MacDon A40D Self-Propelled Windrower Auger Header

Published: November 2018
Introduction

This manual describes the operating and maintenance procedures for MacDon model A40D and A40DX Self-Propelled Windrower Auger Headers, including a Grass Seed version.

An A40D auger header is factory-configured to connect to an M Series Self-Propelled Windrower, while an A40DX auger header is factory-configured to connect to an M1 Series Windrower.

NOTE:
A40D auger header grass seed (GSS) version can be used on an M1 Series Windrower ONLY if conversion kit MD #B5998 and MD #318022 have been installed on the auger header. This kit is optional when converting the A40D for use on M1 Series windrowers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Configuration</th>
<th>Knife</th>
<th>Size m (ft.)</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>A40D, A40DX</td>
<td>Auger header with conditioner</td>
<td>Self-propelled only</td>
<td>Double</td>
<td>4.3, 4.9, and 5.5 (14, 16, and 18)</td>
<td>Separate hydraulic auger, knife, and reel drives, grass seed option</td>
</tr>
</tbody>
</table>

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

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 A40D OR A40DX AUGER HEADER.

MacDon provides warranty for Customers who operate and maintain their equipment as described in this manual. A copy of the MacDon Industries Limited Warranty Policy, which explains this warranty, should have been provided to you by your Dealer. Damage resulting from any of the following conditions will void the warranty:

- Accident
- Misuse
- Abuse
- Improper maintenance or neglect
- Abnormal or extraordinary use of the machine
- Failure to use the machine, equipment, component, or part in accordance with the manufacturer’s instructions

Conventions

The following conventions are used in this document:

- Right and left are determined from the operator’s position. The front of the header is the side that faces the crop; the back of the header is the side that connects to the windrower.
- Unless otherwise noted, use the standard torque values provided in Chapter 8.1 Recommended Torques, page 207.

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).
List of Revisions

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

<table>
<thead>
<tr>
<th>Summary of Change</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added new Declaration of Conformity</td>
<td>EC Declaration of Conformity, page i</td>
</tr>
<tr>
<td>Added IMPORTANT and NOTE to topic</td>
<td>1.2 Signal Words, page 2</td>
</tr>
<tr>
<td>Added MD #170638</td>
<td>1.8 Understanding Safety Signs, page 10</td>
</tr>
<tr>
<td>Updated information for MD #166452</td>
<td>1.8 Understanding Safety Signs, page 10</td>
</tr>
<tr>
<td>Added MD #259058</td>
<td>1.8 Understanding Safety Signs, page 10</td>
</tr>
<tr>
<td>Added information for kit MD #B6604</td>
<td>3.1 Attaching A40DX Header to M1 Series Windrowers, page 25</td>
</tr>
<tr>
<td>Added information to topic</td>
<td>Installing and Adjusting Pan Extensions, page 90</td>
</tr>
<tr>
<td>Added metric values to table and corrected formatting issues</td>
<td>2.2 Product Specifications, page 21</td>
</tr>
<tr>
<td>Updated graphic</td>
<td>1.7 Safety Sign Locations: Self-Propelled Windrower Header, page 8 – Figure 1.17: Right Side of Header</td>
</tr>
<tr>
<td>Updated graphic</td>
<td>1.7 Safety Sign Locations: Self-Propelled Windrower Header, page 8 – Figure 1.18: Decals on Right Side of Header</td>
</tr>
<tr>
<td>Updated note</td>
<td>Introduction, page iii</td>
</tr>
<tr>
<td>Updated table</td>
<td>2.1 Definitions, page 19</td>
</tr>
<tr>
<td>Updated table – Added reel speeds for M and M1 Series</td>
<td>2.2 Product Specifications, page 21</td>
</tr>
<tr>
<td>Updated table – Added GSS information</td>
<td>2.2 Product Specifications, page 21</td>
</tr>
<tr>
<td>Updated information to included M and M1 Series with and without variable speed option</td>
<td>3.6.3 Adjusting Reel Speed, page 61</td>
</tr>
<tr>
<td>Added note</td>
<td>3.6.4 Setting Auger Position, page 61</td>
</tr>
<tr>
<td>Added note</td>
<td>3.2 Detaching A40DX Header from M1 Series Windrower, page 29</td>
</tr>
<tr>
<td>Updated procedure</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Updated illustration</td>
<td>3.3.5 Configuring Reverser Valve Jumper Hose for A40D, page 49</td>
</tr>
<tr>
<td>Updated illustration</td>
<td>Adjusting Reel Vertical Position, page 66</td>
</tr>
<tr>
<td>Updated unload and assembly instruction part number for model year 2019</td>
<td>6 Unloading and Assembly, page 197</td>
</tr>
</tbody>
</table>
Model and Serial Number

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

Header Model Number: ____________
Header Serial Number: ____________
Year: ______

Figure 3. Header Serial Number Plate Location
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC Declaration of Conformity</td>
<td>i</td>
</tr>
<tr>
<td>Introduction</td>
<td>iii</td>
</tr>
<tr>
<td>List of Revisions</td>
<td>v</td>
</tr>
<tr>
<td>Model and Serial Number</td>
<td>vi</td>
</tr>
</tbody>
</table>

## Chapter 1: Safety ............................................................................................................................ 1
1.1 Safety Alert Symbols ................................................................................................................. 1
1.2 Signal Words ............................................................................................................................... 2
1.3 General Safety ............................................................................................................................ 3
1.4 Maintenance Safety ...................................................................................................................... 5
1.5 Hydraulic Safety ......................................................................................................................... 6
1.6 Safety Signs ............................................................................................................................... 7
   1.6.1 Installing Safety Decals ...................................................................................................... 7
1.7 Safety Sign Locations: Self-Propelled Windrower Header .................... 8
1.8 Understanding Safety Signs ................................................................................................. 10
1.9 Owner/Operator Responsibilities .............................................................................................. 16
1.10 Operational Safety .................................................................................................................. 17

## Chapter 2: Product Overview .............................................................................................................. 19
2.1 Definitions ................................................................................................................................. 19
2.2 Product Specifications .............................................................................................................. 21

## Chapter 3: Operation ............................................................................................................................... 25
3.1 Attaching A40DX Header to M1 Series Windrowers ......................................................... 25
3.2 Detaching A40DX Header from M1 Series Windrower ..................................................... 29
3.3 Attaching A40D Headers to M Series SP Windrowers ...................................................... 31
   3.3.1 Attaching A40D to M100 or M105 ..................................................................................... 31
   3.3.2 Attaching A40D to M150, M155, or M155E4 .................................................................... 36
   3.3.3 Attaching A40D to M200 .................................................................................................... 40
   3.3.4 Attaching A40D to M205 .................................................................................................... 45
   3.3.5 Configuring Reverser Valve Jumper Hose for A40D ...................................................... 49
   3.3.6 Routing A40D Hydraulic Drive Hoses ............................................................................ 50
3.4 Detaching A40D Header from M Series Self-Propelled Windrower ............... 55
3.5 Header Lift Cylinder Lock-Out Valves .................................................................................. 59
3.6 Operating Variables .................................................................................................................. 60
   3.6.1 Setting Lean Bar ............................................................................................................... 61
   3.6.2 Adjusting Auger Speed ..................................................................................................... 61
   3.6.3 Adjusting Reel Speed ....................................................................................................... 61
   3.6.4 Setting Auger Position .................................................................................................... 61
      Adjusting Auger Fore-Aft Position ..................................................................................... 62
      Adjusting Vertical Position ............................................................................................. 63
   3.6.5 Setting Reel Position ..................................................................................................... 64
Chapter 4: Maintenance and Servicing

4.1 Preparing for Servicing .......................................................... 99
4.2 Opening/Closing Driveshield .................................................. 100
4.3 Endshields ........................................................................... 102
4.4 Maintenance Requirements .................................................. 103

TABLE OF CONTENTS

Adjusting Reel Fore-Aft Position .................................................. 64
Adjusting Reel Vertical Position ................................................... 66
Checking Reel Tine to Header Pan Clearance .............................. 69

3.6.6 Setting Tine Aggressiveness ................................................ 69
3.6.7 Adjusting Header Angle ....................................................... 70
3.6.8 Setting Cutting Height .......................................................... 71
3.6.9 Checking/Adjusting Float – M Series ................................. 72
3.6.10 Checking/Adjusting Float – M1 Series ............................... 72
   Checking Float – M1 Series Windrower ........................................ 72
   Setting the Float ....................................................................... 73
   Removing and Restoring Float .................................................. 74
3.6.11 Setting Feed Pan and Rock Drop Tine Position .................. 75
3.6.12 Adjusting Conditioner Roll Gap ........................................ 76
3.6.13 Adjusting Conditioner Roll Tension .................................... 78
3.6.14 Positioning the Forming Shields ....................................... 79
   Positioning Side Deflectors ....................................................... 79
   Positioning Rear Deflector (Fluffer Shield) ............................... 80

3.7 Recommended Operating Settings ......................................... 82
3.8 Unplugging Conditioner and Knife ........................................ 86
3.9 Grass Seed Special ................................................................. 88
   3.9.1 Stub Guards and Hold-Downs ........................................... 88
   3.9.2 Special Auger Design for Grass Seed Special .................... 89
   3.9.3 Seven-Bat Reel ................................................................. 89
   3.9.4 Auger Pan Extensions ....................................................... 90
   Installing and Adjusting Pan Extensions .................................... 90
   3.9.5 Windrow Forming Rods .................................................... 92

3.10 Selecting Ground Speed ....................................................... 93
3.11 Tall Crop Dividers ................................................................. 94
   3.11.1 Adjusting Tall Crop Dividers .......................................... 94
   3.11.2 Removing Tall Crop Dividers ......................................... 95
3.12 Haying ................................................................................ 97
   3.12.1 Haying Tips ................................................................. 97
      Curing ................................................................................. 97
      Topsoil Moisture .................................................................. 97
      Weather and Topography ................................................... 97
      Windrow Characteristics ..................................................... 98
      Driving on Windrow .......................................................... 98
      Raking and Tedding ......................................................... 98
      Using Chemical Drying Agents .......................................... 98

3.13 M Series Windrower ............................................................. 72
   – M Series ............................................................................. 72
   – M1 Series ............................................................................ 72
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.1 Maintenance Schedule/Record</td>
<td>104</td>
</tr>
<tr>
<td>4.4.2 Break-In Inspection</td>
<td>105</td>
</tr>
<tr>
<td>4.4.3 Preseason Checks</td>
<td>105</td>
</tr>
<tr>
<td>4.4.4 Storage</td>
<td>106</td>
</tr>
<tr>
<td>4.5 Lubrication</td>
<td>107</td>
</tr>
<tr>
<td>4.5.1 Greasing Procedure</td>
<td>107</td>
</tr>
<tr>
<td>4.5.2 Lubrication Points</td>
<td>107</td>
</tr>
<tr>
<td>Lubrication Points: Auger Header</td>
<td>108</td>
</tr>
<tr>
<td>Lubrication Points: Hay Conditioner</td>
<td>111</td>
</tr>
<tr>
<td>Lubrication Points: Drivelines</td>
<td>112</td>
</tr>
<tr>
<td>4.5.3 Knife and Gearbox Oil</td>
<td>114</td>
</tr>
<tr>
<td>4.5.4 Installing Sealed Bearings</td>
<td>115</td>
</tr>
<tr>
<td>4.6 Hydraulics</td>
<td>116</td>
</tr>
<tr>
<td>4.6.1 Servicing Header Hydraulics</td>
<td>116</td>
</tr>
<tr>
<td>4.6.2 Checking Hoses and Lines</td>
<td>116</td>
</tr>
<tr>
<td>4.7 Cutterbar</td>
<td>117</td>
</tr>
<tr>
<td>4.7.1 Replacing Knife Section</td>
<td>117</td>
</tr>
<tr>
<td>4.7.2 Removing Knife</td>
<td>118</td>
</tr>
<tr>
<td>4.7.3 Installing Knife</td>
<td>118</td>
</tr>
<tr>
<td>4.7.4 Removing Knifehead Bearing</td>
<td>119</td>
</tr>
<tr>
<td>4.7.5 Installing Knifehead Bearing</td>
<td>120</td>
</tr>
<tr>
<td>4.7.6 Removing Spare Knife from Storage</td>
<td>120</td>
</tr>
<tr>
<td>4.7.7 Guards</td>
<td>121</td>
</tr>
<tr>
<td>Aligning Guard</td>
<td>123</td>
</tr>
<tr>
<td>Replacing Pointed Guards and Hold-Downs</td>
<td>124</td>
</tr>
<tr>
<td>Replacing Pointed Center Guard on Double-Knife Header</td>
<td>126</td>
</tr>
<tr>
<td>Replacing Center Stub Guard on Double-Knife Header</td>
<td>128</td>
</tr>
<tr>
<td>4.7.8 Hold-Downs</td>
<td>130</td>
</tr>
<tr>
<td>Adjusting Knife Hold-Down: Center Guard – Double-Knife Header</td>
<td>131</td>
</tr>
<tr>
<td>Adjusting Knife Hold-Down: Stub Guard – Double-Knife Header</td>
<td>131</td>
</tr>
<tr>
<td>4.7.9 Knife Drive Box</td>
<td>132</td>
</tr>
<tr>
<td>Mounting Bolts</td>
<td>132</td>
</tr>
<tr>
<td>Removing Knife Drive Box</td>
<td>133</td>
</tr>
<tr>
<td>Installing Knife Drive Box</td>
<td>134</td>
</tr>
<tr>
<td>Removing Pulley</td>
<td>136</td>
</tr>
<tr>
<td>Installing Pulley</td>
<td>136</td>
</tr>
<tr>
<td>Changing Knife Drive Box Oil</td>
<td>137</td>
</tr>
<tr>
<td>4.7.10 Adjusting Knife Timing</td>
<td>137</td>
</tr>
<tr>
<td>4.8 Header Drive Systems</td>
<td>140</td>
</tr>
<tr>
<td>4.8.1 Header Knife Drive</td>
<td>140</td>
</tr>
<tr>
<td>Checking/Adjusting V-Belt Tension on Left Side</td>
<td>140</td>
</tr>
<tr>
<td>Removing Double V-Belts from Left Side</td>
<td>140</td>
</tr>
<tr>
<td>Installing Double V-Belts</td>
<td>141</td>
</tr>
<tr>
<td>Checking/Adjusting Timing Belt Tension on Left Side</td>
<td>141</td>
</tr>
<tr>
<td>Removing Timing Belt from Left Side</td>
<td>142</td>
</tr>
<tr>
<td>Installing Timing Belt on Left Side</td>
<td>144</td>
</tr>
<tr>
<td>Checking/Adjusting Timing Belt Tension on Right Side</td>
<td>145</td>
</tr>
</tbody>
</table>
Chapter 5: Optional Equipment

5.1 Options and Attachments

5.1.1 Additional Skid Shoes
5.1.2 Gauge Roller Kit
5.1.3 Replacement Reel Bat Kit
5.1.4 Stub Guard Conversion Kit
5.1.5 Tall Crop Divider Kit
# TABLE OF CONTENTS

Chapter 6: Unloading and Assembly ................................................................. 197

Chapter 7: Troubleshooting ............................................................................. 199
  7.1 Header Performance ........................................................................ 199
  7.2 Mechanical ................................................................................. 204

Chapter 8: Reference .......................................................................................... 207
  8.1 Recommended Torques ................................................................. 207
    8.1.1 Torque Specifications ......................................................... 207
      SAE Bolt Torque Specifications ........................................... 207
      Metric Bolt Specifications ..................................................... 209
      Metric Bolt Specifications Bolting into Cast Aluminum .......... 211
      Flare-Type Hydraulic Fittings ................................................ 212
      O-Ring Boss Hydraulic Fittings – Adjustable ......................... 213
      O-Ring Boss Hydraulic Fittings – Non-Adjustable ................. 215
      O-Ring Face Seal Hydraulic Fittings ...................................... 216
      Tapered Pipe Thread Fittings .................................................. 217
  8.2 Conversion Chart ............................................................................. 218

Index ............................................................................................................. 219

Recommended Fluids and Lubricants ........................................................... Inside Back Cover
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
1.2 Signal Words

Three signal words, DANGER, WARNING, and CAUTION, are used to alert you to hazardous situations. Two signal words, IMPORTANT and NOTE, identify non-safety related information. Signal words are 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.

