt |
| 40 | GM417 | 3/4"-10 Nut |
| 41 | RG199 | 3/4" Lock Washer |

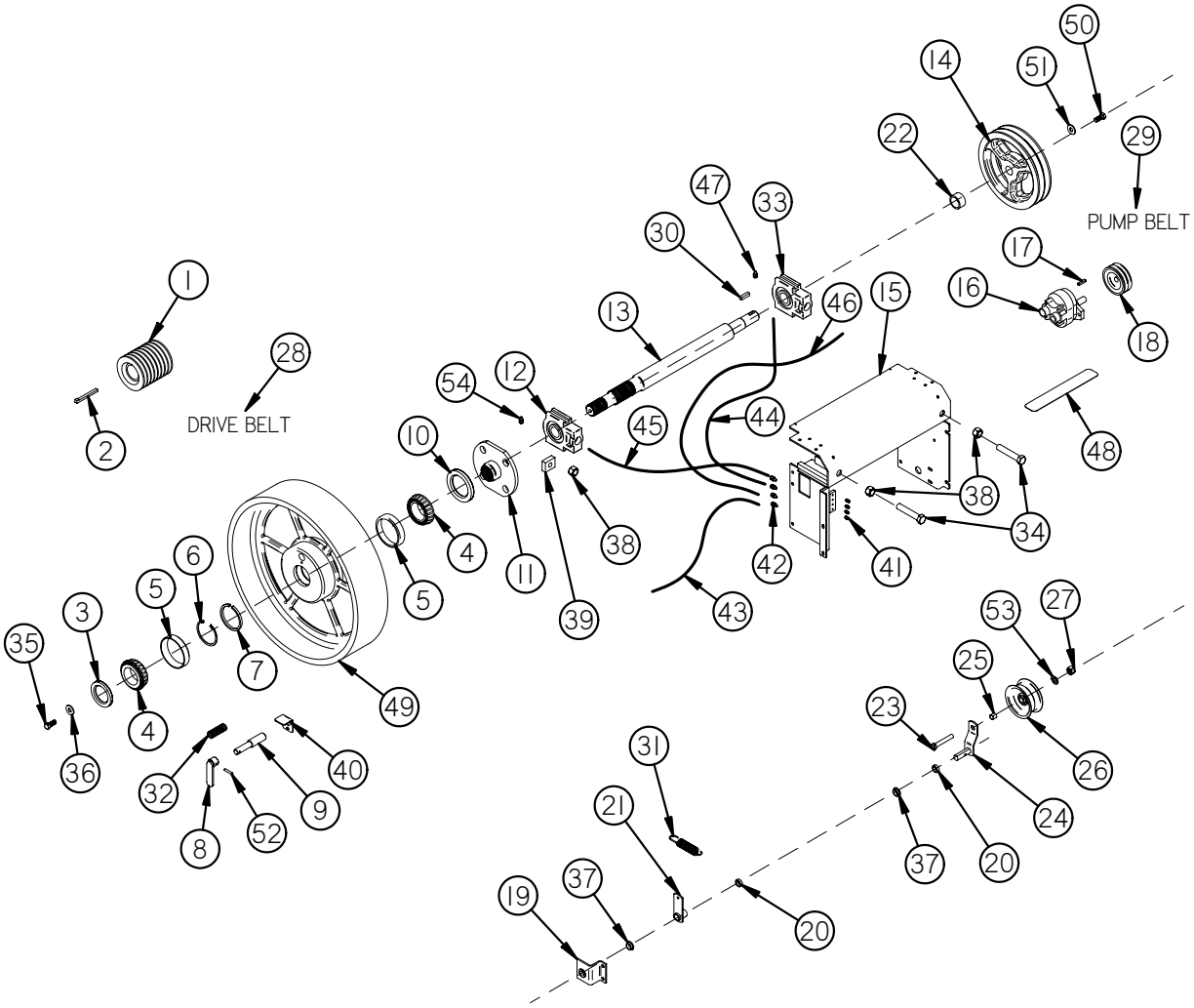
FIGURE 2
CONCENTRATE HOPPER COLLECTOR



# Figure 2
# Concentrate Hopper Collector

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM81 | Dust Collector |
| 2 | GM82 | Dust Collector Cover |
| 3 | GM83 | Blower Pipe |
| 4 | GM84 | Cover Handle |
| 5 | GM85 | Dust Collector Pipe |
| 6 | GM86 | Cover Hopper |
| * | GM420 | Cover Seal |
| 7 | GM87 | Blower Transition Chute |
| 8 | GM88 | Stop Cover |
| 9 | GM89 | Supplement Hopper |
| 10 | GM90 | Retainer Guard |
| 11 | GM91 | Hose Clamp |
| 12 | GM92 | Support Breaker |
| 13 | GM93 | Breaker Bar |
| 14 | GM94 | Dust Shield |
| 15 | GM95 | Dust Flap |
| 16 | GM96 | Dust Flap Retainer |
| 17 | GM97 | Baffle Stop |
| 18 | GM98 | Baffle |
| 19 | GM99 | Baffle Clamp |
| 20 | GM100 | Blower Pipe Seal |
| 21 | GM101 | Dust Collector Seal |
| 22 | GM360 | Hopper Grate |
| 23 | GM368 | Adjustable Mount Plate |
| 24 | K103 | Spring (SP10) |
| 25 | 17G128 | Spring |
| 26 | GM443 | Supplement Hopper Door Pivot |
| 27 | GM452 | 3/4" x 14" Hose |
| 28 | GM453 | 1" Hose Clamp |
| 29 | GM460 | Adjustable Support Bottom |

FIGURE 3
DRIVE LINE

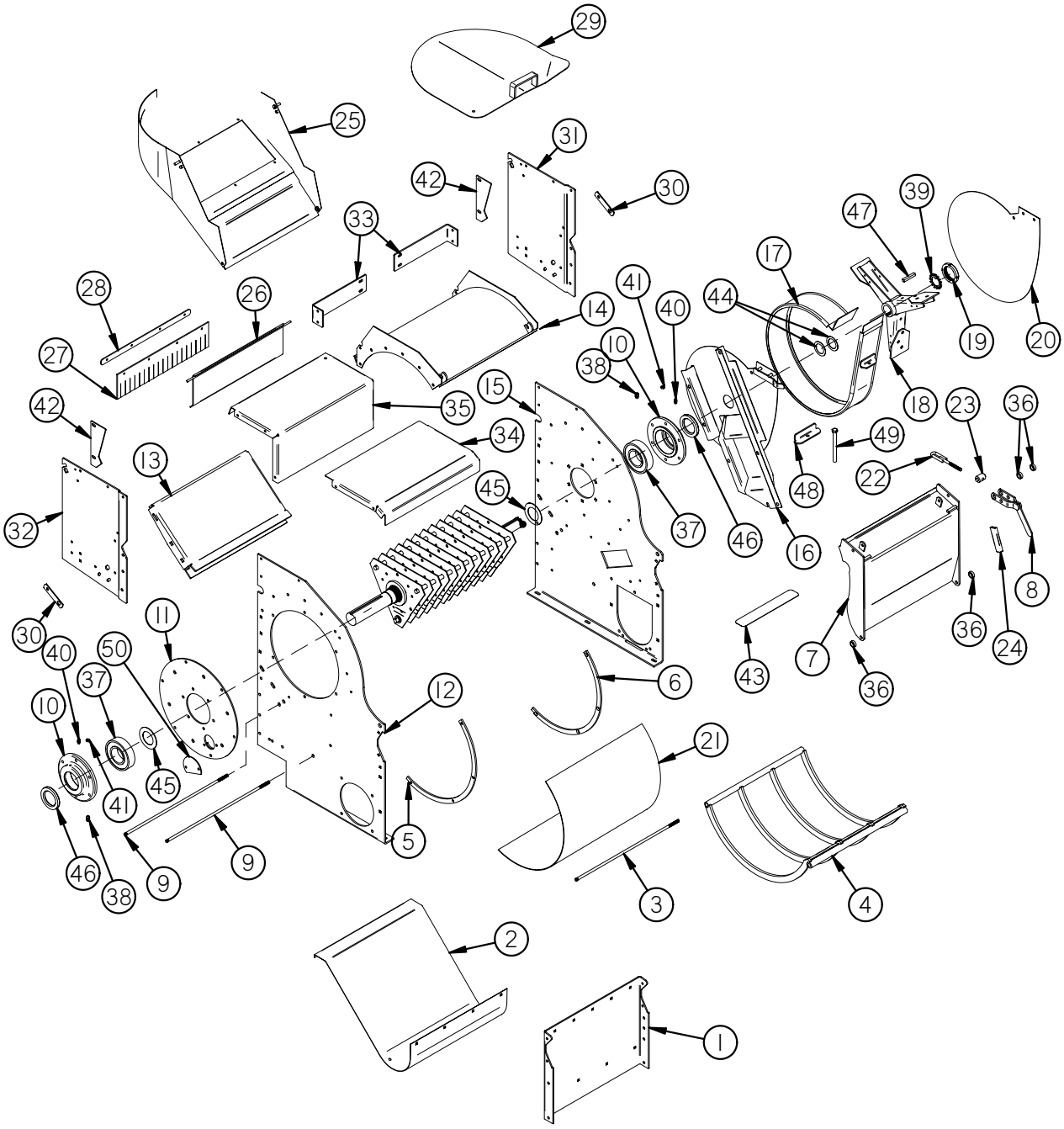


# Figure 3
# DriveLine

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM102 | Mill Sheave 540 RPM |
| * | GM103 | Mill Sheave 1000 RPM |
| 2 | GM104 | Key 3/8" Taper |
| 3 | GM105 | Seal (22338) |
| 4 | GM106 | Outer Bearing (LM501349) |
| 5 | GM107 | Race (LM501310) |
| 6 | GM108 | Snap Ring |
| 7 | GM109 | Spacer |
| 8 | GM110 | Clutch Handle |
| 9 | GM111 | Clutch Pin |
| 10 | GM112 | Seal (22430) |
| 11 | GM113 | Flywheel Clutch |
| 12 | GM114 | Bearing (UCT- 210-31 11/16) |
| 13 | GM115 | Main Drive Shaft |
| 14 | GM116 | Pump Drive Sheave (540 RPM) 2AK124 |
| * | GM276 | Taper Lock Hub (540 RPM) |
| * | GM117 | Pump Drive Sheave (1000 RPM) 2AK74 |
| 15 | GM118 | PTO Carrier |
| 16 | GM14 | Pump |
| 17 | GM275 | Key 3/16" x 1" (Square Key Round Ends) |
| 18 | GM120 | Pump Sheave |
| 19 | GM121 | Idler Shaft Support |
| 20 | GM122 | Spacer |
| 21 | GM123 | Arm |
| 22 | GM444 | Sheave Spacer (540 & 1000 RPM) |
| 23 | BFR438 | Bolt 5/8" x 2" |
| 24 | GM125 | Idler Arm |
| 25 | RG8 | Flat Washer 5/8" |
| 26 | GM127 | Idler Pulley |
| 27 | GM128 | Nut 5/8/2011 |
| 28 | GM129 | V Belt (8/A91) (540 RPM) 93" |
| * | GM130 | V Belt (8/A96) (1000 RPM) 98" |
| 29 | GM131 | V Belt (2/A62) (540 RPM) 64" |
| * | GM132 | V Belt (2/A52) (1000 RPM) 54" |
| 30 | *GM274 | Key 5/16” x 1” Low Height (540 RPM) |
| | *G12 | Key 5/16" x 1" (1000 RPM) |
| 31 | GM410 | Spring (B11108) 540 RPM |
| * | GM454 | Spring (U10063) 1000 RPM |
| 32 | GM411 | Spring (13E29) |
| 33 | GM413 | Bearing (UCT208-24-11/16) |
| 34 | GM306 | Bolt 3/4" x 5" GR. 5 Full Thread |
| 35 | GM414 | 1/2-20 x 1.250" GR. 5 Bolt |
| 36 | GM415 | Input Yoke Washer |
| 37 | GM416 | Idler Pivot Bushing |
| 38 | GM417 | 3/4-10 Nut |
| 39 | GM445 | Slider Bearing Nut |
| 40 | GM423 | Flywheel Clutch Bracket |
| 41 | G89 | Grease Zerk (#1641) |

| ITEM # | PART # | DESC. |
|---|---|---|
| 42 | GM424 | 1/4-28 Grease Line Adapter |
| 43 | GM425 | Grease Line 61" |
| 44 | GM426 | Grease Line 30" |
| 45 | GM427 | Grease Line 20" |
| 46 | GM428 | Grease Line 85" |
| 47 | GM429 | 1/4-28 90° Adapter |
| 48 | GM435 | Safety Tread |
| 49 | GM41 | Flywheel |
| 50 | GM456 | 1/2"-20 x 1-1/4" GR 5 Bolt |
| 51 | GM124 | 540 Sheave Washer |
| 52 | GM40 | 1/4" x 1-1/4" Expansion Pin |
| 53 | T69 | 5/8" Lock Washer |

