DISCLAIMER

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all systems. Crary Company assumes no obligation of notice to holders of this document with respect to changes subsequently made.

Crary Company assumes no responsibility for the accuracy, completeness, sufficiency, or usefulness of the information contained herein.

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Crary Company is continually making improvements and developing new equipment. In doing so, we reserve the right to make changes or add improvements to our product without obligation for equipment previously sold.

Because modification to this machine may affect the performance, function, and safety of its operation, no modifications are to be made without the written permission of Crary Company. Part replacements should be with original equipment supplied by Crary Company.

THE CRARY COMPANY STATEMENT OF PRODUCT SAFETY

As a manufacturer of specialized agricultural equipment, Crary Company fully recognizes its responsibility of providing its customers products that perform their expected use in a reasonably safe manner. Safety considerations shall be an integral and high priority part of all engineering/design analysis and judgments involving Crary products. It is our stated policy that our products will be manufactured to comply with the safety standards specified by the American Society of Agricultural Engineers, the National Electrical Code, the Society of Automotive Engineers, and/or any other applicable recognized standards at the time manufactured. However, this statement should not be construed to mean that our product will safeguard against a customer’s own carelessness or neglect in violating common safety practices specified in each product’s manual, nor will we be liable for any such act.

SERIAL NUMBER LOCATION

Always give your authorized Crary dealer the serial number of your machine when ordering parts, requesting service, or any other information. The serial number decal is located on the front, left hand end of the air manifold.

Please record the serial number in the space provided on the front cover and on the warranty and registration card.
LIMITED WARRANTY

This warranty applies to Bear Cat, Crary, Load-N-Lift, Lockwood and Weed Roller brand products manufactured by Crary Company, a division of TerraMarc Industries, henceforth called Crary Company.

Crary Company warrants to the original owner each new Crary Company product to be free from defects in material and workmanship, under normal use and service. The warranty shall extend 1 year from date of delivery for income producing (commercial) applications and 2 years from date of delivery for non-income producing (consumer) use of the product. The product is warranted to the original owner as evidenced by a completed warranty registration on file at Crary Company. Replacement parts are warranted for (90) days from date of installation.

THE WARRANTY REGISTRATION MUST BE COMPLETED AND RETURNED TO CRARY COMPANY WITHIN 10 DAYS OF DELIVERY OF THE PRODUCT TO THE ORIGINAL OWNER OR THE WARRANTY WILL BE VOID.

In the event of a failure, return the product, at your cost, along with proof of purchase to the selling Crary Company dealer. Crary Company will, at its option, repair or replace any parts found to be defective in material or workmanship. Warranty on any repairs will not extend beyond the product warranty. Repair or attempted repair by anyone other than a Crary Company dealer as well as subsequent failure or damage that may occur as a result of that work will not be paid under this warranty. Crary Company does not warrant replacement components not manufactured or sold by Crary Company.

1. This warranty applies only to parts or components that are defective in material or workmanship.
2. This warranty does not cover normal wear items including but not limited to bearings, belts, pulleys, filters and chipper knives.
3. This warranty does not cover normal maintenance, service or adjustments.
4. This warranty does not cover depreciation or damage due to misuse, negligence, accident or improper maintenance.
5. This warranty does not cover damage due to improper setup, installation or adjustment.
6. This warranty does not cover damage due to unauthorized modifications of the product.
7. Engines are warranted by the respective engine manufacturer and are not covered by this warranty.

Crary Company is not liable for any property damage, personal injury or death resulting from the unauthorized modification or alteration of a Crary product or from the owner’s failure to assemble, install, maintain or operate the product in accordance with the provisions of the Owner’s manual.

Crary Company is not liable for indirect, incidental or consequential damages or injuries including but not limited to loss of crops, loss of profits, rental of substitute equipment or other commercial loss.

This warranty gives you specific legal rights. You may have other rights that may vary from area to area.

Crary Company makes no warranties, representations or promises, expressed or implied as to the performance of its products other than those set forth in this warranty. Neither the dealer nor any other person has any authority to make any representations, warranties or promises on behalf of Crary Company or to modify the terms or limitations of this warranty in any way. Crary Company, at its discretion, may periodically offer limited, written enhancements to this warranty.

CRARY COMPANY RESERVES THE RIGHT TO CHANGE THE DESIGN AND/OR SPECIFICATIONS OF ITS PRODUCTS AT ANY TIME WITHOUT OBLIGATION TO PREVIOUS PURCHASERS OF ITS PRODUCTS.
INSPECTION AFTER DELIVERY

Inspect your shipping cartons for damage. If you suspect any damage, contact the carrier (trucking company) right away. Unpack the shipping cartons and compare the contents with the parts listing on the packing slips. If any parts are missing or damaged, contact your local authorized dealer or call the factory for assistance. NOTE: Depending on header variations, you may or may not receive all crates and or boxes listed below.

BOX 1: FAN KIT (PART # 22668)
- GEARBOX/FAN ASSY 9.375:1
- ELECTRIC ACTUATOR MINI W/PLUG
- SWITCH/MOUNT PLATE ASSY
- FLEX HOSE CHAIN ASSY
- ELBOW, RUBBER 8" X 90°
- T-BOLT CLAMPS
- ELBOW, RUBBER-8" X 45°
- FLEX HOSE / BAND ASSY.
- TUBE CAP
- MISC. HARDWARE

BOX 2: REEL ARM MOUNT KIT (PART # 22254, 24100 or 22256)
- FAR OWNER'S MANUAL
- FAR PARTS MANUAL
- CARD, AG WARRANTY/REGISTRATION
- HARNESS, ACTUATOR SWITCH ADAPTER
- ELECTRIC ACTUATOR
- HOSE CONNECTOR WELDMENTS
- ADJUST BRKT. WELDMENTS (2)
- HALF CLAMPS (2)
- REEL SUPT. PAD-RH & LH
- ASSEMBLY, PIVOT CLAMP
- REEL SUPPORT ASSY LH & RH
- MISC. HARDWARE
- T-BOLT CLAMPS

BOX 3: FAR BOX OF PARTS 6 BAT
- MOTOR, HYD. GEAR
- FOAM SEALS - AIR TUBE
- PIVOT STRAP BUSHINGS
- SHAFT COUPLER
- AIR TUBE WELDMENTS
- IDLER GEAR ASSEMBLIES
- REEL BAT ARM ASSEMBLIES
- ECCENTRIC ARM ASSY'S (2)
- DOUBLE AIR TUBE ASSEMBLIES (2)
- BRACE CLAMP ASSEMBLIES (2)
- WRENCH, ADJUSTMENT
- RH & LH ECCEN. MT. ASSEMBLIES
- MISC. HARDWARE

BOX 4: GEARBOX MOUNT/DRIVE (PART # 22672, 24043 or 22673)
- BUSHINGS, SD 1-3/8" (2)
- ADAPTERS, - 10 MORING / -10MJIC (2)
- MOUNT PLATE SUPPORT
- GEARBOX MOUNT PLATES (2)
- SHIELD WELDMENTS (2)
- MISC. HARDWARE

BOX 5: RH DRIVE SHAFT KIT
- BOX 5: BOX 1 OF 3
  - SLIP CLUTCH SHIELD
  - SHIELD MOUNT PLATE ASSY.
  - DRIVE SHAFT SHIELD-JACKSHAFT
  - BEARING INSERTS
  - CLUTCH SHAFT WELDMENT - HEX
  - SLIP CLUTCH SHIELD WELDMENT
  - SHIELD MOUNT BRACKETS (2)
  - CHAIN COUPLER
  - DRIVE SPROCKETS
  - DRIVELINE SUPPORT BRACKET
  - MISC. HARDWARE
- BOX 5: BOX 2 OF 3
  - DRIVELINE / C-FLANGE ASSY.
- BOX 5: BOX 3 OF 3
  - GEARBOX DRIVE SHAFT
  - DRIVE SHAFT SHIELD

BOX 6: AIR MANIFOLD ASSY & BATS
- MANIFOLD, FAR.
- REEL BAT ASSEMBLIES (6)
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Congratulations on your choice of a new Crary Air Reel to complement your farming operation. This equipment has been designed and manufactured to meet the needs of a discerning agricultural industry for the efficient harvesting of crops.

Safe, efficient, and trouble free operation of your Air Reel requires that you and anyone else who will be operating or maintaining the machine, read and understand the Safety, Operation, Maintenance, and Trouble Shooting information contained within the Operator’s Manual. Check each item referred to and acquaint yourself with the adjustments required to obtain efficient operation.

This manual covers all models of Air Reels manufactured by Crary Company for Case IH 1010/1020 headers. Differences are covered and explained where appropriate. Use the table of contents as a guide to locate required information.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Crary dealer or distributor if you need assistance, information, or additional copies of the manuals.

Many people have worked on the design, production, and delivery of this machine. They have built into it the highest quality of materials and workmanship. The information in this manual is based on the knowledge, study, and experience of these people through years of manufacturing specialized farming machinery.

The performance of the machine depends on proper maintenance and adjustment. Even if you are an experienced operator of this or similar equipment, we ask you to read the operator’s manual before running the machine. Keep the manual handy for future reference. It has been carefully prepared, organized, and illustrated to assist you in finding the information you need. Your Crary Dealer will be happy to answer any further questions you may have about the machine.

OPERATOR ORIENTATION - All references to left, right, front and rear of the machine, as mentioned throughout the manual, are determined by standing behind the machine and facing towards the direction of forward travel.
This Safety Alert Symbol means:

ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

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

Why is SAFETY important to you?

3 Big Reasons
1. Accidents Disable and Kill
2. Accidents Cost
3. Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words DANGER, WARNING, CAUTION, IMPORTANT and NOTE with the safety messages. The appropriate signal word for each message has been selected using the following guidelines:

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

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

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

IMPORTANT - Instructions that must be followed to ensure proper installation/operation of equipment.

NOTE - General statements to assist the reader.


2.2 GENERAL SAFETY

YOU are responsible for the SAFE operation and maintenance of your machine. You must ensure that you and anyone else who is going to operate, maintain or work around the machine are familiar with the operating and maintenance procedures and related safety information contained in this manual. This manual will alert you to all good safety practices that should be adhered to while operating the machine.

Remember, YOU are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that EVERYONE operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

• Owners must give operating instructions to operators or employees before allowing them to operate the machine, and annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.

• The most important safety device on this equipment is a safe operator. It is the operator’s responsibility to read and understand all Safety and Operating instructions in the manual and to follow them. All accidents can be avoided.

• A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

• Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.

1. Read and understand the Owner’s Manual and all safety decals before operating, maintaining, adjusting or servicing the machine.

2. Only trained persons shall operate the machine. An untrained operator is not qualified to operate the machine.

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

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

5. Do not allow children, spectators or bystanders within hazard area of machine.

6. Wear appropriate protective gear. This list includes but is not limited to:
   - A hard hat.
   - Protective shoes with slip resistant soles.
   - Protective goggles.
   - Heavy gloves.
   - Hearing protection.
   - Respirator or filter mask.

7. Wear suitable ear protection during prolonged exposure to excessive noise.

8. Place all controls in neutral or off, lower header to the ground, stop combine engine, set parking brake, chock wheels, remove ignition key and wait for all moving parts to stop, before servicing, adjusting, repairing or unplugging.