IMPORTANT:
Indicates a situation that, if not avoided, could result in a malfunction or damage to the machine.

NOTE:
Provides additional nonessential information or advice.
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 protective clothing and personal safety devices that could be necessary for job at hand. Do NOT 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 earmuffs or earplugs to help protect against loud noises.

- Provide a first aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure fire extinguisher is properly maintained. Be familiar with its proper use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operator is tired or in a hurry. Take time to consider safest way. NEVER ignore warning signs of fatigue.
SAFETY

- 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 shaft and can telescope freely.
- Use only service and repair parts made or approved by 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 engine is running.
- Do NOT modify machine. Unauthorized modifications may impair machine function and/or safety. It may also shorten machine’s life.
- To avoid bodily injury or death from unexpected startup of machine, ALWAYS stop the engine and remove the key from the ignition before leaving the operator’s seat for any reason.

- Keep 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 machine:

- Review operator’s manual and all safety items before operation and/or maintenance of 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
  - Keep work area well lit

- Relieve pressure from hydraulic circuits before servicing and/or disconnecting 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 area of bystanders, especially children, when carrying out any maintenance, repairs, or adjustments.
- Install transport lock or place safety stands under frame before working under machine.
- If more than one person is servicing machine at same time, be aware that rotating a driveline or other mechanically-driven component by hand (for example, accessing a lubricant 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 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 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 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 illegible.
- If original part on which a safety sign was installed is replaced, be sure the repair part displays the current safety sign.
- Replacement safety signs are available from your MacDon 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 decal in position and slowly peel back remaining paper, smoothing decal 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 of Header

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: Decals on Left Side of Header
Figure 1.17: Right Side of Header

Figure 1.18: Decals on Right Side of Header
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.
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.
MD #166452
Hand and arm entanglement hazard

WARNING

• Do NOT open or remove safety shields while the engine is running.
• To avoid injury, stop the engine and remove the key before opening shield.

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.

MD #170638
Reel entanglement hazard

CAUTION

• To avoid injury from entanglement with rotating reel, stand clear of header while machine is running.
MD #171279
Crushing hazard

**DANGER**

- Read the operator’s manual and follow all safety instructions.
- Rest header on ground or engage hydraulic lock-out valves before going under unit.

---

MD #171281
Hot fluid under pressure

**CAUTION**

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

---

MD #171288
Entanglement hazard

**CAUTION**

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

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.

MD #174632
Reel entanglement hazard

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

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.
SAFETY

- 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 the 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**
Chain drive hand and arm entanglement hazard

**WARNING**
- Do not open or remove safety shields while engine is running.
- To avoid injury, stop the engine and remove the key before opening shield.

**Figure 1.30: MD #184422**

**MD #194464**
Shut down for service

**WARNING**
- Stop the engine and remove the key.
- Read the windrower and header manuals for inspection and maintenance instructions.

**Figure 1.31: MD #194464**
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 the 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 A40D, A40DX, and Grass Seed auger headers</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 windrower</td>
</tr>
<tr>
<td>Center-link</td>
<td>A hydraulic cylinder link between header and machine used to change header angle</td>
</tr>
<tr>
<td>CGVW</td>
<td>Combined gross vehicle 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>Export header</td>
<td>Header configuration typical outside North America</td>
</tr>
<tr>
<td>FFFFT</td>
<td>Flats from finger tight</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>GSS</td>
<td>Grass Seed</td>
</tr>
<tr>
<td>GVW</td>
<td>Gross vehicle weight</td>
</tr>
<tr>
<td>Hard joint</td>
<td>A joint made with 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 windrower</td>
</tr>
<tr>
<td>Hex key</td>
<td>A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms</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>N-DETENT</td>
<td>The slot opposite the NEUTRAL position of M Series SP Windrows on operator’s console</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</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>Nut</td>
<td>An internally threaded fastener that is designed to be paired with a bolt</td>
</tr>
<tr>
<td>ORB</td>
<td>O-ring boss: A style of fitting commonly used in port openings 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>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 platings)</td>
</tr>
<tr>
<td>rpm</td>
<td>Revolutions per minute</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 into a mating part</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>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>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>Timed knife drive</td>
<td>Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor</td>
</tr>
<tr>
<td>Torque</td>
<td>The product of a force X lever arm length, usually measured in Newton-meters (Nm) or foot-pounds (lbf-ft)</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 farther a number of degrees 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>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 locking mechanism</td>
</tr>
<tr>
<td>WCM</td>
<td>Windrower control module</td>
</tr>
<tr>
<td>Windrower</td>
<td>Power unit of a self-propelled header</td>
</tr>
<tr>
<td>WOT</td>
<td>Wide open throttle</td>
</tr>
</tbody>
</table>
2.2 Product Specifications

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

Table 2.1 A40D, A40DX Self-Propelled Windrower Auger Header Specifications

<table>
<thead>
<tr>
<th>Cutterbar</th>
<th>4.3 m (14 ft.) header</th>
<th>4.9 m (16 ft.) header</th>
<th>5.5 m (18 ft.) header</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective cutting width</td>
<td>4.3 m (14 ft.) header</td>
<td>4.9 m (16 ft.) header</td>
<td>5.5 m (18 ft.) header</td>
</tr>
<tr>
<td>Effective cutting width</td>
<td>4496 mm (14 ft. 9 in.)</td>
<td>4953 mm (16 ft. 3 in.)</td>
<td>5410 mm (17 ft. 9 in.)</td>
</tr>
<tr>
<td>Double-knife drive: hydraulic motor to two “B” belts/timing belts to enclosed heavy duty (MD) knife drive boxes</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knife stroke</td>
<td>76 mm (3 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knife speed (strokes per minute)</td>
<td>Factory No load</td>
<td>1400–1950</td>
<td></td>
</tr>
<tr>
<td>Knife speed (strokes per minute)</td>
<td>Factory Load</td>
<td>1400–1950</td>
<td></td>
</tr>
<tr>
<td>Knife speed (strokes per minute)</td>
<td>Switching pulleys No load</td>
<td>1400–1950</td>
<td></td>
</tr>
<tr>
<td>Knife speed (strokes per minute)</td>
<td>Switching pulleys Load</td>
<td>1400–1950</td>
<td></td>
</tr>
<tr>
<td>Double heat-treated forged pointed guards (GSS headers fitted with stub guards)</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolted over-serrated knife sections – 9 serrations per inch</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center overlap</td>
<td>3 mm (1/8 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutterbar lift range (measured at guard tip)</td>
<td>Below ground</td>
<td>150 mm (5 3/4 in.)</td>
<td></td>
</tr>
<tr>
<td>Cutterbar lift range (measured at guard tip)</td>
<td>Above ground</td>
<td>900 mm (35 3/8 in.)</td>
<td></td>
</tr>
<tr>
<td>Guard angle (cutterbar on ground)</td>
<td>7 to 17 1/2 degrees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replaceable, abrasion-resistant cutterbar wear plates</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inner skid shoes, adjustable set of two (can be relocated to outboard location)</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer skid shoes or gauge rollers</td>
<td>Optional (Required for GSS header)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer gauge rollers</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter Overall</td>
<td>508 mm (20 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter Tube O.D.</td>
<td>254 mm (10 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undershot, center feed</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flighting Width</td>
<td>127 mm (5 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flighting Thickness</td>
<td>6 mm (1/4 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>590 mm (23 1/4 in.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2.1 A40D, A40DX Self-Propelled Windrower Auger Header Specifications (continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber feed fingers</td>
<td>Standard</td>
</tr>
<tr>
<td>Stripper bars (three per side)</td>
<td>Standard</td>
</tr>
<tr>
<td>Auger drive</td>
<td>Hydraulic, 15.9 cu in. (261 cc) per rev direct mounted motor</td>
</tr>
<tr>
<td>Auger speed</td>
<td>SP windrower 230–320 rpm</td>
</tr>
<tr>
<td>Replaceable high density polyethylene auger pans: two-piece design</td>
<td>Standard</td>
</tr>
<tr>
<td>Rock drop tines at discharge opening with discharge angle adjustment</td>
<td>Standard</td>
</tr>
<tr>
<td>Delivery opening width</td>
<td>2430 mm (95 11/16 in.)</td>
</tr>
<tr>
<td><strong>Reel</strong></td>
<td></td>
</tr>
<tr>
<td>Oval closed section bats with end caps.</td>
<td>6 bats, optional 7 bat</td>
</tr>
<tr>
<td><strong>NOTE:</strong> Grass Seed Special model has standard seven-bat reel</td>
<td></td>
</tr>
<tr>
<td>Steel fingers</td>
<td>6 mm (1/4 in.) diameter</td>
</tr>
<tr>
<td>Reel radius (to finger tip)</td>
<td>540 mm (22 in.)</td>
</tr>
<tr>
<td>Single piece tine bar with replaceable polyethylene bearings</td>
<td>N/A</td>
</tr>
<tr>
<td>Sectioned tine bar with regreasable ball bearings</td>
<td>Standard</td>
</tr>
<tr>
<td><strong>Drive</strong></td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Hydraulic motor: 14.2 cu in. (232 cc) /rev to enclosed gearbox</td>
</tr>
<tr>
<td>Reel speed M100/M105/M205 SP hydraulic variable</td>
<td>50–85 rpm</td>
</tr>
<tr>
<td>Reel speed M150/M155/M155E4/M200 SP hydraulic variable</td>
<td>15–85 rpm</td>
</tr>
<tr>
<td>Reel speed M1170/M1240 SP hydraulic variable (with variable speed kit installed)</td>
<td>15–85 rpm</td>
</tr>
<tr>
<td>Reel speed M1170/M1240 SP hydraulic variable (standard reel)</td>
<td>50–85 rpm</td>
</tr>
<tr>
<td><strong>Hay Conditioner</strong></td>
<td></td>
</tr>
<tr>
<td>Roll-type</td>
<td>Intermeshing steel bars</td>
</tr>
<tr>
<td><strong>Roll size</strong></td>
<td></td>
</tr>
<tr>
<td>Roll size Length</td>
<td>2590 mm (102 in.)</td>
</tr>
<tr>
<td>Roll size Overall</td>
<td>233 mm (9 3/16 in.)</td>
</tr>
<tr>
<td>Roll size Tube</td>
<td>168 mm (6 5/8 in.)</td>
</tr>
<tr>
<td><strong>Drive:</strong> 44 cc. hydraulic piston motor to enclosed gearbox</td>
<td>Standard</td>
</tr>
<tr>
<td>Roll speed SP windrower</td>
<td>601–810 rpm</td>
</tr>
<tr>
<td><strong>Plug Prevention / Unplugging</strong></td>
<td></td>
</tr>
<tr>
<td>Self-propelled</td>
<td>Reverse hydraulic flow to three motors (reverses knife, auger, reel, and conditioner)</td>
</tr>
</tbody>
</table>
Table 2.1  A40D, A40DX Self-Propelled Windrower Auger Header Specifications (continued)

<table>
<thead>
<tr>
<th><strong>Swath Forming Shield</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Swath width range</td>
<td>915 mm (36 in.) to 2540 mm (100 in.)</td>
</tr>
<tr>
<td>Header-mounted adjustable baffle</td>
<td>Standard</td>
</tr>
<tr>
<td>Attachment</td>
<td>Windrower</td>
</tr>
<tr>
<td>Adjustable side deflectors</td>
<td>Standard</td>
</tr>
</tbody>
</table>

<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 windrows (non GSS headers only)</td>
<td>Optional</td>
</tr>
</tbody>
</table>
3 Operation

This chapter will describe the operating procedures for the A40D and A40DX SP Windrower Auger Header.

3.1 Attaching A40DX Header to M1 Series Windrowers

**CAUTION**

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

This procedure also applies to A Series Headers equipped with the Auger Header Compatibility kit (MD #B5998) or the A40D SP Grass Seed Auger Conversion kit (MD #B6384). Refer to your windrower operator’s manual for procedures to mechanically attach an A40DX Auger Header to an M1 Series Windrower and for modifications to the windrower hydraulic connections (if required).

**IMPORTANT:**

If attempting to attach an A40D Header to an M1170 or M1240 Windrower, the M1 Series Conversion kit (MD #B5998) or the A40D SP Grass Seed Auger Conversion kit (MD #B6384) must first be installed. These kits include a new manifold and hose bundle required for operation with an M1 Series Windrower, and effectively converts an A40D header into an A40DX header.

Header drive hydraulic hoses and electrical harness are located on the left, cab-forward side of the windrower. To connect the hydraulic and electrical bundle from an A40DX header to an M1 Series Windrower, follow these steps:

1. Route header hose bundle through hose guide (A) on header as shown.

![Figure 3.1: Hose Bundle](image)
2. Insert hose support (B) into hole (A) in the windrower left leg, and route header hose bundle (C) under the windrower to the hydraulic and electrical couplers.