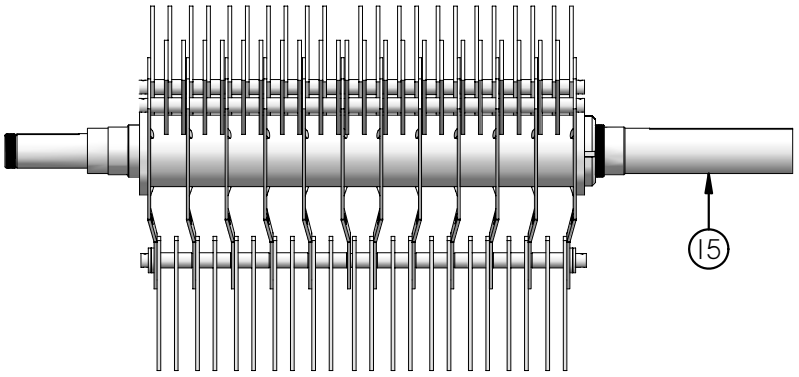
FIGURE 4
MILL



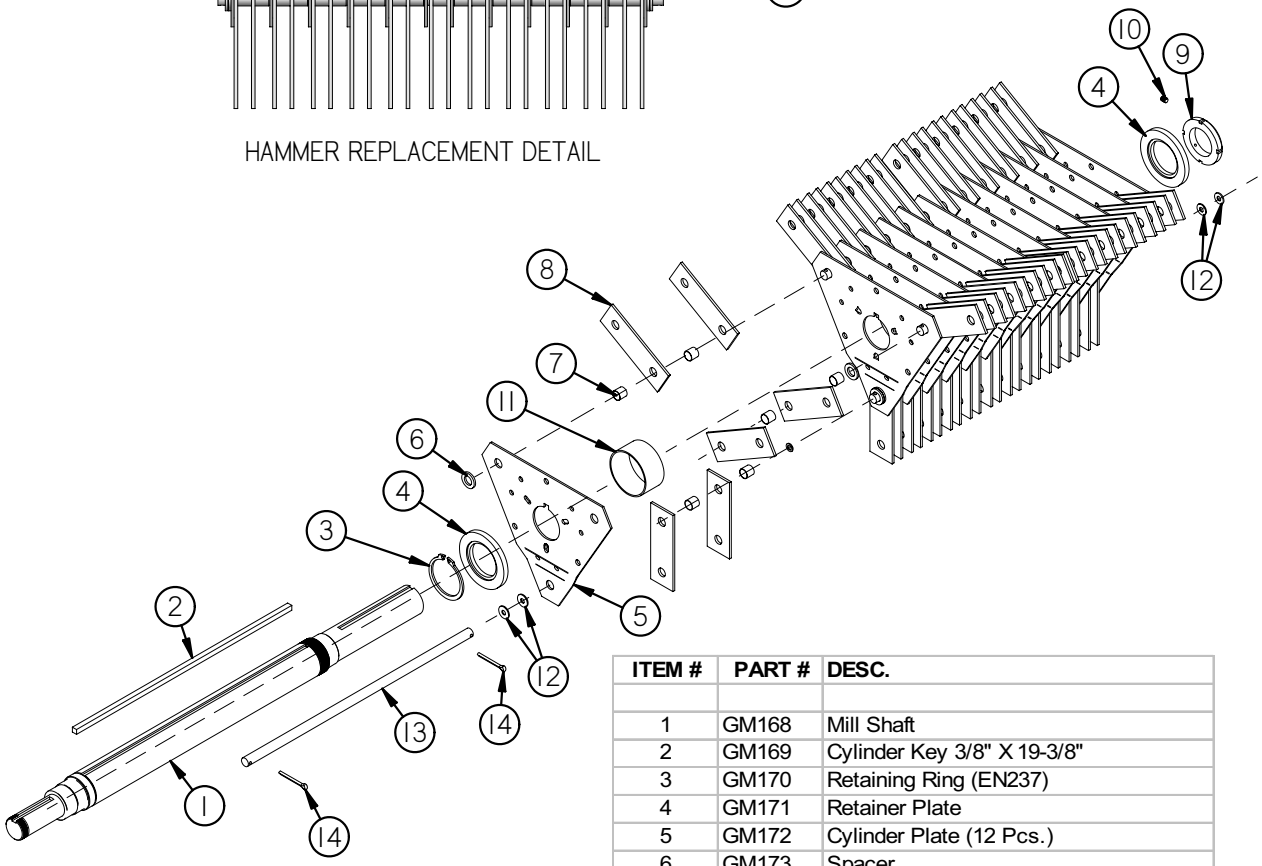
# Figure 4
# Mill

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM133 | Grinder Side Panel |
| 2 | GM134 | Mill Bottom Panel |
| 3 | GM135 | Mill Long Bolt 1/2" x 22.500" |
| 4 | GM136 | Screen Support |
| 5 | GM137 | Screen Guide Front |
| 6 | GM138 | Screen Guide Back |
| 7 | GM139 | Grinder Door |
| 8 | GM140 | Door Latch |
| 9 | GM141 | Bolt 3/8" x 21.875" |
| 10 | GM142 | Bearing Housing |
| 11 | GM143 | Cylinder Cover |
| 12 | GM144 | Mill Front Panel |
| 13 | GM145 | Throat Plate |
| 14 | GM146 | Grinder Top |
| 15 | GM147 | Mill Back Panel |
| 16 | GM148 | Front Blower Panel |
| 17 | GM149 | Blower Band |
| 18 | GM150 | Blower Fan |
| 19 | GM151 | Nut (N-08) |
| 20 | GM152 | Blower Back Panel |
| 21 | GM153 | Hammer Mill Screen 3/32" |
| * | GM154 | Hammer Mill Screen 1/8" |
| * | GM155 | Hammer Mill Screen 3/16" |
| * | GM156 | Hammer Mill Screen 1/4" |
| * | GM157 | Hammer Mill Screen 5/16" |
| * | GM158 | Hammer Mill Screen 3/8" |
| * | GM159 | Hammer Mill Screen 1/2" |
| * | GM160 | Hammer Mill Screen 5/8" |
| * | GM161 | Hammer Mill Screen 3/4" |
| * | GM162 | Hammer Mill Screen 1" |
| * | GM163 | Hammer Mill Screen 1-1/4" |
| * | GM164 | Hammer Mill Screen 1-1/2" |
| * | GM165 | Hammer Mill Screen 2" |
| 22 | GM166 | Door Hook |
| 23 | GM167 | Door Hook Pivot |
| 24 | GM370 | Handle Grip |
| 25 | GM351 | Infeed Chute For Infeed Conveyor |
| * | GM352 | Chute Magnet |
| 26 | GM353 | Infeed Flap |
| 27 | GM354 | Infeed Flap Rubber |
| 28 | GM355 | Infeed Flap Rubber Strap |
| 29 | GM358 | Infeed Chute Cover for Item # 25 |
| 30 | GM362 | Hopper Adjustment |
| 31 | GM363 | Grinder Throat Left |
| 32 | GM364 | Grinder Throat Right |
| 33 | GM365 | Chute Brace |
| 34 | GM366 | Chute Mid Shield |
| 35 | GM367 | Chute Top Shield |
| 36 | GM180 | Pivot Spacer |
| 37 | GM421 | Bearing (J211WDN) |
| 38 | GM419 | 1/8" Grease Line Adapter (244054) |
| 39 | GM431 | Locking Washer (WH-08) |
| 40 | GM432 | 3/8-16 Set Screw w/Point |
| 41 | S355 | 3/8-16 Jam Nut |
| 42 | GM433 | Chute Stop |
| 43 | GM435 | Safety Tread |
| 44 | GM448 | Fan Spacer |
| 45 | GM449 | Bearing Spacer |
| 46 | GM450 | Seal (2608) |
| 47 | GM462 | 3/8" x 2-1/2" Key |
| 48 | GM316 | Blower Band Angle |
| 49 | GM323 | 3/8" x 8-1/2" GR5 Bolt |
| 50 | GM457 | Service Port Cover |