9. Review safety related items annually with all personnel who will be operating or maintaining the machine.

THINK SAFETY! WORK SAFELY!
2.3 OPERATING SAFETY

1. Read and understand the Owner’s Manual and all safety decals before servicing, adjusting or repairing.
2. Install and secure all guards and shields before starting or operating.
3. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
4. Place all controls in neutral or off, lower header to the ground, stop combine engine, set parking brake, chock wheels, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
5. Clear the area of bystanders, especially small children, before starting.
6. Keep all hydraulic lines, fittings, and couplers tight and free of leaks before and during use.
7. Clean reflectors and lights before transporting.
8. Review safety related items annually with all personnel who will be operating or maintaining the machine.
9. Shut the combine off when connecting the machine hydraulics.
10. Do not exceed fan speed of 5300 RPM. Check the fan speed by multiplying the drive shaft speed (RPM) by the gear ratio of the gearbox.
11. Do not run the fan without back pressure. Close the butterfly valve on the fan if the flex hose is disconnected.

2.4 MAINTENANCE SAFETY

1. Follow ALL operating, maintenance, and safety information in this manual.
2. Support the machine with blocks or safety stands when working around it.
3. Follow good shop practices:
   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.
4. Use only tools, jacks and hoists of sufficient capacity for the job.
5. Place all controls in neutral or off, lower header to the ground, stop combine engine, set parking brake, chock wheels, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
6. When maintenance work is completed, install and secure all guards before resuming work.
7. Relieve pressure from hydraulic circuit before servicing or disconnecting from combine.
8. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
9. Clear the area of bystanders, especially small children, when carrying out any maintenance and repairs or making any adjustments.
10. Keep safety decals clean. Replace any decal that is damaged or not clearly visible.
11. First-class maintenance is a prerequisite for the safest operation of your machine. Maintenance, including lubrications, should be performed with the machine stopped and locked out.

THINK SAFETY! WORK SAFELY!
2.5 HYDRAULIC SAFETY

1. Always place all combine hydraulic controls in neutral before disconnecting from combine or working on hydraulic system.

2. Make sure that all components in the hydraulic system are kept in good condition and are clean.

3. Relieve pressure before working on the hydraulic system.

4. Replace any worn, cut, abraded, flattened or crimped hoses.

5. Do not attempt any makeshift repairs to the hydraulic fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.

6. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.

7. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

8. Before applying pressure to the system, make sure all components are tight and that lines, hoses, and couplings are not damaged.

2.6 PTO SAFETY

1. Keep bystanders, especially children, away from drive shafts.

2. Be extremely careful when working around PTO shafts, drivelines, or other rotating shafts.

3. Do not remove or modify protective shields or guards.

4. Do not step across a PTO shaft or driveline or use it as a step.

5. Keep guards and shields in place at all times while operating.

6. Replace all damaged or missing parts or shields with the correct original manufacturer’s parts.

7. Grease, clean, and maintain PTO components according to original manufacturer’s specifications and information in this manual.

8. Clothing worn by the operator must be fairly tight. Never wear loose-fitted jackets, shirts, or pants when working around the drive shafts. Tie long hair back or put under a cap.

9. Keep hydraulic hoses, electrical cords, chains, and other items from contacting the drive shafts.

10. Do not clean, lubricate, or adjust the drive shafts when the reel is engaged and the combine is running.

THINK SAFETY! WORK SAFELY!
2.7 TRANSPORT SAFETY

1. Make sure you are in compliance with all local regulations regarding transporting equipment on public roads and highways.

2. It is the responsibility of the owner to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility.

3. See the Owner’s manual that came with your combine and header for proper transportation.

2.8 STORAGE SAFETY

1. Store the unit in an area away from human activity.

2. Do not permit children to play on or around the stored machine.

3. See the Owner’s manual that came with your combine and header for proper storage.

2.9 ASSEMBLY SAFETY

1. Assemble in an area with sufficient space to handle the largest component and access to all sides of the machine.

2. Use only lifts, cranes and tools with sufficient capacity for the load.

3. When necessary, have someone assist you.

4. Do not allow spectators in the working area.

2.10 SAFETY DECALS

1. Keep safety decals clean and legible at all times.

2. Replace safety decals that are missing or have become illegible.

3. Replaced parts that displayed a safety decal should also display the current decal.

4. Decals that need to be replaced, are to be placed back in the original location.

5. Safety decals are available from your authorized dealer or the factory.

HOW TO INSTALL SAFETY DECALS:

1. Be sure that the installation area is clean and dry.

2. Be sure temperature is above 50°F (10°C).

3. Decide on the exact position before you remove the backing paper.

4. Remove the smaller portion of the split backing paper.

5. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.

6. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.

7. Small air pockets can be pierced with a pin and smoothed out using the piece of decal backing paper.

THINK SAFETY! WORK SAFELY!
Crary Company follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the equipment must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. An untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the owner’s manual and have been instructed in the operation of the equipment.

### SIGN - OFF FORM

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Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

**THINK SAFETY! WORK SAFELY!**

![Figure 3.1 - Decal Location](image)

**A**

![PN 11001 - Decal, Caution](image)

**B**

![PN 11002 - Decal, Warning](image)

**REMEMBER** - If safety decals have been damaged, removed or become illegible or parts have been replaced without safety decals, new decals must be applied. New safety decals are available from the manufacturer or an authorized dealer.
4.1 UNCRATING

1. Locate the manifold and bats crate.
2. Cut the metal bands and remove the 2" X 4"s and saddle tops (Figure 4.1).
3. Remove the bat assemblies from the crate and place to the side.
4. Remove the lag screws from the mounting clamps (as shown in Figure 4.2) from all locations.
5. Using an overhead hoist and a nylon strap, sling or chain, connect to the center of the manifold (Figure 4.3).
6. Remove from crate, and set down on two steel sawhorses (or equivalent) two to four inches from the ends of the manifold.
   
   A. The sawhorses must be capable of supporting 500 pounds each.
   
   B. The sawhorses must be at least 3 feet high.

**WARNING**

1. Assemble in an area with sufficient space to handle the largest component and access to all sides of the machine.
2. Use only lifts, cranes and tools with sufficient capacity for the load.
3. When necessary, have someone assist you.
4. Do not allow spectators in the working area.

**WARNING**

1. The sawhorses must be capable of supporting 500 pounds each.
2. The sawhorses must be at least 3 feet high.
3. The sawhorses must be blocked, to keep the manifold from rolling.
4.2 ECCENTRIC MOUNT INSTALLATION

1. Open Box #3 and sort bolts according to their size and length.

2. Rotate the manifold on the stands so that the drive shaft is at the 12:00 position.

3. Assemble the RH & LH Eccentric Mount Plates (with the nylon rollers facing to the center of the manifold) to the RH & LH End Clamps using six 3/8" X 1" carriage bolts, twelve 3/8" SAE flat washers and six 3/8" centerlock nuts. Do not tighten yet (Figure 4.4 & 4.5).

4. Align the 5th tooth on the RH & LH eccentric mounting plate assemblies with the indicator mark on the RH & LH end clamps.

5. Tighten the six 3/8" centerlock nuts to their specified torque.

**NOTE**

The back side of the manifold is opposite that of the large Air Reel decal.

**NOTE**

The default pitch angle is with the 5th tooth on the eccentric mounting plate assembly aligned with the indicator mark on the RH & LH end clamps. See Section 5.6 for additional information.

**NOTE**

Do not tighten the nuts for the nylon rollers yet (Figure 4.6).
4.3 IDLER GEAR INSTALLATION (BACK SIDE OF MANIFOLD)

1. Assemble one idler gear assembly each to the RH & LH end clamps, and to all idler mount clamps (back side of manifold only) using one 3/8” X 2” bolt, three 3/8” flat washers and one 3/8” centerlock nut per each idler gear assembly (Figure 4.7 & 4.8).

2. Tighten the 3/8” centerlock nuts to their specified torque.

![Figure 4.7 - Idler gear assembly to RH end clamp assembly](image1)

![Figure 4.8 - Idler gear assembly to idler clamp assembly](image2)

4.4 REEL BAT ARM INSTALLATION

1. Slide the reel bat arm assemblies over the manifold assembly. Position each assembly onto the pinion gears and the idler gears of the manifold assembly (Figure 4.9).

2. Align the reel bat arm assemblies, so that all of the arms are in line with one another.

![Figure 4.9 - Reel Bat Arm Installation.](image3)

WARNING

The outside face of the arms of the reel bat arm assemblies must face away from the pillowblock.
4.5 IDLER GEAR INSTALLATION (FRONT SIDE OF MANIFOLD)

1. Assemble one idler gear assembly each to the RH & LH end clamps, and to all idler mount clamps (front side of manifold only) using one 3/8" X 2" bolt, three 3/8" flat washers and one 3/8" centerlock nut per each idler gear assembly (Figure 4.10).

2. Use a small pry bar between the outside wall of the manifold tubing and the idler gears with approx. 5 lbs. of force (Figure 4.11)

3. Tighten the 3/8" centerlock nuts to their specified torque. Check the alignment of the reel bat arm assembly with the pinion and idler gears by looking from the front and rear of the manifold.

4. Rotate the reel arm assemblies to ensure they turn freely.

Figure 4.10 - Idler Gear Installation (Front Side).

Figure 4.11 - Tighten Centerlock nuts.
4.6 AIR TUBES

1. Roll the manifold over so that the air tube holes in the bottom of the manifold are at the 12:00 position.

2. Apply the self adhesive foam seals (Figure 4.12).
   A. Remove and discard the slot and two hole cutouts from the self adhesive foam seal.
   B. Remove the self adhesive foam seal from the backing and apply foam seal to manifold.

3. Assemble the single air tubes to the manifold.
   A. Locate three 11/32 X 7/8 self tapping screws per each air tube.
   B. Place an air tube on the manifold, aligning the three small holes of the air tube with the manifold.
   C. Drive three 11/32 X 7/8 self tapping screws through the air tube into the holes of the manifold (Figure 4.13). You may want to use an impact wrench for this step.
   D. Follow steps A thru. D for the remaining air tubes.

4. Assemble the double air tubes to the manifold: follow step 3 for installation of the double air tubes.

**IMPORTANT**

Make sure that the opening of the single and double air tubes face towards the rear of Air Reel (Figure 4.14).

The double air tube assemblies are only installed on the ends of the manifold (one per end) (Figure 4.14).

---

**Figure 4.12 - Apply Self Adhesive Foam Seals.**

**Figure 4.13 - Fasten Screws.**

**Figure 4.14 - Installation of air tubes.**
4.7 REEL BATS

1. Remove the plastic bearing caps, by removing one 5/16” X 2” bolt, one 5/16” centerlock nut and two 1/4” flat washers per each reel arm (Figure 4.15).

2. Assemble the reel bat assemblies to the reel arms.
   A. Determine the correct orientation of the reel bat. The RH and LH pivot strap points to the rear of the Air Reel (Figure 4.16).
   B. Position the reel bats into the bearing bases.
   C. Reattach the plastic bearing caps, by installing one 5/16” X 2” bolt, one 5/16” centerlock nut and two 1/4” flat washers per each reel arm (Figure 4.15).
   D. Tighten the 5/16” X 2” bolts to 100 In-lbs. Note: do not exceed the recommended torque of 100 In-lbs.

3. Continue with steps 1 and 2 until all six reel bats are installed.

---

Figure 4.15 - Remove Plastic Bearing Caps.

Figure 4.16 - Reel Bat Installation.
4.8 HYDRAULIC MOTOR

1. Determine the drive side of the manifold (RH side of machine).
2. Slide the shaft coupler onto the driveline shaft.
3. Insert the roll pin through the shaft coupler and driveline shaft hole.

