R85
Rotary Disc 4.9-Meter (16-Foot) Self-Propelled Windrower Header

Unload and Assembly Instructions
214367 Revision A
2018 Model Year
Original Instruction

The harvesting specialists.
R85 Rotary Disc 4.9-Meter (16-Foot) Self-Propelled Windrower Header

Published: August 2017
Introduction

This instructional manual describes the unloading, setup, and predelivery requirements for MacDon Model R85 Rotary Disc 4.9-Meter (16-Foot) Self-Propelled Windrower Headers. Carefully read all the material provided before attempting to use or service the machine.

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.

Conventions

The following conventions are used in this document:

- Right and left are determined from the operator’s position, facing forward with the windrower in cab-forward position.
- Unless otherwise noted, use the standard torque values provided in Chapter 5 Reference, page 97 of this document.

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).
## 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 Changes</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed measurement format so that metric values appear first followed by imperial in parentheses.</td>
<td>Throughout the book</td>
</tr>
<tr>
<td>Added conventions to Introduction.</td>
<td>Introduction, page i</td>
</tr>
<tr>
<td>Added illustration, reorganized topic contents.</td>
<td>2 Unloading the Header, page 5</td>
</tr>
<tr>
<td>Updated illustration and adjusted callouts in steps.</td>
<td>3.4 Lowering Header, page 11</td>
</tr>
<tr>
<td>Updated illustration and figure title.</td>
<td>3.7 Unpacking Curtains, page 18</td>
</tr>
<tr>
<td>Added step, note, and illustration for installing M200 hose support on header.</td>
<td>3.9 Assembling Forming Shield, page 24</td>
</tr>
<tr>
<td>Added note to procedure.</td>
<td>3.10 Installing Forming Shield, page 28</td>
</tr>
<tr>
<td>Updated illustrations.</td>
<td>3.11.1 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link with Optional Self-Alignment, page 31</td>
</tr>
<tr>
<td>Updated illustrations.</td>
<td>3.11.2 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link without Optional Self-Alignment, page 36</td>
</tr>
<tr>
<td>Updated illustrations.</td>
<td>3.11.3 Attaching Header to an M200 Windrower: Mechanical Center-Link, page 41</td>
</tr>
<tr>
<td>Updated topic description.</td>
<td>3.12 Attaching Header to an M1 Series Windrower, page 45</td>
</tr>
<tr>
<td>Updated procedure steps and illustrations.</td>
<td>3.12.1 Attaching Header to an M1240 Windrower: Hydraulic Center-Link with Optional Self-Alignment, page 45</td>
</tr>
<tr>
<td>Updated illustration.</td>
<td>3.12.2 Attaching Header to an M1240 Windrower: Hydraulic Center-Link without Optional Self-Alignment, page 50</td>
</tr>
<tr>
<td>Added steps for connecting header to M205 windrower using hard plumb connections.</td>
<td>3.13.1 Attaching Hydraulic and Electrical Components: M205 Windrowers, page 56</td>
</tr>
<tr>
<td>Added note for removing electrical harness extension from header before connecting to M205 windrower.</td>
<td>3.13.1 Attaching Hydraulic and Electrical Components: M205 Windrowers, page 56</td>
</tr>
<tr>
<td>Updated steps and illustrations, clarified manifold port IDs for hydraulic connections.</td>
<td>3.13.2 Attaching Hydraulic and Electrical Components: M200 Windrowers, page 61</td>
</tr>
<tr>
<td>Updated procedure to include steps for connecting header to M1240 windrower using quick-connect and hard plumb fittings.</td>
<td>3.13.3 Attaching Hydraulics and Electrical: M1240 Windrowers, page 67</td>
</tr>
<tr>
<td>Added note at beginning of topic and added footnote referring users to quick coupler kits available for M1240 windrowers configured for disc headers, and auger and draper headers.</td>
<td>3.13.3 Attaching Hydraulics and Electrical: M1240 Windrowers, page 67</td>
</tr>
<tr>
<td>Summary of Changes</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Updated figure title/description.</td>
<td>3.14.5 Installing Tall Crop Feed Plates, page 74</td>
</tr>
<tr>
<td>Updated topic title.</td>
<td>4.2 Checking Header Float: M200 and M205 Windrowers, page 83</td>
</tr>
<tr>
<td>Added topic to manual.</td>
<td>4.3 Checking Header Float: M1240 Windrowers, page 84</td>
</tr>
<tr>
<td>Added topic to manual.</td>
<td>4.3.1 Setting the Float: M1240 Windrower, page 84</td>
</tr>
<tr>
<td>Updated procedure illustrations.</td>
<td>4.4 Checking Header Level, page 86</td>
</tr>
<tr>
<td>Added note and steps to procedure. Updated figure title/description.</td>
<td>4.5.1 Checking Conditioner Roll Gap, page 88</td>
</tr>
<tr>
<td>Added hazard statement and steps.</td>
<td>4.5.2 Checking Conditioner Roll Timing, page 89</td>
</tr>
<tr>
<td>Reordered procedure steps.</td>
<td>4.8 Preparing the Conditioner Roll Timing Gearbox, page 93</td>
</tr>
<tr>
<td>Updated illustration to show new light brackets and added identifying callouts to procedure.</td>
<td>4.9 Checking Lights, page 94</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