# FIGURE 5
# MILL CYLINDER

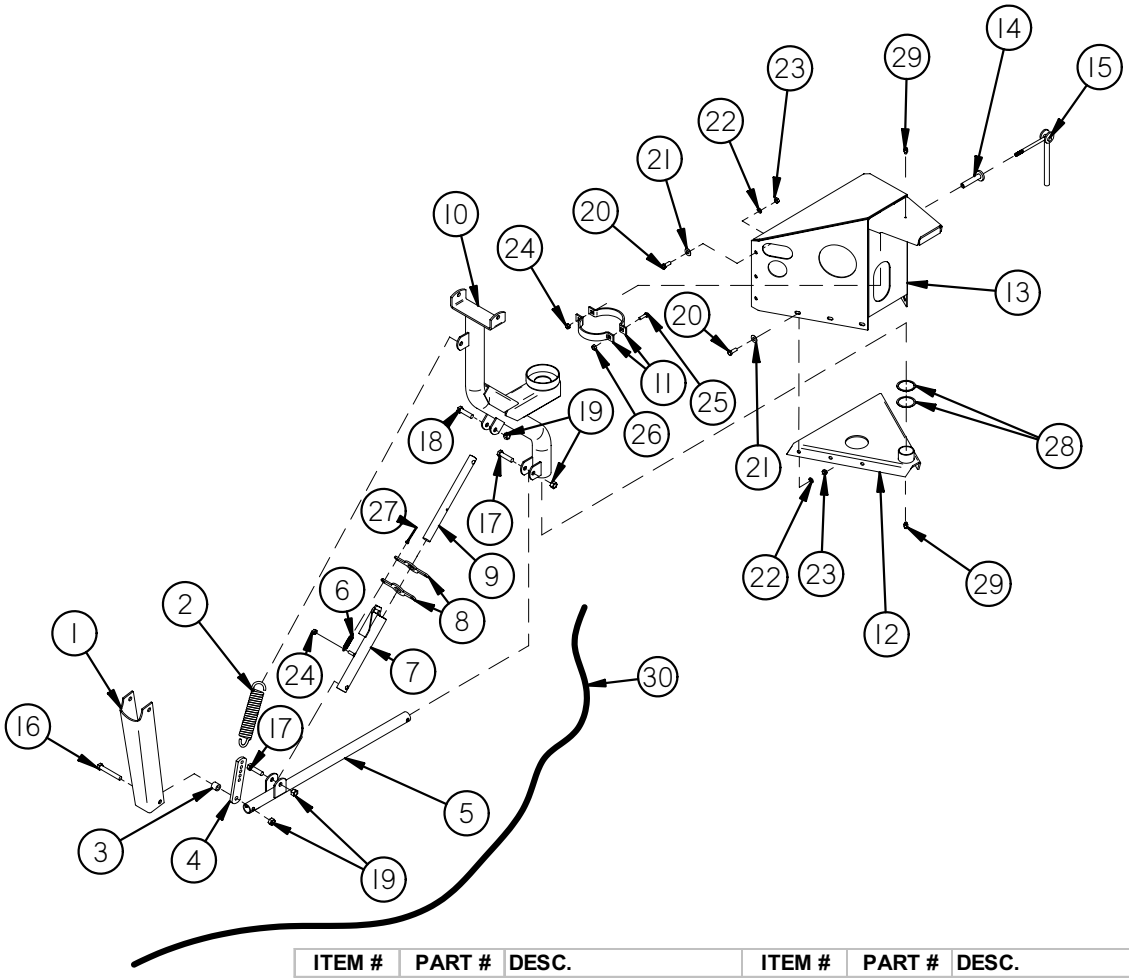



HAMMER REPLACEMENT DETAIL



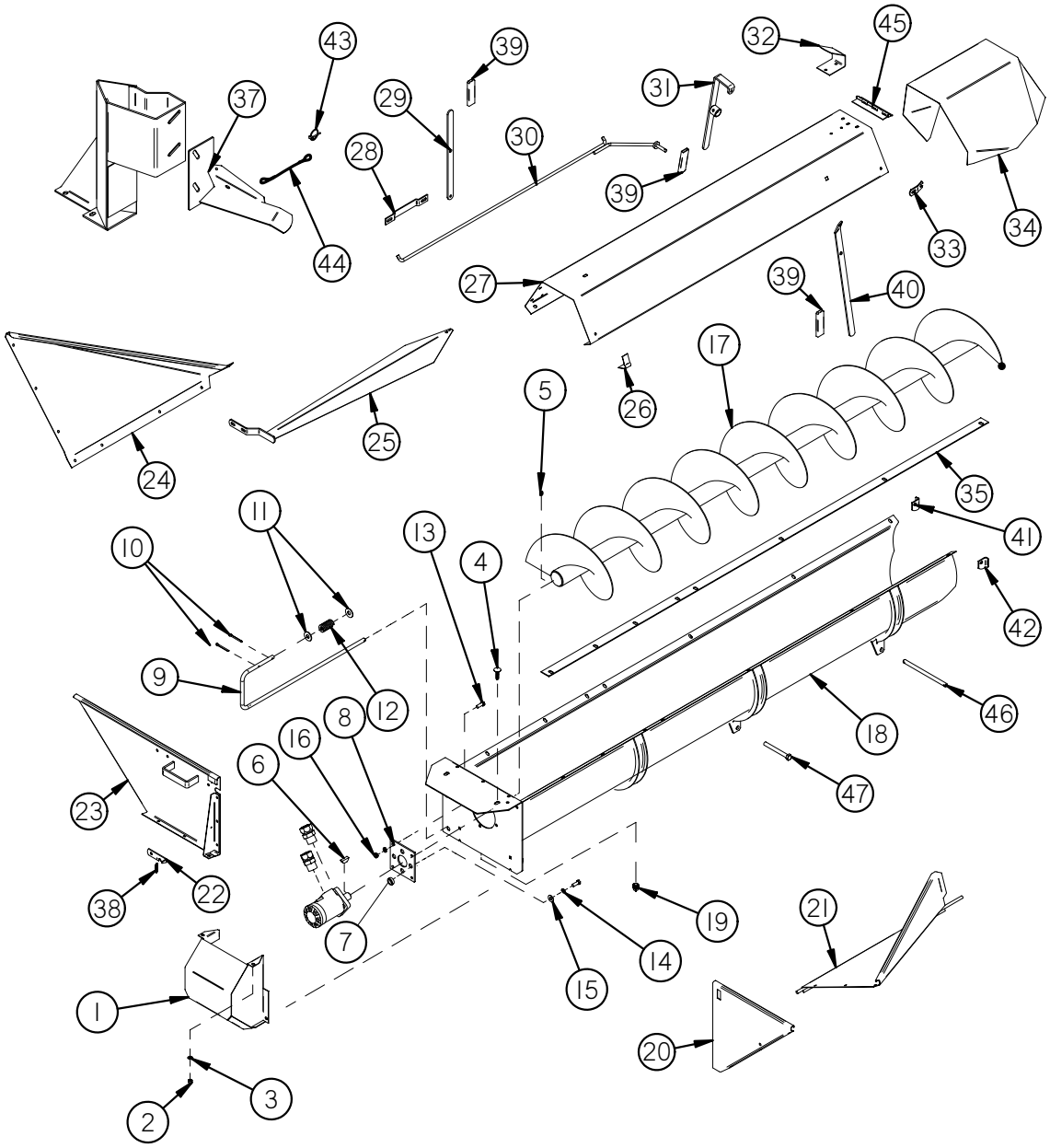

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM168 | Mill Shaft |
| 2 | GM169 | Cylinder Key 3/8" X 19-3/8" |
| 3 | GM170 | Retaining Ring (EN237) |
| 4 | GM171 | Retainer Plate |
| 5 | GM172 | Cylinder Plate (12 Pcs.) |
| 6 | GM173 | Spacer |
| 7 | GM174 | Hammer Spacer |
| 8 | GM175 | Hammer ( 66 Pcs.) |
| 9 | GM176 | Cylinder Shaft Nut (N-12) |
| 10 | GM277 | Set Screw 1/4"-20 X .375 |
| 11 | GM177 | Spacer Plate |
| 12 | GM430 | Balance Washer (4 Pcs ) |
| 13 | GM44 | Hammer Shaft |
| 14 | HSB53 | Cotter Pin (3/16" x 1-1/4") |
| 14 | HSB53 | Cotter Pin (3/16" x 1-1/4") |
| 15 | GM451 | Complete Mill Cylinder |

# FIGURE 6
# INFEED CONVEYOR PIVOT




| ITEM # | PART # | DESC. | ITEM # | PART # | DESC. |
|---|---|---|---|---|---|
| 1 | GM203 | Support | 16 | LW131 | 1/2" X 3-1/2" Bolt |
| 2 | GM204 | Spring (40174) | 17 | BFR119 | 1/2" X 2-1/4" Bolt |
| 3 | GM205 | Spacer | 18 | F52 | 1/2" X 2" Bolt |
| 4 | GM206 | Spring Adjustment | 19 | R11 | 1/2" Lock Nut |
| 5 | GM207 | Pivot Linkage | 20 | X111 | 3/8" X 1" Bolt |
| 6 | GM208 | Spring (17H387) | 21 | X67 | 3/8" Flat Washer |
| 7 | GM209 | Locking Tube | 22 | B68 | 3/8" Lock Washer |
| 8 | GM210 | Locking Lever | 23 | K60 | 3/8" Nut |
| 9 | GM211 | Locking Shaft | 24 | K93 | 3/8" Lock Nut |
| 10 | GM212 | Pivot Main Support | 25 | GM218 | 5/16" X 1-1/4" Bolt |
| 11 | GM213 | Brake Band | 26 | D81 | 5/16" Lock Nut |
| 12 | GM214 | Bottom Support | 27 | HSB55 | 3/16" X 1" Cotter Pin |
| 13 | GM215 | Top Support | 28 | GM219 | Pivot Spacer |
| 14 | GM216 | Lever Guide | 29 | RG51 | Grease Fitting 90° |
| 15 | GM217 | Brake Lever | 30 | GM434 | Trip Rope |
| | | | | | |

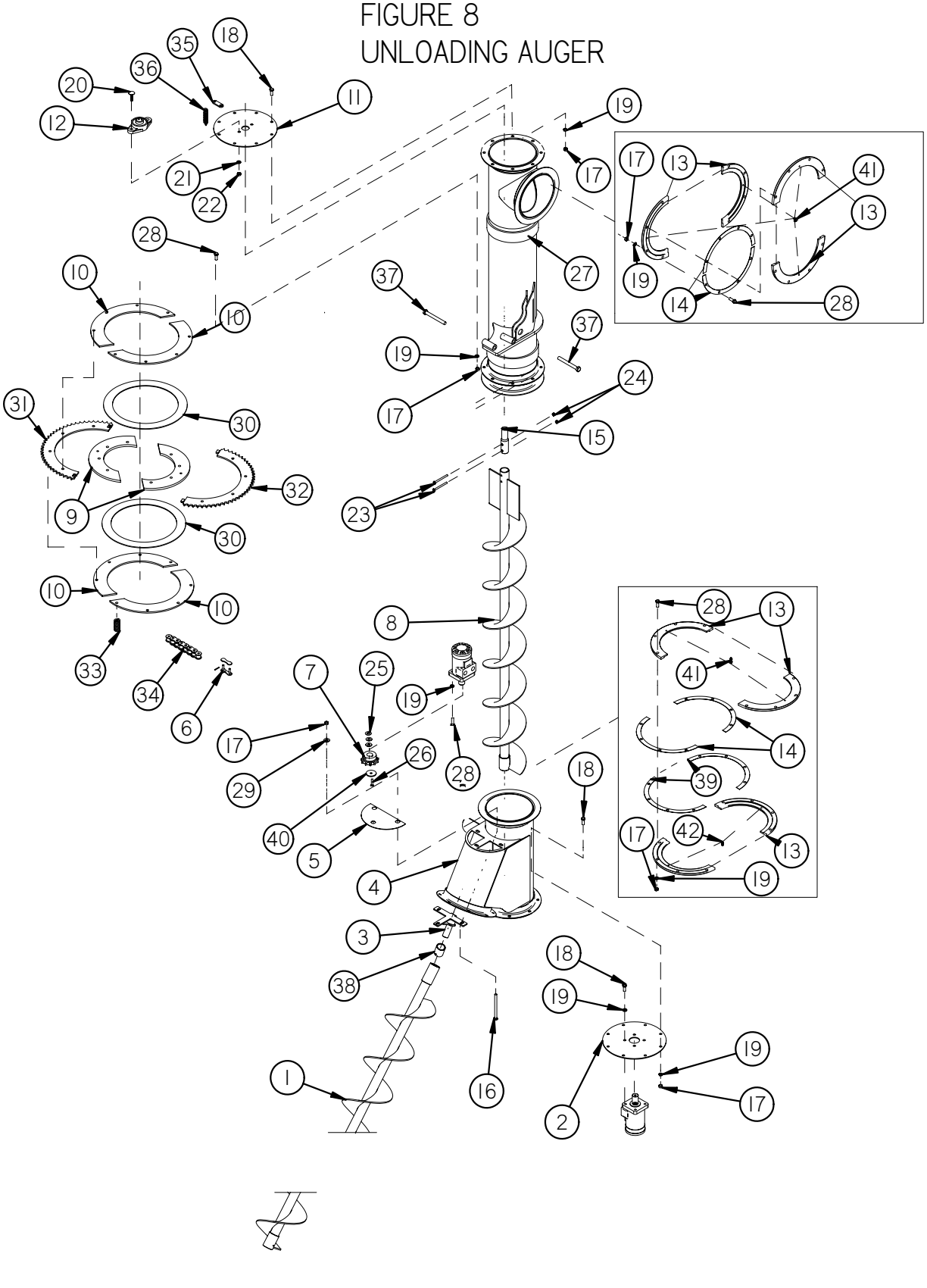
FIGURE 7
INFEED CONVEYOR



# Figure 6
# Infeed Conveyor

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM178 | Shield |
| 2 | T116 | 5/16" Nut |
| 3 | RGB39 | 5/16" Lock Washer |
| 4 | GM179 | 5/16" X 1" Carriage Bolt |
| 5 | BFR22 | 1/4"-20 x 1/2" Set Screw |
| 6 | 5B10 | 1/4" Key |
| 7 | GM180 | Spacer |
| 8 | GM181 | Motor Mount |
| 9 | GM182 | Handle Latch |
| 10 | X43 | 1/8" X 1" Cotter Pin |
| 11 | K68 | 1/2" Flat Washer |
| 12 | 17G128 | Spring |
| 13 | G110 | 3/8" X 3/4" Bolt |
| 14 | B68 | 3/8" Lock Washer |
| 15 | X67 | 3/8" Flat Washer |
| 16 | K60 | 3/8" Nut |
| 17 | GM184 | Auger |
| 18 | GM185 | Trough |
| 19 | GM202 | 1/2" Plug (5406-8P) |
| 20 | GM186 | Trough End Right |
| 21 | GM187 | Side Trough |
| 22 | GM188 | Trough Latch |
| 23 | GM189 | Trough End |
| 24 | GM190 | Trough Side Left |
| 25 | GM191 | Auger Guard |
| 26 | GM192 | Support Pivot |
| 27 | GM193 | Conveyor Cover |
| 28 | GM194 | Handle Guide |
| 29 | GM195 | Handle |
| 30 | GM196 | Flow Control Rod |
| 31 | GM197 | Flow Control Handle |
| 32 | GM198 | Trough Extension Stop |
| 33 | GM199 | Cover Holder |
| 34 | GM200 | Trough Extension |
| 35 | GM201 | Scraper |
| 36 | GM54 | Transport Post |
| 37 | GM75 | Transport Support |
| 38 | GM208 | Latch Spring (17H387) |
| 39 | GM370 | Handle Grip |
| 40 | GM371 | Control Handle |
| 41 | GM372 | Cover Stop Right |
| 42 | GM373 | Cover Stop Left |
| 43 | PB190 | Lynch Pin |
| 44 | S122 | Lanyard |
| 45 | GM126 | Hinge |
| 46 | GM458 | Pivot Pin |
| 47 | BFR224 | 1/2" x 4-1/2" GR5 Bolt |