3. If attaching to a disc-ready windrower, ensure knife drive hose (A) is connected to coupler (B).

**NOTE:**
Hose (A) provides power to run the knife/conditioner.

**NOTE:**
M1170 Windrowers with standard auger/draper configuration don’t require the knife drive hose; only the two multicouplers (A) are used to connect the auger header.
4. Clean multicouplers and receptacles to prevent contamination.

5. Push button (A) on rear multicoupler receptacle and pull handle (B) away from windrower.

6. Open cover (C) and position multicoupler (D) onto receptacle. Align pins in coupler with slots in handle (B), and push handle toward windrower so that coupler is locked onto receptacle and button (A) snaps out.

7. Push button (E) on front multicoupler receptacle and pull handle (F) away from windrower.

8. Open cover (H) and position multicoupler (G) onto receptacle. Align pins in coupler with slots in handle, and push handle (F) toward windrower so that coupler is locked onto receptacle and button (E) snaps out.

9. Remove cover from receptacle (A) and connect electrical harness from header.

**A40DX GSS headers and A40DX headers equipped with Reel Speed Control kit (MD #B6604)**

A40DX GSS headers have a factory-installed reel speed kit and includes a second electrical connection required for attaching to an M1 Series windrower. The Reel Speed Control kit (MD #B6604) is an available option for an A40DX header.

Complete the following step when connecting an A40DX GSS header (or an A40DX header with MD #B6604 equipped) to an M1 Series windrower:
10. Remove cover from receptacle (A) on windrower and connect electrical harness (B) from header.
3.2 Detaching A40DX Header from M1 Series Windrower

Refer to your windrower operator’s manual for procedures to mechanically detach the auger header from the M1 Series Windrower. To detach an A40DX header’s hydraulics and electrical from an M1 Series Windrower, follow these steps:

⚠️ CAUTION

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

1. Disconnect header electrical harness from receptacle (A) on windrower multicoupler.

   **NOTE:**
   Upper harness connection also needs to be disconnected if reel speed kit option is connected.

2. Push button (E) on front multicoupler, and pull handle (F) away from windrower.

3. Remove multicoupler (G) from receptacle and set aside. Clean multicouplers and receptacles to prevent contamination. Install caps and plugs on hoses and fittings (if equipped).

4. Close cover (H) and push handle (F) towards windrower until button (E) snaps out.

5. Push button (A) on rear multicoupler, and pull handle (B) away from the windrower.

6. Remove multicoupler (D) from receptacle and set aside. Clean multicouplers and receptacles to prevent contamination. Install caps and plugs on hoses and fittings (if equipped).

7. Close cover (C) and push handle (B) towards windrower until button (A) snaps out.
8. Remove hose support (B) from hole (A) in windrower left leg, and remove header hose bundle (C) from the windrower.

9. Keeping hose bundle (A) in hose guide (B), store hose bundle on top of header walkway (C), away from the windrower.

10. Detach header from windrower. For instructions, refer to your windrower operator’s manual.
3.3 Attaching A40D Headers to M Series SP Windrows

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

**IMPORTANT:**

M150, M155, M155E4, and M200 Windrows with M Series Reverser kit (MD #B4656) installed need to have the reverser valve hose plumbing changed if switching between a D Series Draper Header with a conditioner to an A40D Auger Header. Changing this plumbing prevents improper operation and damaging the reel drive motor. Refer to 3.3.5 Configuring Reverser Valve Jumper Hose for A40D, page 49 and (if necessary) to M Series Reverser Kit Installation Instructions (MD #169213), 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. Hose routing on the header is factory-configured for M150, M155, M155E4, and M200 Self-Propelled Windrows. Header hose routing must be reconfigured if the header is being used on M100, M105, or M205 Self-Propelled Windrows and back again.

Refer to the following procedures:

- **3.3.4 Attaching A40D to M205, page 45**
- **3.3.6 Routing A40D Hydraulic Drive Hoses, page 50**

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.

3.3.1 Attaching A40D to M100 or M105

**CAUTION**

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

M100 and M105 Self-Propelled Windrows are factory-equipped with four header drive hoses (A) on the left side.

Figure 3.12: Header Drive Hoses
1. Disengage rubber latch (A) and open driveline shield (B).

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

**NOTE:**
Hoses attached to connectors not shown in illustrations at right.

---

**Figure 3.16: A40D Header – 4.3 m and 4.9 m (14 ft. and 16 ft.) Header Shown (5.5 m [18 ft.] Header Similar)**

A - Reel Pressure  
B - Knife and Conditioner Return  
C - Case Drain  
D - Knife and Conditioner Pressure

---

**Figure 3.17: A40D 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 unloading and assembly instructions that were supplied with your A40D 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. Check hose routing at the reel motor.

**NOTE:**
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.

16. For procedure to change hose routing for M100 or M105 Windrowers, refer to 3.3.6 Routing A40D Hydraulic Drive Hoses, page 50.
3.3.2 Attaching A40D to M150, M155, or M155E4

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to Park, 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 (A) on the left side.

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

Figure 3.24: Header Drive Hoses

Figure 3.25: Driveline Shield
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.

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

NOTE: Hoses attached to connectors not shown in illustrations at right.
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 A40D Self-Propelled Windrower Auger Header Unloading and Assembly Instructions, which were supplied with your A40D Auger Header.
14. Locate the auger pressure (A) and auger/reel return (B) hoses.

15. Proceed to **3.3.5 Configuring Reverser Valve Jumper Hose for A40D, page 49.**

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.
3.3.3 Attaching A40D to M200

⚠️ CAUTION

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

The M200 Windrower requires four drive hoses (A) to run an A40D Auger Header.
If only three drive hoses are present, before following the procedure below, configure the M200 to run an A40D 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.

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

**NOTE:**
Hoses attached to connectors not shown in illustrations at right.
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 unloading and assembly instructions supplied with your A40D 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 unloading and assembly instructions supplied with your A40D Auger Header.
17. Proceed to 3.3.5 Configuring Reverser Valve Jumper Hose for A40D, page 49.

3.3.4 Attaching A40D to M205

**CAUTION**

To prevent accidental movement of windrower, return ground speed lever (GSL) to Park, 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, order and install the following kits shown in the table below. Instructions are 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 kit</td>
<td>MD #B5492</td>
</tr>
<tr>
<td>Coupler</td>
<td>MD #B5497</td>
</tr>
</tbody>
</table>

---

1. Reverser kit is optional and not required, although most A40D Headers have a Reverser kit (MD #B5492) ordered for the windrower. Install prior to hook-up if required.
1. Disengage rubber latch (A), and open driveline shield (B).

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

**NOTE:**
Hoses attached to connectors not shown in illustrations at right.

---

**Figure 3.53: A40D Header – 4.3 m and 4.9 m (14 ft. and 16 ft.) Header Shown (5.5 m [18 ft.] Header Similar)**

A - Reel Pressure  
B - Knife and Conditioner Return  
C - Case Drain  
D - Knife and Conditioner Pressure

**Figure 3.54: 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. 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.

**NOTE:**
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.
15. For procedure to change hose routing for M205 Windrowers, refer to 3.3.6 Routing A40D Hydraulic Drive Hoses, page 50.

3.3.5 Configuring Reverser Valve Jumper Hose for A40D

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 header.

**NOTE:**
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.

**NOTE:**
**ONLY** for draper headers with conditioner installed and **ONLY** for the 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 the header being operated to prevent draper header reel damage and improper operation.

To reroute jumper hose from draper header position to A40D position, follow these steps:
1. Move left 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 hose can be routed to port C2 at (C) as shown in Figure 3.61, page 50.

4. Remove cap from port C2 fitting (A) on the 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 windrower platform back to normal operating position.

**NOTE:**
The draper header reverser function is suppressed unless hay conditioner is activated in Windrower Setup using the cab display module (CDM).

### 3.3.6 Routing A40D Hydraulic Drive Hoses

The A40D Auger Header hydraulic drive hose routing depends on the windrower model to which the header is being attached.

A40D Headers are factory-configured for M150, M155, M155E4, and M200 SP Windrowers as shown in Figure 3.66, page 52.

To route hoses for M100, M105, and M205 SP Windrowers, proceed as follows:
1. Press screwdriver against latch in opening (A) and lift to open header left driveshield. Shield will latch at location (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.
Hydraulic hose connections:

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.

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 hose (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.

**Electrical harness routing:**

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.
3.4 Detaching A40D Header from M Series Self-Propelled Windrower

⚠️ CAUTION

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

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

Figure 3.72: M100 and 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
3. Raise lever (B) on hose support (C), and undo three 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.
8. Move hose bundle (A) from header, and position on windrower left 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.
3.5 Header Lift Cylinder Lock-Out Valves

Refer to your windrower operator's manual for information about the lift cylinder lock-out valves.
3.6 Operating Variables

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.

Table 3.1 Header Adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean bar position</td>
<td>3.6.1 Setting Lean Bar, page 61</td>
</tr>
<tr>
<td>Auger speed</td>
<td>3.6.2 Adjusting Auger Speed, page 61</td>
</tr>
<tr>
<td>Reel speed</td>
<td>3.6.3 Adjusting Reel Speed, page 61</td>
</tr>
<tr>
<td>Auger position</td>
<td>3.6.4 Setting Auger Position, page 61</td>
</tr>
<tr>
<td>Reel position</td>
<td>3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Tine aggressiveness adjustment</td>
<td>3.6.6 Setting Tine Aggressiveness, page 69</td>
</tr>
<tr>
<td>Cutting height</td>
<td>3.6.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td>Header angle</td>
<td>3.6.7 Adjusting Header Angle, page 70</td>
</tr>
<tr>
<td>Header float</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Feed pan / rock drop tine position</td>
<td>3.6.11 Setting Feed Pan and Rock Drop Tine Position, page 75</td>
</tr>
<tr>
<td>Roll gap</td>
<td>3.6.12 Adjusting Conditioner Roll Gap, page 76</td>
</tr>
<tr>
<td>Roll timing</td>
<td>4.13.11 Checking/Adjusting Roll Timing, page 185</td>
</tr>
<tr>
<td>Roll alignment</td>
<td>4.13.10 Checking/Adjusting Roll Alignment, page 183</td>
</tr>
<tr>
<td>Roll tension</td>
<td>3.6.13 Adjusting Conditioner Roll Tension, page 78</td>
</tr>
<tr>
<td>Forming shields</td>
<td>3.6.14 Positioning the Forming Shields, page 79</td>
</tr>
<tr>
<td>Tall crop dividers</td>
<td>3.11.1 Adjusting Tall Crop Dividers, page 94</td>
</tr>
<tr>
<td>Ground speed</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
</tbody>
</table>
3.6.1 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 **3.11.1 Adjusting Tall Crop Dividers, page 94**.

3.6.2 Adjusting Auger Speed

An A40 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.

3.6.3 Adjusting Reel Speed

An A40 auger header features a hydraulic direct drive reel with operating speed ranges of 50 to 85 rpm for M100, M105, M200, M205, as well as M1170 and M1240 models with standard reel configuration. Operating speed ranges of 15 to 85 rpm are available for M150, M155, M155E4, as well as M1170 and M1240 models with reel variable speed kit installed.

**NOTE:**
A40DX GSS headers are factory fitted with reel variable speed option.

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

3.6.4 Setting Auger Position

**CAUTION**

To avoid personal injury, before servicing header or opening drive covers, follow procedures in .

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 62**
- **Adjusting Vertical Position, page 63**
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 164.

NOTE:
Auger to stripper bar adjustment is most accurately checked and set with the header in the working position. 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 164.

Adjusting Auger Fore-Aft Position

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

1. Shut off engine and remove key.
2. Open left 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 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 Park, center steering wheel to lock, shut off engine, and remove key.

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

7. Open right endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolts (B), and turn bolts (B) to adjust auger fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close shields before engaging header.
3.6.5 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 64
- Adjusting Reel Vertical Position, page 66

### 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 Park, center steering wheel to lock, shut off engine, and remove key.
1. Shut off engine and remove key.
2. Open left 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 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 Park, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left 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 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.

Figure 3.96: Auger Header Right Side
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.

3.6.6 Setting Tine Aggressiveness

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

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

---

Figure 3.97: Reel Tine Clearance
A - 2-10 mm (2/25–2/5 in.)
B - 2 mm (2/25 in.) Minimum to Knife Section
C - Flex Fingers Back when Checking Clearance

Figure 3.98: Auger Header Right Side
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.

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.*

### 3.6.7 Adjusting Header Angle

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.
3.6.8 Setting Cutting Height

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to Park, 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).

Figure 3.102: Skid Shoe

Figure 3.103: Gauge Roller

5. Check that skid shoes or gauge rollers are adjusted to the same position.
6. Check header float, and adjust if required. Refer to 3.6.9 Checking/Adjusting Float – M Series, 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.
3.6.9 Checking/Adjusting Float – M Series

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

**CAUTION**

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

**IMPORTANT:**

Always check the float with the header set in working position (with the header fully lowered to the ground and the header angle set to the desired cutting height per crop type and conditions).

To check/adjust the float, follow these steps:

1. Start the engine, and lower the header to the ground.
2. Using the header tilt switches on the in-cab controls, set the header center-link to the mid-range position (5.0 on the cab display module). Refer to your windrower operator’s manual for detailed instructions.
3. Lower the header fully with the lift cylinders fully retracted.
4. Set left and right float fine adjustments to mid-range position (5.0 on the cab display module). Refer to your windrower operator’s manual for detailed instructions.
5. Shut down the engine and remove the key.
6. 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.
7. 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).
   **NOTE:**
      Illustration shows top of windrower wheel leg member.
   c. Recheck the float.

**Figure 3.104: Drawbolt**

3.6.10 Checking/Adjusting Float – M1 Series

Header float on M1170 and M1240 Windrowers is completely adjustable from the cab through the Harvest Performance Tracker (HPT).

The windrower float springs are **NOT** used to level the header.
**Checking Float – M1 Series Windrower**

**WARNING**

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

**CAUTION**

Before starting the machine, check to be sure all bystanders have cleared the area.

1. Start the engine.
2. Use the HEADER TILT switches (A) on the ground speed lever (GSL) to set the center-link to the mid-range position (5.0 on the Harvest Performance Tracker [HPT]).
3. Using the HEADER DOWN switch (B), lower header fully with lift cylinders fully retracted.
4. Turn engine off, and remove the ignition key.
5. Grasp one end of the header and lift. Lifting force should be 335–380 N (75–85 lbf) and should be the same at both ends.

6. Restart the engine, and adjust float as required. Refer to *Setting the Float, page 73*.

**NOTE:**

Increasing the float value on the HPT makes the header feel lighter.

**Setting the Float**

The float can be set for windrowing with the cutterbar on the ground.

