MacDon A40-D Self-Propelled Auger Header

Published: May, 2016
EC Declaration of Conformity

[1] M0, [1] 147912 i Revision A


[4] As Per Shipping Document


[6] Christoph Martens
Product Integrity

---

**EN**

- **Ww. [1]**
  - Declaration that the product:
  - **Machine Type** [2]
  - **Name & Model** [3]

- **BG**
  - **M0. [1]**
  - **Prehladhajte, че продукт:
  - **Typ zariadenia** [2]
  - **Názov modelu** [3]

- **CS**
  - **M0. [1]**
  - **Předloužme, že produkt:
  - **Typ zařízení** [2]
  - **Název modelu** [3]

- **DA**
  - **M0. [1]**
  - **Annoncerer at produktet:
  - **Maskinforsøg** [2]
  - **Modellenummer** [3]

- **DE**
  - **Erklärung gemäß:**
  - **Maschinenart [2]
  - **Maschinennummer [3]
  - **Sonderzulassung [4]
  - **alle relevanten Vorschriften der Notfallsicherheit**

- **ES**
  - **Nosotros [1]**
  - **declaramos que el producto:
  - **Tipo de máquina** [2]
  - **Nombre y modelo** [3]

- **ET**
  - **Meie [1]**
  - **kinnitame, et toodet:
  - **Tüüp maadus** [2]
  - **Nimi ja modell** [3]

---

**DK**

- **Sag, at produktet:
  - **Maskin** [2]
  - **Model** [3]
  - **Særbevis** [4]
  - **alle relevante regler og forskrifter**

- **EL**
  - **Ενημερούμενοι [1]**
  - **δηλώνουμε ότι το προϊόν:
  - **Τύπος μηχανής** [2]
  - **Φυλλάδιο μοντέλου** [3]

---

**FR**

- **Nous déclenons, que le produit:
  - **Type de machine** [2]
  - **Nom et modèle** [3]
  - **Numéro de série** [4]
  - **conformément à toutes les dispositions pertinentes de la directive 2006/42/EC**

---

**IT**

- ** dichiariamo che il prodotto:
  - **Tipo di macchina** [2]
  - **Nome e modello** [3]

---

**NL**

- **Erkennen, dat het product:
  - **Machinesoort [2]
  - **Model en nummer** [3]
  - **Voorschrift** [4]
  - **alle relevant wetten en regels**

---

**NO**

- **Erklærer, at produktet:
  - **Maskinart [2]
  - **Modelnr.** [3]
  - **Spesialbevis** [4]
  - **alle relevante forskrifter**

---

**PL**

- **Oświadczamy, że produkt:
  - **Typ maszyny** [2]
  - ** Nazwa modelu** [3]

---

**PT**

- **Declaramos, que o produto:
  - **Tipo de máquina** [2]
  - **Nome e modelo** [3]

---

**RO**

- **Declaram, că produsul:
  - **Tip aparat** [2]
  - **Nume și model** [3]

---

**RU**

- **Утверждаем, что продукт:
  - **Тип машины** [2]
  - **Название и модель** [3]

---

**SV**

- **Vetar att produktet:
  - **Maskinart [2]
  - **Modellnr.** [3]

---

**TR**

- **Tanımlar, ki ürün:
  - **Tip Makine** [2]
  - **Adı ve Modeli** [3]

---

**AR**

- **تؤكد أن منتج:**
  - **نوع الآلة** [2]
  - **النوع والنموذج** [3]

---

**FA**

- **دسته بذل می‌کنیم، که محصول:
  - **نوع ماشین** [2]
  - **نام و مدل** [3]

---

**HI**

- **प्रतिस्पर्धी उपकरण:
  - **मशीन का तायप** [2]
  - **नाम और मॉडल** [3]

---

**ID**

- **Kami [1]
  - **menyatakan bahwa produk:
  - **jenis mesin** [2]
  - **nama dan model** [3]

---

**ZH**

- **我们声明，该产品:
  - **机器类型** [2]
  - **名称和型号** [3]

---

**KO**

- **우리는 이 제품:
  - **기계종류** [2]
  - **모델명** [3]

---

**JA**

- **私たちは、この製品について宣言する：
  - **機械タイプ** [2]
  - **名前とモデル** [3]

---

**ES**

- **Nosotros [1]
  - **declaramos que el producto:
  - **Tipo de máquina** [2]
  - **Nombre y modelo** [3]

---

**DE**

- **Wir [1]
  - **erklären, dass das Produkt:
  - **Maschinenart [2]
  - **Maschinennummer [3]

---

**EN**

- **We declare, that the product:
  - **Machine Type** [2]
  - **Name & Model** [3]

---

**EC Declaration of Conformity Page 1**
Introduction

This Operator’s Manual describes the operating and maintenance procedures for MacDon model A40-D Self-Propelled Windrower Auger Headers, including a Grass Seed version.

These auger headers are designed to cut, condition, and lay windrows in a wide variety of grasses and hay crops. The double-knife feature expands the operational envelope, especially in heavier crops.

When setting up the machine or making adjustments, review and follow the recommended machine settings in all MacDon publications. Failure to do so may compromise machine function and machine life and may result in a hazardous situation.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Configuration</th>
<th>Knife</th>
<th>Size (ft.)</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>A40-D</td>
<td>Auger header with conditioner</td>
<td>Self-propelled only</td>
<td>Double</td>
<td>14, 16, and 18</td>
<td>Separate hydraulic auger, knife, and reel drives, grass seed option</td>
</tr>
</tbody>
</table>

Use this manual as your first source of information about the machine. Use the Table of Contents and the Index to guide you to specific topics. Study the Table of Contents to familiarize yourself with how the information is organized. If you follow the instructions provided here, your header will work well for many years.

Keep this manual handy for frequent reference, and to pass on to new Operators or Owners. Contact your Dealer if you need assistance, information, or additional copies of this manual.

CAREFULLY READ THE INFORMATION PROVIDED IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE OR MAINTAIN AN A40-D AUGER HEADER.

NOTE:
Keep your MacDon publications up-to-date. The most current version can be downloaded from our website (www.macdon.com) or from our Dealer-only site (https://portal.macdon.com) (login required).

NOTE:
A Russian translation of this manual can be ordered from MacDon, downloaded from the MacDon Dealer Portal (https://portal.macdon.com) (login required), or downloaded from the MacDon international website (http://www.macdon.com/world).
Model and Serial Number

Record the model number, serial number, and model year of the header in the space below. The header serial number plate is located on the top of the left-hand end frame (A).

Header Model Number: ____________
Header Serial Number: ____________
Year: ______
(If 2015, indicate early-build or later-build unit: ____________)

NOTE:
Early-build 2015 model A40-D SP windrower headers have a round reel motor (as do 2014 and earlier model year units). Later-build 2015, 2016 and later models have a square-shaped reel motor. For a visual, refer to 2.2.1 A40-D, page 21.

Figure 3: Header Serial Number Plate Location
List of Revisions

The following list provides an account of major changes from the previous version of this document.

<table>
<thead>
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<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added EC Declaration of Conformity.</td>
<td><em>EC Declaration of Conformity, page i</em></td>
</tr>
<tr>
<td>Removed A30-D Pull-Type content.</td>
<td>Throughout the publication</td>
</tr>
</tbody>
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1 Safety

1.1 Safety Alert Symbols

This safety alert symbol indicates important safety messages in this manual and on safety signs on the machine.

This symbol means:

• ATTENTION!
• BECOME ALERT!
• YOUR SAFETY IS INVOLVED!

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

• Accidents disable and kill
• Accidents cost
• Accidents can be avoided

Figure 1.1: Safety Symbol
1.2 Signal Words

Three signal words, DANGER, WARNING, and CAUTION, are used to alert you to hazardous situations. The appropriate signal word for each situation has been selected using the following guidelines:

⚠️ DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

⚠️ WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. 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 be used to alert against unsafe practices.
1.3 General Safety

**CAUTION**

The following are general farm safety precautions that should be part of your operating procedure for all types of machinery.

Protect yourself.

- When assembling, operating, and servicing machinery, wear all the protective clothing and personal safety devices that could be necessary for the job at hand. Don’t take chances. You may need the following:
  - Hard hat
  - Protective footwear with slip resistant soles
  - Protective glasses or goggles
  - Heavy gloves
  - Wet weather gear
  - Respirator or filter mask

- Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as ear muffs or ear plugs to help protect against objectionable or loud noises.

- Provide a first aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure the fire extinguisher is properly maintained. Be familiar with its proper use.
- Keep young children away from the machinery at all times.
- Be aware that accidents often happen when the Operator is tired or in a hurry. Take the time to consider the safest way. Never ignore the warning signs of fatigue.
• Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.

• Keep all shields in place. Never alter or remove safety equipment. Make sure driveline guards can rotate independently of the shaft and can telescope freely.

• Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.

• Keep hands, feet, clothing, and hair away from moving parts. Never attempt to clear obstructions or objects from a machine while the engine is running.

• Do NOT modify the machine. Non-authorized modifications may impair machine function and/or safety. It may also shorten the machine’s life.

• To avoid bodily injury or death from unexpected startup of machine, always shut down the engine and remove the key from ignition before leaving operator’s seat for any reason.

• Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.

• Keep work area well lit.

• Keep machinery clean. Straw and chaff on a hot engine is a fire hazard. Do NOT allow oil or grease to accumulate on service platforms, ladders, or controls. Clean machines before storage.

• Never use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

• When storing machinery, cover sharp or extending components to prevent injury from accidental contact.
1.4 Maintenance Safety

To ensure your safety while maintaining the machine:

- Review the operator’s manual and all safety items before operation and/or maintenance of the machine.
- Place all controls in Neutral, stop the engine, set the park brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, and/or repairing.
- Follow good shop practices:
  - Keep service areas clean and dry
  - Be sure electrical outlets and tools are properly grounded
  - Use adequate lighting for the job at hand
- Relieve pressure from hydraulic circuits before servicing and/or disconnecting the machine.
- Make sure all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to hydraulic systems.
- Keep hands, feet, clothing, and hair away from all moving and/or rotating parts.
- Clear the area of bystanders, especially children, when carrying out any maintenance, repairs or, adjustments.
- Install transport lock or place safety stands under the frame before working under the machine.
- If more than one person is servicing the machine at the same time, be aware that rotating a driveline or other mechanically-driven component by hand (for example, accessing a lube fitting) will cause drive components in other areas (belts, pulleys, and knives) to move. Stay clear of driven components at all times.
- Wear protective gear when working on the machine.
- Wear heavy gloves when working on knife components.
1.5 Hydraulic Safety

- Always place all hydraulic controls in Neutral before dismounting.
- Make sure that all components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do NOT attempt any makeshift repairs to the hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs will fail suddenly and create hazardous and unsafe conditions.

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

- Make sure all components are tight and steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.

Figure 1.11: Testing for Hydraulic Leaks

Figure 1.12: Hydraulic Pressure Hazard

Figure 1.13: Safety around Equipment
1.6 Safety Signs

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or become illegible.
- If original parts on which a safety sign was installed are replaced, be sure the repair part also bears the current safety sign.
- Safety signs are available from your Dealer Parts Department.

1.6.1 Installing Safety Decals

1. Clean and dry installation area.
2. Decide on exact location before you remove decal backing paper.
3. Remove smaller portion of split backing paper.
4. Place sign in position and slowly peel back remaining paper, smoothing sign as it is applied.
5. Prick small air pockets with a pin and smooth out.
1.7 Safety Sign Locations: Self-Propelled Windrower Header

Figure 1.15: Left Side Locations
A - MD #174632  B - MD #184422  C - MD #166452
D - MD #174436  E - MD #171288  F - MD #184372
G - MD #194464  H - MD #194521  J - MD #36651

Figure 1.16: Left Side Decals
Figure 1.17: Right Side Locations
A - MD #184422  B - MD #174632  C - MD #166452

Figure 1.18: Right Side Decals
1.8 Understanding Safety Signs

MD #36651
Rotating driveline

DANGER

- Rotating driveline contact can cause death—keep away!

Do not operate without:

- Stopping the engine and removing the key before opening shield.
- All driveline guards, tractor, and equipment shields in place.

MD #113482
General hazard pertaining to machine operation and servicing

CAUTION

To avoid injury or death from improper or unsafe machine operation:

- Read the operator’s manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do not allow untrained persons to operate the machine.
- Review safety instructions with all Operators every year.
- Ensure that all safety signs are installed and legible.
- Make certain everyone is clear of machine before starting engine and during operation.
- Keep riders off the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage header drive, put transmission in Neutral, and wait for all movement to stop before leaving operator’s position.
- Stop the engine and remove the key before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- Engage safety props to prevent lowering of header or reel before servicing in the raised position (refer to the header operator’s manual).
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.
SAFETY

MD #166452
Pinch point hazard

WARNING
• To avoid injury, stop the engine and remove the key before opening engine hood.

Figure 1.21: MD #166452

MD #166466
High pressure oil hazard

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

Figure 1.22: MD #166466

MD #171279
Crushing hazard

DANGER
• Read the operator's manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
• Rest header on ground or engage hydraulic lock-out valves before going under unit.

Figure 1.23: MD #171279
MD #171281

Hot fluid under pressure

CAUTION

• Coolant is under pressure and may be hot. Never remove radiator cap when engine is hot.

Figure 1.24: MD #171281

MD #171286

Lock pull-type hydraulic for transport

WARNING

• Charge cylinder with oil before towing.
• Rotate valve handle to lock in transport position.
• Maximum towing speed 32 km/h (20 mph).
• Failure to comply could result in death or serious injury.

Figure 1.25: MD #171286

MD #171287

Install lock panel

WARNING

• Rotate valve handle to lock before going under unit.
• Failure to comply could result in death or serious injury.

Figure 1.26: MD #171287
SAFETY

MD #171288
Entanglement hazard

CAUTION
• To avoid injury from entanglement with rotating auger, stand clear of header while machine is running.

Figure 1.27: MD #171288

MD #174436
High pressure oil hazard

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

Figure 1.28: MD #174436

MD #174632
Reel entanglement hazard

CAUTION
• To avoid injury from entanglement with rotating reel, stand clear of header while machine is running.

Figure 1.29: MD #174632
SAFETY

MD #184372
General hazard pertaining to machine operation and servicing

CAUTION
To avoid injury or death from improper or unsafe machine operation:

• Read the operator’s manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
• Do not allow untrained persons to operate the machine.
• Review safety instructions with all Operators annually.
• Ensure that all safety signs are installed and legible.
• Make certain everyone is clear of machine before starting engine and during operation.
• Keep riders off the machine.
• Keep all shields in place and stay clear of moving parts.
• Disengage header drive, put transmission in Neutral, and wait for all movement to stop before leaving operator’s position.
• Stop the engine and remove the key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
• Engage safety props to prevent lowering of raised unit before servicing in the raised position.
• Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

MD #184422
Keep shields in place hazard

WARNING

• Do not place hand.
• To avoid injury, stop the engine and remove the key before opening power drive system shield.
• Keep all shields in place.
MD #194464
Shut down for service

WARNING
• Stop the engine and remove the key.
• Read tractor and mower manufacturer’s manuals for inspection and maintenance instructions.
• Read the windrower and header manuals for inspection and maintenance instructions.

MD #194521
Auger entanglement hazard

CAUTION
• To avoid injury from entanglement with rotating auger, stand clear of header/mower while machine is running.

General hazard pertaining to machine operation and servicing.

CAUTION
• Read the operator’s manual and follow safety instructions. If you do not have a manual, obtain one from your Dealer.
• Do not allow untrained persons to operate the machine.
• Review safety instructions with all Operators every year.
• Ensure that all safety signs are installed and legible.
• Make certain everyone is clear of machine before starting engine and during operation.
• Keep riders off the machine.
• Keep all shields in place and stay clear of moving parts.
• Disengage header drive, put transmission in Neutral, and wait for all movement to stop before leaving operator’s position.
• Stop the engine and remove the key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
• Engage locks to prevent lowering of header or reel before servicing in the raised position.
• Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.
1.9 Owner/Operator Responsibilities

**CAUTION**

- It is your responsibility to read and understand this manual completely before operating the header. Contact your Dealer if an instruction is not clear to you.
- Follow all safety messages in the manual and on safety signs on the machine.
- Remember that YOU are the key to safety. Good safety practices protect you and the people around you.
- Before allowing anyone to operate the header, for however short a time or distance, make sure they have been instructed in its safe and proper use.
- Review the manual and all safety related items with all Operators annually.
- Be alert for other Operators not using recommended procedures or not following safety precautions. Correct these mistakes immediately, before an accident occurs.
- Do not modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.
- Safety information given in this manual does not replace safety codes, insurance needs, or laws governing your area. Be sure your machine meets the standards set by these regulations.
- Ensure that windrower is properly equipped to safely operate header. This may include adding ballast according to the tractor operator’s manual requirements for attachments of this size and mass.
1.10 Operational Safety

**CAUTION**

- Follow all safety and operational instructions given in your operator’s manual. If you do not have a windrower manual, get one from your Dealer and read it thoroughly.
- Never attempt to start windrower engine or operate the machine, except from the operator’s seat.
- Check the operation of all controls in a safe clear area before starting work.
- Do not allow riders on windrower.
- Never start or move the machine until you are sure all bystanders have cleared the area.
- Avoid travelling over loose fill, rocks, ditches or holes.
- Drive slowly through gates and doorways.
- If cutting ditch banks, use extreme caution. If the header hits an obstruction, front of the windrower will usually swerve towards the ditch.
- When working on inclines, travel uphill or downhill when possible. Be sure to keep windrower transmission in gear when travelling downhill.
- Never attempt to get on or off a moving windrower.
- Do not get off the windrower while the machine is in operation.
- To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before adjusting or removing plugged material from the machine.
- Operate only in daylight or good artificial light.