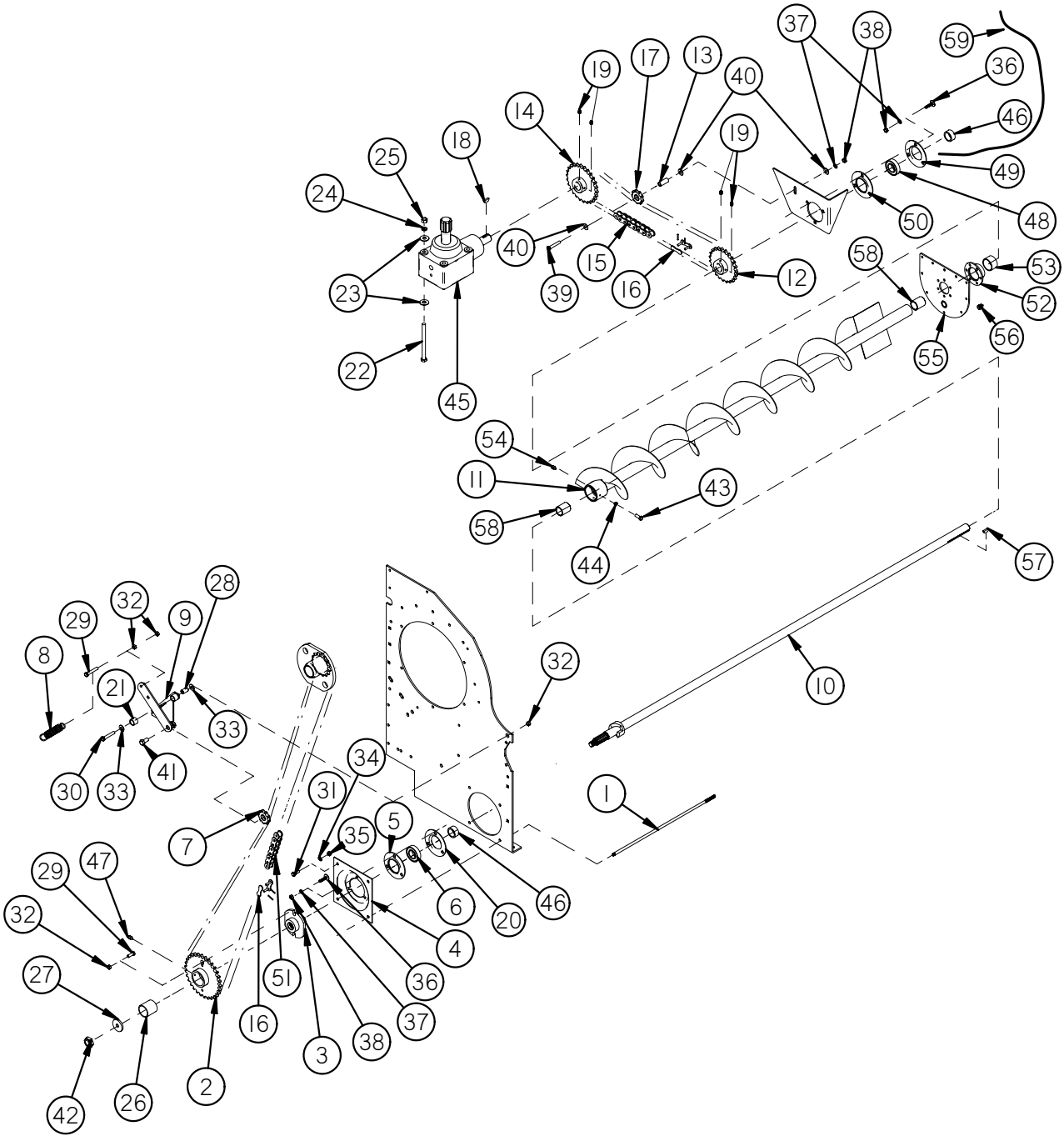
FIGURE 8
UNLOADING AUGER



# Figure 8
# Unloading Auger

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM220 | Tank Unloading Auger |
| 2 | GM221 | Auger Drive Cap |
| 3 | GM222 | Auger Shaft |
| 4 | GM223 | Auger Tube |
| 5 | GM224 | Overflow Cover |
| 6 | D39 | #60 Connector Link |
| 7 | GM226 | Sprocket 60-B11 |
| 8 | GM227 | Vertical Auger |
| 9 | GM228 | Clutch Plate |
| 10 | GM229 | Clutch Face |
| 11 | GM230 | End Cap |
| 12 | T40 | Bearing |
| 13 | GM231 | Collar |
| 14 | GM232 | Collar Shim |
| 15 | GM233 | Vertical Auger Shaft |
| 16 | 17G141 | 3/8" X 1-1/2" GR.5 Bolt |
| 17 | K60 | 3/8" Nut |
| 18 | 80N57 | 3/8" X 3/4" Bolt |
| 19 | B68 | 3/8" Lock Washer |
| 20 | GM179 | 5/16" X 1" Carriage Bolt |
| 21 | GRB39 | 5/16' Lock Washer |
| 22 | T116 | 5/16" Nut |
| 23 | GM235 | 1/4" X 2 1/4" Bolt |
| 24 | D65 | 1/4" Lock Nut |
| 25 | T16 | 1/4" Flat Washer |
| 26 | 23N223 | 1/4" X 1 1/4" Bolt |
| 27 | GM236 | Pivot Tube |
| 28 | 17G141 | 3/8" X 1 1/4" Bolt |
| 29 | X67 | 3/8" Flat Washer |
| 30 | GM237 | Clutch |
| 31 | GM238 | Turn Sprocket B |
| 32 | GM239 | Turn Sprocket A |
| 33 | WM210 | Clutch Spring (Red) |
| 34 | GM409 | #60 Chain x 81 Pitches |
| 35 | GM436 | Hose Holder |
| 36 | 23N187 | Spring |
| 37 | 9S16 | 1/2" x 4-1/2" Bolt (Full Thread) |
| 38 | RG11 | Bushing (1.010" ID x 1-1/4" x 2") |
| 39 | GM459 | Collar Shim |
| 40 | GM461 | Pinion Stop |
| 41 | RG51 | 1/4-28 90° Grease Zerk (1911) |
| 42 | G89 | 1/4-28 Grease Zerk (1641) |

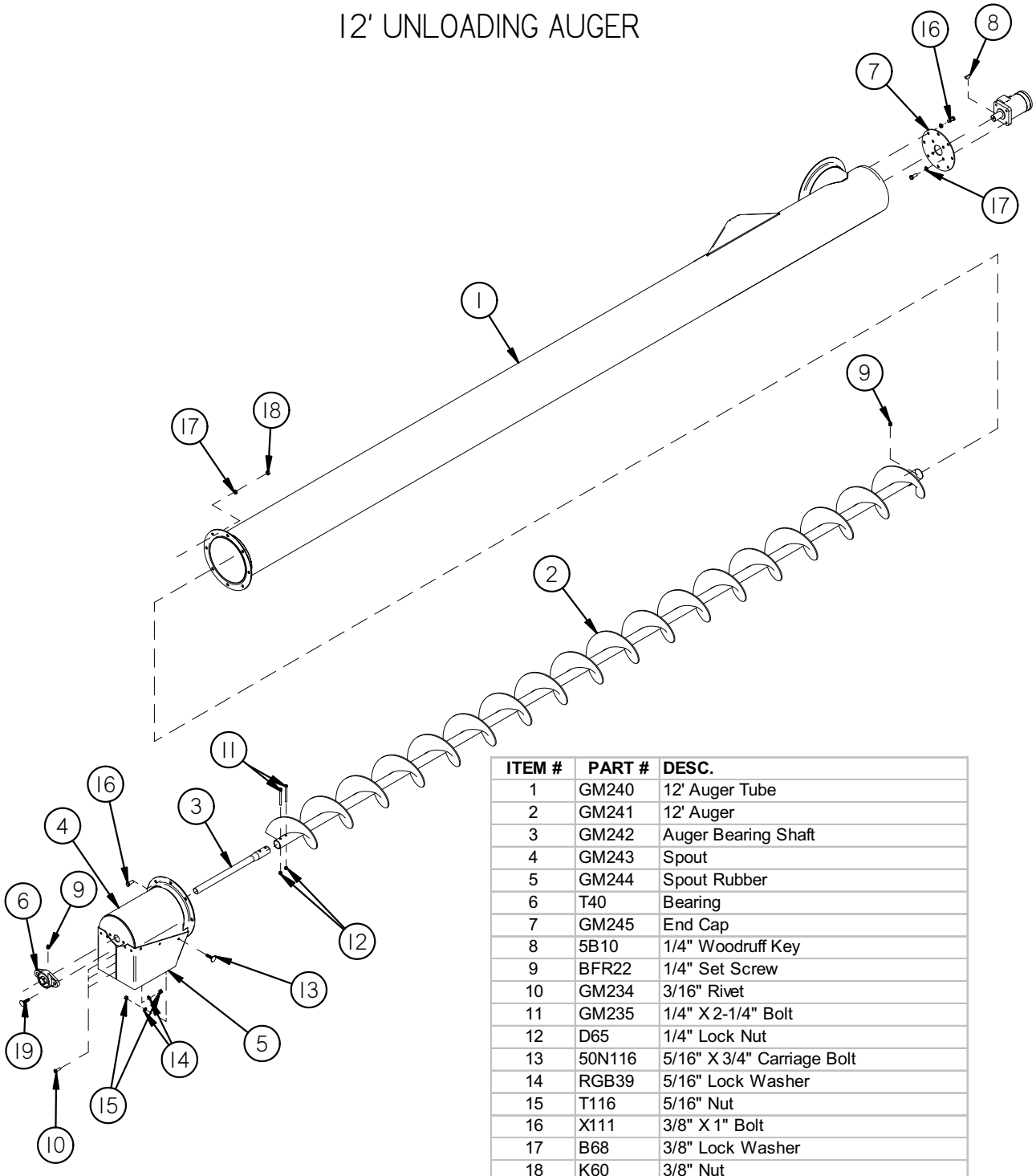
FIGURE 9
CONVEYOR DRIVE



# Figure 9
# Conveyor Drive

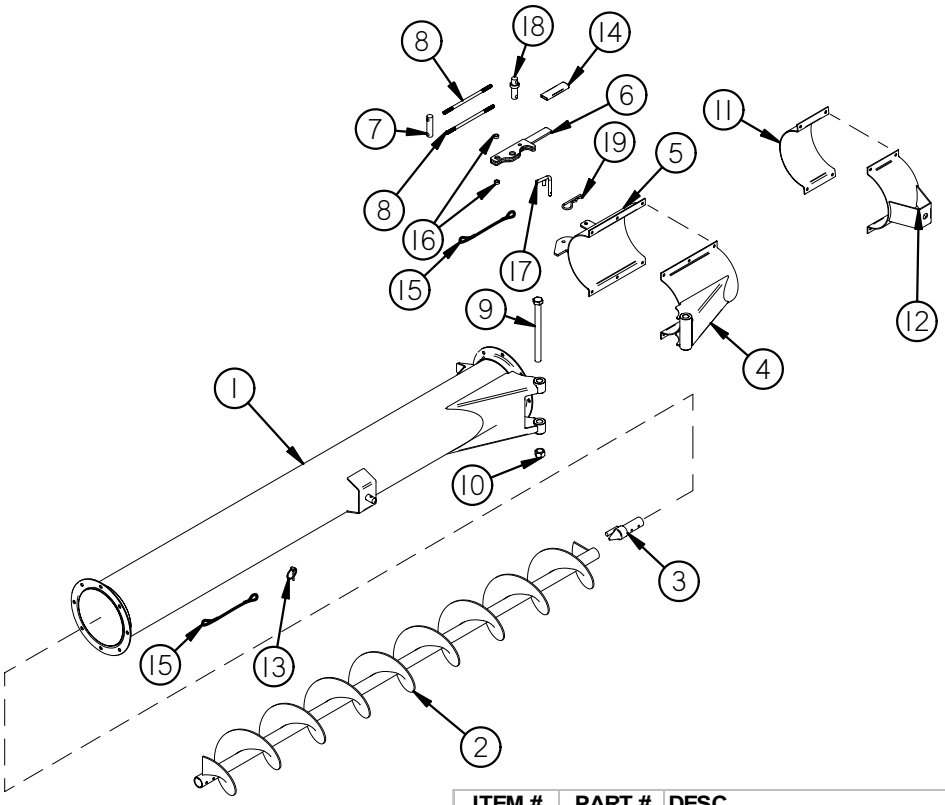
| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM141 | Rod 3/8" X 21.875" |
| 2 | GM247 | Sprocket 30T (540 RPM) |
| * | GM248 | Sprocket 54T (1000 RPM) |
| 3 | GM249 | Shear Flange |
| 4 | GM250 | Bearing Bracket |
| 5 | F14 | Bearing Flange |
| 6 | F115 | Bearing 1-1/4" |
| 7 | GM251 | Idler Sprocket (60A15) |
| * | GM246 | Bearing (203 RR2 USA Fafnir) |
| 8 | GM252 | Idler Spring (077055) |
| 9 | GM253 | Idler Bracket |
| 10 | GM254 | Trans. Drive Shaft |
| 11 | GM255 | Intake Conveyor Auger |
| 12 | GM291 | Sprocket 23T |
| 13 | GM292 | Idler Spacer |
| 14 | GM293 | Sprocket 26T |
| 15 | GM294 | #60 Chain X 48 Pitch |
| 16 | D39 | #60 Connector Link |
| 17 | GM422 | Idler Sprocket 8 Tooth |
| * | WM125 | Bearing Sprocket (SKF 6000-2RSJEM) |
| 18 | GM295 | 5/16" x 1-1/4" Woodruff Key |
| 19 | S435 | 5/16" X 3/8" Set Screw |
| 20 | F114A | Bearing Flange Greaseable 45° |
| 21 | GM296 | Idler Pivot Bushing (3/4" OD x .635" ID x 3/4") |
| 22 | BFR405 | 1/2" X 5-1/2" Bolt |
| 23 | K68 | 1/2" Flat Washer |
| 24 | R35 | 1/2" Lock Washer |
| 25 | R29 | 1/2" Nut |
| 26 | GM297 | Bushing (2.015 ID X 2-1/4 OD X1.312) |
| 27 | GM298 | Transfer Auger Sprocket Washer |
| 28 | GM299 | Tensioner Pivot |
| 29 | RGB38 | 5/16" X 1" GR. 5 Bolt |
| 30 | 12V126 | 5/16" X 2" Bolt |
| 31 | 12V66 | 5/16" X 3/4" Bolt GR 5 |
| 32 | D81 | 5/16" Lock Nut |
| 33 | GM300 | 5/16" Flat Washer |
| 34 | RGB39 | 5/16" Lock Washer |
| 35 | T116 | 5/16" Nut |
| 36 | BFR247 | 3/8" X 1" Carriage Bolt |
| 37 | B68 | 3/8" Lock Washer |
| 38 | K60 | 3/8" Nut |
| 39 | T123 | 3/8" X 2-1/4" Bolt |
| 40 | X67 | 3/8" Flat Washer |
| 41 | 50N183 | 5/8" X 1-1/4" Bolt |
| 42 | BFR104 | 3/4" Nylock Nut (Thin) |
| 43 | D110 | 1/4" X 1" Bolt GR. 5 |
| 44 | D65 | 1/4" Lock Nut |
| 45 | GM273 | Gearbox |
| 46 | F16 | Lock Collar |
| 47 | G89 | Grease Zerk |
| 48 | WM29 | Bearing (SA207-20G) |
| 49 | F143 | Flange (Greaseable) |
| * | GM424 | 1/4"-28 Grease Line Adapter |
| 50 | F145 | Flange |
| 51 | GM361 | #60 Chain X 66 Pitches (540RPM) |
| * | GM343 | #60 Chain X 76 Pitches (1000 RPM) |
| 52 | GM393 | Auger Seal |
| 53 | S50 | Bushing (A-2001 x 1-1/8") |
| 54 | G89 | Grease Zerk (#1641) |
| 55 | GM441 | Auger Transition Cap |
| 56 | GM202 | 1/2" Plug (5406-8P) |
| 57 | G23 | Key 5/16" x 1-3/8" |
| 58 | RG132 | Bushing (1.265 ID x 1-1/2" x 2" S-1503) |
| 59 | GM36 | Grease Line 30" |