The optimum float setting lets the header follow the contour of the terrain. Proceed as follows:

1. Set center-link to mid-range position (5.0 on the Harvest Performance Tracker [HPT]). Refer to the windrower operator’s manual.
2. Lower the header until the cutterbar is on the ground.

**NOTE:**

To minimize scooping rocks when operating at the flattest header angle, lower the header skid shoes. Refer to your header operator’s manual.
3. Press rotary scroll knob (A) on the HPT to display the QuickMenu system.
4. Rotate scroll knob (A) to highlight header float icon (B) and press scroll knob to select.

5. Turn scroll knob (A) to highlight left (B) or right (C) float and press knob (A) to activate selection.
6. Rotate scroll knob (A) to adjust float setting and press knob when finished. Float is now set.

**NOTE:**
Float adjustments of **1.0** (out of 10) change the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust float in increments of **0.05** to optimize field performance.

7. Use soft key 3 (D) to remove/resume float and deck position to previous setting for the attached header.

### Removing and Restoring Float
Follow these steps to remove and restore the header float settings:

1. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to display the QuickMenu system or press F1 on the console.
2. Rotate scroll knob (A) to highlight header float icon (B) and press scroll knob to select.
3. Press soft key 3 (A) to remove or restore the header float.

**NOTE:**
If the header float is active, the icon at soft key 3 will say REMOVE FLOAT; if header float has been removed, the icon will say RESTORE FLOAT.

### 3.6.11 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 safety props.

3.6.12 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 Park, 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) clockwise to raise link, and increase the gauge (C) setting.
3. To decrease roll gap, turn lower nut (B) counterclockwise 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 185
   - 4.13.10 Checking/Adjusting Roll Alignment, page 183

8. Close cover (B), and tighten bolt (A).
3.6.13 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.

Figure 3.114: Conditioner Roll Tension Springs

Table 3.2 Conditioner Roll Tension Factory Settings

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Left spring (A)</td>
<td>81–91 mm (3 3/16 – 3 9/16 in.)</td>
</tr>
<tr>
<td>Right spring (B)</td>
<td>41–51 mm (1 5/8 – 2 in.)</td>
</tr>
</tbody>
</table>

⚠️ CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to Park, 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).

---

**3.6.14 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 **3.12 Haying, page 97** 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**

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 Park, 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).

2. If forming shield attachment is too tight or too loose, tighten or loosen nut (A) as required.

### 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 Park, 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 3.118: Rear Deflector**
3.7 Recommended Operating Settings

These settings are intended as a starting point. Operators should fine-tune to crop and field conditions.

Refer to Table 3.3, page 83.
## Table 3.3 Recommended Operating Settings

<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>Alfalfa</td>
<td>&gt;3</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>73–77</td>
<td>High</td>
<td>Normal</td>
<td>Lower slot</td>
<td>16 (5/8)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>&gt;3</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1600–1800</td>
<td>73–77</td>
<td>High</td>
<td>Light</td>
<td>Lower slot</td>
<td>16 (5/8)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>2–3</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>70–75</td>
<td>Normal</td>
<td>Normal</td>
<td>Center slot</td>
<td>13 (1/2)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>2–3</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1600–1800</td>
<td>70–75</td>
<td>Normal</td>
<td>Light</td>
<td>Center slot</td>
<td>13 (1/2)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>&lt;2</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>65–70</td>
<td>Low</td>
<td>Normal/Heavy</td>
<td>Upper slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>&lt;2</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1600–1800</td>
<td>65–70</td>
<td>Low</td>
<td>Light</td>
<td>Upper slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>Lodged</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>73–77</td>
<td>High</td>
<td>Heavy</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>Lodged</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1600–1800</td>
<td>73–77</td>
<td>High</td>
<td>Light/Normal</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
<tr>
<td>Timothy</td>
<td>&gt;2.5</td>
<td>Smooth</td>
<td>64–76 (2.5–3)</td>
<td>Steep</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Normal</td>
<td>Lower slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Timothy</td>
<td>&gt;2.5</td>
<td>Rocky</td>
<td>64–76 (2.5–3)</td>
<td>Shallow</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Light</td>
<td>Lower slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Timothy</td>
<td>&lt;2.5</td>
<td>Smooth</td>
<td>64–76 (2.5–3)</td>
<td>Steep</td>
<td>1850–1950</td>
<td>65–70</td>
<td>Low</td>
<td>Normal</td>
<td>Center slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Timothy</td>
<td>&lt;2.5</td>
<td>Rocky</td>
<td>64–76 (2.5–3)</td>
<td>Shallow</td>
<td>1850–1950</td>
<td>65–70</td>
<td>Low</td>
<td>Light</td>
<td>Center slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Timothy</td>
<td>Lodged</td>
<td>Smooth</td>
<td>64–76 (2.5–3)</td>
<td>Steep</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Heavy</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
<tr>
<td>Timothy</td>
<td>Lodged</td>
<td>Rocky</td>
<td>64–76 (2.5–3)</td>
<td>Shallow</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Light/Normal</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>&gt;3</td>
<td>Smooth</td>
<td>152 (6)</td>
<td>Steep</td>
<td>1700–1850</td>
<td>70–75</td>
<td>High</td>
<td>Normal</td>
<td>Lower slot</td>
<td>19 (3/4)</td>
</tr>
<tr>
<td>Crop Type</td>
<td>Crop Condition (tons per acre)</td>
<td>Terrain</td>
<td>Stubble Height mm (in.)</td>
<td>Header Angle</td>
<td>Knife Speed (spm)</td>
<td>Reel Speed (rpm)</td>
<td>Auger Speed</td>
<td>Float</td>
<td>Feed Pan Position</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------</td>
<td>---------</td>
<td>-------------------------</td>
<td>--------------</td>
<td>------------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>-------</td>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>&gt;3</td>
<td>Rocky</td>
<td>152 (6)</td>
<td>Shallow</td>
<td>1700–1850</td>
<td>70–75</td>
<td>High</td>
<td>Light</td>
<td>Lower slot</td>
<td>19 (3/4)</td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>&lt;3</td>
<td>Smooth</td>
<td>152 (6)</td>
<td>Steep</td>
<td>1700–1850</td>
<td>65–70</td>
<td>Low</td>
<td>Normal Center slot</td>
<td>16 (5/8)</td>
<td></td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>&lt;3</td>
<td>Rocky</td>
<td>152 (6)</td>
<td>Shallow</td>
<td>1700–1850</td>
<td>65–70</td>
<td>Low</td>
<td>Light</td>
<td>Center slot</td>
<td>16 (5/8)</td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>Lodged</td>
<td>Smooth</td>
<td>152 (6)</td>
<td>Steep</td>
<td>1700–1850</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Heavy</td>
<td>Variable Refer to above</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>Sudan/Tall Crop</td>
<td>Lodged</td>
<td>Rocky</td>
<td>152 (6)</td>
<td>Shallow</td>
<td>1700–1850</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Light/Normal</td>
<td>Variable Refer to above</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>&gt;10</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>70–75</td>
<td>High</td>
<td>Normal</td>
<td>Lower slot</td>
<td>25 (1)</td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>&gt;10</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1600–1800</td>
<td>70–75</td>
<td>High</td>
<td>Light</td>
<td>Lower slot</td>
<td>25 (1)</td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>&lt;10</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>60–65</td>
<td>Normal/High</td>
<td>Normal/Heavy Center slot</td>
<td>Roll Gap mm (in.)</td>
<td></td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>&lt;10</td>
<td>Rocky</td>
<td>0</td>
<td>Medium</td>
<td>1600–1800</td>
<td>60–65</td>
<td>Normal/High</td>
<td>Light</td>
<td>Center slot</td>
<td>25 (1)</td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>Lodged</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1600–1800</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Heavy</td>
<td>Variable Refer to above</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>Triticale (winter forage)</td>
<td>Lodged</td>
<td>Rocky</td>
<td>0</td>
<td>Medium</td>
<td>1600–1800</td>
<td>70–75</td>
<td>Normal/High</td>
<td>Light/Normal</td>
<td>Variable Refer to above</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>Crop Type</td>
<td>Crop Condition (tons per acre)</td>
<td>Terrain</td>
<td>Stubble Height mm (in.)</td>
<td>Header Angle</td>
<td>Knife Speed (spm)</td>
<td>Reel Speed (rpm)</td>
<td>Auger Speed</td>
<td>Float</td>
<td>Feed Pan Position</td>
<td>Roll Gap mm (in.)</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------</td>
<td>---------</td>
<td>-------------------------</td>
<td>--------------</td>
<td>-------------------</td>
<td>------------------</td>
<td>--------------</td>
<td>-------</td>
<td>-------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>&gt;3.5</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1850–1950</td>
<td>73–77</td>
<td>High</td>
<td>Normal</td>
<td>Lower slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>&gt;3.5</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1850–1950</td>
<td>73–77</td>
<td>High</td>
<td>Light</td>
<td>Lower slot</td>
<td>10 (3/8)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>2–3</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal</td>
<td>Normal</td>
<td>Center slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>2–3</td>
<td>Rocky</td>
<td>0</td>
<td>Shallow</td>
<td>1850–1950</td>
<td>70–75</td>
<td>Normal</td>
<td>Light</td>
<td>Center slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>&lt;2</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1850–1950</td>
<td>65–70</td>
<td>Low/ Normal</td>
<td>Normal/ Heavy</td>
<td>Upper slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>&lt;2</td>
<td>Rocky</td>
<td>0</td>
<td>Medium</td>
<td>1850–1950</td>
<td>65–70</td>
<td>Low/ Normal</td>
<td>Light/ Normal</td>
<td>Upper slot</td>
<td>6 (1/4)</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>Lodged</td>
<td>Smooth</td>
<td>0</td>
<td>Steep</td>
<td>1850–1950</td>
<td>73–77</td>
<td>Normal/ High</td>
<td>Heavy</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
<tr>
<td>Wild/ Grass Hay</td>
<td>Lodged</td>
<td>Rocky</td>
<td>0</td>
<td>Medium</td>
<td>1850–1950</td>
<td>73–77</td>
<td>Normal/ High</td>
<td>Light/ Normal</td>
<td>Variable</td>
<td>Refer to above</td>
</tr>
</tbody>
</table>
3.8 Unplugging Conditioner and Knife

M1 Series windrowers are equipped with a header drive reversing function as standard equipment. M Series windrowers (including M150, M155, M155E4, and M200) can be equipped with the Header Drive Reverser kit (MD #B4656). This kit is not available for M100 or M105 windrowers.

On windrowers with this equipment installed, 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 header lift cylinder lock-out valves.

⚠️ WARNING

Exercise caution when working around the cutterbar. Blades are sharp and can cause serious injury. 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 drive compartment.

Figure 3.119: Wrench Location – A40D
8. Use wrench on left 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 side driveshield before restarting machine.

NOTE:
If plugging persists, refer to 7 Troubleshooting, page 199.

Figure 3.120: Primary Driveshaft
3.9 Grass Seed Special

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

- 3.9.1 Stub Guards and Hold-Downs, page 88
- 3.9.2 Special Auger Design for Grass Seed Special, page 89
- 3.9.3 Seven-Bat Reel, page 89
- 3.9.4 Auger Pan Extensions, page 90
- 3.9.5 Windrow Forming Rods, page 92

3.9.1 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 121 for maintenance of these components.

Figure 3.121: Cutterbar Stub Guards
3.9.2 Special Auger Design for Grass Seed Special

The center beaters and beater supports have been removed to reduce auger wrapping.

Figure 3.122: Grass Seed Auger

3.9.3 Seven-Bat Reel

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

Figure 3.123: Grass Seed Reel
3.9.4 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.

*Installing and Adjusting Pan Extensions*

To install the pan extensions, do the following:

1. Remove deflectors (A) from their shipping positions on the header and unwrap.

2. Remove nut and bolt (A), nut and washers (B), and nuts (C) from the pan extension. Retain hardware.

**NOTE:**

Illustrations in this procedure show the left side pan extension. Instructions are similar for installing and adjusting the right side pan extension.
3. Install left side deflector (A) using nuts and bolts (B) and nut, bolt, and five washers (C) retained from the previous step. Torque all nuts to 11.5 Nm (102 lbf-in).

**NOTE:**
Do **NOT** install nut (D) if the pan extension’s width will be adjusted.

**NOTE:**
Do **NOT** torque nuts if the pan extension’s width will be adjusted.

4. Repeat steps for installing the pan extension on the opposite side of the header.

To adjust a pan extension’s width, do the following:

1. Remove nut and bolt (A).
2. Loosen nut (B), but do **NOT** remove.
3. Slide pan extension (C) with swath forming rods inboard to the desired position, aligning holes on the pan extension and header.

4. Replace bolt and nut (A). Torque nut (A) and nut (B) to 11.5 Nm (102 lbf-in).
5. Install nut and bolt (C) and torque to 11.5 Nm (102 lbf-in).
6. Repeat for adjusting the pan extension on the right side of the header.
3.9.5 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 3.129: Windrow Forming Rods
3.10 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 4.9 m (16 ft.) header, the area cut would be approximately 4 hectares (10 acres) per hour.

**Figure 3.130: Ground Speed and Area Cut**

![Graph indicating the relationship between ground speed and area cut for three header sizes.](image)

- **A** – Acres/Hour
- **B** – Hectares/Hour
- **C** – Kilometers/Hour
- **D** – Miles/Hour
- **E** – 5.5 m (18 ft.)
- **F** – 4.9 m (16 ft.)
- **G** – 4.3 m (14 ft.)
3.11 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.

3.11.1 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 3.131: Tall Crop Divider
3.11.2 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.

Figure 3.134: Lean Bar
3.12 Haying

3.12.1 Haying Tips

Curing

Curing crops quickly helps maintain the highest quality of crop material as 5% of protein is lost from hay for each day that it lays on the ground after cutting.

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 hay 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.
- Slopes that face the sun receive up to 100% more exposure to the sun’s heat than slopes that do not face the sun. If hay is baled and chopped, consider baling sun facing slopes and chopping slopes that do not.
- When relative humidity is high, the evaporation rate is low and hay dries slowly.
- Humid air is trapped around the windrow in calm conditions. Raking or tedding will expose the hay to fresher and drier air.
- Cut hay perpendicular to the direction of the prevailing winds if possible.
Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the best results. Refer to 3.6 Operating Variables, page 60 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% or excessive yield loss will result.

Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces and allowing moisture to escape cut crop 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 safety props.
- Place all controls in NEUTRAL or PARK.
- Stop engine and remove key.
- Wait for all moving parts to stop.
4.2 Opening/Closing Driveshield

This procedure is for opening and closing the driveshield over the conditioner drivelines.