**CAUTION**

Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect machine. Follow proper shutdown procedure as follows:

- Engage windrower brake.
- Disengage PTO.
- Turn engine OFF, and remove key.
- Wait for all movement to stop
- Dismount and engage cylinder stops before inspecting raised machine.
# 2 Product Overview

## 2.1 Definitions

The following terms and acronyms may be used in this manual.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Series header</td>
<td>MacDon auger header</td>
</tr>
<tr>
<td>API</td>
<td>American Petroleum Institute</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society of Testing and Materials</td>
</tr>
<tr>
<td>Bolt</td>
<td>A headed and externally threaded fastener that is designed to be paired with a nut</td>
</tr>
<tr>
<td>Cab-forward</td>
<td>Windrower operation with Operator and cab facing in direction of travel</td>
</tr>
<tr>
<td>CDM</td>
<td>Cab display module on a self-propelled windrower</td>
</tr>
<tr>
<td>Center-link</td>
<td>A hydraulic cylinder link between header and machine to which it is attached: It is used to change header angle</td>
</tr>
<tr>
<td>CGVW</td>
<td>Combined vehicle gross weight</td>
</tr>
<tr>
<td>DK</td>
<td>Double knife</td>
</tr>
<tr>
<td>DKD</td>
<td>Double-knife drive</td>
</tr>
<tr>
<td>DWA</td>
<td>Double Windrow Attachment</td>
</tr>
<tr>
<td>ECM</td>
<td>Engine control module</td>
</tr>
<tr>
<td>ECU</td>
<td>Electronic control unit</td>
</tr>
<tr>
<td>Export header</td>
<td>Header configuration typical outside North America</td>
</tr>
<tr>
<td>Finger tight</td>
<td>Finger tight is a reference position where sealing surfaces or components are making contact with each other and fitting has been tightened to a point where fitting is no longer loose</td>
</tr>
<tr>
<td>FFFT</td>
<td>Flats from finger tight</td>
</tr>
<tr>
<td>GSL</td>
<td>Ground speed lever</td>
</tr>
<tr>
<td>GSS</td>
<td>Grass Seed Special</td>
</tr>
<tr>
<td>GVW</td>
<td>Gross vehicle weight</td>
</tr>
<tr>
<td>Hard joint</td>
<td>A joint made with the use of a fastener where joining materials are highly incompressible</td>
</tr>
<tr>
<td>Header</td>
<td>A machine that cuts and lays crop into a windrow and is attached to a self-propelled windrower</td>
</tr>
<tr>
<td>Hex key</td>
<td>A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive)</td>
</tr>
<tr>
<td>hp</td>
<td>Horsepower</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting</td>
</tr>
<tr>
<td>Knife</td>
<td>A cutting device which uses a reciprocating cutter (also called a sickle)</td>
</tr>
<tr>
<td>n/a</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Nut</td>
<td>An internally threaded fastener that is designed to be paired with a bolt</td>
</tr>
<tr>
<td>N-DETENT</td>
<td>The slot opposite the NEUTRAL position on operator’s console</td>
</tr>
<tr>
<td>North American header</td>
<td>Header configuration typical in North America</td>
</tr>
<tr>
<td>NPT</td>
<td>National Pipe Thread: A style of fitting used for low pressure port openings Threads on NPT fittings are uniquely tapered for an interference fit</td>
</tr>
<tr>
<td>ORB</td>
<td>O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors</td>
</tr>
<tr>
<td>ORFS</td>
<td>O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring seal</td>
</tr>
<tr>
<td>rpm</td>
<td>Revolutions per minute</td>
</tr>
<tr>
<td>RoHS (Reduction of Hazardous Substances)</td>
<td>A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc plateings)</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
<tr>
<td>Screw</td>
<td>A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of mating parts</td>
</tr>
<tr>
<td>Self-Propelled (SP) Windrower</td>
<td>Self-propelled machine consisting of a power unit with a header</td>
</tr>
<tr>
<td>SK</td>
<td>Single knife</td>
</tr>
<tr>
<td>SKD</td>
<td>Single-knife drive</td>
</tr>
<tr>
<td>Soft joint</td>
<td>A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time</td>
</tr>
<tr>
<td>spm</td>
<td>Strokes per minute</td>
</tr>
<tr>
<td>Timed knife drive</td>
<td>Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor</td>
</tr>
<tr>
<td>Tension</td>
<td>Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)</td>
</tr>
<tr>
<td>TFFT</td>
<td>Turns from finger tight</td>
</tr>
<tr>
<td>Torque</td>
<td>The product of a force X lever arm length, usually measured in Newton-meters (N·m) or foot-pounds (ft·lb)</td>
</tr>
<tr>
<td>Torque angle</td>
<td>A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned further a number of degrees or a number of flats to achieve its final position</td>
</tr>
<tr>
<td>Torque-tension</td>
<td>The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw</td>
</tr>
<tr>
<td>Untimed knife drive</td>
<td>Unsynchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor or two hydraulic motors</td>
</tr>
<tr>
<td>Washer</td>
<td>A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or a locking mechanism</td>
</tr>
<tr>
<td>Windrower</td>
<td>Power unit of a self-propelled header</td>
</tr>
<tr>
<td>WCM</td>
<td>Windrower control module</td>
</tr>
</tbody>
</table>
2.2 Model Identification

This section assists in identifying the various MacDon A-Series auger header models.

2.2.1 A40-D

The A40-D is a double-knife header using a hydraulically-driven auger, reel, and cutterbar that can be used only on an M-Series Self-Propelled Windrower. For the 2015 model year, there are two types: one with a square motor and one with a round reel motor.

Figure 2.1: A40-D Left Side (Early-Build 2015, 2014 and Earlier) (Round Reel Motor)
Figure 2.2: A40-D Left Side (Later-Build 2015, 2016 and later) (Square Reel Motor)

Figure 2.3: A40-D Right Side (All Years)
### 2.3 Product Specifications

**NOTE:**
Specifications and design are subject to change without notice, or obligation to revise previously sold units.

<table>
<thead>
<tr>
<th>Table 2.1 A40-D SP Windrower Auger Header Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cutterbar</strong></td>
</tr>
<tr>
<td>Effective cutting width</td>
</tr>
<tr>
<td>14-foot header</td>
</tr>
<tr>
<td>16-foot header</td>
</tr>
<tr>
<td>18-foot header</td>
</tr>
<tr>
<td>Double-knife drive: hydraulic motor to two “B” belts/timing belts to enclosed heavy duty (MD) knife drive boxes</td>
</tr>
<tr>
<td>Knife stroke</td>
</tr>
<tr>
<td>Factory</td>
</tr>
<tr>
<td>Load</td>
</tr>
<tr>
<td>Switching pulleys</td>
</tr>
<tr>
<td>No load</td>
</tr>
<tr>
<td>Load</td>
</tr>
<tr>
<td>Double heat-treated forged pointed guards</td>
</tr>
<tr>
<td>Bolted over-serrated knife sections -- 9 serrations per inch</td>
</tr>
<tr>
<td>Center overlap</td>
</tr>
<tr>
<td>Cutterbar lift range (measured at guard tip)</td>
</tr>
<tr>
<td>Below ground</td>
</tr>
<tr>
<td>Above ground</td>
</tr>
<tr>
<td>Guard angle (cutterbar on ground)</td>
</tr>
<tr>
<td>Replaceable, abrasion-resistant cutterbar wear plates</td>
</tr>
<tr>
<td>Inner skid shoes, adjustable set of two (can be relocated to outboard location)</td>
</tr>
<tr>
<td>Outer skid shoes or gauge rollers</td>
</tr>
<tr>
<td>Outer gauge rollers</td>
</tr>
<tr>
<td>Auger</td>
</tr>
<tr>
<td>Diameter</td>
</tr>
<tr>
<td>Undershot, center feed</td>
</tr>
<tr>
<td>Flighting</td>
</tr>
<tr>
<td>Pitch</td>
</tr>
<tr>
<td>Rubber feed fingers</td>
</tr>
<tr>
<td>Stripper bars (three per side)</td>
</tr>
</tbody>
</table>
### PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger drive</td>
<td>Hydraulic, 15.9 cu in. (261 cc) per rev direct mounted motor</td>
<td>Standard</td>
</tr>
<tr>
<td>Auger speed</td>
<td>SP windrower</td>
<td>230–320 rpm</td>
</tr>
<tr>
<td>Replaceable high density polyethylene auger pans: two-piece design</td>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Rock drop tines at discharge opening with discharge angle adjustment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery opening width</td>
<td>2430 mm (95-11/16 in.)</td>
<td></td>
</tr>
<tr>
<td><strong>Reel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oval closed section bats with end caps.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTE:</strong> A40-D Grass Seed Special model has standard seven-bat reel</td>
<td>6 bats optional 7 bat</td>
<td></td>
</tr>
<tr>
<td>Steel fingers</td>
<td>6 mm (1/4 in.) diameter</td>
<td></td>
</tr>
<tr>
<td>Reel radius (to finger tip)</td>
<td>540 mm (22 in.)</td>
<td></td>
</tr>
<tr>
<td>Single piece tine bar with replaceable polyethylene bearings</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Sectioned tine bar with regreasable ball bearings</td>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td>Drive</td>
<td>Mechanical, two &quot;B&quot; belts from auger to 60H roller chain</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Hydraulic motor: 14.2 cu in. (232 cc) /rev to enclosed gearbox</td>
<td>Standard</td>
</tr>
<tr>
<td>Reel speed</td>
<td>M100/M105/M205 SP hydraulic variable</td>
<td>50–85 rpm</td>
</tr>
<tr>
<td></td>
<td>M150/M155/M200 SP hydraulic variable</td>
<td>15–85 rpm</td>
</tr>
<tr>
<td><strong>Hay Conditioner</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roll-type</td>
<td>Intermeshing steel bars</td>
<td></td>
</tr>
<tr>
<td>Roll size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>2590 mm (102 in.)</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>233 mm (9-3/16 in.)</td>
<td></td>
</tr>
<tr>
<td>Tube</td>
<td>168 mm (6-5/8 in.)</td>
<td></td>
</tr>
<tr>
<td>Drive:</td>
<td>44 cc. hydraulic piston motor to enclosed gearbox</td>
<td>Standard</td>
</tr>
<tr>
<td>Roll speed</td>
<td>SP windrower</td>
<td>601–810 rpm</td>
</tr>
<tr>
<td><strong>Plug Prevention / Unplugging</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-propelled</td>
<td>Reverse hydraulic flow to three motors (reverses knife, auger, reel, and conditioner)</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Swath Forming Shield</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swath width range</td>
<td>915 mm (36 in.) to 2540 mm (100 in.)</td>
<td></td>
</tr>
<tr>
<td>Header-mounted adjustable baffle</td>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td>Attachment</td>
<td>Windrower</td>
<td></td>
</tr>
<tr>
<td>Adjustable side deflectors</td>
<td></td>
<td>Standard</td>
</tr>
</tbody>
</table>
### PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th><strong>Frame And Structure</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two amber transport lights</td>
<td>Standard</td>
</tr>
<tr>
<td>Header width</td>
<td>Nominal cut width plus 480 mm (18-7/8 in.)</td>
</tr>
<tr>
<td>Header attachment</td>
<td>Windrower</td>
</tr>
<tr>
<td>Spare knife storage</td>
<td>Lean bar</td>
</tr>
<tr>
<td>Tool and parts storage compartment</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Header Hydraulics Connection</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct coupled hoses</td>
<td>N/A</td>
</tr>
<tr>
<td>Hydraulic quick couplers</td>
<td>Standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Attachments And Accessories</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Header reversing wrench and guard straightening tool</td>
<td>Standard</td>
</tr>
<tr>
<td>Double Windrow Attachment (DWA) M150/M155/M200/M205 windrowers</td>
<td>Optional</td>
</tr>
</tbody>
</table>
3 Operation: A40-D Self-Propelled Windrower Auger Header

This chapter will describe the operating procedures of the A40-D SP Windrower Auger Header.

3.1 Attaching A40-D Header to SP Windrower

Refer to your windrower operator’s manual for procedures to mechanically attach the auger header to the self-propelled windrower and for modifications if required to the windrower hydraulic connections.

Refer to the following procedures for electrical and hydraulic connections. Header drive hydraulic hoses and electrical harness are located on the left-hand cab-forward side of the windrower.

IMPORTANT:
For M150, M155, M155E4, and M200 Windrowers with Reverser kit MD #B4656 installed, hose plumbing to the reverser valve must be changed if switching between a D-Series Draper Header with a conditioner and an A40-D Auger Header to prevent draper header reel damage and improper operation. Refer to 3.1.5 Configuring Reverser Valve Jumper Hose, page 48 and if necessary to instruction MD #169213 (Reverser Kit Installation Instructions), available from our Dealer-only site (https://portal.macdon.com) (login required).

NOTE:
Header reel motor hose routing must be properly configured before attaching the header to a windrower. The header is factory-configured for M150, M155, M155E4, and M200 Windrowers. For M100, M105, or M205 Windrowers, refer to:

- 3.1.1 Attaching to M100 or M105, page 27
- 3.1.4 Attaching to M205, page 43

3.1.1 Attaching to M100 or M105

CAUTION
To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

M100 and M105 Self-Propelled Windrowers are factory-equipped with four header drive hoses on the left-hand side (A).
1. Disengage rubber latch (A) and open driveline shield (B).

2. Remove the cap (A) from electrical connector and remove connector from support bracket.

3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

4. Move hose/electrical bundle (A) to header.

5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.

6. Remove cover on header electrical receptacle (E).

7. Push connector onto receptacle and turn collar on connector to lock it in place.

8. Attach cover to mating cover on windrower wiring harness.

9. Remove caps from hydraulic couplers. Clean if necessary.
NOTE:
At location (C), later-built 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

Figure 3.5: Early-Build 2015, 2014 and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)
A - Reel Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

Figure 3.6: 2015 Grass Seed Header Hose Connectors
A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure
11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.

12. Secure with three straps (D), and lower lever (B).

13. If valve blocks are NOT configured as shown (A), install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions that were supplied with your A40-D Auger Header.
14. Push auger/reel pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

15. Open header left driveshield and check hose routing at the reel motor.

**NOTE:**
Reel drive motor may not be exactly as shown. Later-build 2015, 2016 and later A40-D units have a square reel motor; Early-build 2015 A40-D (and 2014 and earlier units) have a round reel motor. The image at the right shows a square reel motor and so is a later-build model.

The hose routing depends on which windrower model the header is being attached to. The header is factory-configured for M150, M155, and M200 Windrowers.
16. For procedure to change hose routing for M100 or M105 Windrowers, refer to the section based on the year of manufacture:

- Later-build 2015, 2016 and later: 3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51
- Early-build 2015, 2014 and earlier: 3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49

Figure 3.13: Modified Routing M100, M105, and M205 – Later-Build 2015 shown

3.1.2 Attaching to M150, M155, or M155E4

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

M150, M155, and M155E4 self-propelled windrowers are factory-equipped with four header drive hoses on the left-hand side (A).

Figure 3.14: Header Drive Hoses
1. Disengage rubber latch (A) and open driveline shield (B).

2. Remove the cap (A) from electrical connector and remove connector from support bracket.

3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

4. Move hose/electrical bundle (A) to header.

5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.

6. Remove cover on header electrical receptacle (E).

7. Push connector onto receptacle and turn collar on connector to lock it in place.

8. Attach cover to mating cover on windrower wiring harness.

9. Remove caps from hydraulic couplers. Clean if necessary.
NOTE:
At location (C), later-built 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

Figure 3.18: Early-Build 2015, 2014 and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)
A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

Figure 3.19: 2015 Grass Seed Header Hose Connectors
A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure
11. Route auger return and reel pressure hose bundle (A) from header to windrower and position bundle above existing hose support (C) as shown.

12. Secure with three straps (D), and lower lever (B).

13. If valve blocks are NOT configured as shown at right, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.
14. Locate the auger pressure (A) and auger/reel return (B) hoses.

15. Proceed to 3.1.5 Configuring Reverser Valve Jumper Hose, page 48.

16. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.
3.1.3 Attaching to M200

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

The M200 Windrower requires four drive hoses (A) to run an A40-D Auger Header.
If only three drive hoses are present, before following the procedure below, configure the M200 to run an A40-D Auger Header by installing kit MD #B4651. The kit includes an additional hose (A), hardware, and installation instructions.

1. Disengage rubber latch (A), and open driveline shield (B).

2. Remove cap (A) from electrical connector, and remove connector from support bracket.

3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).
4. Move hose/electrical bundle (A) to header.

5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.

6. Remove cover on header electrical receptacle (E).

7. Push connector onto receptacle, and turn collar on connector to lock it in place.

8. Attach cover to mating cover on windrower wiring harness.

9. Remove caps from hydraulic couplers. Clean if necessary.

**NOTE:**
At location (C), later-build 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.
Figure 3.33: 2015 Grass Seed Header Hose Connectors
A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

Figure 3.34: 2015 Grass Seed Header Hose Connectors Side View
11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.

12. Secure with three straps (D), and lower lever (B).
13. If valve blocks are **NOT** configured as shown at right, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.

14. Locate the auger pressure (A) and auger/reel return (B) hoses.
15. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

16. If valve blocks are NOT configured as shown above, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.

17. Proceed to 3.1.5 Configuring Reverser Valve Jumper Hose, page 48.

3.1.4 Attaching to M205

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.
The M205 Windrower must be equipped with an auger drive basic kit and a completion kit as shown at right. If necessary, obtain the following kits from your MacDon Dealer and install them in accordance with the instructions supplied with the kits.

<table>
<thead>
<tr>
<th>Kit Description</th>
<th>MacDon Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base kit</td>
<td>MD #B5491</td>
</tr>
<tr>
<td>Reverser kit1</td>
<td>MD #B5492</td>
</tr>
<tr>
<td>Coupler</td>
<td>MD #B5497</td>
</tr>
</tbody>
</table>

1. Disengage rubber latch (A), and open driveline shield (B).

1. Reverser kit is optional and not required, although most A40-D Headers have a Reverser kit (MD #B5492) ordered for the windrower. Check with your Dealer, and install prior to hook-up if required.
2. Remove cap (A) from the electrical connector, and remove the connector from the support bracket.

3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

4. Move hose/electrical bundle (C) to header.

5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.

6. Remove cover on header electrical receptacle (E).

7. Push connector onto receptacle, and turn collar on connector to lock it in place.

8. Attach cover to mating cover on windrower wiring harness.

9. Remove caps from hydraulic couplers. Clean if necessary.

**NOTE:**

At location (C), later-build 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.
Figure 3.47: 2015 Grass Seed Header Hose Connectors
A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

Figure 3.48: 2014 and Earlier Grass Seed Header
A - Knife Return (Male Fitting at Header) (Hidden in this Image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain
11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.

12. Secure with three straps (D), and lower lever (B).

13. Push auger/reel pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

14. Check hose routing at the reel motor (A). The hose routing depends on which windrower model the header is being attached to. The header is factory-configured for M150, M155, M155E4, and M200 Windrowers.

**NOTE:**
Reel drive motor may not be exactly as shown.
15. For the procedure to change hose routing for M205 Windrowers, refer to the section based on the year of manufacture:

- Later-build 2015, 2016 and later: 3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51
- Early-build 2015, 2014 and earlier: 3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49.

### 3.1.5 Configuring Reverser Valve Jumper Hose

An optional reverser valve block (A) to reverse the header drive in the event of plugging may have been installed on M150, M155, and M200 Self-Propelled Windrowers. A jumper hose on this valve block has a specific routing for each model of auger header.

**IMPORTANT:**
If a reverser valve block (A) has been installed, the jumper hose (B) must be routed for the correct header model. Do **NOT** operate the header unless hose is routed as shown.