# FIGURE 10
# 12' UNLOADING AUGER



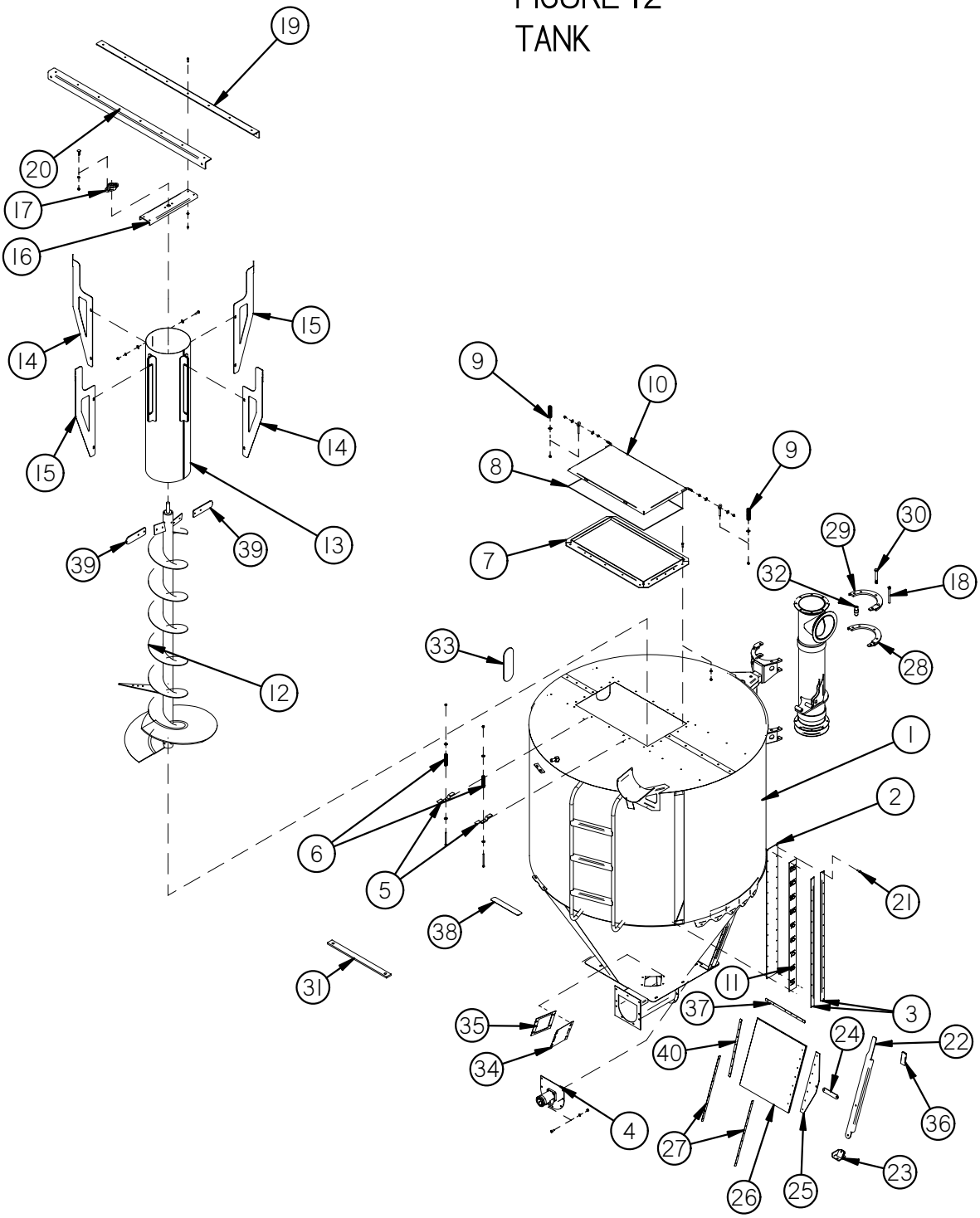

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | GM240 | 12' Auger Tube |
| 2 | GM241 | 12' Auger |
| 3 | GM242 | Auger Bearing Shaft |
| 4 | GM243 | Spout |
| 5 | GM244 | Spout Rubber |
| 6 | T40 | Bearing |
| 7 | GM245 | End Cap |
| 8 | 5B10 | 1/4" Woodruff Key |
| 9 | BFR22 | 1/4" Set Screw |
| 10 | GM234 | 3/16" Rivet |
| 11 | GM235 | 1/4" X 2-1/4" Bolt |
| 12 | D65 | 1/4" Lock Nut |
| 13 | 50N116 | 5/16" X 3/4" Carriage Bolt |
| 14 | RGB39 | 5/16" Lock Washer |
| 15 | T116 | 5/16" Nut |
| 16 | X111 | 3/8" X 1" Bolt |
| 17 | B68 | 3/8" Lock Washer |
| 18 | K60 | 3/8" Nut |
| 19 | GM179 | 5/16" X 1" Carriage Bolt |

# FIGURE 11
# 3' & 6' AUGER EXTENSION




| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM278 | 6' Extension |
| * | GM279 | 3' Extension |
| 2 | GM280 | 6' Auger |
| * | GM281 | 3' Auger |
| 3 | GM282 | Auger Connect Shaft |
| 4 | GM283 | Pivot Clamp |
| 5 | GM284 | Latch Clamp |
| 6 | GM285 | Latch Handle |
| 7 | GM286 | Latch Pivot Shaft |
| 8 | GM287 | Latch Rod |
| 9 | GM288 | Bolt 3/4" x 9" GR.5 |
| 10 | HE7 | 3/4"-10 Lock Nut |
| 11 | GM289 | Transport Lock Clamp |
| 12 | GM290 | Transport Lock Latch |
| 13 | PB190 | Lynch Pin |
| 14 | S403 | Handle Grip |
| 15 | S122 | Lanyard |
| 16 | GM180 | Pivot Spacer |
| 17 | GM39 | Latch Pin |
| 18 | GM369 | Latch Pivot Pin |
| 19 | ES7 | Hair Pin |

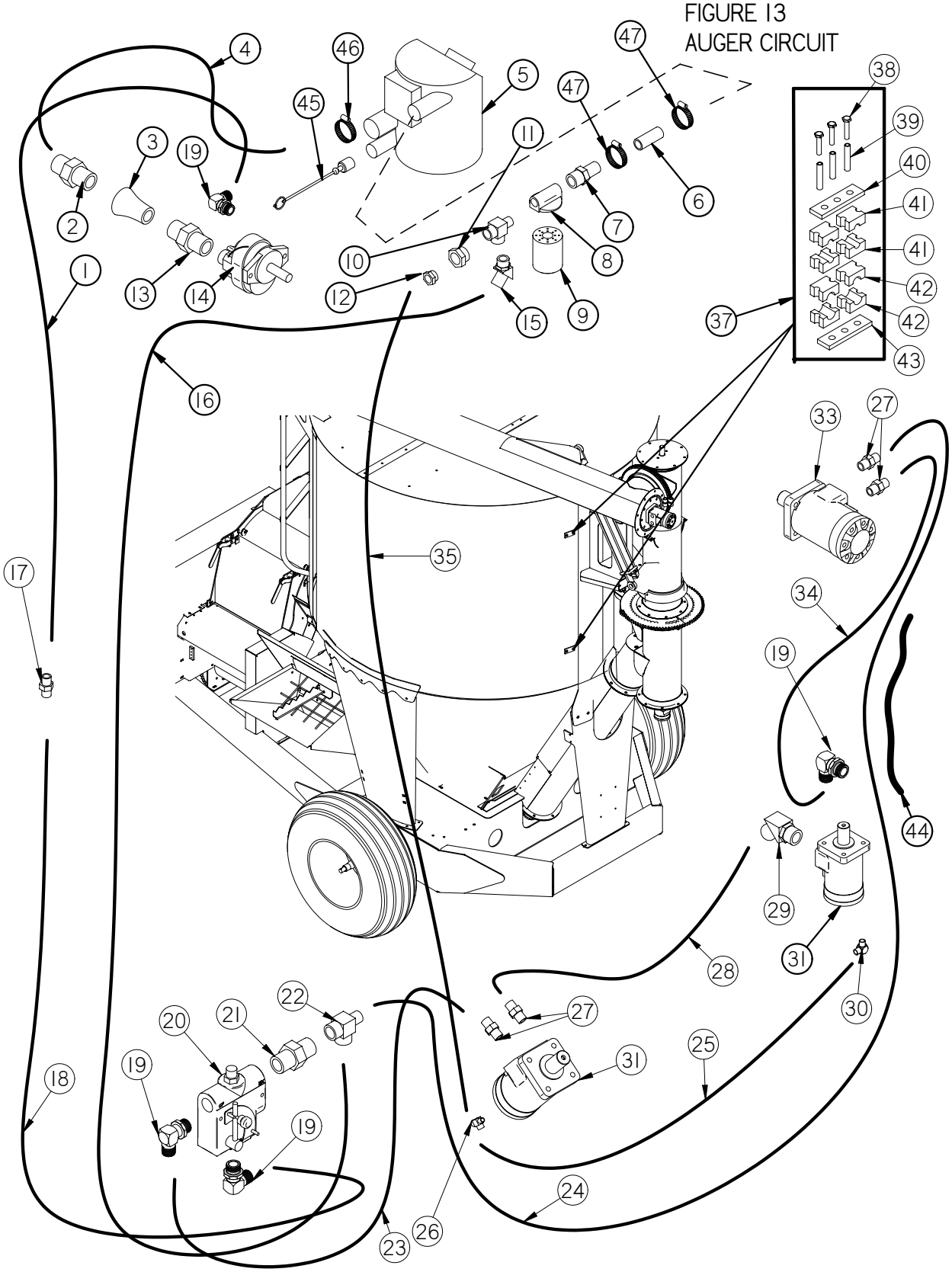
# FIGURE 12
# TANK



# Figure 12
# Tank

| | PART # | DESC. |
|---|---|---|
| 1 | GM301 | Tank |
| 2 | GM302 | Window |
| 3 | GM303 | Window Frame |
| 4 | GM304 | Motor Mount |
| 5 | GM305 | Lid Latch |
| 6 | GM225 | Latch Spring (A262) |
| 7 | GM307 | Lid Frame |
| 8 | GM308 | Lid Gasket |
| 9 | GM309 | I Bolt & Spring Assy. (A162 Spring) |
| 10 | GM310 | Lid |
| 11 | GM3119 | Decal (Bushel Scale) |
| 12 | GM311 | Mixing Auger |
| 13 | GM312 | Mixing Auger Tube |
| 14 | GM313 | Mixing Tube Support B |
| 15 | GM314 | Mixing Tube Support |
| 16 | GM315 | Mixing Auger Top Support |
| 17 | T40 | Bearing |
| 18 | GM463 | 1/2" x 5" GR.5 Bolt (Full Thread) |
| 19 | GM317 | Tank Top Frame Channel Back |
| 20 | GM318 | Tank Top Frame Channel Front |
| 21 | GM234 | Pop Rivit 3/16" x .700" (0155997) |
| 22 | GM334 | Door Handle |
| 23 | GM335 | Door Stop |
| 24 | GM336 | Door Linkage |
| 25 | GM337 | Door Edge |
| 26 | GM338 | Door |
| 27 | GM339 | Door Seal Strap |
| * | GM348 | Rubber Door Seal Front (Left) |
| * | GM349 | Rubber Door Seal Back (Right) |
| 28 | GM340 | Split Ring Bottom |
| 29 | GM341 | Split Ring Top |
| 30 | GM342 | Step Bolt |
| 31 | GM442 | Poly Strip |
| 32 | GM345 | Roller |
| 33 | GM346 | Top Sight Window |
| * | GM347 | Window Gasket |
| 34 | GM356 | Cleanout Door |
| 35 | GM357 | Cleanout Gasket |
| 36 | S403 | Handle Grip |
| 37 | GM391 | Inside Door Seal Strap |
| * | GM392 | Inside Door Seal |
| 38 | GM435 | Safety Tread |
| 39 | GM437 | Paddle Mixer |
| 40 | GM438 | Door Seal Strap |
| * | GM439 | Rubber Door Seal |