*Opening driveshield*

1. Disengage rubber latch (A).
2. Open shield (B).

![Figure 4.1: Driveline Shield](image1)

![Figure 4.2: Driveline Shield Open](image2)
Closing driveshield

1. Lower shield (B).
2. Engage rubber latch (A).

Figure 4.3: Driveline Shield
4.3 Endshields

This procedure is for opening and closing the endshields at each end of the machine.

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.
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 chart on the inside back cover of this manual.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records. Refer to 4.4.1 Maintenance Schedule/Record, page 104.

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.
# MAINTENANCE AND SERVICING

## 4.4.1 Maintenance Schedule/Record

<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 105.

#### 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 106.

#### 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.
### Self-Propelled Windrower Header

<table>
<thead>
<tr>
<th>Maintenance Record</th>
<th>Action</th>
<th>✓ - Check</th>
<th>♦ - Lubricate</th>
<th>▲ - Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦</td>
<td>Conditioner universal shafts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>♦</td>
<td>Roll pivots</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>♦</td>
<td>Conditioner shaft bearings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>♦</td>
<td>Knife drive cross-shaft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲</td>
<td>Knife drive box oil - First 50 hours only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1000 Hours or 3 Years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲</td>
<td>Conditioner drive gearbox lubricant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲</td>
<td>Knife drive box lubricant</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 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 207</td>
</tr>
<tr>
<td>5, 25, and 50</td>
<td>Knife drive belt</td>
<td>Tension</td>
<td>4.8.1 Header Knife Drive, page 140</td>
</tr>
<tr>
<td>10</td>
<td>Knife drive box mounting bolts</td>
<td>Torque</td>
<td>Mounting Bolts, page 132</td>
</tr>
</tbody>
</table>

Replace or tighten any missing or loose hardware. Refer to 8.1 Recommended Torques, page 207.

#### 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 117.
2. Check oil levels and lubricate bearings. Refer to the following sections:
   - 4.5.3 Knife and Gearbox Oil, page 114
   - 4.5.2 Lubrication Points, page 107
3. Perform all annual maintenance. Refer to 4.4.1 Maintenance Schedule/Record, page 104.
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 header lift cylinder lock-out valves.
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 207.
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 99.

⚠️ CAUTION
Refer to inside back cover 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, page 104.

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 at the inside back cover.

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 4.5: Grease Interval Decal](image)

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: Auger Header, page 108](#)
- [Lubrication Points: Hay Conditioner, page 111](#)
- [Lubrication Points: Drivelines, page 112](#)
Lubrication Points: Auger Header

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 4.6: A40D, A40DX 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.
MAINTENANCE AND SERVICING

Figure 4.7: A40D, A40DX 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 4.8: 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.

**Figure 4.9: 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. Refer to the inside back cover of this manual for proper oil.

Figure 4.10: Knife and Gearbox Oil

3. Check oil level with the header down on level ground.
4. Header should be on the ground.
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) 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 set screw 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 Header 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 .

⚠️ WARNING

Exercise caution when working around the cutterbar. Blades are sharp and can cause serious injury. 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 the knife from the 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
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. Stop engine and remove the key from ignition.
2. Stroke the knife manually to its outer limit.
3. Clean the area around the knifehead.
4. Remove bolt (A).
5. Remove grease fitting (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.

4.7.3 Installing Knife

⚠️ 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 installation to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

1. Stop engine, and remove the key from ignition.
2. Slide the knife into place and align the knifehead with the output arm.

3. For ease of removing or installing knifehead pin, remove grease fitting from pin.

4. Install knifehead pin (A) through the output arm and into the knifehead. Tap knifehead pin (A) down, and make sure the pin is seated at the bottom of the knifehead.

5. Set groove (B) in the knifehead pin 1.5 mm (1/16 in.) above output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 Nm (160 lbf-ft).

6. Using a feeler gauge, check that the gap at location (E) is 0.25 mm (0.01 in.).

7. Install grease fitting (A) into the knifehead pin, and turn the grease fitting for easy access.

   **IMPORTANT:**
   Grease knifehead just enough to start a slight downward movement. Overgreasing will lead to knife misalignment which causes guards to overheat and drive systems to overload.

---

**4.7.4 Removing Knifehead Bearing**

1. Remove knife. Refer to 4.7.2 Removing Knife, page 118.

2. Using a flat-ended tool 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.
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.

   **NOTE:**
   It may be necessary to temporarily remove the grease fitting from the knifehead during installation of the knifehead pin. This will allow any trapped air to escape and knifehead pin will seat correctly.

2. Use a flat-ended tool with the same approximate diameter as 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 knifehead pin (A) 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 118.

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

---

Figure 4.20: Knifehead Bearing Assembly

Figure 4.21: Spare Knife Location – Double Knife
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.

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 4.23: Guard Configurations

A - Pointed Standard (MD #118344)  
C - Pointed Right Outboard (MD #118302)  
E - Pointed Center (MD #124338)  
G - Stub Drive End (No Ledger) (MD #118347)

B - Pointed Drive End (No Ledger) (MD #118345)  
D - Pointed Left Outboard (MD #118301)  
F - Stub Standard (MD #118346)  
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 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.

NOTE:
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 guard (C) and hold-down (D).
4. Position new guard (C) on cutterbar, and install carriage bolts (B).
5. Install hold-down (D), and secure with nuts (A). Tighten nuts to 68 Nm (50 lbf·ft).
6. Check and adjust clearance between hold-down and knife. Refer to 4.7.8 Hold-Downs, page 130.

**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

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.

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

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

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

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

5. Check that cutting surfaces (A) of center and adjacent guards are aligned. Adjust as required as per Aligning Guard, page 123.

6. Check and adjust clearance between hold-down and knife. Refer to 4.7.8 Hold-Downs, page 130.
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.

Figure 4.32: Center Guard – Double Knife

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

Figure 4.33: Center Hold-Down – Double Knife
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 Nm (50–68 lbf·ft).
7. Check clearance between hold-down (D) and section. Refer to Adjusting Knife Hold-Down: Center Guard – Double-Knife Header, page 131.
Revising 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).
MAINTENANCE AND SERVICING

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 130.**
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 4.42: Hold-Downs**

![Hold-Downs Diagram]

- A - Pointed Standard (MD #118162)
- C - Stub Center Double Knife (MD #118346)
- B - Pointed Center Double Knife (MD #124344)
- 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: Center Guard – Double-Knife Header

1. Torque nuts (A) to 46 Nm (35 lbf·ft).
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 Nm (53 lbf·ft).
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 Knife Hold-Down: Stub Guard – Double-Knife Header

1. Torque nuts (A) to 46 Nm (35 lbf·ft).
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 Nm (53 lbf·ft).
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 (A) 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.

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

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 Nm (200 lbf·ft). When tightening, start with the side mounting bolts.
Removing Knife Drive Box

1. Loosen knife drive belt (A), and slip off knife drive box pulley. Refer to the following sections:
   - [Checking/Adjusting Timing Belt Tension on Left Side, page 141](#)
   - [Checking/Adjusting Timing Belt Tension on Right Side, page 145](#)

2. Stroke knife to its outer limit.
3. Clean area around knifehead.
4. Remove grease fitting (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 Nm (200 lbf·ft).

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

2. Apply medium-strength threadlocker (Loctite® 243 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 (A) 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 (A), 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 Nm
   (160 lbf·ft).

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.

   NOTE:
   It may be necessary to temporarily remove the grease
fitting from the knifehead during installation of the
knifehead pin. This will allow any trapped air to escape
and knifehead pin will seat correctly.

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 Nm (160 lbf·ft).

14. Replace knifehead pin (B).

15. Replace grease fitting (A) in pin.

16. Install drive belt onto knife drive box pulley and tighten.
Refer to the following sections:
   • Checking/Adjusting Timing Belt Tension on Left
     Side, page 141
   • Checking/Adjusting V-Belt Tension on Left Side,
     page 140
   • Checking/Adjusting Timing Belt Tension on Right
     Side, page 145
Removing Pulley
1. Remove knife drive box. Refer to Removing Knife Drive Box, page 133.
2. Loosen nut and bolt (A) from pulley.
3. Remove pulley using a three-jaw puller.

Installing Pulley
1. Remove any rust or paint from inner spline. For replacement parts, remove oil/grease with degreasing agent.
2. Apply medium-strength threadlocker (Loctite® 243 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 Nm (160 lbf·ft).
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 safety props.
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 safety props.

4.7.10 Adjusting Knife Timing

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

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.

⚠️ **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 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 midspan.

---

**Figure 4.60: Knife Position Adjustment**

**Figure 4.61: Knife Sections Centered Between Knife and Guard Points**
A - Knife Point  B - Guard Point

**Figure 4.62: Timing Belt – Right Side**
6. Check for correct knife timing by rotating the driveshaft (A) slowly with the unplugging wrench (B), and observe where knives 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 side driven pulley (A) clockwise.
   b. **If right knife LAGS left knife**, rotate right driven pulley (A) counterclockwise.
   c. Tighten right side timing belt.
4.8 Header Drive Systems

4.8.1 Header Knife Drive

The A40D and A40DX double-knife headers have a windrower-powered hydraulic motor that drives each knife on the header with two belt-driven knife drive boxes.

Checking/Adjusting V-Belt Tension on Left 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. 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 midspan (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 from Left 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. 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**

**IMPORTANT:**
Belts are a matched set. Even if only one belt is damaged, replace both drive belts.

**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** over-tighten belts.

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

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

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

**Checking/Adjusting Timing Belt Tension on Left Side**

**IMPORTANT:**
To prolong belt and drive life, do **NOT** over-tighten 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 midspan. 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 location (C) and three nuts (B).

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

**Removing Timing Belt from Left Side**

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

1. Turn off engine and remove key.
2. Open shield on header’s left side.
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.

**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).
Installing Timing Belt on Left 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. Position knife drive belt (A) onto knife drive box pulley (B).

3. Route knife drive belt (A) onto knife drive pulley (C).

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

**IMPORTANT:**

To prolong belt and drive life, do **NOT** over-tighten belts.

**NOTE:**

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

5. Tighten adjuster bolt jam nut (A), and three nuts (B) on knife drive pulley.

6. Reconnect hoses onto hydraulic motor (C).

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

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

---

**Checking/Adjusting Timing Belt Tension on Right Side**

**IMPORTANT:**
To prolong belt and drive life, do **NOT** over-tighten 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 midspan. 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 location (B) and three nuts (A).

**NOTE:**
Readjust tension of new belt after 5 hours of operation.
Removing Timing Belt from 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 on 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. Position belt (C) onto knife drive box pulley (E) and knife drive pulley (D) as shown.

   IMPORTANT:
   To prolong belt and drive life, do NOT over-tighten belts.

   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 midspan.

4. Tighten jam nut at location (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 (5 hours).

### 4.8.2 Header Reel Drive

The reel drive gearbox is a sealed, factory-assembled unit on an A40D and A40DX header. The reel drive gearbox requires no scheduled maintenance, but if service is required, see your Dealer.

### 4.8.3 Header Auger Drive

The auger on an A40D and A40DX Header is driven directly from a hydraulic motor that is powered by the windrower hydraulics.
4.9 Reel Tines and Tine Bar Bearings

Separate procedures are required to replace reel tines, depending on their location on the reel. Refer to the following topics for these procedures:

- 4.9.1 Replacing Tine and Bearing: Cam End – Disc #1, page 149
- 4.9.2 Replacing Tine and Bearing: Disc #2, page 153
- 4.9.3 Replacing Tine and Bearing: Center Section X, page 157
- 4.9.4 Replacing Tine and Bearing: Opposite Cam – Section Y, page 159
- 4.9.5 Replacing Tine: Tine Bar Extension – Section Z, page 161

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

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

NOTE:
Apply a light coating of anti-seize compound 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.

![Figure 4.83: Cam End Disc](image)

![Figure 4.84: Cam Disc](image)
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 between Tine Bar Type A and Tine Bar Type B. Identify locations so that tine hardware will be reinstalled at same locations. Both Tine Bar Type A and Tine Bar Type B configurations are required to stagger tines on the reel bat and ensure all crop is picked up.

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 Nm (23–26 lbf·ft).

12. Lock the bearing.
MAINTENANCE AND SERVICING

IMPORTANT:
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 to include both Type A Tine Bar and Type B Tine Bar configurations:
   a. 5/16 x 2 1/2 in. carriage bolt (A)
   b. Spacer (B)
   c. Lock nut (C)
   d. 5/16 x 2 in. hex head bolt (D)

16. Install cam follower bearing (A) with bolt (B). Apply medium-strength threadlocker (Loctite® 262 or equivalent) to bolt threads, and torque to 122 Nm (90 lbf·ft).

   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: Disc #2

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

**IMPORTANT:**

Tine attachment hardware and configuration may vary between Tine Bar Type A and Tine Bar Type B. Identify locations so that tine hardware will be reinstalled at same locations. Both Tine Bar Type A and Tine Bar Type B configurations are required to stagger tines on the reel bat and ensure all crop is picked up.

**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 115.

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 115.
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 Nm (23–26 lbf·ft).

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 115.
18. Remove nut (C), shoulder bolt (D), and 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 flangettes onto connecting shaft (B). Refer to \textit{4.5.4 Installing Sealed Bearings, page 115}.

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 \textbf{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 Nm (23–26 lbf·ft).
4.9.3 Replacing Tine and Bearing: Center Section X

Replace tine and bearings at center section X (X) as follows:

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 115.
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 Nm (23–26 lbf·ft).
4.9.4 Replacing Tine and Bearing: Opposite Cam – Section Y

Replace tine and bearings at center section Y (Y) as follows:

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 115.
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 Nm (16–20 lbf·ft).
4.9.5 Replacing Tine: Tine Bar Extension – Section Z

Replace tine and bearings at center section Z (Z) as follows:

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.
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 99, 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 4.119: 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 auger position needs to be adjusted after adjusting stripper bars, refer to 3.6.4 Setting Auger Position, page 61.

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) (both left and right side) 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 Nm (150 lbf-ft).
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.

**Figure 4.122: Stripper Bars**

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 of engine and remove key.
2. Raise header, and engage safety props.
3. Remove nuts and carriage bolts (A) securing the two extensions (B) to underside of header pan support. Retain hardware for reinstallation.

**Figure 4.123: Stripper Bar Extension**
4. Position extension (A) at inboard end of front stripper bars, and mark locations of the two holes onto the pan.

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

6. Install extension (A) with carriage bolts (C) retained from Step 3, page 165.

7. Repeat above steps for other extension.

**Figure 4.124: Stripper Bar Extension**

A - Stripper Bar Extension  
B - Stripper Bar  
C - Carriage Bolts  
D - Forward
4.13 Conditioner

CAUTION
To avoid personal injury, before servicing header or opening drive covers, follow procedures in.