**IMPORTANT**

Make sure equal amounts of the roll pin are extended past the shaft coupler.

4. Tighten the set screw on the driveline shaft side of the shaft coupler.
5. Install the hydraulic motor.
   A. Line up the key on the shaft of the hydraulic motor with the key way of the shaft coupler.
   B. Align the mounting holes of the hydraulic motor with the mounting holes of the motor mount clamp.
   C. Fasten with the supplied 1/2" X 1-1/2" bolts, two 1/2" flat washers and two 1/2" centerlock nuts.
   D. Torque the centerlock nuts to their specified torque.

6. Slide the brace clamp assemblies onto each end of the manifold and loosely tighten.

**IMPORTANT**

The brace clamp assemblies will be used during reel to header assembly.

---

Figure 4.17 - Hydraulic motor installation
4.9 ECCENTRIC ARM

1. Slide an eccentric arm assembly over each end of the manifold, making sure that the end shield faces towards the outside.
2. Position the pivot straps of the reel bat assemblies, so they point at the 10:00 position, when looking from the right side of the reel, or the 2:00 position from left side.
3. Press a pivot strap bushing into each plastic bearing on the reel arms of the eccentric arm assembly.
4. Bolt the eccentric arm assembly to the reel bat assemblies by inserting a bolt through the end shield and the pivot strap and tighten to specified torque.
5. Adjust each plastic roller against the eccentric ring and tighten to specified torque. You may need to insert additional washers between the roller and the eccentric mount plate to center the eccentric ring on the rollers.

IMPORTANT

The plastic rollers should turn with the reel.

Figure 4.18 - Eccentric Arm Installation.

4.10 HEADER PREPARATION

Clearance of 42" is required between the outside edge of the RH tire and the RH inside edge of the header in order to mount the standard fan/gearbox.

A gearbox/fan extension kit can be purchased for headers smaller than 20' on combines with dual tires (see Section 4.26 for optional equipment).

PRE ‘93 HEADERS

No disassembly required.

‘93 AND AFTER HEADERS

On RH side of header, remove the driveline clutch assembly and shielding and set aside. These components will not be used in reassembly.
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4.11 GEARBOX/FAN MOUNT - PRE 1993 SERIES

1. Position the mount plate support on the back of the header as shown in Figure 4.19 and clamp in place. Refer to Table 4.1 for Dim. A.

2. Mark and drill the four 27/64" (.4218") holes and tap to 1/2-13 NC for the mount plate support.

3. Install four 1/2" washers and bolts and tighten to their specified torque.

4. Check the gearbox and if necessary, fill the gearbox with lube before use.

Use Mobilube SHC 75W-90 synthetic gear lube or equivalent with the following specifications:

- API Service GL-5/MT.1
- MIL-L-2105D
- MACK GO-J PLUS
- SAE J2360
- Capacity: 40 oz.

<table>
<thead>
<tr>
<th>HEADER WIDTH</th>
<th>DIM. “A”</th>
</tr>
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<tbody>
<tr>
<td>15’</td>
<td>9”</td>
</tr>
<tr>
<td>17-1/2’</td>
<td>24”</td>
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<tr>
<td>20’</td>
<td>39”</td>
</tr>
<tr>
<td>22-1/2’</td>
<td>39”</td>
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<td>48”</td>
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<tr>
<td>25’</td>
<td>54”</td>
</tr>
<tr>
<td>30’</td>
<td>84”</td>
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</tbody>
</table>

Table 4.1 - Measurements for Dim A.

Figure 4.19 - Gearbox/Fan Mount Dimensions (Pre-1993 Series).
4.11 GEARBOX/FAN MOUNT - PRE 1993 SERIES

5. Attach gearbox mounting plates to the mount plate support (Figure 4.20). Do not tighten at this time.

6. Lift the gearbox/fan into position using a floor jack or overhead hoist and secure to the support plate with four 1/2" bolts and washers. Do not tighten at this time.

7. Keep gearbox/fan suspended with hoist or jack to install the RH Drive Kit (Section 4.14).

Figure 4.20 - Gearbox/Fan Mount (Pre-1993 Series).
1. Position the mount plate support on the back of the header as shown in (Figure 4.21) and clamp in place.

2. Mark and drill four 27/64" (.4218") holes and tap to 1/2-13 NC for the mount plate support.

3. Install four 1/2" washers and bolts and tighten to their specified torque.

4. Check the gearbox and if necessary, fill the gearbox with lube before use.

Use Mobilube SHC 75W-90 synthetic gear lube or equivalent with the following specifications:
   API Service GL-5/MT.1
   MIL-L-2105D
   MACK GO-J PLUS
   SAE J2360
   Capacity: 40 oz.

5. Attach gearbox mounting plates to the mount plate support (Figure 4.20). Do not tighten at this time.

6. Lift the gearbox/fan into position using a floor jack or overhead hoist and secure to the support plate with four 1/2" bolts and washers. Do not tighten at this time.

7. Keep gearbox/fan suspended with hoist or jack to install the RH Drive Kit (Section 4.15 or 4.16).

---

**NOTE**

On 25' and 30' headers made in 1993 and later, the gearbox is mounted in the top set of mounting holes on the mount plate support. Mounting the gearbox in the top holes diminishes the extreme angle placed on the driveline.

---

*Figure 4.21 - Gearbox/Fan Mount Dimensions (1993/1994 Series).*
Figure 4.22 - Gearbox/Fan Mount (1993/1994 Series).
4.13 GEARBOX/FAN MOUNT - 1995 AND LATER SERIES

1. Position the mount plate support on the back of the header as shown in (Figure 4.23) and clamp in place.

2. Mark and drill the four 27/64” (.4218”) holes and tap to 1/2-13 NC for the mount plate support.

3. Install four 1/2” washers and bolts and tighten to their specified torque.

4. Check the gearbox and if necessary, fill the gearbox with lube before use.

   Use Mobilube SHC 75W-90 synthetic gear lube or equivalent with the following specifications:
   - API Service GL-5/MT.1
   - MIL-L-2105D
   - MACK GO-J PLUS
   - SAE J2360
   - Capacity: 40 oz.

5. Attach gearbox mounting plates to the mount plate support (Figure 4.24). Do not tighten at this time.

6. Lift the gearbox/fan into position using a floor jack or overhead hoist and secure to the support plate with four 1/2” bolts and washers. Do not tighten at this time.

**NOTE**

On 25’ and 30’ headers made in 1993 and later, the gearbox is mounted in the top set of mounting holes on the mount plate support. Mounting the gearbox in the top holes diminishes the extreme angle placed on the driveline.

7. Keep gearbox/fan suspended with hoist or jack to install the RH Drive Kit (Section 4.16 or 4.17).

---

*Figure 4.23 - Gearbox/Fan Mount Dimensions (1995 and Later Series).*
Figure 4.24 - Gearbox/Fan Mount (1995 and Later Series).
## 4.14 RIGHT HAND DRIVE KIT - PRE 1993 SERIES

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<thead>
<tr>
<th>KIT #</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>24044</td>
<td>RIGHT HAND DRIVE KIT, PRE 93 CIH (15 - 20 FT)</td>
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<tr>
<td>24045</td>
<td>RIGHT HAND DRIVE KIT, PRE 93 CIH (22.5-30 FT)</td>
</tr>
</tbody>
</table>

### WARNING

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

### NOTE

While using the following steps, refer to Figure 4.25. When tightening bushing bolts on the gearbox bushings, be sure to use even torque around the bushing.

1. Remove the three 5/16” X 1-1/2” bolts from the gearbox sleeve on each side of the gearbox. Install two bushings to the gearbox, aligning the keyways of the bushings with each other at the 12:00 position. Install three 5/16” X 1-1/2 bolts to each bushing. Do not tighten at this time.

2. Slide the gearbox driveshaft through the gearbox from the left side. Insert the 5/16” X 1-1/2” keys into the keyways of the shaft and position the shaft so approximately 1/2” is exposed on the RH side of the bushing.

3. Tighten the three bolts on the bushings on each side of the gearbox to 15 Ft-lbs. or 180 In-lbs. Tighten the setscrews on each bushing to secure the keys into the keyways of the gearbox shaft.

4. Slide a bushing shield weldment over the RH end of the gearbox driveshaft and secure to the RH side of the gearbox using two 1/2” washers and bolts.

5. Check for shaft alignment up and down and in and out. Tighten the bolts securing the gearbox mounting plates to the gearbox and the bolts securing the gearbox mounting plates to the mount support plate.

6. Bolt the shield mount plate directly to the LH side of the gearbox.

7. Insert a 5/16” X 1-1/2” key into keyway at the LH end of the gearbox driveshaft. Slide the clutch end of the PTO driveline onto the shaft; tighten clamp bolt and setscrews.

8. Slide the slip clutch shield over the PTO driveline and fasten to the shield mount plate using the 5/16” X 3/4” bolts and washers.
Figure 4.25 - RH Drive Kit (Pre-1993 Series)
4.15 RIGHT HAND DRIVE KIT - 1993/1994 SERIES (15 FT - 22.5 FT)

1993/1994 RIGHT HAND DRIVE KITS

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<th>KIT #</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>24047</td>
<td>RIGHT HAND DRIVE KIT, 93 &amp; 94 CIH (15FT - 20FT)</td>
</tr>
<tr>
<td>24048</td>
<td>RIGHT HAND DRIVE KIT, 93 &amp; 94 CIH (22.5FT)</td>
</tr>
</tbody>
</table>

WARNING

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

NOTE

While using the following steps, refer to Figure 4.27. When tightening bushing bolts on the gearbox bushings, be sure to use even torque around the bushing.

1. Remove the OEM driveline from the auger drive shaft located near the right read of the header.

2. Remove the three 5/16" X 1-1/2" bolts from the gearbox sleeve on each side of the gearbox. Install two bushings to the gearbox, aligning the keyways of the bushings with each other at the 12:00 position. Install three 5/16" X 1-1/2 bolts to each of the bushings. Do not tighten at this time.

3. Slide the gearbox driveshaft through the gearbox from the left side. Insert the 5/16" X 1-1/2" keys into the keyways of the shaft and position the shaft so approximately 5-1/2" is exposed on the RH side of the bushing.

4. Tighten the three bolts on the bushings on each side of the gearbox to 15 Ft-lbs. or 180 In-lbs. Tighten the setscrews on each bushing to secure the keys into the keyways of the gearbox shaft.

5. Insert bushing into sprocket/hub weldment and slide onto the LH end of auger driveshaft.

6. Set breakaway torque of auger torque limiter clutch to desired level.

7. Slide torque limiter clutch onto RH end of gearbox driveshaft, and align with sprocket on auger driveshaft. Insert 5/16" X 1-1/2 key into keyway on clutch and tighten setscrews. Tighten bushing bolts into sprocket on auger driveshaft keeping the sprockets aligned.

8. Connect sprockets with the provided chain. Set proper chain tension by adjusting the position of the gearbox in and out and up and down (Section 6.7).

9. Tighten the bolts securing the gearbox mounting plates to the gearbox and the bolts securing the gearbox mounting plates to the mount support plate.


11. Bolt the shield mount plate directly to the LH side of the gearbox with 1/2" washers and bolts.

12. Insert a 5/16" X 1-1/2" key into keyway at the LH end of the gearbox driveshaft. Slide the clutch end of the PTO driveline onto the shaft, tighten clamp bolt and setscrews.