**IMPORTANT:**
ONLY for draper headers with conditioner installed and ONLY for M150, M155 and M200 windrowers: CR is routed to port ‘R4’ (not shown) on reverser block. When switching from draper header to auger header, jumper hose (B) must be routed according to header being operated to prevent draper header reel damage and improper operation.
To reroute jumper hose from draper header position to A40-D position, follow these steps:

1. Move left-hand windrower platform to open position to expose hydraulic valve blocks.
2. Disconnect jumper hose (B) from 90 degree fitting (C) at port R4 on the reverser valve block (A).
3. Rotate 90 degree fitting (D) under reverser valve block so that hose can be routed to port C2 at (C) as shown in figure 3.55: Connected Jumper Hose, page 49 on the next page.
4. Remove cap from port C2 fitting (A) on header drive valve block (B).
5. Connect jumper hose (C) to port C2 fitting (A) on header drive valve block (B).
6. Install previously removed cap onto 90 degree fitting in port R4 on reverser valve block (D).
7. Move left-hand windrower platform back to normal operating position.

3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D)

The A40-D Auger Header drive hose routing depends on the windrower model to which the header is being attached. Early build A40-D Headers are for use on M100, M105 and M205 Windrows Only.

IMPORTANT:
If you have a 2015 A40-D SP windrower header, confirm whether you have an early-build or a later-build 2015 unit. If the reel motor is square, (A) then it is a later-build 2015 model. Refer to 3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51. If the reel motor is round, (B) then use the following procedure:
1. Press screwdriver against latch in opening (A) and lift to open header left-hand driveshield. Shield will latch at (B) to stay open.

2. Check hose routing at the reel motor. The header is factory-configured for M150, M155, and M200 Windrowers as shown in Figure 3.58: Early-Build 2015, 2014 and Earlier Factory Configuration (M150, M155, and M200), page 50.

To route hoses on early-build 2015, 2014 and earlier A40-D Headers for use on M100, M105, and M205 Windrowers, proceed as follows.

3. Disconnect hoses as follows:
   a. Disconnect hose (A) from tee (C).
   b. Disconnect hose (B) from reel motor upper port.
   c. Disconnect tee (C) from reel motor lower port.

4. Reconnect hoses as follows:
   a. Relocate tee (C) to reel motor upper port.
   b. Connect hose (B) to tee (C).
   c. Connect hose (A) to reel motor lower port.
5. Close driveline shield before engaging header.

3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units)

The A40-D Auger Header hydraulic drive hose routing depends on the windrower model to which the header is being attached.

The header is factory-configured for M150, M155, M155E4, and M200 SP Windrowers as shown in Figure 3.66: Factory Configuration (M150, M155, M155E4, and M200), page 53. To route hoses for M100, M105, and M205 Windrowers, proceed as follows:
IMPORTANT:
If you have a 2015 A40-D SP windrower header, confirm whether you have an early-build or a later-build 2015 unit. If the reel motor is round (B), then it is an earlier-build 2015 model. Refer to 3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49. If the reel motor is square (A), then use the following procedure:

1. Press screwdriver against latch in opening (A) and lift to open header left-hand driveshield. Shield will latch at (B) to stay open.

2. Disengage rubber latch (A), and open driveline shield (B).
3. Loosen bulkhead nut (A) on auger and reel pressure coupler (B). This allows auger and reel pressure hose (C) to rotate freely.

4. Disconnect hoses as follows:
   a. Disconnect hose (A) from tee (B).
   b. Disconnect tee (B) from reel motor upper port.
   c. Disconnect hose (C) from reel motor lower port.

5. Cut cable ties (D) at locations shown in illustration.

Figure 3.64: Auger and Reel Pressure Coupler and Hose – 14-Ft. and 16-Ft. Header Shown

Figure 3.65: Auger and Reel Pressure Coupler and Hose – 18-Ft. Header Shown

Figure 3.66: Factory Configuration (M150, M155, M155E4, and M200)
6. Reconnect hoses as follows:
   a. Reroute hose (E) behind hose (A) and (F) to hose (C) and connect tee (B) to lower port fitting.
   b. Reroute hose (C) above hose (E) and (F) and connect hose (C) to tee (B). Tighten hose (C).
   c. Loosen 45 degree fittings at both ports. This allows room for wrenches when tightening tee (B) to lower port.
   d. Connect hose (A) to upper port fitting as shown and check orientation of 45 degree fitting.

   NOTE:
   Ensure that hose (A) is routed in front of hose (C) and (E).

   e. Confirm orientation of upper port 45 degree fitting, back-off tee (B), and tighten upper port fitting in position determined. Tighten hose (A).
   f. Check orientation of lower port 45 degree fitting and tighten.
   g. Connect tee (B) to lower port 45 degree fitting and tighten.

7. Secure electrical harness (B), motor case drain hose (C), and hose (D) together with cable ties (A), as shown.

   IMPORTANT:
   Ensure there is at least 25 mm (1 in.) clearance between hose bundle (E) and knife drive timing belt (F).
8. Rotate coupler (B) and hose (C) downward as shown until slack has been sufficiently reduced. Tighten bulkhead nut (A).

9. Close driveline shield (B) and engage rubber latch (A).

10. Close driveshield before engaging header.
3.2 Detaching A40-D Header from Windrower

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Move left-hand cab-forward platform to rear of windrower.
2. Disconnect the two hydraulic hoses (A) and (B) from windrower valve(s).

Figure 3.72: M100, M105

Figure 3.73: M150 with Reverser Valve (M155 and M155E4 Similar)

Figure 3.74: M150 without Reverser Valve (M155 and M155E4 Similar)
Figure 3.75: M200 with Reverser Valve

Figure 3.76: M200 without Reverser Valve

Figure 3.77: M205
3. Raise lever (B), and undo adjustable straps (D).

4. Move hose bundle (A) to store on header walkway.

5. Install caps on connectors and hose ends (if equipped).

6. At the header, disconnect electrical connector by turning collar counterclockwise, and pulling connector to disengage.

7. Disconnect hoses from hydraulic motor, auger, and reel pressure hose.

Figure 3.78: Hose Bundle
A - Auger Return and Reel Pressure Hose Bundle
B - Lever
D - Three Straps

Figure 3.79: Standard Header
A - Reel/Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure
8. Move hose bundle (A) from header, and position on windrower left-hand side with hose ends in support (B) and under lever (C).

9. Rotate lever (C) clockwise, and push to engage bracket.

10. Position electrical harness through support (B), and attach cap to electrical connector.

11. Close driveline shield, and move windrower platform to closed position.

12. Check to ensure hoses and electrical harness clear tire.

13. Detach header from windrower. For instructions, refer to your windrower operator’s manual.
3.3 Transporting A40-D Header with Windrower

Refer to your windrower operator’s manual for information about transporting headers when attached to a windrower. The orientation of the reflectors on the hazard light fixtures is dependent on the direction of travel for Dual Direction® windrowers.

⚠️ **CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

The amber reflectors **MUST** always face the direction of travel (C), and are changed as follows:

1. Lower header to the ground, shut off engine and remove key from ignition.
2. Remove bolts (A) from reflector assembly (B), and remove assembly from light fixture. Retrieve spacers (nuts).

3. Flip reflector assembly (B), and reinstall ensuring amber side is facing direction of travel (C).

**NOTE:**

Ensure reflector assembly is installed as shown. Otherwise it will interfere with the driveshield in the open position.

4. Secure with bolts (A), spacers, and nuts.

5. Repeat above steps for other light.
3.4 Header Lift Cylinder Lock-Out Valves

Refer to your windrower operator’s manual for details on the lift cylinder locks.
### 3.5 Operating Variables for A40-D

Satisfactory function of the header in all situations requires making proper adjustments to suit various crops and conditions.

Correct operation reduces crop loss and allows cutting of more acres. As well, proper adjustments and timely maintenance will increase the length of service you receive from the machine.

The variables listed below and detailed on the following pages will affect the performance of the header. You will quickly become adept at adjusting the machine to give you the desired results.

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<th>Variable</th>
<th>Refer to</th>
</tr>
</thead>
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<td>3.5.2 Adjusting Auger Speed, page 63</td>
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<tr>
<td>Reel speed</td>
<td>3.5.3 Adjusting Reel Speed, page 63</td>
</tr>
<tr>
<td>Auger position</td>
<td>3.5.4 Setting Auger Position, page 63</td>
</tr>
<tr>
<td>Reel position</td>
<td>3.5.5 Setting Reel Position, page 66</td>
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<td>Cutting height</td>
<td>3.5.8 Setting Cutting Height, page 71</td>
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<td>Header angle</td>
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<tr>
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<tr>
<td>Roll tension</td>
<td>3.5.12 Adjusting Conditioner Roll Tension, page 74</td>
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<td>Forming shields</td>
<td>3.5.13 Positioning the Forming Shields, page 76</td>
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<tr>
<td>Tall crop dividers</td>
<td>3.10.1 Adjusting Tall Crop Dividers, page 87</td>
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<tr>
<td>Ground speed</td>
<td>3.9 Selecting Ground Speed, page 86</td>
</tr>
</tbody>
</table>
3.5.1 Setting Lean Bar

Use the lean bar adjustment to accommodate different crop heights. The lean bar (A) should strike the upper portion of the crop (roughly 2/3 of the crop height), leaning it away from the header, and exposing the stalks to the knife.

**IMPORTANT:**
To prevent structural damage to the header, do NOT operate with lean bar removed.

To extend or retract lean bar (A), reposition hardware in adjustment holes as required.

In crops over 1.52 m (5 ft.) high, an optional tall crop divider kit (MD #B4690) is available that includes lean bar extensions to raise the lean bar. For more information refer to 3.10.1 Adjusting Tall Crop Dividers, page 87.

3.5.2 Adjusting Auger Speed

The A40-D auger header features a hydraulic direct drive auger with operating speed range of 230 to 320 rpm, and is controlled from the operator’s station on the self-propelled windrower.

For instructions, refer to your windrower operator’s manual.

3.5.3 Adjusting Reel Speed

The A40-D auger header features a hydraulic direct drive reel with operating speed range of 15 to 85 rpm (M150 and M155), 50 to 85 rpm (M100, M105, M200, M205), and is controlled from the operator’s station on the self-propelled windrower.

For instructions, refer to your windrower operator’s manual.

3.5.4 Setting Auger Position

⚠️ **CAUTION**

To avoid personal injury, before servicing header or opening drive covers, follow procedures in 4.1 Preparing for Servicing, page 93.

Auger position has been factory-set, and should not normally require adjustment.

For nearly all conditions, the auger performs best when set as close as possible to the stripper bars without rubbing. This is especially important in grass and other crops that have a tendency to wrap.

Component wear may cause clearances to become excessive, resulting in feeding problems and uneven windrows.

To make adjustments to auger position, refer to these sections depending on your equipment:

- Adjusting Auger Fore-Aft Position, page 64
- Adjusting Vertical Position, page 65
NOTE:
In heavier crops it may be necessary to remove the front stripper bar for smoother crop flow across the auger. Refer to 4.12 Stripper Bar, page 155.

NOTE:
The auger should clear the stripper bars on the auger pan by approximately 1–4 mm (1/32–5/32 in.). Shimming the stripper bars may be required. Refer to 4.12 Stripper Bar, page 155.

Adjusting Auger Fore-Aft Position

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).
4. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
5. Tighten jam nut.
6. Tighten nuts (A).
7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close shields before engaging header.

Adjusting Vertical Position

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield
3. Loosen four nuts (A).
4. Loosen jam nuts on adjuster bolt (B), and turn bolt (B) to adjust auger vertical position.
5. Tighten jam nuts.
6. Tighten nuts (A).

7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close shields before engaging header.
3.5.5 Setting Reel Position

Reel position has been found to be a critical factor in achieving good results in adverse conditions. Reel position is factory-set for average straight standing crop. It can be adjusted both vertically and horizontally (fore-aft) for different crop conditions.

See table below for recommended reel position in unusual crop conditions:

<table>
<thead>
<tr>
<th>Crop Condition</th>
<th>Reel Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop down or lodged</td>
<td>Forward and down (also increase reel speed)</td>
</tr>
<tr>
<td>Wet or dead material collects on cutterbar and plugs knife</td>
<td>Back and down (close to guards)</td>
</tr>
<tr>
<td>Short crop</td>
<td>Back</td>
</tr>
<tr>
<td>Thick stemmed or heavy standing</td>
<td>Up and forward</td>
</tr>
</tbody>
</table>

To make adjustments to reel position, refer to the following sections:

- Adjusting Reel Fore-Aft Position, page 66
- Adjusting Reel Vertical Position, page 67

**Adjusting Reel Fore-Aft Position**

The reel fore-aft offset is factory-set to 816 mm (32-3/8 in.) as measured from the inside edge of the reel tube to the back frame member as shown in the illustration at right.

**NOTE:**
The reel must be adjusted equally on both sides.

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.
1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).
4. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust reel fore-aft position.
5. Tighten jam nut.
6. Tighten nuts (A).

7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust reel fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close driveshields before engaging header.

Adjusting Reel Vertical Position

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).
4. Loosen jam nuts on adjuster bolts (A), and turn bolts (A) to raise or lower reel.

5. Tighten jam nuts (A).

6. Tighten nuts (A).

7. Open right-hand endshield.

8. Loosen four nuts (A).
9. Loosen jam nuts on adjuster bolts (A), and turn bolts (A) to adjust reel vertical position.

**NOTE:**
The factory setting at forward adjuster bolt should be 12 mm (15/32 in.) lower than at rear adjuster bolt. If tine aggressiveness has changed then the adjuster bolt offset may not equal factory settings. Always measure the adjuster bolt offset and maintain throughout the vertical adjustment.

10. Tighten jam nut.

11. Tighten nuts (A).

12. Close shields before engaging header.

13. Check that the reel rotates freely.

**NOTE:**
Manually rotate reel, and ensure that tines do not contact header pan, otherwise damage to pan will result. If necessary, grind off excessive length from tine if tine length varies considerably. Remove any sharp edges or burrs from tine.

14. Check that reel is evenly adjusted.

---

**Checking Reel Tine to Header Pan Clearance**

**IMPORTANT:**
The dimensions at right are provided as guidelines only. Tines may slightly contact the guards, but **NOT** the knife sections or the auger pan.

1. Rotate reel slowly by hand, and check tine clearance at knife and pan. Flex tines to simulate crop-loaded position to ensure tine clearances to knife sections and auger pan are adequate for working conditions.

2. Check that reel rotates freely.

**NOTE:**
If there are a few reel tines that are touching the pan while the rest are at the correct height, trim the longer tines to match the rest. Be sure to adjust both sides of the reel. Ensure that tines do **NOT** contact plastic header pan.
3.5.6 Setting Tine Aggressiveness

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open right-hand endshield.
3. At right side of reel (cam end) ONLY, loosen four nuts (A).

![Figure 3.100: A40-D Right Side](image)

4. Loosen jam nuts on bolts (A), and turn bolts to rotate cam to desired position. Viewed from right side, rotate cam clockwise to obtain more aggressive tine action.

NOTE:
The factory setting at forward adjuster bolt should be 12 mm (0.47 in.) lower than at rear adjuster bolt. If tine aggressiveness has changed then the adjuster bolt offset may not equal factory settings. Always measure the adjuster bolt offset and maintain throughout the vertical adjustment.

![Figure 3.101: A40-D Right Side](image)

5. Tighten nuts (A), and jam nuts on bolts.
6. Check that chain and/or belt have NOT become over-tight. Adjust to recommended tension if required.
7. Check reel tine to header pan clearance to ensure that there is no contact between reel tines and the header pan. Refer to Checking Reel Tine to Header Pan Clearance, page 69.

![Figure 3.102: A40-D Right Side](image)
3.5.7 Adjusting Header Angle of A40-D

Header angle can be hydraulically adjusted from the cab using hydraulic cylinder (A), without shutting down the windrower.

**NOTE:**
Some M100, M105, M150, and M155 models are equipped with a mechanical link. For instructions on adjusting header angle, refer to your windrower operator’s manual.

![Header Angle Hydraulic Cylinder](image)

3.5.8 Setting Cutting Height

**CAUTION**
To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Raise header, and engage header lift cylinder lock-out valves.
2. Remove pins (A) at each skid shoe or gauge roller.
3. Raise or lower skid shoe or gauge roller to desired position.
4. Replace pins (A).

![Skid Shoe](image)
5. Check that skid shoes or gauge rollers are adjusted to the same position.

6. Check header float, and adjust if required. Refer to 3.5.9 Checking/Adjusting Float, page 72 for more information.

   **NOTE:**
   The two inboard skid shoes are standard equipment. The inboard shoes can be moved to the outboard position OR outboard positions can be fitted with either gauge rollers or skid shoes.

### 3.5.9 Checking/Adjusting Float

The windrower float springs are **NOT** used to level the header.

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

To adjust the float, follow these steps:

1. Check float by grasping the lean bar and lifting. Lifting force should be 335–380 N (75–85 lbf) and should be approximately the same at both ends.

2. If necessary, perform the following steps to adjust the float:
   a. Raise header fully, shut down engine, and remove key.
   b. Turn drawbolt (A) clockwise to increase float (makes header lighter) or counterclockwise to decrease float (makes header heavier).
   c. Recheck the float.
### 3.5.10 Setting Feed Pan and Rock Drop Tine Position

The rear of the feed pan is adjustable up and down to raise or lower the feed pan and rock drop tines.
- Lowering the feed-pan helps prevent plugging in heavy crop.
- Raising the feed-pan helps to form an even windrow in light crop.

**WARNING**

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

1. Raise header fully, and engage safety props.
2. Stop engine and remove key.
3. Loosen nut (A) both sides, and align pointer (B) at each side of rock drop tine support with one of the slots (C) to match crop condition.

<table>
<thead>
<tr>
<th>Crop Condition</th>
<th>Light</th>
<th>Normal</th>
<th>Heavy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot</td>
<td>Upper</td>
<td>Center</td>
<td>Lower</td>
</tr>
</tbody>
</table>

4. Tighten hardware on both sides.
5. Disengage header lift cylinder stops.

### 3.5.11 Adjusting Conditioner Roll Gap

The roll gap determines the amount of conditioning:
- To reduce conditioning, increase roll gap.
- To increase conditioning, decrease roll gap.

The conditioner roll gap is factory-set at 6 mm (1/4 in.).

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.
1. Loosen and back-off upper jam nut (A), on both sides of conditioner.

2. **To increase roll gap**, turn lower nut (B) to raise link, and increase the gauge (C) setting.

3. **To decrease roll gap**, turn lower nut (B) to lower link, and decrease the gauge (C) setting.