4.13.1 Changing Gearbox Oil

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.

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 4.125: Driveline Shield
MAINTENANCE AND SERVICING

4. Place a suitable container under gearbox drain to collect oil.

5. Remove breather (A) and check plug (B).

6. Remove drain plug (A) and allow oil to drain. Replace drain plug once oil has drained.
7. Add oil at (A) to required level. Refer to inside back cover for recommended lubricant.

8. Oil is at required level when it runs out of check plug (B).

4.13.2 Removing Forming Shield

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

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.

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

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).
4.13.5 Installing Forming Shield

1. If attached, remove header from the windrower for ease of installing the forming shield. Refer to windrower operator’s manual for procedure.

**NOTE:**
Do **NOT** install the two triangular-shaped plates from the forming shield kit. Triangular plates are used with rotary headers.

2. Install bolt (A) with spacer (B) and nut on each windrower leg in the upper hole. Hardware is supplied with forming shield kit.

3. Remove two clevis pins (A) from forward end of forming shield.
4. Position forming shield (A) under windrower frame.

5. Position forming shield onto bolts (A) in windrower legs and secure with clevis pins (B) and hairpin.
6. Lift aft end of the forming shield and attach straps (B) to pins (A) on the windrower frame. Install washer and hairpin to secure strap. Use the middle hole and adjust height to suit the crop.

7. Set forming shield side deflectors to desired width by positioning adjuster bars (A). Use the same hole location on both sides.
   - Position deflectors at the narrowest setting for a narrow windrow (silage for example).
   - Position deflectors at the widest setting for a wide windrow.
   Refer to 3.6.14 Positioning the Forming Shields, page 79.

8. Adjust fluffer shield (C) to middle position. Loosen handles (B) if required. Refer to Positioning Rear Deflector (Fluffer Shield), page 80.

4.13.6 Removing Header Drive Motor

This procedure applies to A40D and A40DX (excluding Grass Seed A40D and Grass Seed A40DX) 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 driveshield.

   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 A40D, and A40DX (excluding Grass Seed A40D and Grass Seed A40DX) 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 Nm (75 lbf·ft).
5. Reconnect hoses to motor.
4.13.8 Removing Conditioner Gearbox

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.

9. Remove knife drive V-belts (A). Refer to *Removing Double V-Belts from Left Side, page 140.*

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).

**CAUTION**

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).
4.13.9 Installing Conditioner Gearbox

1. Position gearbox (B) as shown, picking up the three holes in the endsheet 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 Nm (18 lbf-ft).

8. Tap bushing (A) and torque bolts. Repeat until bolts no longer turn at 25 Nm (18 lbf-ft).

10. Remove oil level check plug (A) in gearbox. If oil does not run out, add oil to required level. If oil is required, refer to the chart on the inside back cover of this 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 Nm (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.

⚠️ 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.

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 roll bar spacing (X) (as shown in Step 5, page 184) 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 Step 5, page 184) 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 at each end of conditioner.

3. Examine roll spacing (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 realigned. Refer to 4.13.10 Checking/Adjusting Roll Alignment, page 183.
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.

5. Recheck distance between the bars at both ends. Refer to Step 3, page 185.

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

7. Close driveshield.
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 support bracket 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 safety props.
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 x 1 in. 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 187 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 safety props.
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.

4.15.2 Installing Gauge Rollers

1. Position gauge roller assembly below cutterbar, and insert tabs on roller assembly into slots (A) in frame.
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 is seated 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 4.182: A40D 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.

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.

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:

- 4.3 m (14 ft.): MD #B4716
- 4.9 m (16 ft.): MD #B4717
- 5.5 m (18 ft.): MD #B4718

![Figure 5.3: Reel Bat Assembly](image)

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:

- 4.3 m (14 ft.) Double-Knife: MD #B4956
- 4.9 m (16 ft.) Double-Knife: MD #B4715
- 5.5 m (18 ft.) Double-Knife: MD #B4957

Installation and adjustment instructions are included with the kit.

![Figure 5.4: Stub Guards](image)
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.

MD #B4690

Figure 5.5: Tall Crop Divider (Left Side)
6 Unloading and Assembly

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

<table>
<thead>
<tr>
<th>Header Description</th>
<th>Used on</th>
<th>Instruction Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A40D, A40DX</td>
<td>Self-Propelled Windrower</td>
<td>MD #214805</td>
</tr>
</tbody>
</table>
## Troubleshooting

### 7.1 Header Performance

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carryover of crop on reel</td>
<td>Reel speed too fast</td>
<td>Reduce reel speed (sprocket size).</td>
<td>[3.6.3 Adjusting Reel Speed, page 61]</td>
</tr>
<tr>
<td>Material build-up on header frame</td>
<td>Auger speed too fast</td>
<td>Reduce auger speed (sprocket size).</td>
<td>[3.6.2 Adjusting Auger Speed, page 61]</td>
</tr>
<tr>
<td>Material build-up on header frame</td>
<td>Very light crop</td>
<td>Reduce windrower rpm.</td>
<td>—</td>
</tr>
<tr>
<td>Insufficient conditioning of stems</td>
<td>Roll gap too large</td>
<td>Decrease roll gap.</td>
<td>[3.6.12 Adjusting Conditioner Roll Gap, page 76]</td>
</tr>
<tr>
<td>Leaves damaged, crushed or stripped off stems</td>
<td>Reel speed too fast</td>
<td>Reduce reel speed.</td>
<td>[3.6.3 Adjusting Reel Speed, page 61]</td>
</tr>
<tr>
<td>Leaves damaged, crushed or stripped off stems</td>
<td>Roll gap too small</td>
<td>Increase roll gap.</td>
<td>[3.6.12 Adjusting Conditioner Roll Gap, page 76]</td>
</tr>
<tr>
<td>Leaves damaged, crushed or stripped off stems</td>
<td>Rolls improperly timed</td>
<td>Adjust roll timing.</td>
<td>[4.13.11 Checking/ Adjusting Roll Timing, page 185]</td>
</tr>
<tr>
<td>Slow crop drying</td>
<td>Rolls not crimping crop sufficiently</td>
<td>Decrease roll gap.</td>
<td>[3.6.12 Adjusting Conditioner Roll Gap, page 76]</td>
</tr>
<tr>
<td>Slow crop drying</td>
<td>Crop is spread too narrow</td>
<td>Adjust forming shields for wider swath.</td>
<td>[3.6.14 Positioning the Forming Shields, page 79]</td>
</tr>
<tr>
<td>Slow crop drying</td>
<td>Crop is bunched in windrow</td>
<td>Adjust forming shields/baffle.</td>
<td></td>
</tr>
<tr>
<td>Excessive drying or bleaching of crop</td>
<td>Excessive crimping</td>
<td>Increase roll gap.</td>
<td>[3.6.12 Adjusting Conditioner Roll Gap, page 76]</td>
</tr>
<tr>
<td>Excessive drying or bleaching of crop</td>
<td>Crop is spread too wide in windrow</td>
<td>Adjust forming shields.</td>
<td>[3.6.14 Positioning the Forming Shields, page 79]</td>
</tr>
<tr>
<td>Leaving small strip of flattened, uncut material</td>
<td>Crowding of the uncut material</td>
<td>Steer windrower slightly away from uncut crop.</td>
<td>—</td>
</tr>
<tr>
<td>Leaving small strip of flattened, uncut material</td>
<td>Reel position incorrect</td>
<td>Move reel forward and down.</td>
<td>[3.6.5 Setting Reel Position, page 64]</td>
</tr>
<tr>
<td>Leaving small strip of flattened, uncut material</td>
<td>Knife sections or guards are worn or broken</td>
<td>Replace worn or broken parts.</td>
<td>[4.7.1 Replacing Knife Section, page 117, 4.7.7 Guards, page 121]</td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long stubble in down crop</td>
<td>Cutting height too high</td>
<td>Lower cutting height with skid shoes.</td>
<td>3.6.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td>Long stubble in down crop</td>
<td>Ground speed too fast</td>
<td>Slow down.</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Long stubble in down crop</td>
<td>Header angle too flat for guards to pick up down crop</td>
<td>Increase header angle.</td>
<td>3.6.7 Adjusting Header Angle, page 70</td>
</tr>
<tr>
<td>Long stubble in down crop</td>
<td>Reel position incorrect</td>
<td>Move reel forward and down.</td>
<td>3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Long stubble in down crop</td>
<td>Tine aggressiveness too low</td>
<td>Rotate cam clockwise (viewed from RH end) for more aggressive tine action.</td>
<td>3.6.6 Setting Tine Aggressiveness, page 69</td>
</tr>
<tr>
<td>Pulling material by the roots or tall material leaning into machine</td>
<td>Ground speed too slow</td>
<td>Increase ground speed.</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Pulling material by the roots or tall material leaning into machine</td>
<td>Reel position incorrect</td>
<td>Move reel forward and down.</td>
<td>3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Bent or misaligned guards causing poor shearing action</td>
<td>Align guards for proper shearing action.</td>
<td>Aligning Guard, page 123</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Bent knife causing binding</td>
<td>Straighten bent knife. Check alignment, and adjust if necessary.</td>
<td>4.7.2 Removing Knife, page 118</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Ground speed too fast</td>
<td>Slow down. Ground speed should not exceed 13 km/h (8 mph).</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Header angle too flat for guards to pick up down crop</td>
<td>Increase header angle.</td>
<td>3.6.7 Adjusting Header Angle, page 70</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Header float too light, causing bouncing</td>
<td>Adjust to heavier float setting.</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Reel position incorrect</td>
<td>Move reel forward and down.</td>
<td>3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Relief valve pressure too low</td>
<td>Replace valve.</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Knife drive belt too loose</td>
<td>Increase belt tension.</td>
<td>4.8.1 Header Knife Drive, page 140</td>
</tr>
<tr>
<td>Ragged or uneven cutting of crop</td>
<td>Knife sections or guards are worn or broken</td>
<td>Replace worn or broken parts.</td>
<td>4.7.1 Replacing Knife Section, page 117</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>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Ground speed too fast</td>
<td>Slow down.</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Roll gap too large for proper feeding</td>
<td>Decrease roll gap.</td>
<td>3.6.12 Adjusting Conditioner Roll Gap, page 76</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Roll gap too small in thick stemmed cane-type crops</td>
<td>Increase roll gap.</td>
<td>—</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Rolls improperly timed</td>
<td>Adjust roll timing.</td>
<td>4.13.11 Checking/Adjusting Roll Timing, page 185</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Extremely thick or wet undergrowth</td>
<td>Raise cutting height to clear undergrowth.</td>
<td>3.6.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Header float too heavy</td>
<td>Adjust to lighter float setting.</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Wet undergrowth</td>
<td>Cut when undergrowth is dry.</td>
<td>—</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Reel position incorrect</td>
<td>Move reel back and down (close to guards).</td>
<td>3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Knife drive belt too loose</td>
<td>Adjust belt tension.</td>
<td>4.8.1 Header Knife Drive, page 140</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Knife hold-downs improperly adjusted</td>
<td>Adjust hold-downs so knife works freely.</td>
<td>4.7.8 Hold-Downs, page 130</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Knife sections or guards are worn or broken</td>
<td>Replace worn or broken parts.</td>
<td>4.7.1 Replacing Knife Section, page 117 , 4.7.7 Guards, page 121</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>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Reel not feeding properly in heavy crops</td>
<td>Decrease ground speed.</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Bent or misaligned guards causing poor shearing action</td>
<td>Align guards for proper shearing action.</td>
<td>Aligning Guard, page 123</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Forming shields improperly adjusted - fluffer too low</td>
<td>Adjust forming shields, raise fluffer.</td>
<td>3.6.14 Positioning the Forming Shields, page 79</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Fluffer bypassing or dragging crop</td>
<td>Adjust fluffer for proper crop control.</td>
<td>3.6.14 Positioning the Forming Shields, page 79</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Auger to stripper clearance too wide</td>
<td>Adjust auger to stripper bars clearance.</td>
<td>3.6.4 Setting Auger Position, page 61</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Roll gap too large</td>
<td>Adjust roll gap.</td>
<td>3.6.12 Adjusting Conditioner Roll Gap, page 76</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Conditioner running too slow</td>
<td>Maintain rated knife / conditioner speed.</td>
<td>2.2 Product Specifications, page 21</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Uneven crop flow across auger</td>
<td>Remove front stripper bar or stripper bar extension if installed.</td>
<td>4.12 Stripper Bar, page 164</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Excessive center feeding of crop</td>
<td>Remove front stripper bar extensions if installed.</td>
<td>4.12 Stripper Bar, page 164</td>
</tr>
<tr>
<td>Conditioner plugging; knife plugging; uneven formation and bunching of windrow</td>
<td>Build up of crop at ends of rolls, especially in tall crops</td>
<td>Add front stripper bar extension.</td>
<td>4.12 Stripper Bar, page 164</td>
</tr>
<tr>
<td>Uneven windrow formation in light crop</td>
<td>Rear of feed pan too low</td>
<td>Raise rock drop tine bar.</td>
<td>3.6.11 Setting Feed Pan and Rock Drop Tine Position, page 75</td>
</tr>
<tr>
<td>Reel causes seed loss (e.g. grass seed)</td>
<td>Reel speed too fast</td>
<td>Adjust flow control on windrower.</td>
<td>3.6.3 Adjusting Reel Speed, page 61</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>Reel causes seed loss (e.g. grass seed)</td>
<td>Header angle too steep, causing tines to contact ground</td>
<td>Flatten header angle, and check header float.</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Reel causes seed loss (e.g. grass seed)</td>
<td>Reel not correctly positioned</td>
<td>Lower reel speed, move reel rearward, as close as possible to auger, and downward as close as possible to knife and pan.</td>
<td>3.6.3 Adjusting Reel Speed, page 61 3.6.5 Setting Reel Position, page 64</td>
</tr>
<tr>
<td>Auger plugging in heavy grass seed</td>
<td>Poor crop flow across auger</td>
<td>Remove lower stripper bar and middle stripper bar if necessary.</td>
<td>4.12 Stripper Bar, page 164</td>
</tr>
<tr>
<td>Plugging at delivery opening in heavy grass seed</td>
<td>Opening too narrow</td>
<td>Move pan extensions to widest position.</td>
<td>3.9 Grass Seed Special, page 88</td>
</tr>
<tr>
<td>Grass seed windrow too wide or too narrow</td>
<td>Pan extensions not adjusted properly</td>
<td>Adjust pan extensions.</td>
<td>3.9 Grass Seed Special, page 88</td>
</tr>
</tbody>
</table>
### 7.2 Mechanical