13. Slide the slip clutch shield over the PTO driveline and fasten to the shield mount plate using the 5/16" X 3/4" bolts and washers.

NOTE

It is recommended that the breakaway torque be set between 180 - 225 Ft. lbs.

<table>
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<tr>
<th>MODEL</th>
<th>APPROXIMATE BREAK AWAY TORQUE</th>
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</thead>
<tbody>
<tr>
<td>500 1 SPRING</td>
<td>90 FT-LB.</td>
</tr>
<tr>
<td>TURNS</td>
<td>1-1/2</td>
</tr>
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</table>

NOTE

Insure that the three adjusting nut screws are backed off four turns and that the adjusting nut is in a finger tight position (Figure 4.26).

Mark the adjusting nut with the hub. Back off the adjusting nut the number of turns that correspond to the desired break away torque.

Tighten the three adjusting screws alternately until the heads bottom out. Torque to 65 In-lbs.

It is recommended that the breakaway torque be set between 180 - 225 Ft. lbs.

Figure 4.26 - Friction Disc Torque Limiter (Slip Clutch)
4.15 RIGHT HAND DRIVE KIT - 1993/1994 SERIES (15 FT - 22.5 FT)

Figure 4.27 - RH Drive Kit (1993/1994 Series)
4.16 RIGHT HAND DRIVE KIT - 1993 AND LATER SERIES (25 FT - 30 FT)

| 1993 AND LATER (25/30’) RIGHT HAND DRIVE KITS |
|-----------------|------------------|
| KIT #           | DESCRIPTION      |
| 25763           | RIGHT HAND DRIVE KIT, 93 & LATER C1H (25/30’) |

**WARNING**

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

**NOTE**

While using the following steps, refer to Figure 4.28. When tightening bushing bolts on the gearbox bushings, be sure to use even torque around the bushing.

1. Remove the OEM driveline from auger driveshaft located near rear right of header.

2. 25’ headers: On 25’ headers made in 1993 and newer, the OEM driveline is used to connect the gearbox to the power supply. Due to where the mount plate sits, the driveline is too long and 24” will have to be cut off (both halves of the driveline are cut). After the driveline has been cut 24” shorter, continue with the mounting instructions below.

3. Remove the OEM driveshaft shield and door assembly.

4. Remove the OEM auger driveshaft (not shown) from back of header by removing the OEM clamp and sprocket (not shown) at right hand of the driveshaft, then slide driveshaft out to left.

5. Remove remaining OEM clamp (not shown) from OEM auger driveshaft.

6. Remove all flangettes and bearings from back of header, except for the right hand end.

7. Install the bearing mount bracket to the right hand end of header (in existing holes) using 3/8” X 1” carriage bolts and 3/8” serrated flange nuts.

8. Drill two 9/32” (.281) holes using the holes in the bearing mount bracket as a guide to drill through the frame of the header. These holes will be used to reinstall the OEM driveshaft shield and door assembly that was removed in step 3.

9. Install the two flangettes and 1-1/8” hex bearing to the bearing mount bracket using 3/8” x 1” carriage bolts and 3/8” serrated flange nuts.

10. Install the Crary RH driveshaft through the bearing so that the grooved end is on the left.

11. Install auger drive sprocket and clamp to the right hand driveshaft.

12. Install the remaining clamp that was removed in Step 5 to the RH driveshaft up against the left hand side of bearing.

13. Remove the three 5/16” X 1-1/2” bolts from the gearbox sleeve on each side of the gearbox. Install two bushings to the gearbox, aligning the keyways of the bushings with each other at the 12:00 position. Install three 5/16” X 1-1/2” bolts to each of the bushings. Do not tighten at this time.

14. Slide the gearbox driveshaft through the gearbox so entire hex portion of gearbox driveshaft protrudes past the right side of bushing making sure approx. 3” protrudes from the left side of bushing. Insert the 5/16” X 1-1/2” keys into the keyways of the shaft.

15. Tighten the three bolts on the bushings on each side of the gearbox to 15 Ft-lbs. or 180 In-lbs. Tighten the setscrews on each bushing to secure the keys into the keyways of the gearbox shaft.

16. Tighten the bolts securing the gearbox mounting plates to the gearbox and the bolts securing the gearbox mounting plates to the mount support plate.

17. Install the clutch end of the OEM driveline to the right hand driveshaft. Secure with quick disconnect mechanism.

18. Slide the shield weldment over the OEM driveline. Do not install at this time.

19. Insert a 5/16” X 1-1/2” key into the gearbox driveshaft keyway located on the right hand side of the gearbox. Slide the OEM driveline onto the gearbox driveshaft and tighten set screws.

20. Install shield weldment to the right hand side of the gearbox using 1/2” X 1” bolts.

21. Re-install the OEM driveline shield and door assembly into holes previously drilled in step 8.

22. Bolt the shield mount plate directly to the left side of the gearbox with 1/2” washers and bolts.

23. Insert a 5/16” X 1-1/2” key into keyway at the left end of the gearbox driveshaft. Slide the clutch end of the driveline onto the shaft, tighten clamp bolt and setscrews.

24. Slide the slip clutch shield over the driveline and fasten to the shield mount plate using the 5/16” X 3/4” bolts and washers.
4.16 RIGHT HAND DRIVE KIT - 1993 AND LATER SERIES (25 FT - 30 FT)

Figure 4.28 - RH Drive Kit (1993 and Later Series: 25 - 30 FT)
### 4.17 RIGHT HAND DRIVE KIT - 1995 AND LATER SERIES (15 FT’ - 22.5 FT)

#### WARNING

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

#### NOTE

While using the following steps, refer to Figure 4.30. When tightening bushing bolts on the gearbox bushings, be sure to use even torque around the bushing.

1. Remove the OEM driveline from the auger driveshaft located near the right rear of the header.
2. Remove the three 5/16” X 1-1/2” bolts from the gearbox sleeve on each side of the gearbox. Install two bushings to the gearbox, aligning the keyways of the bushings with each other at the 12:00 position. Install the three 5/16” X 1-1/2” bolts to each of the bushings. Do not tighten at this time.
3. Slide the gearbox driveshaft through the gearbox from the left side. Insert the 5/16” X 1-1/2” keys into the keyways of the shaft and position the shaft so approximately 5-1/2” is exposed on the RH side of the bushing.
4. Tighten the three bolts on the bushings on each side of the gearbox to 15 Ft-lbs. or 180 In-lbs. Tighten the setscrews on each bushing to secure the keys into the keyways of the gearbox shaft.
5. Insert bushing into sprocket / hub weldment and slide onto the LH end of auger driveshaft.
6. Set breakaway torque of auger torque limiter clutch to desired level.

#### MODEL APPROXIMATE BREAK AWAY TORQUE

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<tr>
<th>MODEL</th>
<th>500 1 SPRING</th>
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#### NOTE

It is recommended that the breakaway torque be set between 180 - 225 Ft. lbs.
4.17 RIGHT HAND DRIVE KIT - 1995 AND LATER SERIES (15 FT' - 22.5 FT)

Figure 4.30 - RH Drive Kit (1995 and L Series)
4.18 HOSE CONNECTOR

4.18.1 WITH EXISTING LIGHT ARM BRACKETS

1. Remove the bolts securing the OEM light arm bracket located on the top right hand side of the header beam (Figure 4.31).

2. Relocate the OEM light arm bracket to the top two holes of the hose connector weldment and fasten with 3/8" hardware (Figure 4.32).

3. Assemble the hose connector weldment and light bracket assembly to the holes specified in Figure 4.33 below. Fasten with 3/8" hardware.

4. Torque all hardware to the specified torque.

Figure 4.31 - Remove OEM Light Bracket.

Figure 4.32 - OEM Light Bracket/Hose Connector Weldment.

Figure 4.33 - Assemble to Header.

Figure 4.34 - Assembly complete
4.18 HOSE CONNECTOR

4.18.2 WITHOUT LIGHT ARM BRACKETS

If your header does not have existing Ø.44 (7.16") holes 3.19" (3-3/16") apart, it may be necessary to drill the holes to mount the hose connector weldment.

1. Assemble the hose connector weldment assembly to the holes specified in Figure 4.35 below. Fasten with 3/8" hardware.

2. If no holes exist on the header beam, use the hose connector weldment to measure and mark two holes. These holes will be used to mount the hose connector weldment. Make sure the hose connector weldment is positioned so there is no interference between the hoses and end shield.

3. Drill two Ø.44 (7/16") holes 3.19" (3-3/16") apart in the locations marked in step 2 (Figure 36).

4. Mount the hose connector weldment and torque all hardware to the specified torque.

![Figure 4.35 - Assemble Hose Connector.](image)

![Figure 4.36 - Drill Holes.](image)

![Figure 4.37 - Assembly Complete.](image)
4.19 REEL SUPPORT (MANUAL)

4.19.1 DISASSEMBLY

It may be necessary to consult your Case IH Parts Catalog for identification of certain parts during disassembly.

1. Remove reflector brackets from the front of the reel arms.
2. Remove existing OEM reel and reel supports.
3. The header should now resemble Figures 4.38 & 4.39.

![Figure 4.38 - Reel Support-Manual (Right Hand).](image)

![Figure 4.39 - Reel Support-Manual (Left Hand).](image)

4.19.2 ASSEMBLY

1. Turn the threaded end of the reel crank assembly into the nut at the end of adjustment tube weldment on each side.
2. Insert reel support pads into the reel support assemblies and slide onto the reel arms on each side.
3. Bolt the adjustment tube weldment onto the reel support assemblies and secure using 1/2 X 2-1/2 bolts and centerlock nuts.
4. Assemble the reel support yokes onto the reel arms using 1/4 X 2-1/2 bolts and serrated flange nuts.
5. Bolt a spacer on each side of front bottom hole on LH reel arm with 1/2 X 4 bolt and nut.
6. Assemble the reflector bracket back onto the end of the RH reel arm only, with 1/2 bolt and nut.
7. Torque all hardware to the specified torque.

![NOTE](image)
Figure 4.40 - Reel Support-Manual (Right Hand).

Figure 4.41 - Reel Support-Manual (Left Hand).
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4.20 REEL SUPPORT (HYDRAULIC)

4.20.1 DISASSEMBLY

Avoid crushing injury or death from fall of raised reel.
Before working on or under a raised reel, place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop and set cylinder stops on both sides of reel before servicing, adjusting, repairing, or unplugging.

It may be necessary to consult your Case IH Parts Catalog for identification of certain parts during disassembly.
1. Remove reflector brackets from the front of the reel arms.
2. Remove existing OEM reel and reel supports.
3. The header should now resemble Figures 4.42 & 4.43.

Figure 4.42 - Reel Support-Hydraulic (Right Hand).