4. Tighten jam nuts (A), both sides.

5. Loosen bolt (A), and rotate cover (B) to expose access port (C).

6. Inspect space between roll bars at both ends of the rolls at access port (C).

**IMPORTANT:**
Roll timing and alignment are critical when the roll gap is decreased because:
- Conditioning is affected
- The bars may contact each other

7. Check roll timing and alignment when reducing roll gap. Refer to:
   - 4.13.11 Checking/Adjusting Roll Timing, page 174
   - 4.13.10 Checking/Adjusting Roll Alignment, page 172

8. Close cover (B), and tighten bolt (A).

### 3.5.12 Adjusting Conditioner Roll Tension

The roll tension (the force holding the rolls together) is factory-set, and is adjustable. There is a spring for each end of the roll.
CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Lower header fully.
2. Stop engine, and remove key.
3. To increase the roll tension, loosen jam nut (B) at spring insert, and turn spring drawbolt (C) clockwise to tighten the spring. Tighten jam nut (B).
4. To decrease the roll tension, loosen jam nut (B) at spring insert, and turn spring drawbolt (C) counterclockwise to loosen the spring. Tighten jam nut (B).
3.5.13 Positioning the Forming Shields

**WARNING**

Keep hands and feet away from discharge opening. Keep everyone several hundred feet away from your operation. Never direct the discharge toward anyone. Stones or other foreign objects can be ejected with force.

The position of the forming shields controls the width and placement of the windrow. The decision on forming shield position (settings between 915–2346 mm [36–92 in.]) should be made based on the following factors:

- Weather conditions (rain, sun, humidity, wind)
- Type and yield of crop
- Drying time available
- Method of processing ("green-feed", bales, silage)

A wider windrow will generally dry faster and more evenly, resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. Refer to 3.11 Haying, page 90 for more information.

Where weather conditions permit or when drying is not critical, for example, when cutting for silage or green-feed, a narrower windrow may be preferred for ease of pick-up.

**Positioning Side Deflectors – Self-Propelled**

The position of the side forming shields controls the width and placement of the windrow.

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

To ensure windrow placement is centered with respect to carrier/drive wheels, adjust both side deflectors to the same hole position on the adjuster bar.

1. Set forming shield side deflectors to desired width by repositioning adjuster bars as follows:
   a. Remove lynch pin (A).
   b. Move adjuster bar (B) to another hole.
   c. Reinstall lynch pin (A).

![Figure 3.112: Forming Shield Side Deflector](image-url)
2. If forming shield attachment is too tight or too loose, tighten or loosen nut (A) as required.

![Figure 3.113: Forming Shield Adjustment Nut](image)

**Positioning Rear Deflector (Fluffer Shield)**

The rear deflector (A) slows the crop exiting the conditioner rolls, directs the flow downward, and fluffs the material.

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. For more crop control in light material, lower the deflector (A) by pushing down on one side of the deflector, and then on the other side. Locking handles (B) are located at either end of deflector, and may be loosened slightly.
3. For heavier crops, raise the deflector (A) by pulling up on one side, and then on the other side.

**NOTE:**
For even windrow formation, be sure the deflector is **NOT** twisted.

![Figure 3.114: A40-D Rear Deflector](image)
### 3.6 Recommended Operating Settings

These settings are intended as a starting point. Operators should fine-tune to crop and field conditions. The settings chart continues on the next page.

#### Table 3.3 Recommended Operating Settings

<table>
<thead>
<tr>
<th>Field Conditions</th>
<th>Operating Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Type</td>
<td>Crop Condition (tons per acre)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>&gt;3 Smooth Rocky</td>
</tr>
<tr>
<td></td>
<td>2–3 Smooth Rocky</td>
</tr>
<tr>
<td></td>
<td>&lt;2 Smooth Rocky</td>
</tr>
<tr>
<td>Lodged</td>
<td>Smooth Rocky</td>
</tr>
<tr>
<td>Timothy</td>
<td>&gt;2.5 Smooth Rocky</td>
</tr>
<tr>
<td></td>
<td>&lt;2 Smooth Rocky</td>
</tr>
<tr>
<td>Lodged</td>
<td>Smooth Rocky</td>
</tr>
<tr>
<td>Sudan/ Tall Crop</td>
<td>&gt;3 Smooth Rocky</td>
</tr>
<tr>
<td></td>
<td>&lt;3 Smooth Rocky</td>
</tr>
<tr>
<td>Lodged</td>
<td>Smooth Rocky</td>
</tr>
</tbody>
</table>
## OPERATION: A40-D SELF-PROPELLED WINDROWER AUGER HEADER

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Crop Condition (tons per acre)</th>
<th>Terrain</th>
<th>Stubble Height (mm (in.))</th>
<th>Header Angle</th>
<th>Knife Speed (spm)</th>
<th>Reel Speed (rpm)</th>
<th>Auger Speed</th>
<th>Float</th>
<th>Feed Pan Position</th>
<th>Roll Gap (mm (in.))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triticale (winter forage)</td>
<td>&gt;10</td>
<td>Smooth</td>
<td>Steep</td>
<td>70–75</td>
<td>High</td>
<td>Normal</td>
<td>Light</td>
<td>Lower Slot</td>
<td>25 (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;10</td>
<td>Rocky</td>
<td>Shallow</td>
<td>60–65</td>
<td>Normal/High</td>
<td>Normal/Heavy</td>
<td>Light</td>
<td>Center Slot</td>
<td>25 (1)</td>
<td></td>
</tr>
<tr>
<td>Lodged</td>
<td>Smooth</td>
<td>Steep</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Heavy</td>
<td>Light/Normal</td>
<td>Variable</td>
<td>See Above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wild/Grass Hay</td>
<td>&gt;3.5</td>
<td>Smooth</td>
<td>Steep</td>
<td>73–77</td>
<td>High</td>
<td>Normal</td>
<td>Light</td>
<td>Lower Slot</td>
<td>10 (3/8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2–3</td>
<td>Smooth</td>
<td>Shallow</td>
<td>70–75</td>
<td>Normal</td>
<td>Normal</td>
<td>Light</td>
<td>Center Slot</td>
<td>6 (1/4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;2</td>
<td>Smooth</td>
<td>Shallow</td>
<td>65–70</td>
<td>Low/Normal</td>
<td>Normal/Heavy</td>
<td>Light/Normal</td>
<td>Upper Slot</td>
<td>6 (1/4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lodged</td>
<td>Smooth</td>
<td>Steep</td>
<td>73–77</td>
<td>Normal/High</td>
<td>Heavy</td>
<td>Light/Normal</td>
<td>Variable</td>
<td>See Above</td>
<td></td>
</tr>
</tbody>
</table>
3.7 Unplugging Conditioner and Knife: Self-Propelled

If your windrower is equipped with the optional Header Drive Reverser (MD #B4656), reverse the hydraulic flow to the knife, auger, reel, and conditioner hydraulic motors to help remove any plugged material from the header.

If reverser is not installed, proceed through the following instructions.

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Stop forward movement of windrower, and shut down header.
2. Lift cutterbar about 300 mm (12 in.).
3. Back up about 1 m (3 ft.) while slowly engaging the header.
4. If plug does not clear; raise machine, apply windrower brake, shut off engine, and remove key.
5. Engage lift cylinder lock-outs.

⚠️ WARNING

Wear heavy gloves when working around or handling knife.

6. Clean off cutterbar and area under reel by hand.
7. Retrieve wrench (A) from storage inside the left-hand drive compartment.

8. Use wrench on left-hand end of primary driveshaft (A) to turn rolls forward until plug clears.
9. Return wrench to storage location, and secure in place with pin.

⚠️ WARNING

Return unplug wrench to storage location, and close left-hand driveshield before restarting machine.

NOTE:
If plugging persists, refer to 7 Troubleshooting, page 185.
3.8 Grass Seed Special A40-D

The grass seed auger header has several features to adapt it to this special application. These features include:

- 3.8.1 Stub Guards and Hold-Downs, page 82
- 3.8.2 Special Auger Design for Grass Seed Special A40-D, page 82
- 3.8.3 Seven-Bat Reel, page 83
- 3.8.4 Auger Pan Extensions, page 83
- 3.8.5 Windrow Forming Rods, page 85

3.8.1 Stub Guards and Hold-Downs

The cutterbar is equipped with stub guards for effective cutting in tough grass crops. Refer to 4.7.7 Guards, page 112 for maintenance of these components.

3.8.2 Special Auger Design for Grass Seed Special A40-D

The center beaters and beater supports have been removed to reduce auger wrapping.
3.8.3 Seven-Bat Reel

A seventh bat is added to the reel body, for smoother reel action and better crop feed into the header.

3.8.4 Auger Pan Extensions

The grass seed header is equipped with adjustable auger pan extensions that allow adjustment of delivery opening to vary the windrow characteristics.
Adjusting Pan Extensions: Grass Seed Special

The grass seed header auger pan extensions are factory-installed for the widest delivery. Adjust as follows:

1. Remove two bolts (A) and loosen bolt (B).

2. Slide pan extensions (C) and swath forming rods inboard to desired position and align holes.

3. Reinstall two bolts (A). Tighten bolts (A) and (B).

4. Repeat for opposite pan extension.
3.8.5 Windrow Forming Rods

Forming rods are provided to assist in forming the narrow windrows preferred for this application.
Bend rods to modify the windrow shape. Use forming rods in conjunction with auger pan extensions to achieve the width and shape of windrows you desire.

Figure 3.122: Windrow Forming Rods
3.9 Selecting Ground Speed

**CAUTION**

Reduce speed when turning, crossing slopes, or when travelling over rough ground.

Windrower ground speed *SHOULD NOT EXCEED* 13 km/h (8 mph). For most crop conditions a ground speed of 8 km/h (5 mph) has been found satisfactory.

Choose a ground speed that allows the knife to cut the crop smoothly and evenly.

The chart below indicates the relationship between ground speed and area cut for three header sizes. For example, at a ground speed of 8 km/h (5 mph) with a 16-foot header, the area cut would be approximately 4 hectares (10 acres) per hour.

![Figure 3.123: Ground Speed and Area Cut](image)

**Figure 3.123: Ground Speed and Area Cut**

- A – Acres/Hour
- B – Hectares/Hour
- C – Kilometers/Hour
- D – Miles/Hour
- E – 18 ft
- F – 16 ft
- G – 14 ft
3.10 Tall Crop Dividers

The tall crop dividers attach to the ends of the header for clean crop dividing, and reel entry in tall crops. They can be easily adjusted to suit the crop, or removed when not required.

3.10.1 Adjusting Tall Crop Dividers

1. Loosen U-bolt (A).
2. Remove bolts (B), and reposition divider (C) to align with alternate hole location (D).
3. Reinstall bolts (B), and tighten.
4. Tighten U-bolt (A)

Figure 3.124: Tall Crop Divider
3.10.2 Removing Tall Crop Dividers

1. Remove U-bolt (A) and bolts (B), and remove divider. Repeat for other divider.
2. Remove bolts attaching lean bar to header.

3. Remove bolts (A) attaching extensions (B) to lean bar (C), and remove extensions.
4. Reposition lean bar on header at desired height, and install existing carriage bolts (A)—two per side. Tighten bolts.
3.11 Haying

3.11.1 Haying Tips

Curing

Curing crops quickly helps maintain the highest quality because for each day that hay lies on the ground, 5% of the protein is lost.

Leaving the windrow as wide and fluffy as possible results in the quickest curing. Cured hay should be baled as soon as possible.

Topsoil Moisture

Table 3.4 Topsoil Moisture Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>% Moisture</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet</td>
<td>Over 45%</td>
<td>Soil is muddy</td>
</tr>
<tr>
<td>Damp</td>
<td>25–45%</td>
<td>Shows footprints</td>
</tr>
<tr>
<td>Dry</td>
<td>Under 25%</td>
<td>Surface is dusty</td>
</tr>
</tbody>
</table>

- On wet soil, the general rule of wide and thin does not apply. A narrower windrow will dry faster than hay left flat on wet ground.
- When the ground is wetter than the hay, moisture from the soil is absorbed by the hay above it. Determine topsoil moisture level before cutting. Use a moisture tester or estimate level.
- If ground is wet due to irrigation, wait until soil moisture drops below 45%.
- If ground is wet due to frequent rains, cut when weather allows and let the forage lie on wet ground until it dries to the moisture level of the ground.
- Cut hay will dry only to the moisture level of the ground beneath it, so consider moving the windrow to drier ground.

Weather and Topography

- Cut as much hay as possible by midday when drying conditions are best.
- Fields sloping south get up to 100% more exposure to the sun’s heat than do north sloping fields. If hay is baled and chopped, consider baling the south facing fields and chopping those facing north.
- When relative humidity is high, the evaporation rate is low and hay dries slowly.
- If there is no wind, saturated air becomes trapped around the windrow. Raking or tedding will expose the hay to fresh, less saturated air.
- Cut hay perpendicular to the direction of the prevailing winds if possible.

Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the greatest results. Refer to 3.5 Operating Variables for A40-D, page 62 for instructions on adjusting the header.
Table 3.5 Recommended Windrow Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High and fluffy</td>
<td>Enables airflow through windrow which is more important to the curing process than direct sunlight</td>
</tr>
<tr>
<td>Consistent formation (not bunching)</td>
<td>Permits an even flow of material into the baler, chopper, etc.</td>
</tr>
<tr>
<td>Even distribution of material across windrow</td>
<td>Results in even and consistent bales to minimize handling and stacking problems</td>
</tr>
<tr>
<td>Properly conditioned</td>
<td>Prevents excessive leaf damage</td>
</tr>
</tbody>
</table>

**Driving on Windrow**

Driving on previously cut windrows that will not be raked can lengthen drying time by a full day. If practical, set forming shields to produce a narrower windrow that the machine can straddle.

**NOTE:**
Driving on the windrow in high-yield crops may be unavoidable if a full width windrow is necessary.

**Raking and Tedding**

Raking or tedding speeds up drying; however, the resulting leaf loss may outweigh the benefits. There is little or no advantage to raking or tedding if the ground beneath the windrow is dry.

Large windrows on damp or wet ground should be turned over when moisture levels reach 40–50%. Hay should not be raked or tedded at moisture levels below 25%, however, or excessive yield loss will result.

**Using Chemical Drying Agents**

Hay drying agents work by removing wax from legume surfaces and enabling water to escape and evaporate faster. However, treated hay lying on wet ground will absorb ground moisture faster.

Before deciding to use a drying agent, carefully compare the relative costs and benefits for your area.
4 Maintenance and Servicing

The following instructions are provided to assist you in the use of the header. Detailed maintenance and service information is contained in the technical service manual that is available from your Dealer. A parts catalog is provided with your shipment.

4.1 Preparing for Servicing

⚠️ CAUTION

To avoid personal injury, before servicing header or opening drive covers:

- Fully lower the header. If necessary to service in the raised position, always engage lift cylinder stops.
- Place all controls in NEUTRAL or PARK.
- Stop engine and remove key.
- Wait for all moving parts to stop.
4.2 Driveshields

This procedure is for opening and closing the endshields at each end of the machine, and the driveshield over the conditioner drivelines.

To open endshields:

⚠️ CAUTION

Ensure shield lock engages in the open position as shown at (B) before letting go of shield.

1. Insert screwdriver or equivalent into opening (A) at base of endshield and push to release latch.

2. Pull bottom and lift endshield until shield support (B) engages bolt. Check that support (B) is engaged before releasing hold on shield.

To close endshields:

3. Grasp endshield at top and push slightly and move support (B) inboard to disengage.

4. Lower endshield to about 300 mm (12 in.) from closed position.

5. Release endshield so that it drops to closed position and shield will self-latch.

To open driveline shield:

6. Disengage rubber latch (A).

7. Open shield (B).

To close driveline shield:

8. Lower shield (B).

4.3 Maintenance Specifications

4.3.1 Recommended Fluids and Lubricants

Your machine can operate at top efficiency ONLY if clean lubricants are used.
- Use clean containers to handle all lubricants.
- Store in an area protected from dust, moisture, and other contaminants.

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Specification</th>
<th>Description</th>
<th>Use</th>
<th>Capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease</td>
<td>SAE Multi-Purpose</td>
<td>High temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2). Lithium base.</td>
<td>As required unless otherwise specified</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High temperature extreme pressure (EP) performance with 10% max molybdenum disulphide (NLGI Grade 2). Lithium base.</td>
<td>Driveline slip-joints</td>
<td></td>
</tr>
<tr>
<td>Gear lubricant</td>
<td>SAE 85W-140</td>
<td>API service class GL-5</td>
<td>Knife drive box</td>
<td>2.2 liters (2.3 quarts)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Conditioner drive gearbox</td>
<td>1 liter (1.06 quarts)</td>
</tr>
<tr>
<td>Hydraulic oil</td>
<td>SAE 15W-40</td>
<td>Compliant with SAE specs for API class SJ And CH-4 engine oil.</td>
<td>Lift and header drive systems reservoir</td>
<td>126 liters (33 gal US)</td>
</tr>
</tbody>
</table>
4.4 Maintenance Requirements

Periodic maintenance requirements are organized according to service intervals.

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine’s life.

When servicing the machine, refer to the specific headings in this section and use only fluids and lubricants specified in 4.3.1 Recommended Fluids and Lubricants, page 95.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records. Refer to 4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97.

If a service interval specifies more than one timeframe, e.g., "100 hours or Annually", service the machine at whichever interval is reached first.

**IMPORTANT:**
Recommended intervals are for average conditions. Service the machine more often if operating under adverse conditions (severe dust, extra heavy loads, etc.).

⚠️ **CAUTION**

Carefully follow all safety messages, refer to 1 Safety, page 1.
### 4.4.1 Maintenance Schedule/Record: Self-Propelled

<table>
<thead>
<tr>
<th>Maintenance Record</th>
<th>Action:</th>
<th>✓ - Check</th>
<th>♦ - Lubricate</th>
<th>▲ - Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour meter reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serviced by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Break-in
Refer to 4.4.2 Break-In Inspection, page 98.

#### 100 Hours or Annually

- ✔ Conditioner drive gearbox lubricant level
- ✔ Knife drive box bolt torque
- ✔ Knife drive box Lubricant level

#### End of Season
Refer to 4.4.4 Storage, page 99.

#### 10 Hours or Daily

- ✔ Hydraulic Hoses and Lines²
- ♦ Sections, guards, And hold-downs²
- ✔ Knife hold-downs²
- ✔ Knife assembly²
- ✔ Knife drive box bolt torque - First 10 hours only

#### 25 Hours

- ♦ Knifehead

#### 50 Hours

- ♦ Auger shaft bearings
- ♦ Gauge roller bearings
- ♦ Main driveshaft bearings
- ♦ Tine bar bearings
- ♦ Reel shaft bearings
- ▲ Conditioner gearbox oil - First 50 hours only

---

2. A record of daily maintenance is not normally required, but is at the owner/operator’s discretion.
### 4.4.2 Break-In Inspection

<table>
<thead>
<tr>
<th>Hours</th>
<th>Item</th>
<th>Check</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Hardware</td>
<td>Torque</td>
<td>8.1 Recommended Torques, page 193</td>
</tr>
<tr>
<td>5, 25, and 50</td>
<td>Knife drive belt</td>
<td>Tension</td>
<td>4.8.1 Knife Drive – A40-D, page 131</td>
</tr>
<tr>
<td>10</td>
<td>Knife drive box mounting bolts</td>
<td>Torque</td>
<td>Mounting Bolts, page 123</td>
</tr>
</tbody>
</table>

Replace or tighten any missing or loose hardware. Refer to 8.1 Recommended Torques, page 193.
4.4.3 Preseason Checks

**CAUTION**

- Review the operator’s manual to refresh your memory on safety and operating recommendations.
- Review all safety signs and other decals on the header and note hazard areas.
- Be sure all shields and guards are properly installed and secured. Never alter or remove safety equipment.
- Be sure you understand and have practiced safe use of all controls. Know the capacity and operating characteristics of the machine.
- Check the first aid kit and fire extinguisher. Know where they are and how to use them.