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger and/or conditioner rolls damaged by stones</td>
<td>Auger and/or conditioner rolls damaged by stones</td>
<td>Feed pan doesn't allow stones to fall through.</td>
<td>3.6.11 Setting Feed Pan and Rock Drop Tine Position, page 75</td>
</tr>
<tr>
<td>Excessive breakage of knife sections or guards</td>
<td>Excessive breakage of knife sections or guards</td>
<td>Ground speed too high in stony conditions</td>
<td>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Excessive breakage of knife sections or guards</td>
<td>Excessive breakage of knife sections or guards</td>
<td>Cutting height too low in stony conditions</td>
<td>3.6.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td>Excessive breakage of knife sections or guards</td>
<td>Excessive breakage of knife sections or guards</td>
<td>Header angle too steep in stony conditions</td>
<td>3.6.7 Adjusting Header Angle, page 70</td>
</tr>
<tr>
<td>Excessive breakage of knife sections or guards</td>
<td>Excessive breakage of knife sections or guards</td>
<td>Header float too heavy in stony conditions</td>
<td>3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td>Excessive breakage of knife sections or guards</td>
<td>Excessive breakage of knife sections or guards</td>
<td>Knife speed too slow</td>
<td>2.2 Product Specifications, page 21</td>
</tr>
<tr>
<td>Excessive heating of hydraulic oil</td>
<td>Excessive heating of hydraulic oil</td>
<td>Relief pressure too low</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Header stalling in extremely tall, heavy crop (6+ tons per acre)</td>
<td>Header stalling in extremely tall, heavy crop (6+ tons per acre)</td>
<td>Insufficient crop clearance at rear of feed pan</td>
<td>3.6.11 Setting Feed Pan and Rock Drop Tine Position, page 75, or 3.6.9 Checking/Adjusting Float – M Series, page 72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower rock drop tines (rear of header pan).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remove rubber fingers from auger at delivery opening.</td>
<td>4.11 Replacing Rubber Fingers, page 163</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase roll gap.</td>
<td>3.6.12 Adjusting Conditioner Roll Gap, page 76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remove front set of stripper bars.</td>
<td>4.12 Stripper Bar, page 164</td>
</tr>
</tbody>
</table>

*Header stalling in extremely tall, heavy crop (6+ tons per acre) Insufficient crop clearance at rear of feed pan Lower rock drop tines (rear of header pan).*
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<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 Header Hydraulics, page 116</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>3.10 Selecting Ground Speed, page 93</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Defective motor</td>
<td>Repair motor.</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Defective O-ring inside relief valve</td>
<td>Replace relief valve.</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Defective pump</td>
<td>Repair pump.</td>
<td>See Dealer</td>
</tr>
<tr>
<td>Header turns while unloaded but slows or stops when starting to cut</td>
<td>Defective relief valve</td>
<td>Repair relief valve.</td>
<td>See Dealer</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 119</td>
</tr>
<tr>
<td>Knocking in knife drive</td>
<td>Worn knifehead pin</td>
<td>Replace</td>
<td>4.7.3 Installing Knife, page 118</td>
</tr>
<tr>
<td>Knocking in knife drive</td>
<td>Incorrect end guards</td>
<td>Replace with special end guards.</td>
<td>4.7.7 Guards, page 121</td>
</tr>
<tr>
<td>Knife back breakage</td>
<td>Dull knife</td>
<td>Replace</td>
<td>4.7.4 Removing Knifehead Bearing, page 119</td>
</tr>
<tr>
<td>Knife back breakage</td>
<td>Worn knife head pin</td>
<td>Replace</td>
<td>4.7.3 Installing Knife, page 118</td>
</tr>
<tr>
<td>Knife back breakage</td>
<td>Bent or broken guard</td>
<td>Straighten or replace</td>
<td>4.7.7 Guards, page 121</td>
</tr>
<tr>
<td>Knife back breakage</td>
<td>Incorrect end guards at knifehead</td>
<td>Replace with correct number of special guards.</td>
<td>4.7.7 Guards, page 121</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>3.6.8 Setting Cutting Height, page 71</td>
</tr>
<tr>
<td>Windrower side drift</td>
<td>Header is dragging on one end and pulling to that side.</td>
<td>Adjust header float.</td>
<td>3.6.9 Checking/Adjusting Float – M Series, 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 191</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>Lights malfunctioning</td>
<td>Burned out bulb</td>
<td>Replace bulb.</td>
<td><em>4.16 Maintaining the Electrical System, page 191</em></td>
</tr>
<tr>
<td>Lights malfunctioning</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 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.

**Jam nuts**

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by \( f = 0.65 \).

**Self-tapping screws**

Standard torque is to be used (NOT to be used on critical or structurally important joints).

**SAE Bolt Torque Specifications**

Torque values shown in 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 (Nm)</th>
<th>Torque (lbf·ft) (*lbf·in)</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>
</tr>
<tr>
<td>1/2-13</td>
<td>106</td>
<td>118</td>
</tr>
<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>
</tr>
<tr>
<td>3/4-10</td>
<td>380</td>
<td>420</td>
</tr>
<tr>
<td>7/8-9</td>
<td>606</td>
<td>669</td>
</tr>
<tr>
<td>1-8</td>
<td>825</td>
<td>912</td>
</tr>
</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 (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</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>
</tr>
</tbody>
</table>

### Table 8.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</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>
</tr>
<tr>
<td>1-8</td>
<td>874</td>
<td>966</td>
</tr>
</tbody>
</table>
Table 8.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</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>
</tr>
<tr>
<td>1-8</td>
<td>1165</td>
<td>1288</td>
</tr>
</tbody>
</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 (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</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>
</tr>
<tr>
<td>16-2.0</td>
<td>236</td>
<td>261</td>
</tr>
<tr>
<td>20-2.5</td>
<td>460</td>
<td>509</td>
</tr>
<tr>
<td>24-3.0</td>
<td>796</td>
<td>879</td>
</tr>
</tbody>
</table>
Table 8.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf·ft) (*lbf·in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>4-0.7</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>5-0.8</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>6-1.0</td>
<td>7.7</td>
<td>8.6</td>
</tr>
<tr>
<td>8-1.25</td>
<td>18.8</td>
<td>20.8</td>
</tr>
<tr>
<td>10-1.5</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>12-1.75</td>
<td>65</td>
<td>72</td>
</tr>
<tr>
<td>14-2.0</td>
<td>104</td>
<td>115</td>
</tr>
<tr>
<td>16-2.0</td>
<td>161</td>
<td>178</td>
</tr>
<tr>
<td>20-2.5</td>
<td>314</td>
<td>347</td>
</tr>
<tr>
<td>24-3.0</td>
<td>543</td>
<td>600</td>
</tr>
</tbody>
</table>

Table 8.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf·ft) (*lbf·in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.8</td>
<td>2</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.8</td>
<td>3.1</td>
</tr>
<tr>
<td>4-0.7</td>
<td>4.2</td>
<td>4.6</td>
</tr>
<tr>
<td>5-0.8</td>
<td>8.4</td>
<td>9.3</td>
</tr>
<tr>
<td>6-1.0</td>
<td>14.3</td>
<td>15.8</td>
</tr>
<tr>
<td>8-1.25</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>10-1.5</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>12-1.75</td>
<td>132</td>
<td>145</td>
</tr>
<tr>
<td>14-2.0</td>
<td>210</td>
<td>232</td>
</tr>
<tr>
<td>16-2.0</td>
<td>326</td>
<td>360</td>
</tr>
<tr>
<td>20-2.5</td>
<td>637</td>
<td>704</td>
</tr>
<tr>
<td>24-3.0</td>
<td>1101</td>
<td>1217</td>
</tr>
</tbody>
</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 (Nm)</th>
<th>Torque (lbf·ft) (*lbf·in)</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>
<td>7</td>
</tr>
<tr>
<td>6-1.0</td>
<td>10.7</td>
<td>11.8</td>
</tr>
<tr>
<td>8-1.25</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>10-1.5</td>
<td>51</td>
<td>57</td>
</tr>
<tr>
<td>12-1.75</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>14-2.0</td>
<td>143</td>
<td>158</td>
</tr>
<tr>
<td>16-2.0</td>
<td>222</td>
<td>246</td>
</tr>
<tr>
<td>20-2.5</td>
<td>434</td>
<td>480</td>
</tr>
<tr>
<td>24-3.0</td>
<td>750</td>
<td>829</td>
</tr>
</tbody>
</table>

### 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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.8 (Cast Aluminum)</td>
</tr>
<tr>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>M3</td>
<td>–</td>
</tr>
<tr>
<td>M4</td>
<td>–</td>
</tr>
<tr>
<td>M5</td>
<td>–</td>
</tr>
<tr>
<td>M6</td>
<td>9</td>
</tr>
<tr>
<td>M8</td>
<td>20</td>
</tr>
<tr>
<td>M10</td>
<td>40</td>
</tr>
<tr>
<td>M12</td>
<td>70</td>
</tr>
<tr>
<td>M14</td>
<td>–</td>
</tr>
<tr>
<td>M16</td>
<td>–</td>
</tr>
</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, page 212.

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$^5$</th>
<th>Flats from Finger Tight (FFFT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</td>
<td>lbf·ft</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>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>19–21</td>
<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>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>81–89</td>
<td>60–66</td>
</tr>
<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>
</tr>
<tr>
<td>-16</td>
<td>1 5/16–12</td>
<td>160–176</td>
<td>118–130</td>
</tr>
<tr>
<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>

$^5$ Torque values shown are based on lubricated connections as in reassembly.
O-Ring Boss 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 backup 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;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</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>

---

<sup>6</sup> Torque values shown are based on lubricated connections as in reassembly.
**O-Ring Boss 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, page 215.
6. Check final condition of fitting.

![Figure 8.13: Hydraulic Fitting](image)

**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*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</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>

---

7. Torque values shown are based on lubricated connections as in reassembly.
**O-Ring Face Seal 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, page 216.

   **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$^8$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>-3</td>
<td>Note$^9$</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$^9$</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>
</tbody>
</table>

---

8. Torque values and angles shown are based on lubricated connection as in reassembly.
9. O-ring face seal type end not defined for this tube size.
Table 8.13  O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Tube O.D. (in.)</th>
<th>Torque Value(^{10})</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14</td>
<td>Note(^{9})</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>

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) and flats from finger tight (FFFT) values are shown in Table 8.14, page 217. Make sure that tube end of a shaped connector (typically 45 degree or 90 degree) 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:**

Overtorque 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 TFFT</th>
<th>Recommended FFFT</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>
</tbody>
</table>

\(^{10}\) Torque values and angles shown are based on lubricated connection as in reassembly.
## 8.2 Conversion Chart

### Table 8.15 Conversion Chart

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SI Units (Metric)</th>
<th>Factor</th>
<th>US Customary Units (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>hectare</td>
<td>ha</td>
<td>x 2.4710 =</td>
</tr>
<tr>
<td>Flow</td>
<td>liters per minute</td>
<td>L/min</td>
<td>x 0.2642 =</td>
</tr>
<tr>
<td>Force</td>
<td>Newton</td>
<td>N</td>
<td>x 0.2248 =</td>
</tr>
<tr>
<td>Length</td>
<td>millimeter</td>
<td>mm</td>
<td>x 0.0394 =</td>
</tr>
<tr>
<td>Length</td>
<td>meter</td>
<td>m</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Power</td>
<td>kilowatt</td>
<td>kW</td>
<td>x 1.341 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascal</td>
<td>kPa</td>
<td>x 0.145 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>megapascal</td>
<td>MPa</td>
<td>x 145.038 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>bar (Non-SI)</td>
<td>bar</td>
<td>x 14.5038 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meter</td>
<td>Nm</td>
<td>x 0.7376 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meter</td>
<td>Nm</td>
<td>x 8.8507 =</td>
</tr>
<tr>
<td>Temperature</td>
<td>degrees Celsius</td>
<td>°C</td>
<td>(°C x 1.8) + 32 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per minute</td>
<td>m/min</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per second</td>
<td>m/s</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>kilometers per hour</td>
<td>km/h</td>
<td>x 0.6214 =</td>
</tr>
<tr>
<td>Volume</td>
<td>liter</td>
<td>L</td>
<td>x 0.2642 =</td>
</tr>
<tr>
<td>Volume</td>
<td>milliliter</td>
<td>mL</td>
<td>x 0.0338 =</td>
</tr>
<tr>
<td>Volume</td>
<td>cubic centimeter</td>
<td>cm³ or cc</td>
<td>x 0.061 =</td>
</tr>
<tr>
<td>Weight</td>
<td>kilogram</td>
<td>kg</td>
<td>x 2.2046 =</td>
</tr>
</tbody>
</table>
Index