Figure 4.43 - Reel Support-Hydraulic (Left Hand).
4.20 REEL SUPPORT (HYDRAULIC)

4.20.2 ASSEMBLY

| WARNING | Avoid crushing injury or death from fall of raised reel. Before working on or under a raised reel, place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop and set cylinder stops on both sides of reel before servicing, adjusting, repairing, or unplugging. |

| NOTE | While performing the following assembly steps, refer to Figures 4.44 & 4.45. |

| LEFT HAND SIDE: |

1. Insert reel support pad into the reel support assembly and slide onto the reel arm.
2. Fasten the rod end of the hydraulic cylinder to the yoke on the reel support assembly with clevis pin and cotter pin.
3. Bolt a spacer on each side of front bottom hole on reel arm with 1/2” X 4” bolt and nut.
4. Torque all hardware to the specified torque.

| RIGHT HAND SIDE: |

1. Insert reel support pad into the reel support assembly and slide onto the reel arm.
2. Bolt the adjustment tube weldment onto the reel support assembly and secure using 1/2 X 2-1/2 bolts and centerlock nuts.
3. Bolt the OEM support assembly and reflector bracket onto the end of the reel arm. Secure using 1/2 X 2-1/2 bolts and 1/2 nuts.
4. Fasten the stationary end of the hydraulic cylinder to the support assembly using clevis pin and cotter pin.
5. Fasten the rod end of the hydraulic cylinder to the cylinder tube weldment using clevis pin and cotter pin.
6. Fasten the cylinder tube weldment to the adjustment tube weldment using 1/2 X 2-1/2 bolts and nuts.
7. Assemble the reel support yoke onto the reel arm using 1/4 X 2-1/2 bolts and serrated flange nuts.
8. Torque all hardware to the specified torque.
4.20 REEL SUPPORT (HYDRAULIC)

Figure 4.44 - Hydraulic Fore and Aft/Reel Support (Left Hand).

Figure 4.45 - Hydraulic Fore and Aft/Reel Support (Right Hand).
4.21 REEL TO HEADER INSTALLATION

**WARNING**

Avoid crushing injury or death from fall of raised reel.

Before working on or under a raised reel, place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop and set cylinder stops on both sides of reel before servicing, adjusting, repairing, or unplugging.

**NOTE**

On certain header widths, because of limited space between reel arms, the brace clamp may not be needed on the motor end of the reel. In Figure 4.46 the brace clamp is not used, whereas in Figure 4.47 the brace clamp is used.

**NOTE**

Bolt half-clamps from the bottom up so the nuts are on top.

Figure 4.46 - Reel to Header Install (brace clamp not used).

Figure 4.47 - Reel to Header Install (brace clamp used).
4.22 MANIFOLD TILT

WARNING

Avoid crushing injury or death from fall of raised reel.
Before working on or under a raised reel, place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop and set cylinder stops on both sides of reel before servicing, adjusting, repairing, or unplugging.

NOTE

The pivot clamp assembly may serve as a clamp for the tube cap in some instances. In this case, you would not use the 8-1/4” t-bolt clamp.

NOTE

Be sure the reel can be rotated by hand before attaching the actuator.

1. Slide the pivot clamp assembly over the LH end of the manifold, and position it next to the reel support bracket. Do not tighten the clamp at this time.
2. Place the tube cap over the end of the manifold tube and secure with the t-bolt clamp.
3. Bolt the stationary end of the electric actuator to the clevis on the reel support bracket.
4. Rotate the manifold so the line of sight along the air tubes is directed just behind the cutterbar (see section 5.51).
5. Extend the actuator 1/2 the length of the full extension (approx. 2”).
6. Bolt the actuator to the clevis on the pivot clamp assembly.
7. Tighten the pivot clamp assembly around the manifold tube.

Figure 4.48 - Manifold Tilt.
4.23 AIR HOSE

WARNING

Avoid crushing injury or death from fall of raised reel.

Before working on or under a raised reel, place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop and set cylinder stops on both sides of reel before servicing, adjusting, repairing, or unplugging.

NOTE

The hose connector weldment is attached to the mounting holes for the light OEM bracket. If the header is not equipped with a light bracket, holes must be drilled for the hose connector weldment.

NOTE

While performing the following assembly steps, refer to Figure 4.49.

1. For easier installation of hose parts, prepare a mixture of soapy water in a spray bottle.

2. Connect one end of 45° elbow to elbow support band and secure with one 8-11/16" t-bolt clamp.

3. Slip one 8-11/16" t-bolt clamp over exposed end of the 45° elbow. Spray soapy water onto the inside of the hose exposed end of the 45° elbow and slide onto the back side of the hose connector weldment.

4. Install one 8-1/4" t-bolt clamp on the flex hose and install on the elbow support band.

5. Rotate 45° elbow to provide proper routing of hose to the fan. Tighten t-bolt clamps that secure elbow to connector weldment and hose to elbow support band.

6. Determine the correct length of flex hose to reach the fan and cut hose to length.

7. Slip a 8-1/4" t-bolt clamp over the end of the flex hose, spray soapy water onto the inside of the flex hose and insert onto the fan outlet. Tighten t-bolt clamp.

8. Slip one 8-11/16" t-bolt clamp over one end of the 90° rubber elbow, spray soapy water onto the inside of the elbow, and insert onto the RH end of the air manifold. Position the elbow so it points approx. towards the 9:00 position.

9. Slip one 8-11/16" t-bolt clamp over exposed end of the 90° elbow, spray soapy water onto the inside of the elbow, and insert one end of an elbow support band into the 90° elbow.

10. Slip one 8-1/4" t-bolt clamp over one end of the remaining flex hose, spray soapy water onto the inside of the hose, and slide over the exposed end of the elbow support band.

11. Move the reel until it is fully extended. Determine correct length of flex hose to reach the hose connector and cut to length.

NOTE

Make sure the hose being cut in Step 10 is long enough to allow for travel of reel fore and aft.

12. Slip one 8-1/4" t-bolt clamp over the other end of the flex hose, cut to proper length. Spray soapy water onto the inside of hose, and slide onto the front side of the hose connector weldment. Rotate 90° elbow to desired position, and tighten all four hose clamps on this section.

13. Secure front hose to reel arm with flex hose chain assembly if desired.

Figure 4.49 - Air Hose Installation.
4.24 ELECTRICAL WIRING

![WARNING]

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

1. Mount the switch plate assembly in a convenient place inside the cab (use either velcro or bolts).
2. Run the red wires (with fuse-15 Amp & 6 Amp) to a power source. Use actuator switch harness (if provided) and combine is equipped with same type of auxiliary power supply.
3. Run the black wires to a suitable ground or to the actuator switch harness ground wires.
4. Route the long harnesses along the combine and header to the actuators (15 Amp Manifold Tilt; 6 Amp Air Volume) and plug in.
5. Mount the intermediate harness connectors to a convenient location on the combine feeder house.

![Figure 4.50 - Switch Plate Assembly.]

![Figure 4.51 - CASE IH 2388, Actuator Switch Adapter.]
4.25 OPTIONAL EQUIPMENT

4.25.1 AUXILIARY REEL TINE KIT

The Auxiliary Reel Tine Kit is recommended for crops that do not move easily from the knife to the auger at the ends of the header.

![Figure 4.52 - Loosen and Remove Hardware and Bushing.](image1)

![Figure 4.53 - Assemble Auxiliary Reel Tine Kit.](image2)

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

1. Loosen and remove one 1/2” X 1-1/2” hex bolt, two 1/2” flat washers, one pivot strap bushing and one 1/2” centerlock nut (Figure 4.52).

2. Simultaneously assemble the auxiliary reel tine assembly with two steel machine bushings as shown in Figure 4.53.

![Figure 4.52 - Loosen and Remove Hardware and Bushing.](image1)

3. Rotate the auxiliary reel tine assembly until the square end sets into the square hole of the pivot strap.

4. Insert the 3/8” X 2-1/2” carriage bolt through the square hole of the auxiliary reel tine assembly and fasten the 3/8” flat washer and 3/8” centerlock nut.

5. Tighten the 3/8” centerlock nut to the specified torque.

6. Repeat Steps 1 - 5 for each auxiliary reel tine assembly being installed.

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
</table>

Make sure the pitch of the auxiliary reel tines line up with the existing reel tines.
4.25 OPTIONAL EQUIPMENT

4.25.2 GEARBOX / FAN EXTENSION

The gearbox/fan extension option is designed to extend the fan up to eliminate clearance problems with headers smaller than 20' and combines with dual tires.

WARNING

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

1. Separate gearbox and fan. Refer to Figure 4.54 for identification of parts.
   A. Loosen set screw securing the indicator weldment and remove from butterfly shaft.
   B. Remove 3/8" x 1-1/4" bolts connecting fan housings and separate.
   C. Loosen 3/4" castle nut and remove washer and nut from gearbox shaft.
   D. Remove fan rotor and spacer washers.
   E. Remove bolts connecting lower fan housing to gearbox flange.

2. Attach extension shaft/hub assembly.
   A. Bolt extension shaft/hub assembly to gearbox flange with 1/2" x 1" bolts. Rotate extension shaft so the key in the coupler at the bottom of the shaft lines up with the keyway on the gearbox shaft.
   B. Place bearing retainer plate and washers onto end of extension shaft/hub assembly.
   C. Bolt lower fan housing to extension flange with 1/2 x 1" bolts.
   D. Attach spacer washers and fan rotor to extension shaft and secure with washer and 3/4" castle nut.
   E. Bolt upper fan housing to lower fan housing with 3/8" x 1-1/4" bolts.
   F. Reinstall indicator weldment onto butterfly shaft and tighten set screw.

3. Mount gearbox/fan extension to combine.
   A. Refer to owner’s manual for gearbox/fan installation instructions.
   B. Select appropriate support bracket for combine model.
   C. Bolt mounting bracket onto header.
   D. Remove upper bolts on gearbox mount plate. Bolt support bracket in the location bolts were removed using provided 1/2 x 1-1/2" bolts.
   E. Attach gearbox/fan extension to support bracket with provided u-bolt.
Figure 4.54 - Gearbox/Fan Extension Kit

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7022</td>
<td>KEY, 3/16&quot; SQUARE X 1-1/4&quot; PLAIN</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>13014</td>
<td>U-BOLT, 3/8&quot; X 3&quot; X 4&quot;, FAN MOUNT ZP</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>15006</td>
<td>BOLT, 3/8&quot; X 1&quot; HHCS GR5 ZP</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>15012</td>
<td>BOLT, 1/2&quot; X 1&quot; HHCS GR5 ZP</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>15014</td>
<td>BOLT, 1/2&quot; X 1-1/2&quot; HHCS GR5 ZP</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>15031</td>
<td>WASHER, 3/8&quot; FLAT ZP</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>15042</td>
<td>NUT, 3/8&quot; HEX NC ZP</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>15049</td>
<td>NUT, 1/2&quot; CENTERLOCK GRB ZP</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>15051</td>
<td>NUT, 3/8&quot; SERRATED FLANGE NC ZP</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>15055</td>
<td>NUT, 3/4&quot; NF CASTLE ZP</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>15097</td>
<td>WASHER, 1/2&quot; SAE FLAT ZP</td>
<td>8</td>
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<tr>
<td>12</td>
<td>15098</td>
<td>WASHER, 3/4&quot; SAE FLAT ZP</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>15099</td>
<td>WASHER, 7/8&quot; SAE FLAT ZP</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>15332</td>
<td>SCREW, 1/4&quot;-20 X 1/4&quot; SET</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>15364</td>
<td>BOLT, 3/8&quot; X 1-1/4&quot; HHCS GR5 ZP</td>
<td>12</td>
</tr>
<tr>
<td>16</td>
<td>16466</td>
<td>ROTOR, FAN, 12.88&quot; X 2.5&quot;, 7/8&quot; B, CW, HSPD, ALUM</td>
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</tr>
<tr>
<td>17</td>
<td>21193</td>
<td>8&quot; FAN, SIDE W/BUTTERFLY, RH</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>21194</td>
<td>8&quot; FAN, SIDE W/BUTTERFLY, LH</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>21444</td>
<td>PLATE, LARGE BUTTERFLY</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>22344</td>
<td>WELDMENT, INDICATOR</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>24510-12</td>
<td>PLATE, BEARING RETAINER</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>24639-12</td>
<td>BRACKET, EXTENSION SUPPORT</td>
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</tr>
<tr>
<td>23</td>
<td>24640-12</td>
<td>BRACKET, EXTENSION SUPPORT</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>24641-12</td>
<td>BRACKET, EXTENSION SUPPORT</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>24643</td>
<td>ASSEMBLY, EXTENSION SHAFT/HUB</td>
<td>1</td>
</tr>
</tbody>
</table>
Follow all safety instructions exactly. Safety is everyone’s business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the area around the work site. Untrained operators are not qualified to operate the machine.