Perform the following checks at the beginning of each operating season:

1. Adjust tension on knife drive belt. Refer to 4.7 Cutterbar, page 108.
2. Check oil levels and lubricate bearings. Refer to the following sections:
   - 4.5.3 Knife and Gearbox Oil, page 105
   - 4.5.2 Lubrication Points, page 100
3. Perform all annual maintenance. Refer to 4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97.

4.4.4 Storage

Do the following at the end of each operating season.

**CAUTION**

*Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.*

**CAUTION**

*Cover cutterbar and knife guards to prevent injury from accidental contact.*

1. Clean the header thoroughly.
2. Store in a dry, protected place if possible. If stored outside, always cover header with a waterproof canvas or other protective material.
3. Raise header, and engage lift cylinder lock-outs.
4. If possible, block up the header to take weight off tires.
5. Repaint all worn or chipped painted surfaces to prevent rust.
7. Lubricate header thoroughly, leaving excess grease on fittings to keep moisture out of bearings. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components. Oil knife components to prevent rust.
8. Check for worn components, and repair.
9. Check for broken components and order replacement from your Dealer. Attention to these items right away will save time and effort at beginning of next season.
10. Replace or tighten any missing or loose hardware. Refer to 8.1 Recommended Torques, page 193.
11. Remove divider rods (if equipped) to reduce space required for inside storage.
4.5 Lubrication

⚠️ CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in 4.1 Preparing for Servicing, page 93.

⚠️ CAUTION

Refer to 4.3.1 Recommended Fluids and Lubricants, page 95 for recommended greases.

Log hours of operation and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to 4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97.

4.5.1 Greasing Procedure

⚠️ WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine, stop engine, remove key, and engage safety props before going under machine.

The greasing points are marked on the machine by decals showing a grease gun (A) and grease interval (B) in hours of operation.

Use the recommended lubricants specified in this manual. Refer to 4.3.1 Recommended Fluids and Lubricants, page 95.

1. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
2. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
3. Leave excess grease on fitting to keep out dirt.
4. Replace any loose or broken fittings immediately.
5. If fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

Figure 4.3: Grease Interval Decal

4.5.2 Lubrication Points

Lubrication requirements depend on the model of header that is being serviced. Refer to lubrication points for your specific model:

- Lubrication Points: A40-D SP Windrower Headers, page 101
- Lubrication Points: Hay Conditioner, page 103
- Lubrication Points: Drivelines, page 104
Lubrication Points: A40-D SP Windrower Headers

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do NOT over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

Figure 4.4: A40-D Header Right Side
A - Knife Drive Bearing (1 Place) (50 Hours)  
B - Reel Shaft Bearing (1 Place) (50 Hours)  
C - Auger Shaft Bearing (1 Place) (50 Hours)  
D - Knifehead Bearing (1 Place) (25 Hours)
NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

**Figure 4.5: A40-D Header Left Side**

A - Tine Bar Bearing (4 Places Each Tine Bar) (50 Hours)
B - Knifehead Bearing (1 Place) (25 Hours)
C - Gauge Roller Bearings (2 Places) Both Sides - if Installed (50 Hours)
D - Knife Drive Bearing (1 Place) (50 Hours)
Lubrication Points: Hay Conditioner

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base.

Figure 4.6: Hay Conditioner
A - Roll Pivot (1 Place - Both Sides)  B - Roll Shaft Bearings (2 Places)  C - Roll Shaft Bearings (2 Places)
Lubrication Points: Drivelines

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

![Drivelines Diagram]

**Figure 4.7: Drivelines**
A - Driveline Shafts (2 Places) (50 hours) - NOTE: 10% Moly Grease Is Recommended For Driveline Shaft Slip Joints ONLY.
B - Cross Shafts (2 Places) (50 hours)
C - Driveline Universals (2 Places) (50 hours)
D - Driveline Universals (2 Places) (50 hours)
4.5.3 Knife and Gearbox Oil

Refer to the following illustration to identify the various locations that require lubrication. See 4.3.1 Recommended Fluids and Lubricants, page 95 for proper oil. Use SAE 30 oil.

Figure 4.8: Knife and Gearbox Oil
A - Oil Knife Daily Except in Sandy Soil (SAE 30)
B - Check Roll Gearbox (1 Place) (Lower Header to the Ground)
C - Knife Drive Box (2 Places) (Check Oil Level with Knife Drive Box Horizontal)
4.5.4 Installing Sealed Bearings

Follow these steps to install sealed bearings:

1. Clean shaft and coat with rust preventative.
2. Install flangette (A), bearing (B), second flangette (C), and lock collar (D).

   **NOTE:**
   The locking cam is only on one side of the bearing.

3. Install (but do **NOT** tighten) the flangette bolts (E).
4. When the shaft is correctly located, lock the lock collar with a punch.

   **NOTE:**
   The collar should be locked in the same direction the shaft rotates. Tighten the setscrew in the collar.

5. Tighten the flangette bolts.
6. Loosen the flangette bolts on the mating bearing one turn and retighten. This will allow the bearing to line up.
4.6 Hydraulics

For hydraulics information about self-propelled windrower headers, contact your Dealer.

4.6.1 Servicing A40-D Hydraulics

Refer to your windrower operator’s manual for hydraulic system maintenance procedures for self-propelled windrower headers.

4.6.2 Checking Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

⚠️ WARNING

- Avoid high-pressure fluids. Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines.
- Tighten all connections before applying pressure. Keep hands and body away from pin-holes and nozzles which eject fluids under high pressure.
- If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.
- Use a piece of cardboard or paper to search for leaks.

IMPORTANT:

Keep hydraulic coupler tips and connectors clean. Dust, dirt, water and foreign material are the major causes of hydraulic system damage. DO NOT attempt to service hydraulic system in the field. Precision fits require WHITE ROOM CARE during overhaul.
4.7 Cutterbar

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in 4.1 Preparing for Servicing, page 93.

WARNING

Wear heavy gloves when working around or handling knife.

WARNING

Keep hands clear of the area between guards and knife at all times.

4.7.1 Replacing Knife Section

Check daily that sections are firmly bolted to the knife back, and are not worn or broken. Replace as required. A worn or broken knife section can be replaced without removing knife from cutterbar.

WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine, always stop engine, remove key, and engage safety props before going under machine for any reason.

WARNING

Stand to rear of knife during removal to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

1. Turn off engine and remove key.
2. Stroke knife as required to expose knife sections.
3. Remove lock nuts (A), and lift section (B) off of bolts.

IMPORTANT:

Do NOT mix heavy and light knife sections on same knife.

4. Clean any dirt off of knife back, and position new knife section on bolts.
5. Secure with lock nuts, and tighten to required torque.
4.7.2 Removing Knife

**WARNING**
Stand to rear of knife during removal to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife manually to its outer limit.
3. Clean the area around the knifehead.
4. Remove bolt (A).
5. Remove the grease zerk (B) from the pin.
6. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
7. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.
8. Push the knife assembly inboard until it is clear of the output arm.
9. Seal the knifehead bearing with plastic or tape unless it is being replaced.
10. Wrap a chain around the knifehead and pull out the knife.

![Figure 4.14: Knifehead](image)

4.7.3 Installing Knife

**WARNING**
Stand to rear of knife during installation to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

1. Slide the knife into place and align the knifehead with the output arm.

**NOTE:**
Remove the grease zerk from the knifehead pin for easier removal and installation of knifehead pin.

2. Install the knifehead pin (A) through the output arm (C) and into the knifehead.
3. Set the groove (B) in the knifehead pin 1.5 mm (1/16 in.) above the output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 N·m (160 ft·lbf).

![Figure 4.15: Knifehead](image)
4. Install the grease zerk (A) into the knifehead pin, and turn the grease zerk for easy access.

**IMPORTANT:**
Slowly apply grease to the knifehead until slight downward movement of the knifehead is observed. Do **NOT** over grease the knifehead. Over greasing leads to knife misalignment causing excessive heating of guards and overloading of drive systems. If over greasing occurs, remove the grease zerk to release pressure.

![Figure 4.16: Knifehead](image1)

**4.7.4 Removing Knifehead Bearing**

1. Remove knife. Refer to 4.7.2 Removing Knife, page 109.

2. Using a flat-ended tool (A) with approximately the same diameter as the plug (D), tap out the seal (B), bearing (C), plug (D), and O-ring (E) from the underside of the head.

**NOTE:**
The seal can be replaced without removing the bearing. When changing seal, check pin and needle bearing for wear. Replace if necessary.

![Figure 4.17: Bearing Removal](image2)
### 4.7.5 Installing Knifehead Bearing

1. Place O-ring (E) and plug (D) into knifehead.
   **IMPORTANT:**
   Install the bearing with the stamped end (the end with the identification markings) facing up.

2. Use a flat-ended tool (A) with the same approximate diameter as the bearing (C), and push the bearing into the knifehead until the top of the bearing is flush with the step in the knifehead.

3. Install seal (B) into knifehead with the lip facing outwards.
   **IMPORTANT:**
   To prevent premature knifehead or knife drive box failure, ensure there’s a tight fit between the knifehead pin and the needle bearing, and also between the knifehead pin and the output arm.

4. Install the knife. Refer to 4.7.3 Installing Knife, page 109.

---

### 4.7.6 Removing Spare Knife from Storage

For double knife headers, a spare knife with knifehead may be stored inside the lean bar (A):
- The left knife is stored at the left end of the lean bar
- The right knife is stored at the right end of the lean bar.
MAINTENANCE AND SERVICING

CAUTION
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Remove bolts (A) from lean bar end cap.
2. Pull out end cap and plastic storage tube assembly with the knife inside.
3. Slide knife from storage tube.
4. Replace storage tube inside lean bar.
5. Reinstall bolts (A), and tighten.

Figure 4.20: Spare Knife – Double-Knife

4.7.7 Guards

Guards protect the knife from damage from rocks and other objects and provide a surface for the knife to cut against, much like a pair of scissors. It is important that guards are adjusted properly.

Auger headers can be equipped with two types of guards: pointed or stub.

- Pointed guards are suitable for most standing crops and cutting conditions.
- Stub guards improve cutting performance in tough, stringy grass type crops, and crops that need to be cut close to the ground.

Guards are also designed slightly differently depending on where they are installed along the cutterbar:

- **Outboard Left** – Located at left end of cutterbar. Does not have a ledger to allow for slight fore/aft motion from the knife drive box.
- **Outboard Right** – Located at right end of cutterbar. Does not have a ledger to allow for slight fore/aft motion from the knife drive box (double-knife headers).
- **Center** – Located at center of cutterbar on double-knife headers. Has a stepped ledger to allow for knife overlap.
- **Drive End** – Located at the drive end of cutterbar, next to outboard guard. Similar to standard but does not have a ledger to allow for slight fore/aft motion from the knife drive box.
- **Standard** – Standard guard used at all other locations.
Figure 4.21: Guard Configurations

A - Pointed Standard (MD #118344)
B - Pointed Drive End (No Ledger) (MD #118345)
C - Pointed Right Outboard (MD #118302)
D - Pointed Left Outboard (MD #118301)
E - Pointed Center (MD #124338)
F - Stub Standard (MD #118346)
G - Stub Drive End (No Ledger) (MD #118347)
H - Stub Center (MD #124775)

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar.
Aligning Guard

Check **DAILY** that guards are aligned to obtain proper shear cut between knife section and guard. Knife sections should contact shear surface of each guard.

1. Retrieve tool (A) from left-hand side of header.

2. To adjust guard tips downward, position tool as shown at right, and push down.

3. To adjust guard tips upward, position tool as shown at right, and pull up.

**TIP:** If trouble is encountered cutting tangled, or fine-stemmed material, replace guards with stub guards.

If material is tough to cut, install stub guards with top guard and adjuster plate. A stub guard conversion kit for the header is available from your Dealer.
Replacing Pointed Guards and Hold-Downs

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure describes the replacement of pointed guards and hold-downs on single and double knife headers.

Pointed Standard Guard and Hold-Down

Follow this procedure to replace standard pointed guards and hold-downs on single- and double-knife headers, except the double knife center guard and hold-down. Refer to Double Knife Pointed Center Guard and Hold-Down in this section.

1. Stroke the knife so that knife sections are spaced midway between the guards.
2. Remove two nuts (A), and carriage bolts (B) that attach guard (C), and hold-down (D) to the cutterbar.
3. Remove the guard (C), and the hold-down (D).
4. Position new guard (B) on cutterbar, and install carriage bolts (B).
5. Install hold-down (D), and secure with nuts (A). Tighten nuts to 68 N·m (50 ft-lbf).
6. Check and adjust clearance between hold-down and knife. Refer to 4.7.8 Hold-Downs, page 121.

**IMPORTANT:**
The second, third, and fourth outboard guards (A) on drive side of the header do **NOT** have a ledger (B) as shown for normal guard (C). Ensure that the proper replacement is installed.

Double Knife Pointed Center Guard and Hold-Down
MAINTENANCE AND SERVICING

IMPORTANT:
Ensure center guard (B) has offset (A) in ledgers and that hold-down accommodates overlapping knives.

NOTE:
Replace adjacent guards when replacing center guard.

7. Remove two nuts (A), and carriage bolts (B) that attach guard (C), adjuster bar (D) and hold-down (E) to the cutterbar.

8. Remove the guard (C), the hold-down (E) and adjuster bar (D).

9. Position new guard (C) on cutterbar, and install carriage bolts (B).

10. Install adjuster bar (D) and hold-down (E), and secure with nuts (A). Tighten nuts to 68–92 N·m (50–68 ft·lbf).

11. Check that cutting surfaces (A) of center and adjacent guards are aligned. Adjust as required as per Aligning Guard, page 114.

12. Check and adjust clearance between hold-down and knife. Refer to 4.7.8 Hold-Downs, page 121.
Replacing Pointed Center Guard on Double-Knife Header

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure applies to the center guard where the two knives overlap on a double-knife header.

**IMPORTANT:**
Replace adjacent guards when replacing center guard.

**IMPORTANT:**
Ensure center guard (A) has offset (B) cutting surface.

**IMPORTANT:**
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

**IMPORTANT:**
Hold-down (A) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is the correct part.
1. Stroke the knife so that knife sections are spaced midway between the guards.

2. Remove two nuts (A), and bolts (B) that attach center guard (C), and hold-down (D) to cutterbar.

3. Remove guard (C), hold-down (D), and adjuster bar (E).

4. Position new guard (C) on cutterbar and install two 7/16 x 2-3/4 in. carriage bolts (B).

5. Position adjuster bar (E) and hold-down (D) on cutterbar and install nuts (A).

6. Torque nuts to 68–92 N·m (50–68 lbf·ft).

7. Check clearance between hold-down (D) and section. Refer to Adjusting Knife Hold-Down: Pointed Guard – Double-Knife Header, page 122.
Replacing Center Stub Guard on Double-Knife Header

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure applies to the center guard where the two knives overlap on a double-knife header.

IMPORTANT:
Replace adjacent guards when replacing center guard.

IMPORTANT:
Ensure center guard (A) has offset cutting surface (B).

IMPORTANT:
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

IMPORTANT:
Hold-down (A) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is the correct part. Hold-down is actually an inverted stub guard (MD # 118346).

Figure 4.35: Center Guard: Double Knife

Figure 4.36: Center Hold-Down: Double Knife
1. Remove two nuts (A) and bolts that attach center guard (B) and top guide (C) to cutterbar.

2. Remove guard, top guide, and adjuster bar (D).

**IMPORTANT:**
Ensure center guard (B) has offset cutting surfaces. Refer to illustration.

**NOTE:**
Top guide (C) (which is an inverted stub guard) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is correct part.

**IMPORTANT:**
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

3. Position replacement guard (B), adjuster bar (D), top guide (C), and install bolts and nuts (A). Do **NOT** tighten.

4. Check and adjust clearance between hold-down, and knife. Refer to **4.7.8 Hold-Downs, page 121.**
4.7.8 Hold-Downs

Hold-downs, also referred to as guides, keep the knife in contact with the guard cutting surface. It is important that the hold-downs are adjusted properly.

Hold-downs are designed to accommodate specific guard locations and guard types:

- Center – Located at center of cutterbar on double-knife headers. Allows for knife overlap.
- Standard – Used at all other locations.

![Figure 4.40: Hold-Downs](image)

A - Pointed Standard (MD #118162)  
B - Pointed Center Double Knife (MD #124344)  
C - Stub Center Double Knife (MD #118346)  
D - Stub Standard (MD #034359)

**CAUTION**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

Check daily that knife hold-downs are set to prevent knife sections from lifting off guards, but still permit the knife to slide without binding.
Adjusting Knife Hold-Down: Pointed Guard – Double-Knife Header

1. Torque nuts (A) to 46 N·m (35 ft·lbf).
2. Turn adjuster bolts (B). Using feeler gauge, clearance from hold-down to knife section (C) should be:
   - 0.1–0.4 mm (0.004–0.016 in.) at the guide tip (C)
   - 0.1–1.0 mm (0.004–0.040 in.) at rear of guide (D)
3. Torque nuts (A) to 72 N·m (53 ft·lbf).
4. After adjusting all hold-downs, run header at a low engine speed, and listen for noise due to insufficient clearance. Insufficient clearance will also result in overheating of the knife and guards.

Adjusting Center Knife Hold-Down: Stub Guard – Double-Knife Header

1. Torque nuts (A) to 46 N·m (35 ft·lbf).
2. Turn adjuster bolts (B). Using a feeler gauge, clearance from hold-down to knife section should be:
   - 0.1–0.4 mm (0.004–0.016 in.) at the guide tip (C)
   - 0.1–1.0 mm (0.004–0.040 in.) at rear of guide (D)
3. Torque nuts (A) to 72 N·m (53 ft·lbf).
4. After adjusting all hold-downs, run header at a low engine speed, and listen for noise due to insufficient clearance. Insufficient clearance will also result in overheating of the knife and guards.
4.7.9 Knife Drive Box

The knife drive box converts rotational motion from the windrower header driveshaft to reciprocating motion for the knife.

The heavy-duty, oil bath, knife drive box uses tapered roller bearings on the input shaft and yoke for increased durability. The pulley and drive arm connections are straight splines with clamping bolts to ensure a tight fit.

The oil level in the knife drive box is checked with a dipstick that is incorporated into the breather.