A
A40D
auger drive ..................................................... 148
A40DX
auger drive ..................................................... 148
API
definition .......................................................... 19
ASTM
definition .......................................................... 19
attaching/detaching
A40D SP windrower header
attaching to M205 .......................................... 45
attaching to windrower
hydraulic hose routing – M100, M105, M205
only ................................................................. 50
M100 or M105............................................ 31
M150, M155, or M155E4............................. 36
M200......................................................... 40
detaching A40D from windrower ............. 55
modifications needed to attach header ......... 31
A40DX SP windrower header
attaching to M1 Series windrower ............. 25
detaching from M1 Series windrower ........ 29
auger and auger drives
auger pan
auger pan extensions for grass seed
special .......................................................... 90
adjusting extensions .................................... 90
straightening auger pan.................................. 162
grass seed special auger design ................. 89
replacing rubber fingers ............................... 163
stripper bar .................................................... 164
installing front stripper bar extensions ......... 165
removing stripper bar ..................................... 164
replacing stripper bar ..................................... 165
auger positions ................................................. 61
adjusting
auger fore-aft position ................................... 62
auger vertical position................................. 63
auger speeds
adjusting ......................................................... 61
break-in inspections ........................................... 105
C
center-links ..................................................... 19
definition .......................................................... 19
CGVW
definition .......................................................... 19
clearances
auger to stripper bar clearance ................. 61, 164
hold-down to knife section – DK ................. 131
reel tine to header pan clearance ............... 69
conditioners ....................................................... 167
conditioning
conditioner rolls
adjusting conditioner roll gap ..................... 76
adjusting conditioner roll tension ................ 78
roll alignment
checking/adjusting ........................................... 183
roll timing
checking/adjusting ........................................... 185
forming shield, See forming shields
hydraulic motor, See hydraulic motors
conversion chart ............................................... 218
cutting heights
setting ................................................................. 71
D
DDD
definition .......................................................... 19
definition of terms ................................................. 19
deflectors
forming shield
assembling ...................................................... 172
disassembling .................................................. 170
installing ......................................................... 174
self-propelled windrower headers
removing shield .............................................. 169
rear deflector (fluffer shield)
positioning rear deflector ......................... 80
side deflectors
positioning side deflectors ......................... 79
dividers, See tall crop dividers
DK
definition .......................................................... 19
DKD
definition .......................................................... 19
drive systems
A40D ............................................................. 140
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>center hold-down – DK header</td>
<td>131</td>
</tr>
<tr>
<td>grass seed special</td>
<td>88</td>
</tr>
<tr>
<td>hoses</td>
<td></td>
</tr>
<tr>
<td>checking for leaks</td>
<td>116</td>
</tr>
<tr>
<td>hydraulic drive hoses</td>
<td></td>
</tr>
<tr>
<td>routing for M1 Series only</td>
<td>25</td>
</tr>
<tr>
<td>routing for M100, M105, M205 only</td>
<td>50</td>
</tr>
<tr>
<td>reversion valve jumper hose</td>
<td></td>
</tr>
<tr>
<td>routing on M150, M155, M155E4, M200</td>
<td>49</td>
</tr>
<tr>
<td>hydraulic motors</td>
<td></td>
</tr>
<tr>
<td>installing hydraulic motor on gearbox</td>
<td>177</td>
</tr>
<tr>
<td>removing hydraulic motor from gearbox</td>
<td>176</td>
</tr>
<tr>
<td>hydraulics</td>
<td></td>
</tr>
<tr>
<td>checking for leaks</td>
<td>116</td>
</tr>
<tr>
<td>fittings</td>
<td></td>
</tr>
<tr>
<td>flare-type</td>
<td>212</td>
</tr>
<tr>
<td>O-ring boss (ORB) adjustable</td>
<td>213</td>
</tr>
<tr>
<td>O-ring boss (ORB) non-adjustable</td>
<td>215</td>
</tr>
<tr>
<td>O-ring face seal (ORFS)</td>
<td>216</td>
</tr>
<tr>
<td>tapered pipe thread fittings</td>
<td>217</td>
</tr>
<tr>
<td>hydraulic safety</td>
<td>6</td>
</tr>
<tr>
<td>servicing hydraulics</td>
<td>116</td>
</tr>
<tr>
<td>K</td>
<td></td>
</tr>
<tr>
<td>knife and knife drives</td>
<td></td>
</tr>
<tr>
<td>cutterbar</td>
<td>117</td>
</tr>
<tr>
<td>stub guards and hold-downs</td>
<td>88</td>
</tr>
<tr>
<td>knife</td>
<td></td>
</tr>
<tr>
<td>adjusting knife timing – DK header</td>
<td>137</td>
</tr>
<tr>
<td>removing spare knife from storage</td>
<td>120</td>
</tr>
<tr>
<td>replacing knife section</td>
<td>117</td>
</tr>
<tr>
<td>knife drive</td>
<td></td>
</tr>
<tr>
<td>windrower header</td>
<td>140</td>
</tr>
<tr>
<td>knife guards, See guards</td>
<td></td>
</tr>
<tr>
<td>knifehead bearing</td>
<td></td>
</tr>
<tr>
<td>removing</td>
<td>119</td>
</tr>
<tr>
<td>unplugging conditioner and knife</td>
<td>86</td>
</tr>
<tr>
<td>knife drive belts</td>
<td></td>
</tr>
<tr>
<td>windrower header</td>
<td></td>
</tr>
<tr>
<td>left side</td>
<td></td>
</tr>
<tr>
<td>adjusting timing belt tension</td>
<td>141</td>
</tr>
<tr>
<td>adjusting v-belt tension</td>
<td>140</td>
</tr>
<tr>
<td>installing double V-belts</td>
<td>144</td>
</tr>
<tr>
<td>installing timing belt</td>
<td>144</td>
</tr>
<tr>
<td>removing double V-belts</td>
<td>140</td>
</tr>
<tr>
<td>right side</td>
<td></td>
</tr>
<tr>
<td>adjusting timing belt tension</td>
<td>145</td>
</tr>
<tr>
<td>installing timing belt</td>
<td>147</td>
</tr>
<tr>
<td>removing timing belt</td>
<td>146</td>
</tr>
<tr>
<td>knife drive boxes</td>
<td>132</td>
</tr>
<tr>
<td>changing oil</td>
<td>137</td>
</tr>
<tr>
<td>installing knife drive box</td>
<td>134</td>
</tr>
<tr>
<td>installing pulley</td>
<td>136</td>
</tr>
<tr>
<td>mounting bolts</td>
<td>132</td>
</tr>
<tr>
<td>removing knife drive box</td>
<td>133</td>
</tr>
<tr>
<td>removing pulley</td>
<td>136</td>
</tr>
<tr>
<td>knife drives</td>
<td></td>
</tr>
<tr>
<td>knives</td>
<td>118</td>
</tr>
<tr>
<td>knife guards, See guards</td>
<td></td>
</tr>
<tr>
<td>knives</td>
<td></td>
</tr>
<tr>
<td>installing knife</td>
<td>118</td>
</tr>
<tr>
<td>knifehead bearings</td>
<td></td>
</tr>
<tr>
<td>installing</td>
<td>120</td>
</tr>
<tr>
<td>removing knife</td>
<td>118</td>
</tr>
<tr>
<td>L</td>
<td></td>
</tr>
<tr>
<td>lean bar position</td>
<td>61</td>
</tr>
<tr>
<td>lights</td>
<td></td>
</tr>
<tr>
<td>replacing light bulbs</td>
<td>191</td>
</tr>
<tr>
<td>lock-out valves</td>
<td></td>
</tr>
<tr>
<td>lift cylinder lock-out valves</td>
<td>59</td>
</tr>
<tr>
<td>lubrication</td>
<td>107</td>
</tr>
<tr>
<td>lubrication points</td>
<td>107</td>
</tr>
<tr>
<td>drivelines</td>
<td>112</td>
</tr>
<tr>
<td>hay conditioner</td>
<td>111</td>
</tr>
<tr>
<td>windrower header</td>
<td>108</td>
</tr>
<tr>
<td>recommended fluids and lubricants</td>
<td>225</td>
</tr>
<tr>
<td>M</td>
<td></td>
</tr>
<tr>
<td>M100/M105 SP windrows</td>
<td></td>
</tr>
<tr>
<td>attaching A40D header</td>
<td>31</td>
</tr>
<tr>
<td>M150, M155, and M155E4 SP windrows</td>
<td></td>
</tr>
<tr>
<td>attaching A40D header</td>
<td>36</td>
</tr>
<tr>
<td>M200 SP windrows</td>
<td></td>
</tr>
<tr>
<td>attaching A40D header</td>
<td>40</td>
</tr>
<tr>
<td>M205 SP windrows</td>
<td></td>
</tr>
<tr>
<td>attaching A40D header</td>
<td>45</td>
</tr>
<tr>
<td>maintenance and servicing</td>
<td>99</td>
</tr>
<tr>
<td>See also maintenance</td>
<td></td>
</tr>
<tr>
<td>break-in inspection</td>
<td>105</td>
</tr>
<tr>
<td>greasing procedure</td>
<td>107</td>
</tr>
<tr>
<td>maintenance record</td>
<td>104</td>
</tr>
<tr>
<td>maintenance requirements</td>
<td>103</td>
</tr>
<tr>
<td>preparing for servicing</td>
<td>99</td>
</tr>
<tr>
<td>preseason checks</td>
<td>105</td>
</tr>
<tr>
<td>safety</td>
<td>5</td>
</tr>
<tr>
<td>mechanical troubleshooting</td>
<td>204</td>
</tr>
<tr>
<td>metric bolts</td>
<td></td>
</tr>
<tr>
<td>torque specifications</td>
<td>209</td>
</tr>
<tr>
<td>model numbers</td>
<td>vi</td>
</tr>
<tr>
<td>moisture</td>
<td>97</td>
</tr>
<tr>
<td>motors</td>
<td></td>
</tr>
<tr>
<td>hydraulic motor</td>
<td></td>
</tr>
</tbody>
</table>
INDEX

installing on gearbox ........................................... 177
removing from gearbox ....................................... 176

N
NPT
definition .................................................................. 19

O
operating windrower header .................................. 25
recommended operating settings ................................... 82
variables affecting performance ................................... 60
auger fore-aft position ........................................... 62
auger position ..................................................... 61
auger speed ....................................................... 61
auger vertical position ........................................... 63
conditioner roll alignment ....................................... 183
conditioner roll gap ............................................... 76
conditioner roll tension .......................................... 78
conditioner roll timing ........................................... 185
cutting height ...................................................... 71
feed pan and rock drop tine position ......................... 75
float
M Series .............................................................. 72
M1 Series ............................................................ 72
forming shield position ......................................... 79
ground speed ....................................................... 93
header angles ....................................................... 70
lean bar ............................................................... 61
rear deflector position .......................................... 80
reel fore-aft position ............................................. 64
reel position ....................................................... 64
reel speed ........................................................... 61
reel tine to header pan clearance ............................... 69
reel vertical position ............................................. 66
side deflector position .......................................... 79
tall crop dividers, See tall crop dividers ....................... 69
tine aggressiveness .............................................. 69
options
additional gauge roller .......................................... 193
additional skid shoes ............................................. 193
replacement reel bat kits ........................................ 194
stub guard conversion kit ....................................... 194
tall crop divider kit ................................................ 195

ORB
definition ................................................................ 19
owner/operator responsibilities .................................. 16

P
pointed guards, See guards

power take-off (PTO)
PTO speed ................................................................ vi
preseason checks ................................................... 105
pulleys
installing ............................................................. 136
removing ............................................................. 136

R
raking ..................................................................... 98
reel and reel drives
replacement reel bat kit .......................................... 194
seven-bat reel
standard on grass seed special ................................. 89
windrower header
reel drive ............................................................ 148
reel positions
adjusting
reel position .......................................................... 64
reel fore-aft position ............................................. 64
reel tine to header pan clearance .............................. 69
reel vertical position ............................................. 66
reel speeds
adjusting ............................................................. 61
reel tines and tine bar bearings
A40D SP windrower header
replacing – disc #2 ............................................... 157
replacing opposite cam – section Y ......................... 159
replacing tine bar extension – section Z .................... 161
A40DX SP windrower header
replacing center section X ...................................... 157
replacing opposite cam – section Y ......................... 159
replacing tine bar extension – section Z .................... 161
adjusting reel tine aggressiveness ............................. 69
windrower header ................................................ 149
adjusting rock drop tine position ............................. 75
replacing – disc #2 ............................................... 153
replacing cam end – disc #1 .................................... 149
reference
header specifications .............................................. 21
maintenance requirements ...................................... 103
reverser valve jumper hose
routing hose – M150, M155, M155E4, M200 ............ 49
rock drop tine position
adjusting position .................................................. 75
RoHS
definition ............................................................. 19
roll alignment ....................................................... 183
roll gap ................................................................. 76
roll tension ........................................................... 78
roll timing ............................................................. 185
rpm
definition ............................................................. 19

RoHS
definition ............................................................. 19
roll alignment ....................................................... 183
roll gap ................................................................. 76
roll tension ........................................................... 78
roll timing ............................................................. 185
rpm
definition ............................................................. 19

rubber fingers .......................................................... 163

S

SAE
bolt torques .......................................................... 207
definition .......................................................... 19
safety
general safety .......................................................... 3
hydraulic safety .................................................... 6
maintenance safety .................................................. 5
operational ............................................................ 17
owner/operator responsibilities ................................... 16
safety alert symbols .................................................. 1
safety sign decals .................................................... 7
installing decals ...................................................... 7
interpreting decals .................................................. 10
locations on SP windrower headers ................................ 8
signal words .......................................................... 2
screws
definition .......................................................... 19
sealed bearings
installing ............................................................. 115
serial numbers ........................................................ vi
servicing, See maintenance and servicing
seven-bat reels
standard on grass seed special .................................. 89
sickles, See knife and knife drives
side deflectors
positioning side forming shields .................................. 79
SK
definition .......................................................... 19
skid shoes
additional skid shoes (optional) ................................ 193
replacing skid shoe wear plate ................................ 187
setting cutting height ............................................. 71
specifications
fluids and lubricants ............................................... 225
header ................................................................. 21
torque specifications ............................................... 207
storage ................................................................. 106
stripper bars
description .......................................................... 164
installing front extensions ....................................... 165
removing stripper bar ............................................ 164
replacing stripper bar ............................................. 165
teddng ................................................................. 98
TFFT
definition .......................................................... 19
topography .......................................................... 97
torque
definition .......................................................... 19
torque angles
definition .......................................................... 19
torque specifications ............................................... 207
flame-type hydraulic fittings .................................... 212
metric bolt specifications ........................................ 209
bolting into cast aluminum ....................................... 211
O-ring boss (ORB) hydraulic fittings – adjustable ...... 213
O-ring boss (ORB) hydraulic fittings – non-adjustable .. 215
O-ring face seal (ORFS) fittings .................................. 216
SAE bolt torque specifications .................................... 207
tapered pipe thread fittings ....................................... 217
torque-tension
definition .......................................................... 19
troubleshooting ..................................................... 199
header performance ............................................... 199
mechanical issues .................................................... 204
trucks
definition .......................................................... 19

U
unloading and assembly instructions .......................... 197
unplugging conditioner and knife ................................ 86

W
washers
definition .......................................................... 19
weather ............................................................... 97
windrower headers
attaching
A40D to M Series SP windrower ............................... 31
A40DX to M1 Series windrower ................................ 25
detaching
A40D from M Series SP windrower ........................... 55
A40DX from M1 Series windrower ............................ 29
grass seed special ................................................... 88
auger pan extensions ............................................. 90
adjusting extensions ............................................. 90
seven-bat reel (standard) ......................................... 89
special auger design ............................................. 89
stub guards and hold-downs .................................... 88
windrow forming rods ........................................... 92
hydraulic hose routing
for M1 Series only ................................................ 25
INDEX

for M100, M105, M205 only ............................50
troubleshooting mechanical issues ...................204
troubleshooting performance issues ............199
unplugging conditioner and knife ..................86
windrow forming rods .................................92

windrows
  driving on windrows ..................................98
  windrow characteristics .............................98

wobble boxes, See knife drive boxes
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>Grease</td>
<td>SAE Multi-Purpose</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 US qts)</td>
</tr>
<tr>
<td>Gear lubricant</td>
<td>SAE 85W-140</td>
<td>API service class GL-5</td>
<td>Conditioner drive gearbox</td>
<td>1 liter (1.06 US qts)</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 US gal)</td>
</tr>
</tbody>
</table>