Many features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum efficiency. By following the operating instructions in conjunction with a good maintenance program, your machine will provide many years of trouble-free service.

The Air Reel is designed to dramatically improve harvesting efficiency. Power is provided by the combine feeder and hydraulics. Be familiar with the machine before starting.

It is the responsibility of the owner or operator to read this manual and to train all other operators before they start working with the machine. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, and prudence of personnel involved in the operation, transport, maintenance and storage of equipment or in the use and maintenance of facilities.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read and understand the Owner’s Manual and all safety signs before servicing, adjusting or repairing.</td>
</tr>
<tr>
<td>2. Install and secure all guards and shields before starting or operating.</td>
</tr>
<tr>
<td>3. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.</td>
</tr>
<tr>
<td>4. Place all controls in neutral or off, lower header to the ground, stop combine engine, set parking brake, chock wheels, remove ignition key, wait for all moving parts to stop, before servicing, adjusting, repairing or unplugging.</td>
</tr>
<tr>
<td>5. Clear the area of bystanders, especially small children, before starting.</td>
</tr>
<tr>
<td>6. Keep all hydraulic lines, fittings, and couplers tight and free of leaks before and during use.</td>
</tr>
<tr>
<td>7. Clean reflectors and lights before transporting.</td>
</tr>
<tr>
<td>8. Review safety related items annually with all personnel who will be operating or maintaining the machine.</td>
</tr>
<tr>
<td>9. Shut the combine off when connecting the machine hydraulics.</td>
</tr>
<tr>
<td>10. Do not exceed fan speed of 5300 RPM. Check the fan speed by multiplying the drive shaft speed (RPM) by the gear ratio of the gearbox.</td>
</tr>
<tr>
<td>11. Do not run the fan without back pressure. Close the butterfly valve on the fan if the flex hose is disconnected.</td>
</tr>
</tbody>
</table>
5.1 MACHINE COMPONENTS

Your Crary Finger Air Reel incorporates the superior feeding performance of an adjustable tine pitch pickup reel and an adjustable air system. The combination of these two systems results in superior harvesting efficiency. Please take the time to familiarize yourself with the proper adjustment and operation of your Finger Air Reel. You will be well rewarded for your time in increased performance and crop yields.

The finger reel is designed to support and direct the crop during the cutting process and subsequent transfer to the header auger or belt.

Air is used to enhance the performance of your finger reel by moving the cut crop off the sickle towards the header auger or belt.

- Drive Shaft
- Reel Bat Arm Assy.
- Air Tube
- Reel Bat Assy.
- Reel Tine
- Hydraulic Motor
- Eccentric Arm Assy.
- Gearbox
- Fan
- Fan Hose
- PTO Driveline
5.2 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Air Reel requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. A pre-operation checklist is provided for the operator. It is important for both personal safety and maintaining the good mechanical condition of the machine that this checklist is followed.

Before operating the machine and each time thereafter, the following areas should be checked off:

1. Service the machine per the schedule outlined in the Service Record.
2. Use only a combine of adequate power and specifications to operate the machine.
3. Check that all guards are installed, secured and functioning as intended. Do not operate with missing or damaged shields.
4. Ensure that the machine is properly attached to the header and that mechanical retainers, such as quick pins, are installed.
5. Check the cutterbar, reel area and drives for entangled material.
6. Check the chains and sprockets for proper tension and alignment. Adjust as required.
7. Visually inspect the hydraulic system for leakage, loose fittings, and damaged hoses. Tighten fittings, replace damaged components and wipe up leaked or excess hydraulic fluid.
8. Check condition of driveline slip clutch friction discs. If installing replacement discs, adjust spring height to original height. Deviation from original setting may be needed depending upon disc wear. Run-in is recommended at the start of the season (see Service and Maintenance Section).
9. Check condition of auger driveshaft slip clutch friction discs. Run-in is recommended at the start of the season (see Service and Maintenance Section).

5.3 MACHINE BREAK-IN

5.3.1 PRE-START INSPECTION

1. Read the Operator’s Manual.
2. Check that the hydraulic lines and electrical harnesses are routed where they will not contact moving parts. Be sure all components are clipped, taped or tied securely in place.
3. Check that all guards are installed and secured.
4. Check that all required nuts and bolts are installed and tightened to their specified torque.

5.3.2 AFTER OPERATING FOR 2 HOURS

1. Re-torque fasteners and hardware.
2. Check that all safety decals are installed and legible. Apply new decals if required.
3. Check that no hydraulic hoses are being pinched, crimped, or are rubbing. Reroute as required.
4. Check that the wiring harness is not being pinched, crimped, or rubbing. Reroute as required.
5. Check the tension and alignment of all drive chains. Adjust as required.
6. The gearbox will generate heat. The typical operating temperature of the gearbox is 180° F.

5.3.3 AFTER OPERATING FOR 10 HOURS:

1. Re-torque fasteners and hardware.
2. Check that all guards are installed, secured and functioning as intended. Do not operate with missing or damaged shields.
3. Check safety decals. Install new ones if required.
4. Check the routing of hydraulic lines and the wiring harness. Reroute as required to prevent pinching, crimping, binding, or rubbing.
5. Check the plastic eccentric rollers for uneven wear.
6. Refer to the normal servicing and maintenance schedule as defined in the Service Record.
5.4 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of the controls and safety devices. Some machines may vary due to different models of combines and headers.

MANIFOLD TILT:

1. Moving the toggle switch to the FORE position (Figures 5.1 & 5.2) extends the shaft of the electric actuator forward. This rotates the manifold CW which directs the air tubes towards the front of the header. See Section 5.5.1 for the center stroke position which points the air tubes directly behind the cutterbar.

2. Moving the toggle switch to the AFT position (Figures 5.1 & 5.2) retracts the shaft of the electric actuator backward. This rotates the manifold CCW, which directs the air tubes towards the back of the header.

FAN AIR VOLUME ACTUATOR:

1. Move the toggle to the OPEN position (Figures 5.1 & 5.2) to open the butterfly plate which increases air volume to the air tubes.

2. Move the toggle to the CLOSED position (Figures 5.1 & 5.2) to close the butterfly plate which decreases air volume to the air tubes.

REEL LIFT:

Consult your owner/operator’s manual that came with your header.

HYDRAULIC REEL FORE AND AFT ADJUSTMENT:

Consult your owner/operator’s manual that came with your header.

MANUAL REEL FORE & AFT ADJUSTMENT:

Consult your owner/operator’s manual that came with your header.
5.5 INITIAL ADJUSTMENTS

Since all applications of the Air Reel are not the same, based on header and combine variations, some initial adjustments must be made to achieve peak performance of your Air Reel.

5.5.1 INITIAL ADJUSTMENT

1. Place header on a level surface.
2. Pull reel back as close as possible to auger while maintaining clearance between auger flighting and bat tubes.
3. Install aft stop.
4. Adjust reel tines perpendicular to sickle sections.
5. Adjust reel height to achieve reel tine to sickle clearance of 1" minimum for rigid operation.
6. Adjust reel height to achieve reel tine to sickle clearance of 1" minimum with sickle at maximum up flex for flex operation.
7. Set cylinder stops at this position.
8. Move reel ahead until fingers contact ground surface.
9. Install stop on reel arm to prevent further travel.

**WARNING**

Place all controls in neutral or off, stop combine engine, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

10. DO NOT OPERATE WITH TINES CONTACTING THE GROUND.

11. Move reel aft against stop.
12. Adjust the air tube position to point at the back of the sickle bar.
13. Loosen tilt actuator clamp and adjust so the actuator is in middle of stroke (approx. 2" of actuator shaft exposed) with tube nozzles pointed at sickle bar.

5.5.2 REEL ADJUSTMENT

1. Rest the header on the ground and lower the reel so the reel tines clear the cutterbar by at least 1 inch.
2. Position the reel so that the reel tines sweep over the cutter bar and begin their lift just behind it.
3. Rotate the manifold so the line of sight along the air tubes is directed just behind the cutterbar.
4. Turn adjustable air tubes at each end approximately 90° so they direct air into the corners of the header.
5. Open fan butterfly to fully open position.

**NOTE**

Use the electric actuators to adjust air flow direction and air volume.

---

*Figure 5.4 - Initial Reel Adjustment.*
5.5 INITIAL ADJUSTMENTS

5.5.3 TINE PITCH ADJUSTMENT

1. From the right side of the machine loosen the three 3/8" X 1" carriage bolts securing the eccentric mount plate assembly to the RH end Clamp (Figure 5.5).

2. Insert the Tine Pitch Adjustment wrench into the shaped cutout on the side of the eccentric mount plate assembly (as shown in Figure 5.5). The default pitch angle is with the 5th tooth (middle tooth) on the eccentric mount plate assembly aligned with the indicator mark on the RH & LH end clamps (Figure 5.6).

3. From the RH side of the machine, move the Tine Pitch Adjustment wrench CCW to change the tine pitch forward. Move the Tine Pitch Adjustment wrench CW to change the tine pitch backward (Figure 5.5).

4. Tighten the three 3/8" X 1" carriage bolts to their specified torque.

5. From the LH side of the machine, follow steps 1 & 2, then move the Tine Pitch Adjustment wrench CCW to change the tine pitch backward. Move the Tine Pitch Adjustment wrench CW to change the tine pitch forward (Figure 5.5).

6. Tighten the three 3/8" X 1" carriage bolts to their specified torque.

NOTE

Although the adjustment can be made anywhere along the adjustment slot, aligning the teeth tips with the indicator point, allow you to better identify the position of the reel tine adjustment for both sides (Figure 5.6).
5.5 INITIAL ADJUSTMENTS

**WARNING**
Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

**IMPORTANT**
To prevent burn-up of slip disks the torque limiter (slip clutch) must be adjusted prior to use.

5.5.4 TORQUE LIMITER (SLIP CLUTCH)
The Air Reel comes equipped with a torque limiter (slip clutch) on the main drive of the air reel. From the factory the torque limiter is set in the engaged position. Before use, the slip clutch must be slipped and adjusted to ensure proper function.

ALLOWING THE TORQUE LIMITER TO SLIP
1. Loosen the centerlock nuts on the torque limiter so that the pressure is relieved from the pressure plates.
2. With the combine engine at idle speed, engage the PTO for 2-3 seconds to make the torque limiter slip. **Do not allow the torque limiter to slip for more than 2-3 seconds at a time to prevent damage to the linings.**
3. If the torque limiter does not slip, repeat the procedure 2 or 3 times. If it still doesn’t slip, check that all the centerlock nuts are loosened and not placing tension on the pressure plates.
4. After the torque limiter has slipped, refer to the adjustment section for instructions on how to reset the torque limiter.

ADJUSTING THE TORQUE LIMITER
After the torque limiter has slipped, it must be adjusted to the tension required to operate the header. The goal of this procedure is to have the torque limiter slip momentarily upon initial startup and then operate normally.