Mounting Bolts

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

Check torque of four knife drive box mounting bolts (A) after the first 10 hours operation, and every 100 hours thereafter. Torque bolts to 270 N·m (200 ft·lbf). When tightening, start with the side mounting bolts.
Removing Knife Drive Box

1. Loosen knife drive belt (B), and slip off knife drive box pulley. Refer to the following sections:
   - Checking/Adjusting Timing Belt Tension – A40-D Left Side, page 132
   - Checking/Adjusting Timing Belt Tension – A40-D Right Side, page 136

2. Stroke knife to its outer limit.

3. Clean area around knifehead.

4. Remove grease zerk (A) from knifehead pin (B).

5. Remove nut and bolt (C).

6. Insert screwdriver in groove of pin (B), and pry up on pin to free knife. Pin does not have to be removed from arm.

7. Remove bolt (A) from pitman arm.

8. Remove pitman arm (B) from knife drive box output shaft.
9. Remove bolts (A) attaching knife drive box to frame.
10. Remove knife drive box.

**Installing Knife Drive Box**

1. Position knife drive box as shown, and install four bolts (A). Torque side bolts, and then torque bottom bolts to 270 N·m (200 ft·lbf).

   **IMPORTANT:**
   Use only Grade L9 bolts and flat washers.

2. Apply Loctite® #243 adhesive (or equivalent) in two bands (B) around shaft as shown, with one band at end of shaft, and one band approximately mid-way.

3. Slide pitman arm (B) onto knife drive box output shaft.
4. Rotate knife drive box pulley to ensure pitman arm just clears frame to ensure proper placement on splines. Remove arm (B), and reposition on splines as required.
5. Rotate knife drive box pulley to locate pitman arm at furthest outboard position.
6. Slide pitman arm (C) up or down on shaft until it just contacts knifehead (B), (0.25 mm [0.010 in.]) gap.

7. Install bolt (E) and nut, and torque to 217 N·m (160 ft·lbf).

8. Align knifehead (B) with pitman arm (C).

9. Install knifehead pin (A) in pitman arm (C), and tap it down into the knifehead, ensuring pin is bottomed out in the knifehead.

10. Tap underside of the knifehead until the pin is flush with the upper face of the pitman arm (C).

11. Carefully adjust to achieve a 0.25 mm (0.010 in.) gap at (D) with the knife laying flat on the first few guards.

12. Replace bolt (C) and nut.

13. Tighten nut to 220 N·m (160 ft·lbf).

14. Replace grease zerk (A) in pin.

15. Install drive belt onto knife drive box pulley and tighten. Refer to the following sections:
   - Checking/Adjusting Timing Belt Tension – A40-D Left Side, page 132
   - Checking/Adjusting V-Belt Tension on Left Side – A40-D, page 131
   - Checking/Adjusting Timing Belt Tension – A40-D Right Side, page 136

Removing Pulley

1. Remove knife drive box. Refer to Removing Knife Drive Box, page 124.

2. Loosen nut and bolt (A) from pulley.

3. Remove pulley using a three-jaw puller.
MAINTENANCE AND SERVICING

Installing Pulley

1. Remove any rust or paint from inner spline. For replacement parts, remove oil/grease with degreasing agent.

2. Apply Loctite® #243 adhesive (or equivalent) in two bands around shaft (A), with one band at end of spline, and one band approximately mid-way.

3. Install pulley on shaft until flush with end of shaft, and secure with bolt (A) and nut. Torque bolts to 217 N·m (160 ft·lbf).

Changing Knife Drive Box Oil

Change knife drive box lubricant after the first 50 hours operation, and every 1000 hours (or 3 years) thereafter. To change lubricant, follow these steps:

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Raise header and then place a suitable container under the knife drive box drain to collect oil.
2. Engage header lift cylinder stops.
3. Remove breather/dipstick (A) and drain plug (B), and allow oil to drain.
4. Replace drain plug and add oil to required level. Use gear lubricant, SAE 85W-140, API Service Class GL-5, 2.2 liters (2.3 quarts).
5. Disengage lift cylinder stops.

### 4.7.10 Adjusting Knife Timing

Double-knife A40-D headers require that the knives are properly timed to move in opposite directions. Knives moving in the same direction will result in unnecessary vibration.

To adjust the knife timing, follow these steps:

1. Remove the right-side knife drive belt (A), if it is not already removed.

2. Rotate the left-side knife drive box driven pulley (A) clockwise until the left-side knife is at the center of the inboard stroke (moving towards center of header).

**NOTE:**
Center stroke is when the knife points are centered between guard points.
3. Rotate the right-side knife drive box pulley counterclockwise until the right-side knife is at the center of the inboard stroke.

**NOTE:**
Secure knives to prevent movement when installing the belts.

4. Install the right-side knife drive box drive belt and tension.

![Figure 4.59: Knife Sections Centered Between Guard Points](image)

**CAUTION**
To maintain timing, knife drive box driver and driven pulleys must NOT rotate as the belt is tightened.

5. Check that the timing belt (A) is properly seated in the grooves on both driver and driven pulley on the right-hand side, and is tensioned correctly. The belt should be tensioned to a 14 mm (9/16 in.) deflection, this is achieved by applying 22–30 N (5–6.5 lbf) to the belt at mid-span.

![Figure 4.60: Timing Belt – Right Side](image)
6. Check for correct knife timing by rotating the driveshaft (A) slowly with an unplugging wrench (B), and observe knives where they overlap at the center of the header.

**IMPORTANT:**
Knives must move in opposite directions, and must begin moving at exactly the same time.

7. If timing is correct, skip the remaining steps.

8. If timing is off, loosen right-side timing belt sufficiently to allow skipping the belt one or more teeth as required.
   a. **If right knife LEADS left knife,** rotate RIGHT HAND driven pulley (C) clockwise.
   b. **If right knife LAGS left knife,** rotate RIGHT HAND driven pulley (C) counterclockwise.
   c. Tighten right-side timing belt.
4.8 A40-D Drive Systems

4.8.1 Knife Drive – A40-D

The A40-D double-knife header is driven by a windrower-powered hydraulic motor that drives each knife with two belt-driven knife drive boxes.

Checking/Adjusting V-Belt Tension on Left Side – A40-D

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Turn off engine and remove key.
2. Open left endshield.
3. Apply a force of 35–50 N (8–12 lbf) on each belt at mid-span (D). Belt should deflect 4 mm (3/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (A), and jam nut on adjuster bolt (B).
   b. Turn adjuster bolt (B) to move pulley (C) to achieve required deflection at (D).
   c. Tighten jam nut at (B), and three nuts (A).

NOTE:
Readjust tension of new belts after about 5 hours of operation.

Removing Double V-Belts on Left Side – A40-D

This procedure is applicable to A40-D Grass Seed and A40-D standard headers.

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Turn off engine and remove key.

2. Open left endshield.

3. Loosen three nuts (A), and jam nut on adjuster bolt (B).

4. Turn adjuster bolt (B) so that drive belts (C) can be slipped off pulleys (D) and (E).

## Installing Double V-Belts – A40-D Left Side

This procedure is applicable to A40-D Grass Seed and A40-D standard headers.

**IMPORTANT:**

Belts are a matched set. Replace both drive belts even if only one needs replacing.

**NOTE:**

When installing new belt, never pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

1. Slip belts (A) onto pulleys (B) and (C).

   **IMPORTANT:**
   To prolong belt and drive life, do not overtighten belts.

2. Turn adjuster bolt (D) to move pulley (B) until a force of 35–50 N (8–12 lbf) applied at mid-span to each belt deflects each belt (A) 4 mm (3/16 in.).

3. Tighten jam nut at (D), and three nuts (E).


   **NOTE:**
   Readjust tension of a new belt after a short run-in period (about 5 hours).

## Checking/Adjusting Timing Belt Tension – A40-D Left Side

**IMPORTANT:**

To prolong belt and drive lift, do not overtighten belt.

⚠️ **CAUTION**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Turn off engine and remove key.
2. Open left endshield.
3. Apply a force of 22–30 N (5–6.5 lbf) on belt (A) at mid-span. Belt should deflect 14 mm (9/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (B), and jam nut on adjuster bolt (C).
   b. Turn adjuster bolt (C) to move pulley (D) until required tension is achieved.
   c. Tighten jam nut at (C), and three nuts (B).

**NOTE:**
Readjust tension of new belt after about 5 hours of operation.

---

**Removing Timing Belt on Left Side**

To remove the knife drive timing belt from the left side of an A40-D header, follow these steps:

1. Turn off engine and remove key.
2. Open shield on left-hand of the header.
3. Loosen the three bolts (A) that lock the bottom drive pulley in place.
4. Loosen adjusting bolt (B); this will loosen the belts.

5. Loosen the three bolts (A) that lock the pulley in position.
6. Loosen adjusting bolt (B); this will loosen the knife drive belt.
7. Remove the two belts (C) that drive the cross shaft.
8. Remove the knife drive timing belt (D) from the rear pulley.
9. Open the access panel (A) located beside the knife drive box. Line up the belt with the notch machined into the knife drive box pulley. Rotate the pulley with the belt in the notch until it is free for removal.

![Knife Drive Belt Access Panel](image)

**Figure 4.69: Knife Drive Belt Access Panel**

**NOTE:**
Mark the ports and hoses and place port caps or plastic bags with tie wraps to prevent contamination.

10. To completely remove the belt, you will need to remove the two hoses (A) off of the auger drive motor, and disconnect the knife speed harness (B).

![Auger Hoses](image)

**Figure 4.70: Auger Hoses**

*Installing Timing Belt – A40-D Left Side*

This procedure is applicable to A40-D Grass Seed and A40-D Standard headers.

⚠️ **CAUTION**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Route knife drive timing belt from inboard side of endsheet through opening (A).

2. Locate knife drive belt (D) onto knife drive box pulley (F).

3. Route knife drive belt (D) onto knife drive pulley (E).

   **NOTE:**
   When installing new belt, never pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

   **IMPORTANT:**
   To prolong belt and drive life, do not overtighten belts.

4. Turn adjuster bolt (C) to move pulley (E) until a force of 22–30 N (5–6.5 lbf) deflects belt 14 mm (9/16 in.) at mid-span (D).

5. Tighten jam nut at (C), and three nuts (B).


8. Install cover (B) in endsheet and secure with bolt (A).


   **NOTE:**
   Readjust tension of a new belt after a short run-in period (about 5 hours).
Checking/Adjusting Timing Belt Tension – A40-D Right Side

IMPORTANT:
To prolong belt and drive life, do not overtighten belt.

⚠️ CAUTION
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Turn off engine and remove key.
2. Open right endshield.
3. Apply a force of 22–30 N (5–6.5 lbf) on belt (D) at mid-span. Belt should deflect 14 mm (9/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (A), and jam nut on adjuster bolt (B).
   b. Turn adjuster bolt (B) to move pulley (C) until required tension is achieved.
   c. Tighten jam nut at (B), and three nuts (A).

NOTE:
Readjust tension of new belt after about 5 hours of operation.

Removing Timing Belt – A40-D Right Side

⚠️ CAUTION
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Remove bolt (A) and remove cover (B) in right endsheet.
2. Open right endshield.
3. Loosen three nuts (A), and jam nut on adjuster bolt (B).
4. Turn adjuster bolt (B) so that knife drive belt (C) can be slipped off pulley (D).
5. Remove belt (C) from pulley (E) and remove belt through hole in endsheet.

**Installing Timing Belt – A40-D Right Side**

⚠️ **CAUTION**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Route knife drive timing belt from inboard side of endsheet through opening (A).

2. Locate belt (C) onto knife drive box pulley (E) and knife drive pulley (D) as shown.

**NOTE:**

When installing new belt, **NEVER** pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

3. Turn adjuster bolt (B) to move pulley (C) until a force of 22–30 N (5–6.5 lbf) deflects belt (C) 14 mm (9/16 in.) at mid-span.

4. Tighten jam nut at (B), and three nuts (A).
5. Install cover (B) in endsheet at knife drive box and secure with bolt (A).

6. Close endshield.

**NOTE:**
Readjust tension of a new belt after a short run-in period (about 5 hours).

---

4.8.2 Reel Drive – A40-D

The reel drive gearbox and hydraulic motor are a factory-assembled unit. The gearbox is sealed, and requires no scheduled maintenance. If service is required for either the gearbox or motor, see your Dealer.

4.8.3 Auger Drive – A40-D

The A40-D header auger is driven directly from a hydraulic motor that is powered by the windrower hydraulics.
4.9 Reel Tines and Tine Bar Bearings – A40-D

Separate procedures are required to replace reel tines, depending on their location on the reel.

**IMPORTANT:**
Keep reel tines in good condition. Straighten or replace as required.

### 4.9.1 Replacing Tine and Bearing – A40-D: Cam End – Disc #1

**NOTE:**
It is recommended that a light coating of anti-sieze compound be applied to tine tube connections and all bolts prior to reassembly.

Replace tines and bearing at disc #1 (A) as follows:

1. Loosen bolt on cover (A), and slide cover to expose hole in cam disc. Rotate reel, and align bearing with hole.
2. Remove cam follower bearing bolt (A), bearing (B), and nut.

3. Disengage cam arm (C) from the cam track with a pry bar.

4. Remove flangette mounting bolts (D).

5. Remove nuts (A), keepers (B), and shoulder bolts (C) that connect cam arm (D) and end tines (E) to tine bar.

**IMPORTANT:**
Tine attachment hardware and configuration may vary. Identify locations so that tine hardware will be reinstalled at same locations.

6. Position end of tine bar clear of cam disc, and remove cam arm assembly (D), complete with bearing assembly.

8. Replace tines as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
   e. Slide remaining tines onto tine bar and attach to tine bar. Do NOT install bolts in end tines at this time.

9. Install cam arm assembly (A), complete with bearing onto tine bar.
10. Engage cam arm (A) into cam track as shown.
11. Attach bearing flangettes with bolts (B). Tighten bolts to 31–36 N·m (23–26 ft·lbf).
12. Lock the bearing.
IMPORTANT:
It is recommended to replace hardware at cam end of tine bar with hardware as specified in the following steps.

13. Position tines as shown and install bolts (A) with keepers, spacers (B) and nuts (C).
14. Install bolts (D), spacers (B), and nuts (C) between tines as shown.
15. Alternate hardware configuration for later-build 2015, 2016 and later units:
   a. 5/16 x 2-1/2 Carriage Bolt (A), MD #136348
   b. Spacer (B), MD #170622
   c. Lock Nut (C), MD #018690
   d. 5/16 x 2 Hex Head Bolt (D), MD #21569

16. Install cam follower bearing (A) with bolt (B). Apply Loctite® #262 (or equivalent) to bolt threads, and torque to 122 N·m (90 ft·lbf).

IMPORTANT:
Install nut with distorted thread TOWARDS bolt head.
17. Reposition cover (A) on cam, and tighten bolt.

4.9.2 Replacing Tine and Bearing – A40-D: Disc #2

Replace tine and bearing at disc #2 (B) as follows:

Type A Tine Bars

1. Remove flangette mounting bolts (A) at reel disc #2.
2. Remove shoulder bolts (B) and keeper (C) from tine bar.
3. Separate left tine bar (D) with bearing from center tine bar (E).
4. Remove tine from center tine bar (E).
5. Remove bearing (A) from tine bar connecting shaft (B).
   Refer to 4.5.4 Installing Sealed Bearings, page 106.

6. Remove nuts (C), shoulder bolts (D), keepers (E) from left tine bar (F) and remove tines (G).

7. Replace tines as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
   e. Slide remaining tines onto tine bar and attach to tine bar. Do NOT install bolts in end tines at this time.

8. Install end tines (G) onto left tine bar (F) with shoulder bolts (D), keepers (E) and nuts (C).

9. Assemble new bearing (A) with flangettes onto connecting shaft (B). Refer to 4.5.4 Installing Sealed Bearings, page 106.
10. Slip new tine onto center tine bar (E).
11. Assemble left tine bar (D) to center tine bar (E) and secure with shoulder bolts (B), keeper (C), and nuts.
12. Install tine bar onto reel disc with hardware (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).

**Type B Tine Bars**

13. Remove flangette mounting bolts (A) at reel disc #2.
14. Remove shoulder bolts (B) and keeper (C) from tine bar.
15. Separate left tine bar (D) with bearing from center tine bar (E).
16. Remove tine from center tine bar (E).

17. Remove bearing (A) from tine bar connecting shaft (B). Refer to 4.5.4 Installing Sealed Bearings, page 106.
18. Remove nut (C), shoulder bolt (D), keeper (E) from left tine bar (F) and remove tine (G).
19. Install new tine (G) onto left tine bar (F) with shoulder bolt (D), keeper (E) and nut (C).

20. Assemble new bearing (A) with flange onto connecting shaft (B). Refer to 4.5.4 Installing Sealed Bearings, page 106.

21. Replace tines as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
   e. Slide remaining tines onto tine bar and attach to tine bar. Do NOT install bolts in end tines at this time.

22. Slip new tine onto center tine bar (E).

23. Assemble left tine bar (D) to center tine bar (E) and secure with shoulder bolt (B) and nut.

24. Secure tine onto center tine bar (E) with shoulder bolt (B), keeper (C) and nut.

25. Install tine bar onto reel disc with hardware (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).
4.9.3 Replacing Tine and Bearing – A40-D: Center Section X

1. Remove flangette mounting bolts (A) at reel discs #3 and #4.

2. Remove shoulder bolts (B) and keeper (C) connecting tine bar sections ‘X’ and ‘Y’ at reel disc #3.

3. Lift tine bar away from reel arms, and remove complete tine bar section ‘Y’ (including reel bearings at discs #3 and #4).

4. To replace tine bar bearing, refer to 4.5.4 Installing Sealed Bearings, page 106.
5. Remove tine as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install tines on tine bar, and secure with bolts (A) and keepers (B). Install nut with tapered side against tine bar. Do **NOT** install bolts in end tines at this time.

6. Assemble tine bar section ‘Y’ (including reel bearings at discs #3 and #4) to tine bar section ‘X’ at reel disc #3.

7. Position tines as shown, and install shoulder bolts (B) with keeper (C).

8. Attach bearing flangettes to reel arm at discs #3 and #4 with bolts (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).
4.9.4 Replacing Tine and Bearing – A40-D: Opposite Cam – Section Y

1. Remove shoulder bolts (A) and keeper (B) connecting tine bar sections ‘Z’ and ‘Y’ at reel disc #4.

2. Remove flangette mounting bolts (C) at reel disc #4.

3. Lift tine bar away from reel arms, and remove complete tine bar section ‘Z’, complete with bearing assembly.

4. To replace tine bar bearing, refer to 4.5.4 Installing Sealed Bearings, page 106.
5. Replace tine as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install tines on tine bar, and secure with bolts (A) and keepers (B). Install nut with tapered side against tine bar. Do NOT install bolts in end tines at this time.