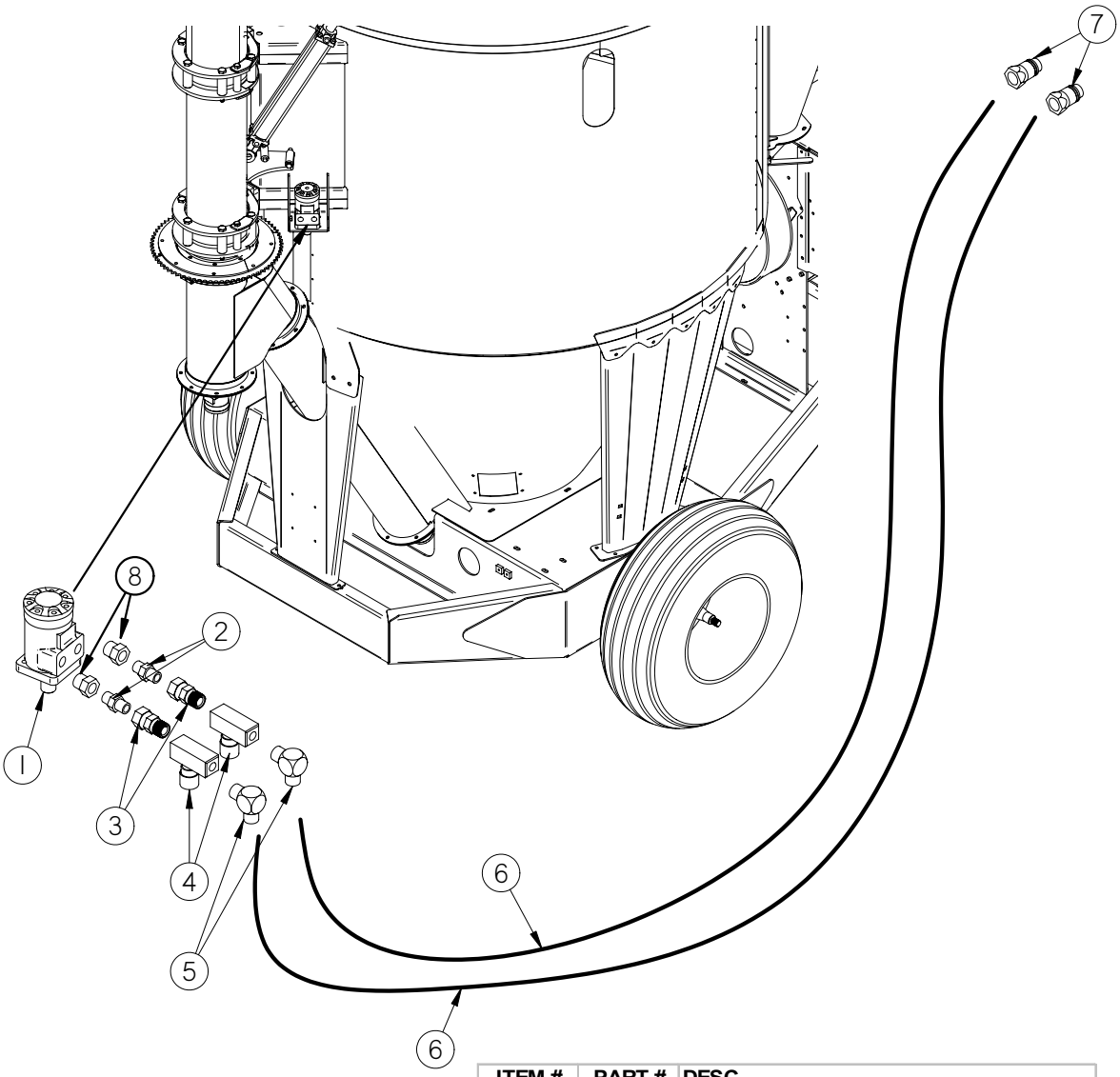
FIGURE 13
AUGER CIRCUIT



# Figure 13
# Auger Circuit

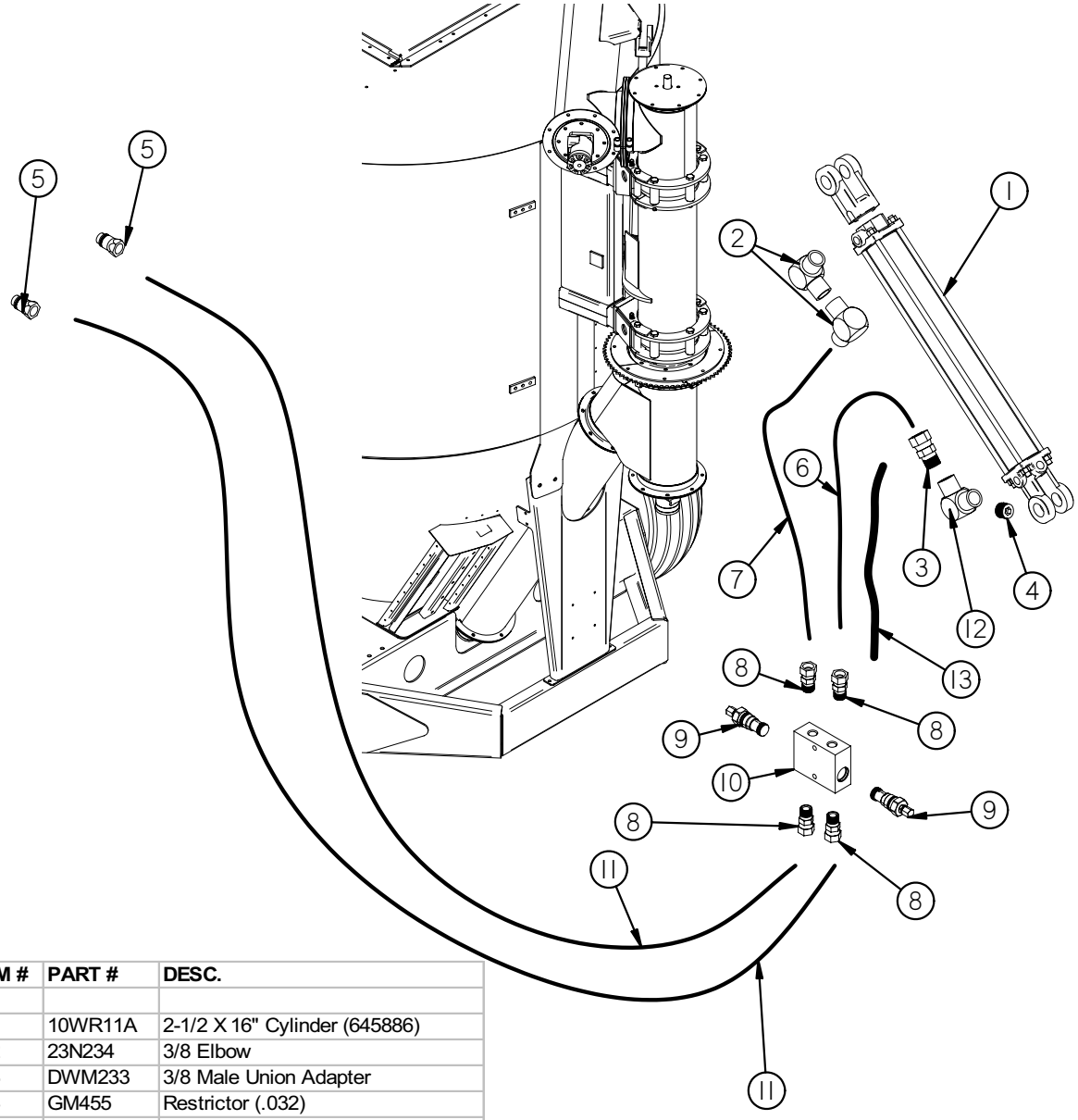
| | PART # | DESC. |
|---|---|---|
| 1 | GM1 | 1/2 X 32" Hose |
| 2 | GM2 | Adapter (24FTX-S) |
| 3 | GM3 | Pipe Reducer (1 1/2 NPT TO 3/4) |
| 4 | GM4 | 1 1/2 X 64" Suction Hose |
| 5 | GM5 | Resevoir |
| 6 | GM6 | 3/4 X 3" Hose |
| 7 | GM7 | 3/4" Hose Barb |
| 8 | LW288 | Filter Head |
| 9 | LW289 | Filter Element |
| 10 | GM10 | 3/4 Street Tee (3/4 MRO) |
| 11 | GM11 | Reducer (3/4 X 1/4 PTR) |
| 12 | GM12 | Adapter (4-4 FTX) |
| 13 | GM13 | Adapter (12-3/4 F50F-S) |
| 14 | GM14 | Pump |
| 15 | GM15 | 45° Elbow (12VTX) |
| 16 | GM16 | 3/4 X 76" Hose |
| 17 | GM17 | Union (8 HTX) |
| 18 | GM18 | 1/2 X 30" Hose |
| 19 | GM19 | Elbow (8-10 C50X) |
| 20 | GM20 | Flow Control |
| 21 | GM21 | Adapter (12-10 F50X-S) |
| 22 | GM22 | Tee (12R6X) |
| 23 | GM23 | 1/2 X 30" Hose |
| 24 | GM24 | 1/2 X 160" Hose |
| 25 | GM25 | 1/4 X 80" Hose |
| 26 | GM26 | Tee (4R50X-S) |
| 27 | GM27 | Adapter (8-10 F50X) |
| 28 | GM28 | 1/2 X 79" Hose |
| 29 | GM29 | 45° Elbow (8-10 V50X) |
| 30 | GM30 | Elbow (4C50X-S) |
| 31 | GM31 | Motor (101-2116-009) |
| 33 | GM33 | Motor (101-1010-009) |
| 34 | GM34 | 1/2x116 Hose |
| 35 | GM35 | 1/4 X 51" Hose |
| 37 | GM8 | Hose Clamp 3/8" X 1/2" (Complete) |
| 38 | GM62 | Bolt |
| 39 | GM63 | Tube |
| 40 | GM64 | Top Plate |
| 41 | GM65 | 3/8" Insert |
| 42 | GM66 | 1/2" Insert |
| 43 | GM67 | Weld Plate |
| 44 | GM32 | Spiral Wrap (HG125) 1-1/4" x 2' |
| 45 | GM37 | Port Cap (TFH-38) |
| 46 | GM38 | 1-1/2" Hose Clamp |
| 47 | DWM123 | 1" Hose Clamp |

# FIGURE 14
# AUGER SWING CIRCUIT



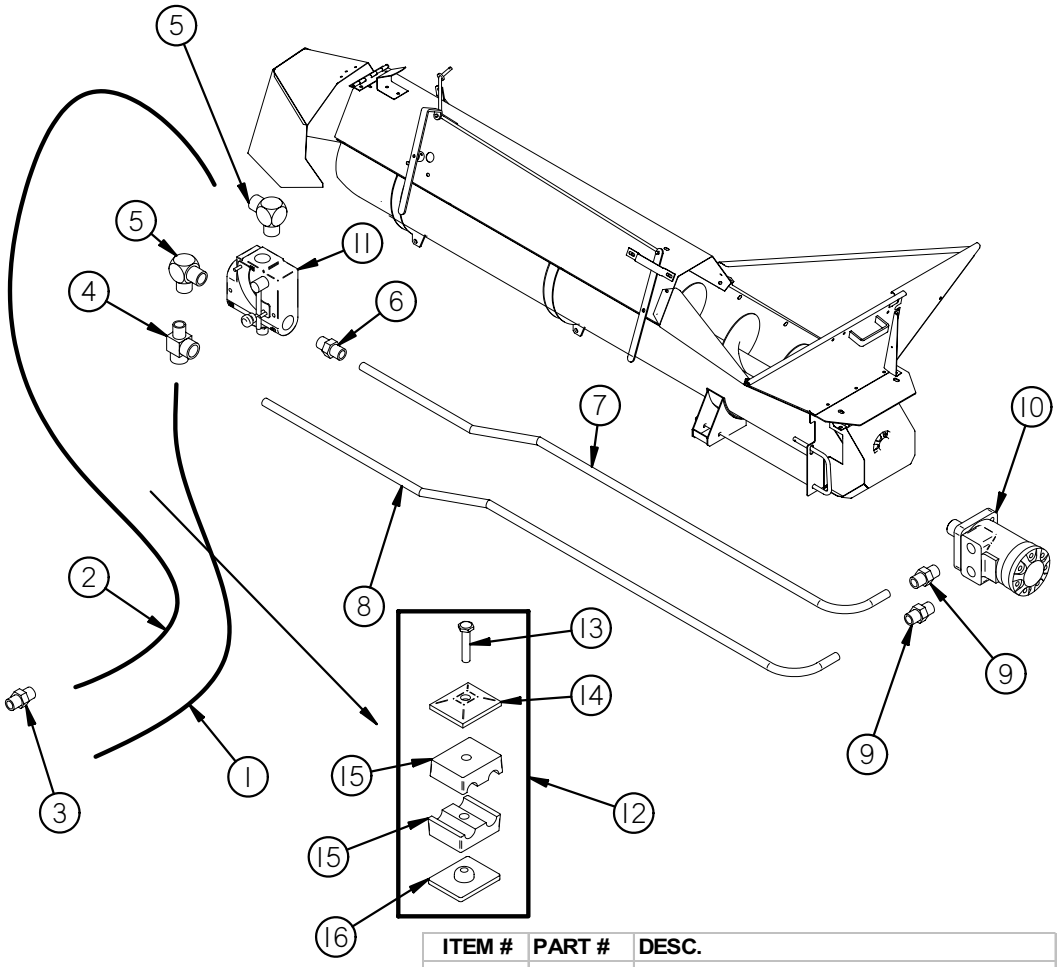

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM412 | Motor (Parker) TB0390FP100AAAB |
| 2 | 16SV351 | 3/8" Nipple Nut (5404-6-6) |
| 3 | DWM233 | 3/8" Male Union Adapter |
| 4 | CHM265 | Needle Valve (F600S) |
| 5 | GM42 | Elbow (6-6 CTX) |
| 6 | GM43 | 3/8 X 264" Hose |
| 7 | DWM205 | 1/2 Male Coupler |
| 8 | JB82 | Bushing 1/2" to 3/8" (5406-8-6) |