1. Slowly engage the PTO with the engine running at idle speed.
2. If the torque limiter does not slip, shut off machine and loosen the centerlock nuts in 1/4 turn increments until it slips momentarily when the header is engaged. If the torque limiter continues to slip after start-up, tighten the centerlock nuts in 1/4 turn increments until it slips momentarily when the header is engaged.
3. The torque limiter is ready for use.

**NOTE**
At the end of the season, or before any long period of non-use, loosen the centerlock nuts to relieve the pressure on the linings.

*Figure 5.7 - Adjusting the Torque Limiter.*
5.6 OPERATING HINTS

The following are recommended adjustments the operator can make based on crop conditions. Any adjustments that involve the operator leaving the combine cab should heed the warning instructions listed below.

1. Adjust reel speed to slightly faster (5% to 10%) than ground speed.
2. Gradually lower reel speed until crop head is slightly tipped towards header and appear to be held stationary when cut.
3. Gradually adjust reel height just low enough to tip crop towards head without wrapping.
4. Increase air to maximum.
5. Move tilt control until air is directed at back of sickle bar with reel feeding properly.
6. Gradually reduce air until crop is no longer moving smoothly across sickle.
7. Gradually increase air until smooth crop flow across the sickle is achieved.
8. Remember more air uses more horsepower.
9. Gradually adjust air position fore and aft until optimum crop flow is achieved.
10. Gradually reduce air further until minimum air is used to maintain crop flow.

DO use the reel to bring the crop into the header.
DO operate reel as close to auger as possible.
DO keep tines as perpendicular to sickle as possible.
DO use air to feed crop across the sickle.
DO adjust air tube angle to maximize crop flow across the sickle.
DO make adjustments gradually.
DO verify proper air tube position whenever adjusting reel height or fore and aft position.
DO SHUT OFF AIR IMMEDIATELY IF THE AIR HOSE SHOULD FAIL. FAILURE TO DO SO MAY RESULT IN GEARBOX FAILURE.
DO follow troubleshooting guide one step at a time.

5.7 TRANSPORTING

The Air Reel is designed to be easily and conveniently moved from location to location. When transporting the machine, review and follow these safety instructions:

1. Make sure you are in compliance with all local regulations regarding transporting equipment on public roads and highways.
2. It is the responsibility to the owner to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility.
3. See the owner’s manual that came with your combine and header for proper transportation guidelines.

WARNING

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

DO NOT operate reel lower than needed.
DO NOT operate with tines striking the ground or sickle.
DO NOT use more air than needed.
DO NOT operate with plugged air tubes.
After the season’s use, the machine should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the start of next season. To insure a long, trouble free life, this procedure should be followed when preparing the unit for storage.

1. Clear the area of bystanders, especially small children.
2. Thoroughly wash the entire machine using a pressure washer to remove all dirt, mud, debris or residue.
3. Inspect the following components:
   
   A. PTO Driveline Components
      • Check the condition and operation of the friction disc torque limiter (slip clutch).
      • Release slip clutch pressure.
      • Store in a dry place.
   
   B. Electrical System
      • Check the wiring harness and all wiring components for damaged or worn areas.
      • Check for cracked or worn insulation.
      • Replace any components that have come in contact with moving parts and re-route to prevent damage in the future.
   
   C. Hydraulic Components:
      • Check all hydraulic lines for damage; replace as required.
   
   D. Air Reel Components
      • Air Tubes: repair or replace bent or damaged air tubes.
      • Plastic Tines: repair or replace bent or damaged plastic tines.
      • Manifold Driveshaft Bearings: Driveshaft bearings are sealed bearings and do not need lubrication. If worn or damaged, replace as required.
      • Idler Gears and Bearing Components, Pinion Gears and Bearing Components and Internal Gear sections: Check gears for wear; check for worn or damaged bearings and replace as required; adjust gears as required.
      • Plastic Eccentric Rollers: check for uneven wear; replace as required.
   
   E. Right Hand Drive Components
      • Roller Chain, Sprockets and Bearings: check for wear; replace as required.
      • Visually inspect fan rotor for wear or buildup.
      • Check condition of the rotary screen bearings.
   
4. Make a list of all parts needed for repairs and order them immediately. Repairs can then be done when time permits and prevent unnecessary down time at the start of next season.
5. Lubricate all grease points to remove any water residue from the washing and prevent rusting during the storage period. Rotate all moving parts to distribute lubricant to all surfaces.
6. Apply a light coat of grease on the shafts.
7. Check the cutterbar, reel area and drives for entangled material.
8. Touch up all paint nicks and scratches to prevent rusting.
9. Move the machine to its storage area.
10. Select an area that is dry, level, and free of debris.
11. If the machine cannot be stored inside, cover with a waterproof tarpaulin and tie securely in place.
12. Store out of the way of human activity.
13. Do not allow children to play on or around stored unit.

REMOVING FROM STORAGE

When removing from storage and preparing to use, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Remove the tarpaulin from the machine if it was covered.
3. Clean off accumulated trash and dirt.
4. Check routing and securing of all hydraulic lines and wiring harness; adjust as required.
5. Rotate all components and systems by hand to see that none are seized. Loosen any seized components with penetrating oil before starting.
6. Retighten any loose bolts to their specified torque.
7. Lubricate all grease points and shaft surfaces.
8. Check for excessive wear on all moving parts.
9. Tighten all hydraulic connections and mounts; replace o-rings, fittings, or connectors subject to leaking.
10. Review and follow all items in the Pre-Operaton and Machine Break-In sections before starting (Sections 5.2 & 5.3).
11. Install all safety shields and review precautions with operators and other personnel involved in the operation.
12. Drain and refill gearbox.
## 6.1 MAINTENANCE CHECKLIST

Along with a servicing interval, perform a visual inspection. Maintenance personnel can often detect potential problems from any unusual sounds made by such components as shafts, bearings and drives.

These service recommendations are based on normal operating conditions. Severe or unusual conditions may require more frequent attention. Copy this page to continue record.

**ACTION CODE:**
- **√** = CHECK OR INSPECT
- **L** = LUBRICATE
- **CL** = CLEAN
- **C** = CHANGE

<table>
<thead>
<tr>
<th>HOURS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICED BY</td>
<td></td>
</tr>
</tbody>
</table>

### DAILY
- L PTO CROSS JOURNAL ZERKS
- √ GEARBOX OIL LEVEL

### 16 HOURS
- L PTO INNER TUBE

### 40 HOURS
- L PTO SHIELD RETAINING BEARING
- L PTO DISCONNECT MECHANISM
- √ TENSION OF IDLER GEARS
- √ FAN HOUSING AND DUCTWORK
- √ PLASTIC ECCENTRIC ROLLERS

### YEARLY
- C GEARBOX OIL
- √ CONDITION OF FRICTION DISC TORQUE LIMITER (SLIP CLUTCH)
6.2 FLUIDS AND LUBRICANTS

1. **GREASE:** Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance meeting or exceeding the NLGI #2 rating for all requirements. Also acceptable is an SAE multi-purpose lithium based grease.

2. **GEARBOX LUBE:** Use Mobilube SHC 75W-90 synthetic gear lube or equivalent with the following specifications:
   - API Service GL-5/MT.1
   - MIL-L-2105D
   - MACK GO-J PLUS
   - SAE J2360
   - Capacity: 40 oz.

3. **STORING LUBRICANTS:** Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

6.3 GREASING

1. Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

2. Use a hand-held grease gun for all greasing.

3. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.

4. Replace and repair broken fittings immediately.

5. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.
6.4 GEARBOX OIL

CHECKING THE GEARBOX OIL LEVEL
Check the gearbox oil level daily. Check more frequently if leaks exist around any of the plugs or shaft seals.

The oil level in the gearbox should be no higher than the bottom of the driveshaft (Figure 6.1).

CHANGING THE GEARBOX OIL
Each gearbox is equipped with a drain, level and fill plug. Every 500 operating hours or annually, whichever comes first, the oil should be replaced. When changing the oil, follow this procedure:

1. Place a container under the gearbox.
2. Remove the drain plug. Allow 10 minutes to drain.
3. Replace the drain plug.
4. Add 40 oz of Mobilube SHC 75W-90 synthetic gear lube or equivalent with the following specifications:
   - API Service GL-5/MT.1
   - MIL-L-2105D
   - MACK GO-J PLUS
   - SAE J2360
   - Capacity: 40 oz.
5. Fill the gearbox oil through the top fill plug.
6. Check that the air passage through the vent plug is open.
7. Dispose of the used oil in an environmentally safe manner.

Figure 6.1 - Gearbox Oil Level.

IMPORTANT
Always clean the vent plug if any leaks are noticed around shaft seals.
6.5 PTO LUBRICATION

DAILY
Lubricate PTO cross journals. Make sure grease purges through all four bearings.

EVERY 16 HOURS
Lubricate PTO inner tubes. Telescoping members must have lubrication to operate successfully. Telescoping members without fittings should be pulled apart and grease should be added manually with a brush.

EVERY 40 HOURS
Lubricate the PTO shield retaining bearing. Molded nipples on the guard near each guard bearing are intended as grease fittings and should be lubricated every 40 hours of operation.
Lubricate the PTO disconnect mechanism.

6.6 AUGER DRIVE CHAIN LUBRICATION (1993 AND LATER SERIES) (15 FT - 22.5 FT)

Every 50 hours the auger drive chain should be lubricated. When lubricating the chain follow this procedure.

WARNING
Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

1. Remove the chain drive shield weldment (Figure 6.3).
2. Lubricate the roller chain every 50 hours of operation with a light motor oil to extend wear life.
3. Use a spray chain lubricant or SAE 30 engine oil.
   * Stamped on chain link side plate.
4. Remove the chains from the machine for cleaning and lubrication at the end of every season. Soak roller chains in diesel fuel to clean. Dry and then oil chain thoroughly.

<table>
<thead>
<tr>
<th>CHAIN TYPE*</th>
<th>AMBIENT TEMPERATURE RANGE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>14° F - 32° F</td>
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<tr>
<td>RS-50 LESS</td>
<td>SAE 10</td>
</tr>
<tr>
<td>RS-60 / RS-80</td>
<td>SAE 20</td>
</tr>
<tr>
<td>RS-100</td>
<td>SAE 20</td>
</tr>
<tr>
<td>RS-120 / MORE</td>
<td>SAE 30</td>
</tr>
</tbody>
</table>

Figure 6.2 - Lubricate PTO Cross Journals.
Figure 6.3 - Auger Chain Lube.
6.7 AUGER DRIVE CHAIN TENSION AND ALIGNMENT (1993 AND LATER SERIES)

At the end of every season or annually the auger drive chain tension and alignment should be checked. When checking the tension and alignment of the auger drive chain follow this procedure.

**WARNING**

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

**TENSION:**

Maintain correct chain tension. Overtightening causes the chain to stretch and exerts excessive side loads on the sprockets, shafts, and bearings. A loose chain will slap and climb the sprocket teeth causing excessive wear. To check and adjust chain tension, follow this procedure.

1. Remove the chain drive shield weldment (Figure 6.4).
2. Loosen bolts on gearbox and slide gearbox up or down to permit 3/16 to 3/8 inch sag in the top strand of the chain.
3. When necessary, add or remove links to achieve correct tension. Do not install a new link on a chain with excessive wear. The shorter pitch of the new link will shorten the life of the drive parts.
4. Place spring clips on master links so that the closed end is facing the direction of travel.
5. Tighten bolts on gearbox to their specified torque.
6. Re-install chain drive shield weldment.