6. Install tine bar extension 'Z' including bearing to section 'Y' at reel disc #4.

7. Install shoulder bolts (A) and keeper (B) with tine to connect tine bar extension.

8. Install flangette mounting bolts (C) at reel disc #4. Tighten to 21–27 N·m (16–20 ft·lbf).
4.9.5 Replacing Tine – A40-D: Tine Bar Extension – Section Z

1. Remove bolt (A) and keepers (B) on tine to be replaced, and slide tines off tine bar.
2. Install tines on tine bar, and secure with bolt (A) and two keepers (B). Tine (C) must be clamped between keepers (B). Install nut with flat side against tine bar extension.

Figure 4.115: End View of Tine Bar
A - Bolt
B - Keepers
C - Tine
4.10 Straightening Auger Pans

The high density polyethylene auger pans are repairable and replaceable. Refer to your Dealer for details on replacing the pans.

**IMPORTANT:**
To prolong the life of the auger pan, be sure to check that reel tines do not contact the pans when adjusting the reel position or tine pitch.

Stones and other debris can deform the polyethylene pans. If this occurs, the pans can be straightened.

⚠️ **CAUTION**

To avoid personal injury, before servicing header or opening drive covers, follow procedures in 4.1 Preparing for Servicing, page 93, and 1 Safety, page 1.

1. Heat the deformed area with a heat gun until the polyethylene is almost sticky.
2. Push out the dent, and then apply a cold wet rag. Keep wetting the rag in cold water, and applying it on the area until cool. This ensures the polyethylene retains its shape.

**NOTE:**
If the dent is too severe, and has stretched the polyethylene, it may be necessary to locally remove the polyethylene. Use a plastic welder to rejoin the material. Replacement pans are also available from your Dealer.
4.11 Replacing Rubber Fingers

Rubber fingers should be replaced if missing or damaged.

To replace a rubber finger, follow these steps:
1. Remove nut and bolt (A), and then remove finger (B).
2. Position new finger in holder, and then install bolt and nut. Rubber finger should be free to move after bolt is tightened.

Figure 4.116: Auger Finger
4.12 Stripper Bar

Stripper bars help prevent the crop from wrapping around the auger and improve crop flow into the conditioner.

To maintain 1–4 mm (1/32–5/32 in.) clearance (B) between auger (A) flighting and stripper bars, bars may need replacing due to wear or damage. Shims may also need to be installed to compensate for local irregularities in the structure.

If after adjusting stripper bars, auger position needs to be adjusted, refer to 3.5.4 Setting Auger Position, page 63.

4.12.1 Removing Stripper Bar

Heavy crops may cause plugging across the auger due to restricted flow at the stripper bars. To address this problem, remove the lower stripper bar (A), and if necessary, the center stripper bar (B) at each end of the header.

⚠️ WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine, stop engine, remove key, and engage safety props before going under machine.

⚠️ WARNING

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

To remove a stripper bar, follow these steps:

1. Turn off engine and remove key.
2. Remove bolts attaching stripper bar to pan.
3. Remove four nuts and bolts (A) that secure stripper bar (B) to the pan.
4. Replace bolts in pan.

NOTE:
Special countersunk bolts are available from your Dealer.
4.12.2 Replacing Stripper Bars

⚠️ WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine, stop engine, remove key, and engage safety props before going under machine.

1. Remove four nuts and bolts (A) that secure each stripper bar (B) (left-hand and right-hand) to the pan, and remove bars. There are six bars in total.
2. Position new bars (B) on pan as shown, with upper flange on front bar facing forward.
3. Install three bolts and nuts (A) in each bar, and torque to 203 N·m (150 ft-lbf).
4. Check clearance between auger and stripper bars.
5. Loosen bolts (A), and add shims between stripper bars and pan at bolt locations as required to obtain clearance as shown.
6. Retighten bolts to specified torque.

4.12.3 Installing Front Stripper Bar Extensions

Extensions for the front stripper bar are provided for installation (if required for certain crop conditions), especially in tall crops that cause material to bunch up at the ends of the conditioner rolls.

Stripper bar extensions will allow the auger to carry the crop more towards the center, rather than prematurely feeding it to the conditioner.

⚠️ WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine, stop engine, remove key, and engage safety props before going under machine.

To install front stripper bar extensions, follow these steps:

1. Turn off engine and remove key.
2. Raise header, and engage lift cylinder stops.
3. Remove nuts and carriage bolts (A) securing the two extensions (B) to underside of header pan support, and retain for reinstallation.
4. Position extension (D) at inboard end of front stripper bars (E), and mark locations of the two holes onto the plastic pan.

5. Drill two 8 mm (5/16 in.) holes at these locations.

6. Install extension with previously removed carriage bolts (C).

7. Repeat above steps for other extension.
4.13 Conditioner

⚠️ CAUTION
To avoid personal injury, before servicing header or opening drive covers, follow procedures in 4.1 Preparing for Servicing, page 93.

4.13.1 Changing Gearbox Oil

NOTE:
Change conditioner drive gearbox lubricant after the first 50 hours of operation, and every 1000 hours (or 3 years) thereafter.

To change the oil in the conditioner gearbox, follow these steps:

1. Lower header to ground.
2. Turn off engine and remove key.
3. Open driveline shield (A).

Figure 4.122: Driveline Shield
4. Place a suitable container under gearbox drain to collect oil.
5. Remove breather (A) and check plug (B).

6. Remove drain plug (C) and allow oil to drain.
7. Replace drain plug (C), and add oil at (A) to required level. Use gear lubricant, SAE 85W-140, API Service Class GL-5, 1.4 liters (1.5 quarts).
8. Oil is at required level when it runs out of check plug (B).
4.13.2 Removing Forming Shield – A40-D

1. Turn off engine and remove key.
2. Remove hairpins (B), and washers that secure straps (A) to frame.
3. Hold onto forming shield, and slip straps off pins. Lower forming shield to ground.

4. Remove two clevis pins (B) from forming shield forward end.
5. Lift forming shield off bolts (A) in windrower legs, and lower to ground. Replace clevis pins in forming shield.
6. Slide forming shield out from under windrower, or drive windrower away from forming shield.
4.13.3 Disassembling Forming Shield – A40-D

To disassemble the forming shield, follow these steps:

1. Invert forming shield onto top.
2. Remove lynch pin (A) from adjuster rods (B), and disassemble rods from side deflectors (C).

3. Disassemble nut (A) from bolt (B), and lift deflector (C) and washer (D) off forming shield. Repeat for other deflector.

Figure 4.128: Forming Shield

Figure 4.129: Forming Shield
4. Disassemble locking handles (A), and remove bolts.

5. Disassemble fluffer shield (B) from forming shield cover.

6. Remove bolts (A) to remove deflector fins (B) from cover.

4.13.4 Assembling Forming Shield – A40-D

To assemble the forming shield, follow these steps:

1. Attach deflector fins (B) to forming shield cover with bolts (A).
2. Attach fluffer shield (B) to forming shield cover.

3. Attach locking handles (A) to forming shield cover with bolts.

4. Attach deflectors (C) and washers (D) to forming shield cover with nuts (A) and bolts (B).
5. Attach adjuster rods (B) to side deflectors (C) with lynch pin (A).

Figure 4.135: Forming Shield

4.13.5 Installing Forming Shield – A40-D

To install forming shield, follow these steps:

1. Turn off engine and remove key.
2. Remove two clevis pins (A) from forming shield forward end.

3. Position forming shield (A) under the windrower frame.

Figure 4.136: Forming Shield

Figure 4.137: Forming Shield
4. Lift forming shield onto bolts (A) in windrower legs, and secure with clevis pins (B) and hairpin.

5. Lift aft end of forming shield, and attach straps (A) to pins (B) on windrower frame. Install washer and hairpin to secure strap. Use the middle hole, and adjust height to suit the crop.
6. Set forming shield side deflectors to desired width by repositioning adjuster bars (A). Use the same hole location on both sides.

7. Adjust fluffer shield (B) to middle position. Loosen handles (C) if required.

4.13.6 Removing Header Drive Motor

This procedure applies to A40-D (except Grass Seed) double-knife headers.

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Shut down the engine and remove key from ignition.
2. Open conditioner drive shield.
   
   **IMPORTANT:**
   Mark hoses and make a diagram of hose routing. This is useful during reassembly.

3. Disconnect hoses at couplers on motor.
4. Remove two bolts (A) securing motor to gearbox, and remove motor.
4.13.7 Installing Header Drive Motor

This procedure applies to A40-D (except Grass Seed) double-knife headers.

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

Install hydraulic motor onto the gearbox as follows:

1. Turn off engine and remove key.
2. Apply light coat of silicone to motor flange, and position motor on gearbox as shown until mounting holes are aligned, and pinion engages gear in gearbox.
3. Clean off excess sealant from motor flange and gearbox face.
4. Install bolts (A) and washers, and torque to 102 N·m (75 ft-lbf).
5. Reconnect hoses to motor.

4.13.8 Removing Conditioner Gearbox – A40-D

To remove the conditioner drive gearbox from an A40-D header, follow these steps:

1. Open the conditioner drive shield and header left endshield.
2. Remove two bolts (A) securing channel (B) to frame.
3. Remove two hex bolts (A), and one carriage bolt (B) securing channel (C) to endsheet and remove channel (C).

4. Remove two bolts (A) securing motor (B) to gearbox. Do **NOT** disconnect hoses.

**NOTE:**
Hoses not shown for clarity.

5. Carefully pull motor (B) from gearbox and move it clear of work area.

6. Remove two bolts (A) in upper driveline (B).

7. Pull driveline (B) off gearbox. If necessary, use a screwdriver or equivalent to spread yoke. Move driveline clear of work area.

8. Remove four bolts (C) from flange on lower driveline (D) and remove driveline from gearbox. Move driveline clear of work area.

10. Remove the three bolts (B) from the tapered bushing (D).

11. Install two bolts (B) in the two threaded holes (C) in bushing (D) and tighten to release the bushing.

12. Remove bushing (D) and key.

13. Remove pulley (E).

\textbf{CAUTION}

\textbf{Be sure to support the gearbox when removing the nuts. Gearbox weighs 34 kg (79 lb.).}

14. Remove three nuts (A) securing gearbox (B) to frame and remove gearbox (B).

\section*{4.13.9 Installing Conditioner Gearbox – A40-D}

To install the conditioner drive gearbox on an A40-D header, follow these steps:

1. Position gearbox (B) as shown, picking up the three holes in the end sheet and secure with three flanged lock nuts (A). Do not fully tighten.
2. Locate key (A) in shaft.
3. Place pulley (B) onto shaft.

4. Place tapered bushing (A) onto shaft, align with key (B) in shaft and push bushing (A) into place.
5. Align slot in pulley (C) with key (D) in tapered bushing and slide pulley (C) onto bushing (A).
6. Align pulley (C) and countershaft pulley (F) faces to within 1.5 mm (1/16 in.).
7. Install three bolts (E) in tapered bushing (A) and tighten to 25 N·m (18 ft·lbf).
8. Tap bushing (A) and torque bolts. Repeat until bolts no longer turn at 25 N·m (18 ft·lbf).

10. Remove oil level check plug in gear box. If oil does not run out, add oil to required level. Refer to your header operator’s manual.

11. Align keyway in upper driveline yoke (B) with key in gearbox shaft and attach yoke (B) to shaft.

12. Install two hex head bolts (A) and flanged lock nuts to secure yoke. Tighten bolts.

13. Install timing flange on lower driveline (D) onto lower shaft on gearbox with four hex head bolts (C), two flat washers (E) under each bolt head, lock washers (F) and plain nuts (G). Do not tighten.

14. Apply a light coat of silicone to motor flange.

15. Position hydraulic motor (A) onto gearbox as shown and secure with two hex head bolts (B) with thread locking compound, two flat washers (C), and two lock washers (D). Torque to 112 N·m (83 lbf·ft).

17. Position channel (B) against endsheet as shown, picking up the three holes in endsheet.

18. Install two carriage bolts and nuts (A) in lower two holes.

19. Install carriage bolt and nut in upper hole (B) with head facing inboard.

20. Install two hex bolts with lock washers, and flat washers in remaining locations (A).

21. Tighten hardware.

22. Close conditioner driveline shield and endshield.

4.13.10 Checking/Adjusting Roll Alignment

Rolls are aligned at the factory, but adjustment is provided in case the rolls become misaligned during operation.

1. Lower header until it rests on the ground.
2. Open conditioner driveshield.
3. Locate roll alignment cover (A).
4. Loosen bolt (A), and rotate cover (B) to expose access port.

5. Examine roll bar spacing 'X' at each end of the rolls. The rolls are aligned if 'X' varies less than 1.6 mm (1/16 in.) from one end to the other.

6. If 'X' varies more than 1.6 mm (1/16 in.), align rolls as follows:
   a. Remove nuts and bolts (A), and remove shims (B). The shims can be lifted off the pivot rod.
   b. Move upper roll until dimension 'X' at both ends looking through port (as shown in previous step 4. above) is within 1.6 mm (1/16 in.).
   c. Reinstall shims, ensuring hardened washer (C) is against the pivot tube.
   d. Reinstall bolts (A) and nuts.
7. Operate header, and recheck alignment.
8. Close cover (B), and tighten bolt (A).

4.13.11 Checking/Adjusting Roll Timing

The rolls must be correctly timed with each steel bar on one roll centered between two bars of the other roll.

⚠️ WARNING

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

1. Open conditioner driveshield at left end of conditioner.
2. Loosen bolt (A), and rotate cover (B) to expose access port (C) at each end of conditioner.

Figure 4.162: Access Cover

Figure 4.163: Access Cover
3. Examine roll timing (distance 'X') at each end of the rolls with header fully lowered. Each steel bar on one roll should be centered between two bars of the other roll so that distance 'X' is 12 mm (1/2 in.).

**NOTE:**
If the distance 'X' varies more than 1.6 mm (1/16 in.) from one end to the other, the rolls should be re-aligned. Refer to 4.13.10 Checking/Adjusting Roll Alignment, page 172.

4. If required, adjust the roll timing as follows:
   a. Loosen four bolts (A) in slots of yoke plate on lower driveline.
   b. Turn rolls to achieve best timing.
   c. When roll timing is satisfactory, tighten bolts (A) to secure the position.

   Recheck distance between the bars at both ends of the rolls at (C).

5. Close cover (B), and tighten bolt (A).
4.14 Replacing Skid Shoe Wear Plate

Skid shoes are equipped with replaceable wear plates that can be reversed for increased service life. It is recommended that wear plates be replaced when the skid shoe weldment becomes exposed.

⚠️ CAUTION

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

To replace skid shoe wear plates, follow these steps:

1. Raise header, and engage lift cylinder stops.
2. Turn off engine and remove key.
3. Remove bolts and clips (A) from forward edge of skid shoe.

   **NOTE:**
   Use a socket and ratchet wrench to access the nuts.

4. Remove clevis pins (B), and disengage tabs on skid shoe from slots in cutterbar.

5. Remove eight bolts (A), and remove wear plates (B).
6. Position replacement wear plate (B) as shown. (The same wear plate can be reinstalled, but in the reverse position).
7. Secure wear plate with bolts and nuts (A).

   **IMPORTANT:**
   If bolt heads are worn down, replace them with new 1/2 in. x 1 carriage bolts.
8. Insert tabs on skid shoe into slots (A) on cutterbar at inboard mounting locations on frame, and secure with clevis pin (B).

9. Reinstall clips (A) with bolts and nuts removed at Step 3, page 176 to secure skid shoe to cutterbar.

**NOTE:**
Use a socket and ratchet wrench to access the nuts.

10. Remove clevis pin (B), adjust skid shoe to desired height, and reinstall two clevis pins. Secure with lynch pins.
4.15 Gauge Rollers

Gauge rollers can be removed for replacement or repair.

4.15.1 Removing Gauge Rollers

**CAUTION**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.

1. Raise header, and engage lift cylinder stops.
2. Turn off engine and remove key.
3. Remove bolts and clips (A) from forward edge of gauge roller assembly.

**NOTE:**

Use a socket and ratchet wrench to access the nuts.

4. Remove hairpins on pins (B).
5. Support gauge roller, and remove pins (B).
6. Disengage tabs on mounting plate from slots in cutterbar to remove roller assembly.

![Figure 4.171: Gauge Roller](image1)

**Figure 4.171: Gauge Roller**

4.15.2 Installing Gauge Rollers

To install gauge rollers, follow these steps:

1. Position gauge roller assembly below cutterbar, and insert tabs on roller assembly into slots (A) in frame.

![Figure 4.172: Gauge Roller Frame Location](image2)

**Figure 4.172: Gauge Roller Frame Location**
2. Secure with two pins (B) at lowest position.

3. Attach clips (A) with bolts and nuts to secure roller assembly to cutterbar.

**NOTE:**
Use a socket and ratchet wrench to access the nuts.

4. Tighten nuts.

5. Remove pins (A), and adjust rollers to desired height. Reinstall the two pins (A).

6. Ensure that nut (B) on each pin registers in adjacent hole in support bracket.

7. Secure pins with hairpins (C).
4.16 Maintaining the Electrical System

Use electrical tape and wire clips as required to prevent wires from dragging or rubbing.

Keep lights clean, and replace defective bulbs.

To replace light bulbs, follow these steps:

1. Using a Phillips screwdriver, remove screws (A) from fixture, and remove plastic lens.
2. Replace bulb, and reinstall plastic lens and screws.

Figure 4.175: A40-D Hazard Light
5 Optional Equipment

5.1 Options and Attachments

5.1.1 Additional Skid Shoes

In addition to the standard skid shoes, two additional skid shoes may be added for extra control of cutting height and protection of cutting components.

Figure 5.1: MD #B4594

5.1.2 Gauge Roller Kit

The gauge roller kit replaces the outer skid shoes with rollers. They can be adjusted for varying cutting heights.

Figure 5.2: MD #B4593
5.1.3 Replacement Reel Bat Kit

This kit consists of one complete bat assembly for ease of replacement. Separate kits are available for different header widths.

Figure 5.3: Reel Bat Assembly

5.1.4 Stub Guard Conversion Kit

Stub guards, complete with top guides and adjuster plates are designed to cut tough crops.

Separate kits are available for different header widths. Installation and adjustment instructions are included with the kit.

Figure 5.4: Stub Guards

5.1.5 Tall Crop Divider Kit

Tall crop dividers attach to the ends of the header for clean crop dividing and reel entry in tall crops. The kit includes left and right dividers, lean bar extensions and attachment hardware.

Figure 5.5: MD #B4690
6 Unloading and Assembly

Header-specific instructional manuals for unloading, assembly and set-up procedures are included with your shipment.