# FIGURE 15
# AUGER LIFT CIRCUIT



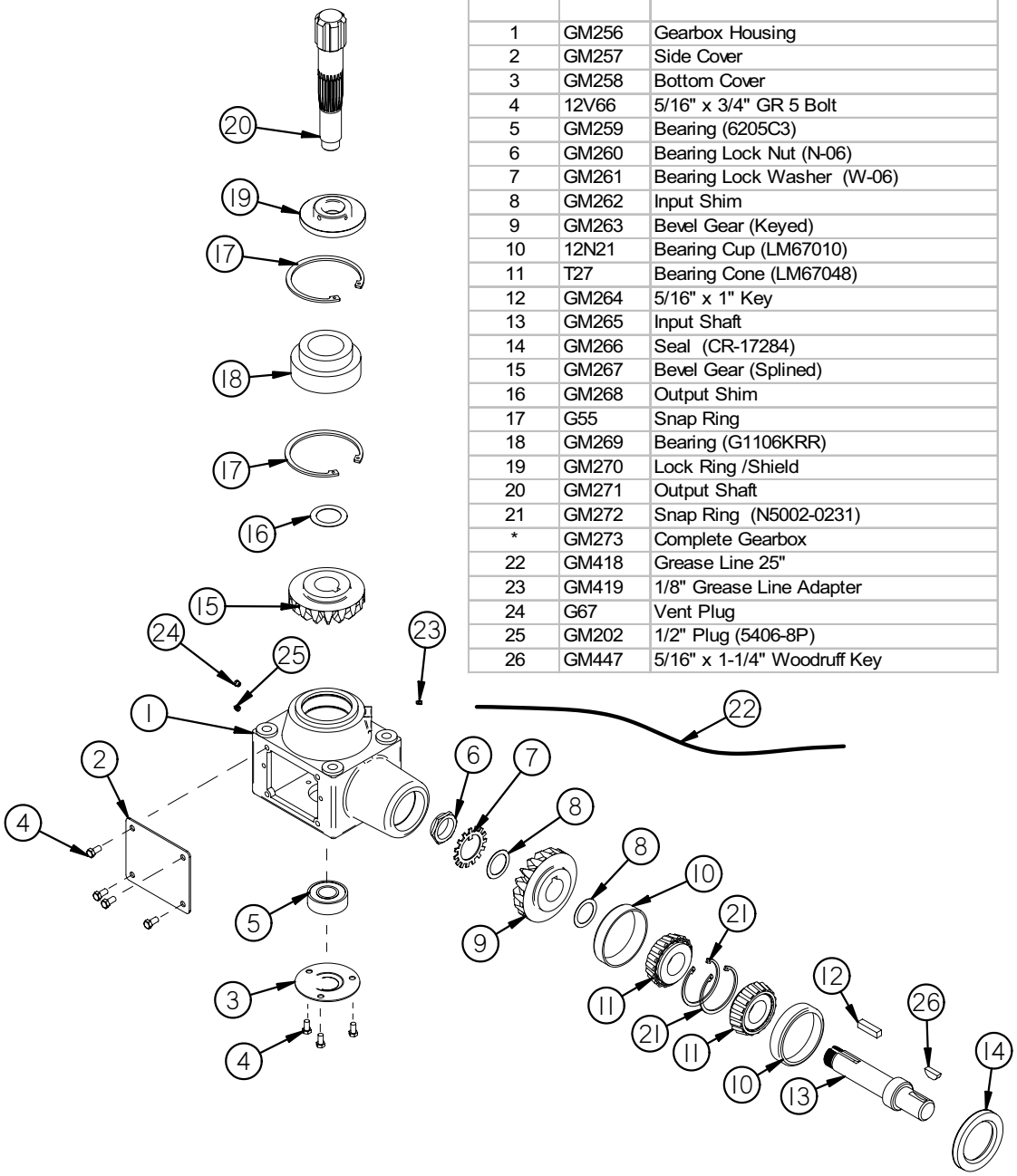

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | 10WR11A | 2-1/2 X 16" Cylinder (645886) |
| 2 | 23N234 | 3/8 Elbow |
| 3 | DWM233 | 3/8 Male Union Adapter |
| 4 | GM455 | Restrictor (.032) |
| 5 | DWM205 | 1/2 Male Coupler |
| 6 | GM45 | 3/8 X 130" Hose |
| 7 | GM46 | 3/8 X 125" Hose |
| 8 | GM47 | Adapter (0507-6-6) |
| 9 | GM48 | Relief Cartridge |
| 10 | GM49 | Relief Valve Body |
| * | GM50 | Relief Valve Complete |
| 11 | GM51 | 3/8 X 240" Hose |
| 12 | GM446 | 3/8" Street Elbow w/ Restrictor |
| 13 | GM32 | Spiral Wrap (HG125) 1-1/4" x 2' |

# FIGURE 16
# INFEED AUGER CIRCUIT



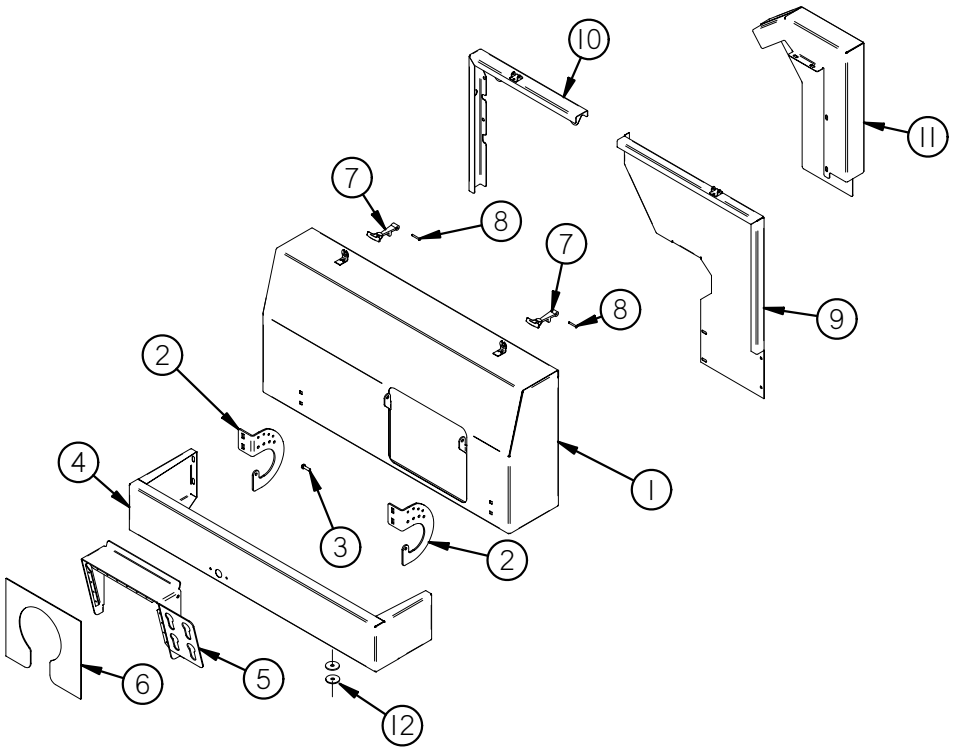

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM52 | 1/2 X 81 1/4" Hose |
| 2 | GM53 | 1/2 X 97 1/2" Hose |
| 3 | GM17 | Adapter (8 HTX) |
| 4 | GM55 | Tee (10 R6X) |
| 5 | GM56 | Elbow (10 C50X) |
| 6 | GM57 | Adapter (10 F50X) |
| 7 | GM58 | Pressure Tube |
| 8 | GM59 | Return Tube |
| 9 | GM57 | Adapter (10F50X) |
| 10 | GM61 | Motor (101-1013-009) |
| 11 | GM20 | Flow Control |
| 12 | GM9 | Hose Clamp 1/2" Twin (Complete) |
| 13 | GM68 | Bolt |
| 14 | GM69 | Top Plate |
| 15 | GM70 | 1/2" Insert |
| 16 | GM71 | Weld Plate |

# FIGURE 17
# GEARBOX



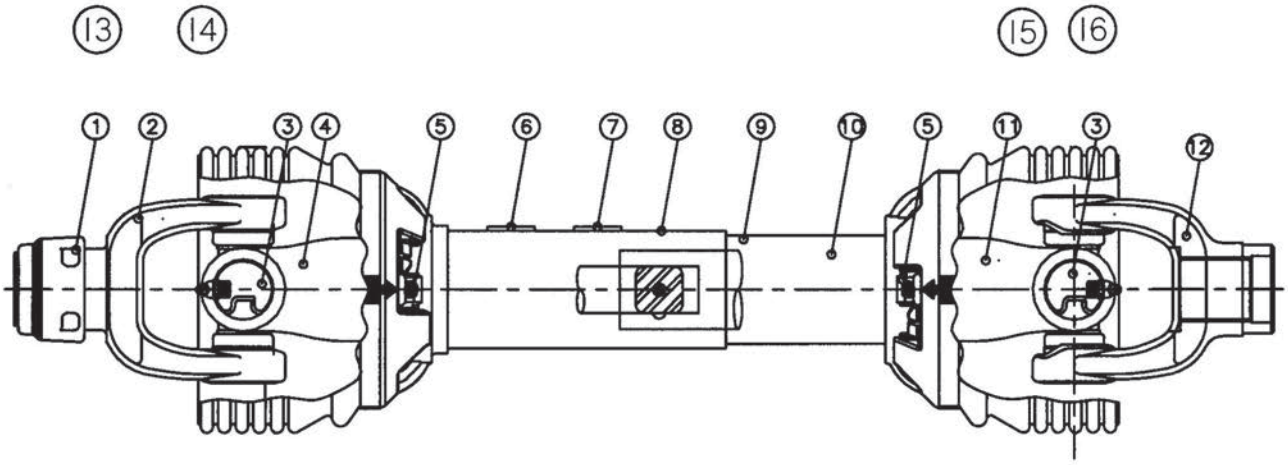

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM256 | Gearbox Housing |
| 2 | GM257 | Side Cover |
| 3 | GM258 | Bottom Cover |
| 4 | 12V66 | 5/16" x 3/4" GR 5 Bolt |
| 5 | GM259 | Bearing (6205C3) |
| 6 | GM260 | Bearing Lock Nut (N-06) |
| 7 | GM261 | Bearing Lock Washer (W-06) |
| 8 | GM262 | Input Shim |
| 9 | GM263 | Bevel Gear (Keyed) |
| 10 | 12N21 | Bearing Cup (LM67010) |
| 11 | T27 | Bearing Cone (LM67048) |
| 12 | GM264 | 5/16" x 1" Key |
| 13 | GM265 | Input Shaft |
| 14 | GM266 | Seal (CR-17284) |
| 15 | GM267 | Bevel Gear (Splined) |
| 16 | GM268 | Output Shim |
| 17 | G55 | Snap Ring |
| 18 | GM269 | Bearing (G1106KRR) |
| 19 | GM270 | Lock Ring /Shield |
| 20 | GM271 | Output Shaft |
| 21 | GM272 | Snap Ring (N5002-0231) |
| * | GM273 | Complete Gearbox |
| 22 | GM418 | Grease Line 25" |
| 23 | GM419 | 1/8" Grease Line Adapter |
| 24 | G67 | Vent Plug |
| 25 | GM202 | 1/2" Plug (5406-8P) |
| 26 | GM447 | 5/16" x 1-1/4" Woodruff Key |