**ALIGNMENT:**

Maintain correct chain alignment. A chain that is out of alignment causes excessive wear on the chain and sprockets. The chain can also fall off. To check and adjust chain alignment, follow this procedure.

1. Remove the chain drive shield weldment (Figure 6.4).
2. Check alignment with a straight edge across the face of the sprockets.
3. If sprocket faces are out of alignment, loosen the set screws on the torque limiter (slip clutch) securing it to the gearbox drive shaft and slide to the left or right.
4. Re-check alignment with a straight edge across the face of the sprockets.
5. Tighten the set screws on torque limiter to their specified torque.
6. Re-install chain drive shield weldment.

![Figure 6.4 - Chain Tension and Alignment.](image)
6.8 IDLER GEAR TENSION

Every 40 hours the tension of the idler gears should be checked. If the tension between the idler gears and internal gear sections of the reel bat arm assembly has any radial movement it will be necessary to make adjustments. When adjusting the tension of the idler to internal gears, follow this procedure.

1. Loosen the 3/8" centerlock nuts which are on the idler gear assembly on the front side of the manifold.
2. Insert a small pry bar between the outside wall of the manifold tubing and the idler gears. Apply approx. 5 lbs of force to slide the gear away from the manifold (Figure 6.5).
3. Tighten the 3/8" centerlock nuts to their specified torque.
4. Rotate the reel arm assemblies to ensure they turn freely.

**WARNING**

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

**IMPORTANT**

Do not grease pinion or idler gears on the reel. Drive shaft bearings on the reel are sealed and do not need lubrication. If worn or damaged, replace as required.

![Figure 6.5 - Tightening centerlock nuts of idler gears](image-url)
Every 40 hours the eccentric rollers should be checked. Flat wear spots may show on the eccentric rollers if they do not rotate while the reel rotates. If this occurs it may be necessary to make adjustments or replace the rollers and/or bearings.

**WARNING**

Place all controls in neutral or off, stop combine engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

**IMPORTANT**

The eccentric rollers must rotate with the reel.

---

1. Inspect the eccentric rollers for uneven wear. If no wear is detected proceed to Step 5.
2. If uneven wear is detected, loosen and remove the bolt and hardware for each roller that is defective.
3. Inspect the radial bearings that are seated in the rollers; check to see if they turn freely.
4. If replacement parts are needed, consult your local authorized Crary dealer.
5. Reassemble the eccentric roller assembly as shown in Figure 6.7.
6. Readjust the roller firmly against the eccentric ring and tighten bolts to the specified torque. You may need to insert additional washers between the roller and the eccentric mount plate to center the eccentric ring on the rollers.

---

**Figure 6.6 - Inspect Plastic Rollers for Uneven Wear.**

**Figure 6.7 - Loosen and Remove Hardware.**
6.10 FAN HOUSING AND AIR HOSE

Every 40 hours the fan housing and ductwork should be checked for wear (Figure 6.8).

6.11 FRICTION DISC TORQUE LIMITER (SLIP CLUTCH) - DRIVELINE

6.11.1 RUN-IN

It is recommended that the unit be run-in by slipping the hub before initial use.

1. Release tension on the torque limiter by loosening the eight nuts (Figure 6.9).
2. Slip the hub 3-4 seconds with combine at idle speed.
3. Tighten the nuts following an alternating cross pattern until the clutch slips momentarily upon initial startup, and then continues to operate normally.

6.11.2 MAINTENANCE

1. Disconnect the PTO driveline from the implement.
2. Position the driveline on a workbench.
3. Loosen the eight nuts.
4. Remove bolts and disassemble all components.
5. Check the condition of all parts, especially the friction discs (Figure 6.10).
6. If replacement parts are needed, consult your local authorized Crary dealer.
7. Reassemble all components.
8. Tighten nuts following an alternating cross pattern until the clutch slips momentarily upon initial startup and then continues to operate normally.
6.12 FRICTION DISC TORQUE LIMITER (SLIP CLUTCH) - AUGER DRIVESHAFT

1993 AND LATER HEADERS

6.12.1 RUN-IN AND TORQUE ADJUSTMENT
1. It is recommended that the unit be run-in by slipping the sprocket before initial use.
2. Insure that the three adjusting nut screws are backed off four turns and that the adjusting nut is in a finger tight position (Figure 6.11).
3. Mark the adjusting nut with the hub. Back off the adjusting nut the number of turns that correspond to the desired break away torque as shown in the chart below.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>APPROXIMATE BREAK AWAY TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 1 SPRING</td>
<td>90 LB. FT</td>
</tr>
<tr>
<td>TURNS</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

4. Tighten the three adjusting screws alternately until the heads bottom out. Torque to 65 In-lbs.

6.12.2 MAINTENANCE
After prolonged use, the auger driveline torque limiter should be inspected for wear.
1. Remove the torque limiter from the gearbox driveline on the RH side of the gearbox. Follow reverse assembly procedure from Section 4 (RH Drive Kit installations).
2. Back off the three adjusting screws four full turns.
3. Remove the adjusting nut, spring retainer, spring, pressure plate, and friction discs.
4. Insure that the friction discs are free from oil or moisture.
5. Install the bushing over the hub and pilot the sprocket over the bushing. Re-assemble the friction disc, pressure plate with the smooth side to the friction disc, spring, spring retainer with pilot facing the spring, and the adjusting nut.
6. Advance the adjusting nut to a finger tight position, insuring that the spring is piloted on the spring retainer.
7. Adjust the breakaway torque according to Section 6.12.1

NOTE
It is recommended that the breakaway torque be set between 180 - 225 Ft. lbs.

Figure 6.11 - Friction Disc Torque Limiter (Slip Clutch)
In the following section, we have listed many of the problems, causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please call your local Crary dealer. Before you call, please have this manual and the serial number from your machine ready.

### BEFORE YOU CALL

Please have the following information available:

Serial # ______________________________

---

## TROUBLESHOOTING

### CUTTING

| BUILDUP OF CROP IN CORNERS | 1. Gradually adjust crop dividers to direct crop towards center.  
2. Gradually direct air from adjustable nozzles to move crop from area  
3. Add auxiliary tines |
|---------------------------|------------------------------------------------------------------|
| BUILDUP OF CROP ON SICKLE | 1. Gradually adjust air flow to the middle of the sickle  
2. Gradually increase air volume until crop flow is achieved. |
| CROP NOT FEEDING AUGER | 1. Gradually move reel back  
2. Adjust tine angle one notch at a time closer to perpendicular  
3. Gradually adjust air flow closer to auger until crop is feeding properly.  
4. Gradually adjust air volume to achieve optimum crop flow with minimum amount of air  
5. Gradually increase auger speed  
6. Gradually increase header speed |
| CROP NOT FEEDING HEAD FIRST | 1. Gradually increase reel speed  
2. Gradually increase air flow to tilt head of crop towards header |
| DOWN OR LODGED CROP | 1. Gradually move reel ahead to achieve best feeding  
2. Gradually increase reel speed to achieve best feeding  
3. Gradually adjust air flow forward to assist reel in lifting crop.  
4. Gradually increase air volume as needed  
5. Adjust tine angle back one tooth at a time to achieve best feeding |
| FLYING DEBRIS | 1. Gradually reduce air flow while maintaining adequate crop flow |
| SHATTER LOSS | 1. Gradually decrease reel speed  
2. Gradually increase air flow |
| WRAPPING (REEL) | 1. Gradually raise reel to reduce or eliminate wrapping while maintaining crop flow  
2. Gradually move reel forward to reduce or eliminate rapping while maintaining crop flow  
3. Gradually reduce reel speed  
4. Adjust tine angle one notch at a time closer to perpendicular |
8 Section SPECIFICATIONS

8.1 REEL SPECIFICATIONS

SPEED OF HYDRAULIC DRIVE ............... 0 - 59 RPM
DIAMETER (BAT REEL) ............................... 48"
NUMBER OF BATS ......................................... 6

8.2 FAN PERFORMANCE DATA

4500 RPM
FORWARD CURVE
8" OUTLET FAN

ROTOR SIZE =
16.50" DIA X 3.00" WIDE

Efficiency
Pressure
Horsepower

CFM
1000
2000
3000
4000

10
20
30
40
50

10
20
30
40
50

HORSEPOWER & EFFICIENCY %
### 8.3 HYDRAULIC MOTOR DATA

<table>
<thead>
<tr>
<th>Torqmotor Series</th>
<th>MG08</th>
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<tr>
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</tr>
<tr>
<td>(cm³/rev)</td>
<td>130</td>
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<tr>
<td>Pressure (PSI)</td>
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<td>Continuous (Differential)*</td>
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<td>(kg-m)</td>
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</tr>
<tr>
<td>(kg)</td>
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</table>

*a - The maximum pressure at the motor inlet or outlet ports without regard to the continuous or intermittent pressure ratings is 2400 PSI (168.7 kg/cm²).

**Hydraulic Gear Motor:**
- Roller vane rotor set design.
- Full flow lubrication.
- Shaft seal with stands full system pressure.
- Front ports 7/8 - 14 UNF straight thd. o-ring.
- 1” dia woodruff key shaft.
- Roller stator displacement - 8.0 cu. in. per rev.

**HYDRAULIC MOTOR MG SERIES PERFORMANCE CHART**

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<th>Series: MG08 (8.0)</th>
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<tbody>
<tr>
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<td>Flow (GPM)</td>
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<td>Maximum</td>
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<td>Speed (RPM)</td>
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<td>Cont. Flow &amp; Pressure</td>
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<td>Max. Flow, No Load</td>
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<tr>
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<td>Intermittent Flow</td>
</tr>
<tr>
<td>Minimum Starting at Continuous Pressure</td>
</tr>
<tr>
<td>Minimum Starting at Intermittent Pressure</td>
</tr>
</tbody>
</table>

- Testing was done at 130 °F using 10W40 Oil.

- Intermittent rating all others continuous.
8.4 HYDRAULIC FITTING TORQUE

TIGHTENING FLARE TYPE TUBE FITTINGS *

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.

<table>
<thead>
<tr>
<th>TUBE SIZE</th>
<th>NUT SIZE</th>
<th>TORQUE VALUE</th>
<th>RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)</th>
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</thead>
<tbody>
<tr>
<td>O.D</td>
<td>ACROSS FLATS</td>
<td>(in.)</td>
<td>(N.m)</td>
</tr>
<tr>
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<td>(in.)</td>
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<td>1-3/8</td>
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<td>122</td>
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</tbody>
</table>

* The torque values shown are based on lubricated connections as in reassembly

TIGHTENING O-RING FITTINGS *

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the centerlock nut off until washer bottoms out at top of groove.
3. Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten while holding body of fitting with a wrench.

<table>
<thead>
<tr>
<th>TUBE SIZE</th>
<th>NUT SIZE</th>
<th>TORQUE VALUE</th>
<th>RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)</th>
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<tr>
<td>O.D</td>
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<td>(N.m)</td>
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* The torque values shown are based on lubricated connections as in reassembly
CHECKING BOLT TORQUE:

The table shown below is for reference purposes only and its use by anyone is entirely voluntary, unless otherwise noted. Reliance on its contents for any purpose is at the sole risk of that person. Crary Co. is not responsible for any loss claim or damage arising therefrom. In developing these tables, Crary has made a determined effort to present the contents accurately.

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

* Torque value for bolts and cap screws are identified by their head markings.