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# 7 Troubleshooting

## 7.1 Header Performance

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# TROUBLESHOOTING

## 7.2 Mechanical

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</tr>
<tr>
<td>Header angle too steep in stony conditions</td>
<td>Decrease header angle.</td>
<td></td>
<td>3.5.7 Adjusting Header Angle of A40-D, page 71</td>
</tr>
<tr>
<td>Header float too heavy in stony conditions</td>
<td>Adjust to lighter float setting.</td>
<td></td>
<td>3.5.9 Checking/Adjusting Float, page 72</td>
</tr>
<tr>
<td>Knife speed too slow</td>
<td>Maintain proper rpm on PTO. Check for proper match of pump and gear-drive at PTO.</td>
<td></td>
<td>2.3 Product Specifications, page 23</td>
</tr>
<tr>
<td>Guards, knife and hold-downs misaligned</td>
<td>Straighten guards, align hold-downs.</td>
<td></td>
<td>4.7.7 Guards, page 112 4.7.8 Hold-Downs, page 121</td>
</tr>
<tr>
<td>Excessive heating of hydraulic oil</td>
<td>Relief pressure too low</td>
<td>Replace relief valve.</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Header stalling in extremely tall, heavy crop (6+ tons per acre)</td>
<td>Insufficient crop clearance at rear of feed pan</td>
<td>Lower rock drop tines (rear of header pan).</td>
<td>3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73, or 3.5.9 Checking/Adjusting Float, page 72</td>
</tr>
<tr>
<td></td>
<td>Remove rubber fingers from auger at delivery opening.</td>
<td></td>
<td>4.11 Replacing Rubber Fingers, page 154</td>
</tr>
<tr>
<td></td>
<td>Increase roll gap.</td>
<td></td>
<td>3.5.11 Adjusting Conditioner Roll Gap, page 73</td>
</tr>
<tr>
<td></td>
<td>Insufficient crop clearance at rear of feed pan</td>
<td>Lower rock drop tines (rear of header pan).</td>
<td>3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73, or 3.5.9 Checking/Adjusting Float, page 72</td>
</tr>
<tr>
<td></td>
<td>Remove rubber fingers from auger at delivery opening.</td>
<td></td>
<td>4.11 Replacing Rubber Fingers, page 154</td>
</tr>
<tr>
<td></td>
<td>Increase roll gap.</td>
<td></td>
<td>3.5.11 Adjusting Conditioner Roll Gap, page 73</td>
</tr>
<tr>
<td></td>
<td>Feeding aids for shorter, lighter crop impede flow of heavy or thick stemmed crops (cane, sudan grass etc.)</td>
<td>Remove front set of stripper bars.</td>
<td>4.12 Stripper Bar, page 155</td>
</tr>
<tr>
<td>Symptom</td>
<td>Problem</td>
<td>Solution</td>
<td>Section</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Low reservoir oil level</td>
<td>Add oil to reservoir.</td>
<td>4.6.1 Servicing A40-D Hydraulics, page 107</td>
</tr>
<tr>
<td></td>
<td>Defective motor</td>
<td>Repair motor.</td>
<td>See Dealer</td>
</tr>
<tr>
<td></td>
<td>Defective O-ring inside relief valve</td>
<td>Replace relief valve.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective pump</td>
<td>Repair pump.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective relief valve</td>
<td>Repair relief valve.</td>
<td></td>
</tr>
<tr>
<td>Knocking in knife drive</td>
<td>Worn needle bearing in knifehead</td>
<td>Replace</td>
<td>4.7.4 Removing Knifehead Bearing, page 110</td>
</tr>
<tr>
<td></td>
<td>Worn knifehead pin</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorrect end guards</td>
<td>Replace with special end guards.</td>
<td>4.7.7 Guards, page 112</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Cold oil in system</td>
<td>Reduce ground speed until oil reaches operating temperature.</td>
<td>3.9 Selecting Ground Speed, page 86</td>
</tr>
<tr>
<td>Knife back breakage</td>
<td>Dull knife</td>
<td>Replace</td>
<td>4.7.4 Removing Knifehead Bearing, page 110</td>
</tr>
<tr>
<td></td>
<td>Worn knifehead pin</td>
<td>Replace</td>
<td>4.7.3 Installing Knife, page 109</td>
</tr>
<tr>
<td></td>
<td>Bent or broken guard</td>
<td>Straighten or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorrect end guards at knifehead</td>
<td>Replace with correct number of special guards.</td>
<td>4.7.7 Guards, page 112</td>
</tr>
<tr>
<td>Windrower side drift</td>
<td>Header is dragging on one end and pulling to that side.</td>
<td>Adjust skid shoes to prevent cutterbar dragging.</td>
<td>3.5.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust header float.</td>
<td>3.5.9 Checking/Adjusting Float, page 72</td>
</tr>
<tr>
<td>Lights malfunctioning</td>
<td>Improper ground</td>
<td>Check for proper grounding between light base and header.</td>
<td>4.16 Maintaining the Electrical System, page 180</td>
</tr>
<tr>
<td></td>
<td>Burned out bulb</td>
<td>Replace bulb.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor connection</td>
<td>Check connector at windrower.</td>
<td>—</td>
</tr>
</tbody>
</table>
# 8 Reference

## 8.1 Recommended Torques

### 8.1.1 Torque Specifications

The following tables provide the correct torque values for various bolts, cap screws, and hydraulic fittings.

- Tighten all bolts to torque values specified in charts (unless otherwise noted throughout this manual).
- Replace hardware with same strength and grade of bolt.
- Use torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and cap screws by using their identifying head markings.

### SAE Bolt Torque Specifications

Torque values shown in the following tables are valid for non-greased, or non-oiled threads and heads; therefore, do NOT grease or oil bolts or cap screws unless otherwise specified in this manual.

#### Table 8.1 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>11.9</td>
<td>13.2</td>
</tr>
<tr>
<td>5/16-18</td>
<td>24.6</td>
<td>27.1</td>
</tr>
<tr>
<td>3/8-16</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>7/16-14</td>
<td>70</td>
<td>77</td>
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<tr>
<td>1/2-13</td>
<td>106</td>
<td>118</td>
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<tr>
<td>9/16-12</td>
<td>153</td>
<td>170</td>
</tr>
<tr>
<td>5/8-11</td>
<td>212</td>
<td>234</td>
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<tr>
<td>3/4-10</td>
<td>380</td>
<td>420</td>
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<tr>
<td>7/8-9</td>
<td>606</td>
<td>669</td>
</tr>
<tr>
<td>1-8</td>
<td>825</td>
<td>912</td>
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</tbody>
</table>

#### Figure 8.1: Bolt Grades

A - Nominal Size  
B - SAE-8  
C - SAE-5  
D - SAE-2
Table 8.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>8.1</td>
<td>9</td>
</tr>
<tr>
<td>5/16-18</td>
<td>16.7</td>
<td>18.5</td>
</tr>
<tr>
<td>3/8-16</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>7/16-14</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>1/2-13</td>
<td>73</td>
<td>80</td>
</tr>
<tr>
<td>9/16-12</td>
<td>105</td>
<td>116</td>
</tr>
<tr>
<td>5/8-11</td>
<td>144</td>
<td>160</td>
</tr>
<tr>
<td>3/4-10</td>
<td>259</td>
<td>286</td>
</tr>
<tr>
<td>7/8-9</td>
<td>413</td>
<td>456</td>
</tr>
<tr>
<td>1-8</td>
<td>619</td>
<td>684</td>
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Table 8.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

<table>
<thead>
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<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>16.8</td>
<td>18.6</td>
</tr>
<tr>
<td>5/16-18</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>3/8-16</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>7/16-14</td>
<td>67</td>
<td>74</td>
</tr>
<tr>
<td>1/2-13</td>
<td>102</td>
<td>113</td>
</tr>
<tr>
<td>9/16-12</td>
<td>148</td>
<td>163</td>
</tr>
<tr>
<td>5/8-11</td>
<td>204</td>
<td>225</td>
</tr>
<tr>
<td>3/4-10</td>
<td>362</td>
<td>400</td>
</tr>
<tr>
<td>7/8-9</td>
<td>583</td>
<td>644</td>
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<tr>
<td>1-8</td>
<td>874</td>
<td>966</td>
</tr>
</tbody>
</table>

Figure 8.2: Bolt Grades
A - Nominal Size  B - SAE-8
C - SAE-5        D - SAE-2

Figure 8.3: Bolt Grades
A - Nominal Size  B - SAE-8
C - SAE-5        D - SAE-2
### Table 8.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>16.8</td>
<td>18.6</td>
</tr>
<tr>
<td>5/16-18</td>
<td>35</td>
<td>38</td>
</tr>
<tr>
<td>3/8-16</td>
<td>61</td>
<td>68</td>
</tr>
<tr>
<td>7/16-14</td>
<td>98</td>
<td>109</td>
</tr>
<tr>
<td>1/2-13</td>
<td>150</td>
<td>166</td>
</tr>
<tr>
<td>9/16-12</td>
<td>217</td>
<td>239</td>
</tr>
<tr>
<td>5/8-11</td>
<td>299</td>
<td>330</td>
</tr>
<tr>
<td>3/4-10</td>
<td>531</td>
<td>587</td>
</tr>
<tr>
<td>7/8-9</td>
<td>855</td>
<td>945</td>
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<tr>
<td>1-8</td>
<td>1165</td>
<td>1288</td>
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</table>

### Metric Bolt Specifications

### Table 8.5 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.2</td>
<td>2.5</td>
</tr>
<tr>
<td>4-0.7</td>
<td>3.3</td>
<td>3.7</td>
</tr>
<tr>
<td>5-0.8</td>
<td>6.7</td>
<td>7.4</td>
</tr>
<tr>
<td>6-1.0</td>
<td>11.4</td>
<td>12.6</td>
</tr>
<tr>
<td>8-1.25</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>10-1.5</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>12-1.75</td>
<td>95</td>
<td>105</td>
</tr>
<tr>
<td>14-2.0</td>
<td>152</td>
<td>168</td>
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<tr>
<td>16-2.0</td>
<td>236</td>
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<td>20-2.5</td>
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<td>24-3.0</td>
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<td>879</td>
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</table>
### Table 8.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

<table>
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<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
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<tr>
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</tr>
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<td>1.7</td>
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<td>4-0.7</td>
<td>2.3</td>
<td>2.5</td>
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<td>5-0.8</td>
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<td>5</td>
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<tr>
<td>14-2.0</td>
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<td>115</td>
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<tr>
<td>16-2.0</td>
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### Table 8.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

<table>
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<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
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<td>2</td>
</tr>
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<td>3.5-0.6</td>
<td>2.8</td>
<td>3.1</td>
</tr>
<tr>
<td>4-0.7</td>
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<td>4.6</td>
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<td>5-0.8</td>
<td>8.4</td>
<td>9.3</td>
</tr>
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<td>6-1.0</td>
<td>14.3</td>
<td>15.8</td>
</tr>
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<td>1217</td>
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</table>
Table 8.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (N·m)</th>
<th>Torque (ft·lbf) (*in·lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.1</td>
<td>2.3</td>
</tr>
<tr>
<td>4-0.7</td>
<td>3.1</td>
<td>3.4</td>
</tr>
<tr>
<td>5-0.8</td>
<td>6.3</td>
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<tr>
<td>6-1.0</td>
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<td>24-3.0</td>
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</table>

Figure 8.8: Bolt Grades
Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.9 Metric Bolt Bolting into Cast Aluminum

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Bolt Torque 8.8 (Cast Aluminum)</th>
<th>Bolt Torque 10.9 (Cast Aluminum)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N·m</td>
<td>ft·lbf</td>
</tr>
<tr>
<td>M3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>M4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>M5</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>M6</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>M8</td>
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<td>M14</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>M16</td>
<td>–</td>
<td>–</td>
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</tbody>
</table>

Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in Table 8.10 Flare-Type Hydraulic Tube Fittings, page 199.
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on fitting body (D) and tighten nut (E) with other wrench to torque shown.
5. Assess final condition of connection.
### Table 8.10 Flare-Type Hydraulic Tube Fittings

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^3)</th>
<th>Flats from Finger Tight (FFFT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N·m</td>
<td>ft·lbf</td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>4–5</td>
<td>3–4</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>7–8</td>
<td>5–6</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>18–19</td>
<td>13–14</td>
</tr>
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<td>-5</td>
<td>1/2–20</td>
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<td>14–15</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>30–33</td>
<td>22–24</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>57–63</td>
<td>42–46</td>
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<td>-10</td>
<td>7/8–14</td>
<td>81–89</td>
<td>60–66</td>
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<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>113–124</td>
<td>83–91</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/16–12</td>
<td>136–149</td>
<td>100–110</td>
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<td>1-5/16–12</td>
<td>160–176</td>
<td>118–130</td>
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<td>-20</td>
<td>1-5/8–12</td>
<td>228–250</td>
<td>168–184</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>264–291</td>
<td>195–215</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>359–395</td>
<td>265–291</td>
</tr>
<tr>
<td>-40</td>
<td>3–12</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

---

3. Torque values shown are based on lubricated connections as in reassembly.
**O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)**

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Check that O-ring (A) is NOT on threads and adjust if necessary.
4. Apply hydraulic system oil to O-ring (A).

5. Install fitting (B) into port until back up washer (D) and O-ring (A) contact part face (E).
6. Position angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).
8. Check final condition of fitting.
Table 8.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N·m</td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>75–82</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>120–132</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/8–12</td>
<td>153–168</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>221–243</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>270–298</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>332–365</td>
</tr>
</tbody>
</table>

---

4. Torque values shown are based on lubricated connections as in reassembly.
O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is NOT on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to values in Table 8.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable), page 202.
6. Check final condition of fitting.

Table 8.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N·m</td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>75–82</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>120–132</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/8–12</td>
<td>153–168</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>221–243</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>270–298</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>332–365</td>
</tr>
</tbody>
</table>

5. Torque values shown are based on lubricated connections as in reassembly.
O-Ring Face Seal (ORFS) Hydraulic Fittings

1. Check components to ensure that sealing surfaces and fitting threads are free of burrs, nicks, scratches, or any foreign material.

2. Apply hydraulic system oil to O-ring (B).

3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).

4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.

5. Torque fittings according to values in Table 8.13 O-Ring Face Seal (ORFS) Hydraulic Fittings, page 204.

   **NOTE:**
   If applicable, hold hex on fitting body (E) to prevent rotation of fitting body and hose when tightening fitting nut (D).

6. Use three wrenches when assembling unions or joining two hoses together.

7. Check final condition of fitting.
# Table 8.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Tube O.D. (in.)</th>
<th>Torque Value$^6$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>N·m ft·lbf</td>
</tr>
<tr>
<td>-3</td>
<td>Note$^7$</td>
<td>3/16</td>
<td>–</td>
</tr>
<tr>
<td>-4</td>
<td>9/16</td>
<td>1/4</td>
<td>25–28</td>
</tr>
<tr>
<td>-5</td>
<td>Note$^7$</td>
<td>5/16</td>
<td>–</td>
</tr>
<tr>
<td>-6</td>
<td>11/16</td>
<td>3/8</td>
<td>40–44</td>
</tr>
<tr>
<td>-8</td>
<td>13/16</td>
<td>1/2</td>
<td>55–61</td>
</tr>
<tr>
<td>-10</td>
<td>1</td>
<td>5/8</td>
<td>80–88</td>
</tr>
<tr>
<td>-12</td>
<td>1-3/16</td>
<td>3/4</td>
<td>115–127</td>
</tr>
<tr>
<td>-14</td>
<td>Note$^7$</td>
<td>7/8</td>
<td>–</td>
</tr>
<tr>
<td>-16</td>
<td>1-7/16</td>
<td>1</td>
<td>150–165</td>
</tr>
<tr>
<td>-20</td>
<td>1-11/16</td>
<td>1-1/4</td>
<td>205–226</td>
</tr>
<tr>
<td>-24</td>
<td>1–2</td>
<td>1-1/2</td>
<td>315–347</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2</td>
<td>2</td>
<td>510–561</td>
</tr>
</tbody>
</table>

---

6. Torque values and angles shown are based on lubricated connection as in reassembly.  
7. O-ring face seal type end not defined for this tube size.
Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The Turns From Finger Tight (TFFT) values are shown in Table 8.14 Hydraulic Fitting Pipe Thread, page 205. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

**NOTE:**
*Over-torque failure of fittings may not be evident until fittings are disassembled.

Table 8.14 Hydraulic Fitting Pipe Thread

<table>
<thead>
<tr>
<th>Tapered Pipe Thread Size</th>
<th>Recommended T.F.F.T</th>
<th>Recommended F.F.F.T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8–27</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/4–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/8–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/2–14</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/4–14</td>
<td>1.5–2.5</td>
<td>12–18</td>
</tr>
<tr>
<td>1–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/4–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
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</table>
# 8.2 Conversion Chart

## Table 8.15 Conversion Chart

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SI Units (Metric)</th>
<th>Factor</th>
<th>Inch-Pound Units</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SI Units (Metric)</td>
<td>Factor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inch-Pound Units</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>hectares</td>
<td>ha</td>
<td>x 0.4047 =</td>
</tr>
<tr>
<td>Flow</td>
<td>liters per minute</td>
<td>L/min</td>
<td>x 3.7854 =</td>
</tr>
<tr>
<td>Force</td>
<td>Newtons</td>
<td>N</td>
<td>x 4.4482 =</td>
</tr>
<tr>
<td>Length</td>
<td>millimeters</td>
<td>mm</td>
<td>x 25.4 =</td>
</tr>
<tr>
<td></td>
<td>meters</td>
<td>m</td>
<td>x 0.305 =</td>
</tr>
<tr>
<td>Power</td>
<td>kilowatts</td>
<td>kW</td>
<td>x 0.7457 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascals</td>
<td>kPa</td>
<td>6.8948 =</td>
</tr>
<tr>
<td></td>
<td>megapascals</td>
<td>MPa</td>
<td>0.00689 =</td>
</tr>
<tr>
<td></td>
<td>bar (Non-SI)</td>
<td>bar</td>
<td>0.145038 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meters</td>
<td>N·m</td>
<td>1.3558 =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1129 =</td>
</tr>
<tr>
<td>Temperature</td>
<td>Celsius</td>
<td>ºC</td>
<td>(ºF-32) x 0.56 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per minute</td>
<td>m/min</td>
<td>0.3048 =</td>
</tr>
<tr>
<td></td>
<td>meters per second</td>
<td>m/s</td>
<td>0.3048 =</td>
</tr>
<tr>
<td></td>
<td>kilometers per hour</td>
<td>km/h</td>
<td>1.6063 =</td>
</tr>
<tr>
<td>Volume</td>
<td>liters</td>
<td>L</td>
<td>3.7854 =</td>
</tr>
<tr>
<td></td>
<td>milliliters</td>
<td>ml</td>
<td>29.5735 =</td>
</tr>
<tr>
<td></td>
<td>cubic centimeters</td>
<td>cm³ or cc</td>
<td>16.3871 =</td>
</tr>
<tr>
<td>Weight</td>
<td>kilograms</td>
<td>kg</td>
<td>0.4536 =</td>
</tr>
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</table>
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