# FIGURE 18
# SHIELDS



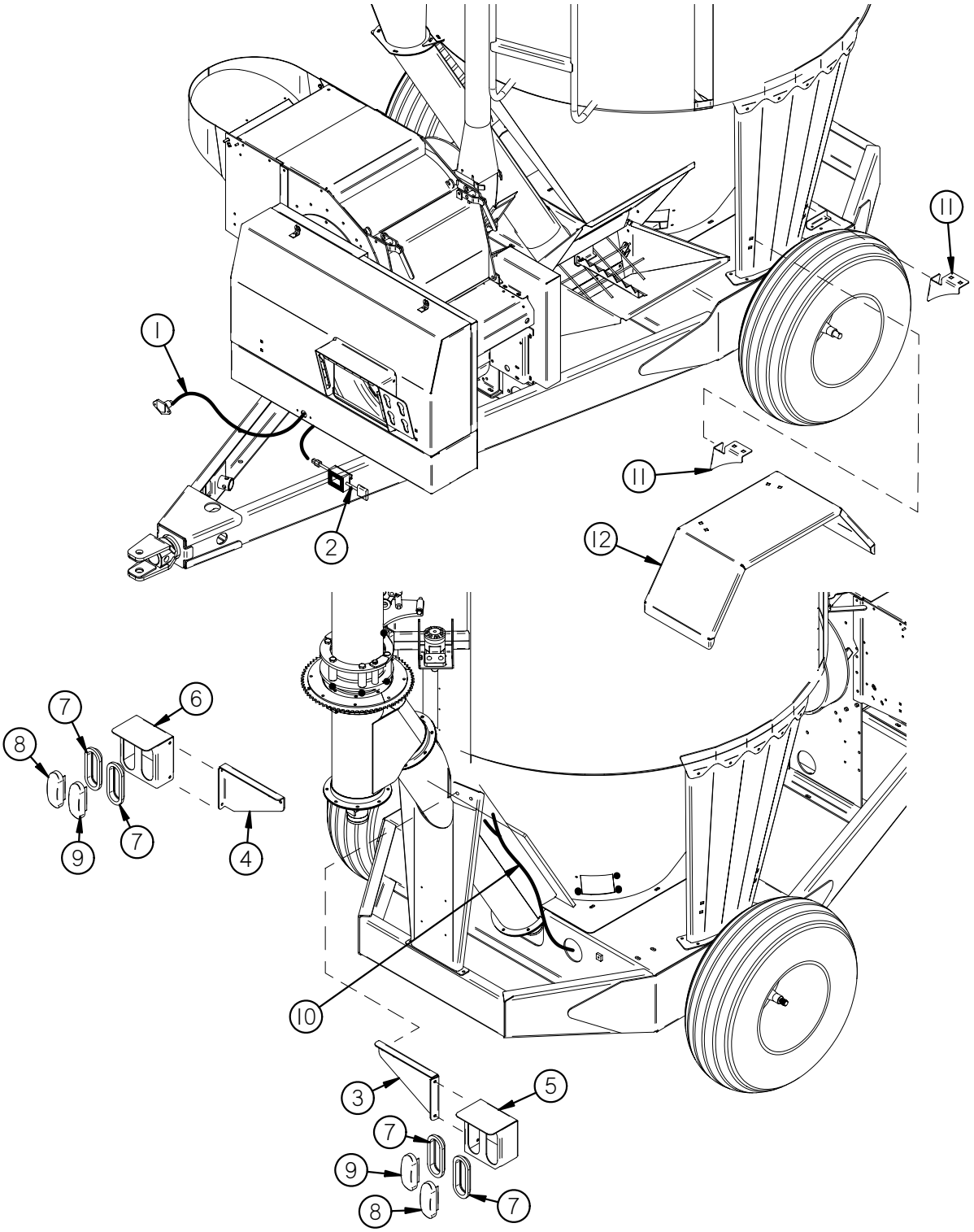

| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM321 | Front Shield |
| 2 | GM322 | Shield Hinge |
| 3 | RGB38 | 5/16" x 1" GR. 5 Bolt |
| * | D110 | 1/4" x 1" GR.5 Bolt |
| 4 | GM324 | Flywheel Shield Lower |
| 5 | GM325 | PTO Guard |
| 6 | GM326 | Poly PTO Guard |
| 7 | X192 | Rubber Latch |
| 8 | X195 | Latch Pin |
| 9 | GM327 | Flywheel Shield Back Left |
| 10 | GM328 | Top Seal |
| 11 | GM329 | Hydraulic Pump Shield |
| 12 | S304 | Washer |

# FIGURE 19
# PTO




| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | 16SV274 | Safety Slide Lock Repair Kit 540 RPM |
| * | " | Safety Slide Lock Repair Kit 1000 RPM 1-3/8" |
| 2 | GM374 | Safety Slide Lock Yoke Assembly 540RPM |
| * | GM375 | Safety Slide Lock Yoke Assembly 1000RPM 1-3/8" |
| 3 | GM376 | 55R Cross & Bearing Kit |
| 4 | GM377 | Yoke & Shaft |
| 5 | GM378 | Nylon Repair Kit (Not Shown) |
| 6 | 16SV283 | Safety Sign |
| 7 | GM379 | Safety Sign 540 RPM |
| * | GM380 | Safety Sign 1000 RPM |
| 8 | GM381 | Outer Guard |
| 9 | GM382 | Inner Guard |
| 10 | 16SV286 | Safety Sign (Not Shown) |
| 11 | GM383 | Yoke, Tube & Slip Sleeve |
| 12 | GM384 | Yoke |
| 13 | GM385 | Joint & Shaft Halt Assembly w/Guard |
| 14 | GM386 | Joint & Shaft Half Assembly |
| 15 | GM387 | Joint & Tube Half Assmebly w/Guard |
| 16 | GM388 | Joint & Tube Half Assmebly |
| * | GM389 | Complete PTO 540 RPM |
| * | GM390 | Complete PTO 1000 RPM 1-3/8" |

FIGURE 20
OPTIONAL LIGHTS & FENDER



# Figure 20
# Optional Lights & Fenders

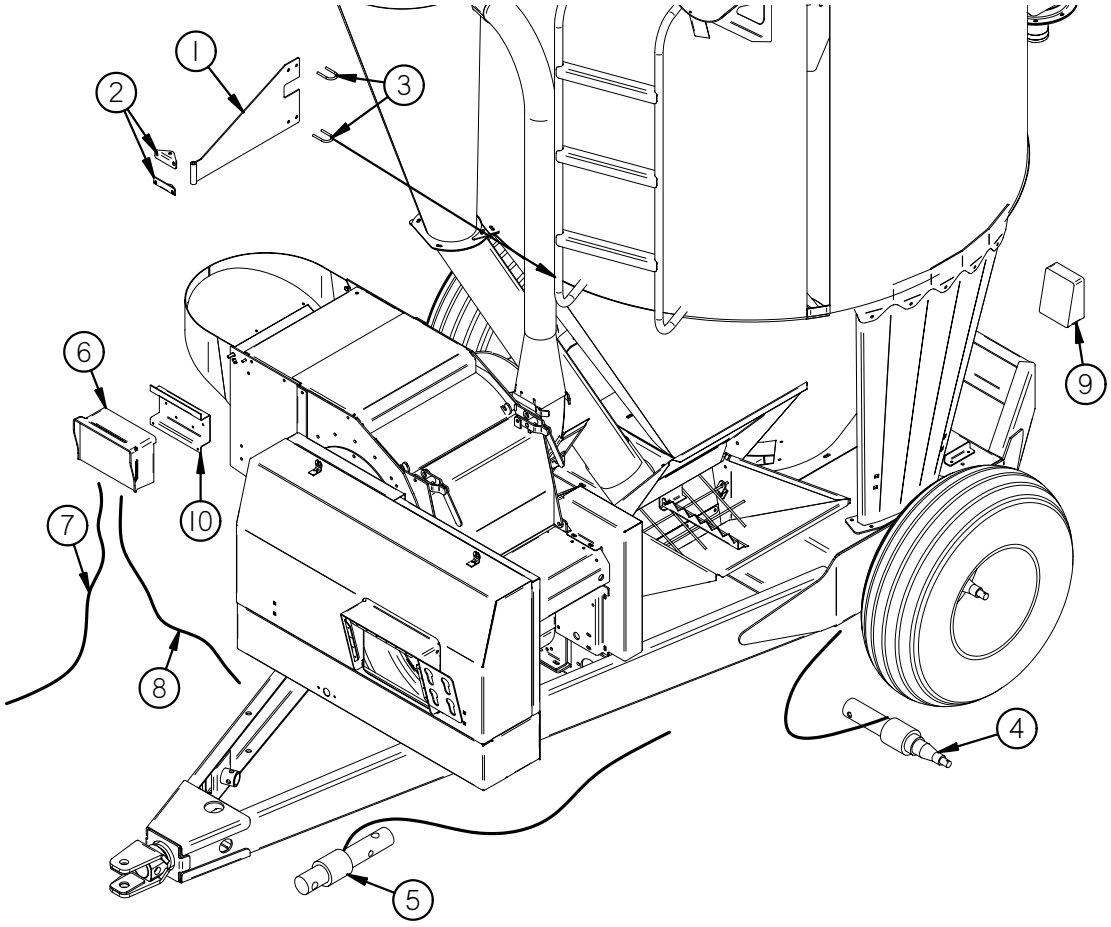
## LIGHTS

| ITEM # | PART # | DESC. |
|---|---|---|
| 1 | 56N154 | Flasher Module Loom |
| 2 | S441 | Flasher Module |
| 3 | GM330 | Light Bracket Right |
| 4 | GM331 | Light Bracket Left |
| 5 | 55N62 | Light Housing Right |
| 6 | 55N61 | Light Housing Left |
| 7 | S308 | Rubber Grommet |
| 8 | S309 | Amber Hazard Light |
| 9 | S310 | Red Hazard Light |
| 10 | MHD2 | Tail Light Loom |

## FENDERS

| | | |
|---|---|---|
| 11 | GM332 | Fenders Support |
| 12 | GM333 | Fender (Fits Either Side) |

# FIGURE 21
# OPTIONAL SCALE




| ITEM # | PART # | DESC. |
|---|---|---|
| | | |
| 1 | GM400 | Control Box Arm |
| 2 | GM401 | Control Box Mount |
| 3 | GM119 | U Bolt 5/16" x 2" |
| 4 | GM402 | Spindle Load Cell (146772) |
| 5 | GM403 | Hitch Load Cell (143480) |
| 6 | GM404 | Scale Display (400590) |
| 7 | GM405 | Power Cord |
| 8 | GM406 | Junction Box Cord |
| 9 | GM407 | Junction Box (404465) |
| 10 | GM408 | Scale Hanger Bracket (840459) |

# H&S GM 170 Specifications

| | |
|---|---|
| Tank Capacity –Bushel | 135 |
| Tank Capacity – Cubic Ft. | 170 |
| Tank Diameter | 72” |
| Diameter of Mixing Auger | 14” Diameter w/30” Base |
| Ladder | Standard -Front Mount Over Mill |
| Tank Windows | 2 Full Length & 1 Port Hole Style |
| Overall Height | 10’ 7” |
| Overall Width | 7’ 9” w/o Auger Feeder |
| Overall Length | 15’ 8” |
| Ground Clearance | 11½” |
| Supplement Hopper | 23”W x 18”L - 35” Above Ground |
| Feeder | Gravity Hopper or Feed Auger |
| PTO Drive | 540 or 1000 RPM |
| H.P. Requirement | 540 RPM up to 115 HP - 1000 RPM up to 145 HP |
| Tires | 12.5L-15 - 20 Ply |
| Jack | Standard |
| Weight w/Auger Feeder | 3,600# |

**Auger Feeder**

| | |
|---|---|
| Auger Feeder Length | 84” |
| Auger Feeder Auger Diameter | 12” |
| Infeed Hopper | 42” w/Fold-In-Flare - Adjustable as low as 20” |
| Drive | Direct Drive Independent Hydraulic Motor |

**Mill**

| | |
|---|---|
| Hammermill Width | 21” |
| Cylinder Diameter | 20” |
| Grinder Drive | 8 “A” Section Banded V-Belt |
| Grinder Hammers | 66–4 Way Reversible Steel Alloy |
| Grinder Screen Area | 600 Square Inches |
| Throat Magnets | 2 - 4” x 18” |
| Speed | 2700 RPM |

**Discharge Conveyor**

| | |
|---|---|
| Unloading Auger Tube Diameter | 8" |
| Unloading Auger Length | 12’ |
| Unloading Auger Rotation | 300 Degrees |
| Unloading Auger Reach Standard | 19’ @ 53 Degrees |

**Drive System -** Self-Contained - Includes Pulley-Driven Pump, Reservoir & Pressure Relief Valve

| | |
|---|---|
| Pump Pressure | 2,800 PSI Maximum |
| Oil Flow | 10.5 G.P.M. |
| Hydraulic Reservoir | Cyclonic Reservoir |
| Oil Filter | 10 Micron |

**SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE**

# H&S MFG. CO.

products approved

for the

# FEMA

# SEAL OF QUALITY