Introduction.................................................................................................................................................i
List of Revisions .......................................................................................................................................... ii

Chapter 1: Safety ......................................................................................................................................... 1
1.1 Signal Words ........................................................................................................................................1
1.2 General Safety .....................................................................................................................................2
1.3 Safety Signs .........................................................................................................................................4

Chapter 2: Unloading the Header ................................................................................................................. 5

Chapter 3: Assembling the Header .............................................................................................................. 7
3.1 Removing Underside Shipping Support and Installing Auger Pan .........................................................7
3.2 Installing Skid Shoes (Optional) ..........................................................................................................9
3.3 Installing Gauge Rollers (Optional) ....................................................................................................10
3.4 Lowering Header ...............................................................................................................................11
3.5 Removing Shipping Stands ...............................................................................................................13
3.6 Installing Swath Baffle Lever ............................................................................................................17
3.7 Unpacking Curtains ...........................................................................................................................18
3.8 Attaching Conditioner Cover ...........................................................................................................22
3.9 Assembling Forming Shield ..............................................................................................................24
3.10 Installing Forming Shield ................................................................................................................28
3.11 Attaching Header to an M Series Windrower .....................................................................................31
  3.11.1 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link with Optional Self-Alignment ....................................................................................................................31
  3.11.2 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link without Optional Self-Alignment ....................................................................................................................36
  3.11.3 Attaching Header to an M200 Windrower: Mechanical Center-Link ..............................................41
3.12 Attaching Header to an M1 Series Windrower .....................................................................................45
  3.12.1 Attaching Header to an M1240 Windrower: Hydraulic Center-Link with Optional Self-Alignment ...........................................................................................................................45
  3.12.2 Attaching Header to an M1240 Windrower: Hydraulic Center-Link without Optional Self-Alignment ...........................................................................................................................50
3.13 Attaching Hydraulics and Electrical Connections ..............................................................................56
  3.13.1 Attaching Hydraulic and Electrical Components: M205 Windrowers ..........................................56
  3.13.2 Attaching Hydraulic and Electrical Components: M200 Windrowers ........................................61
  3.13.3 Attaching Hydraulics and Electrical: M1240 Windrowers ............................................................67
3.14 Installing Other Options ....................................................................................................................71
  3.14.1 Installing Tall Crop Divider ........................................................................................................71
  3.14.2 Installing Double Windrow Attachment (DWA) ............................................................................72
  3.14.3 Installing Skid Shoes (Optional) ..................................................................................................73
  3.14.4 Installing Gauge Rollers (Optional) ............................................................................................73
  3.14.5 Installing Tall Crop Feed Plates ................................................................................................74
3.14.6 Installing Nut Protectors (for Blade Hardware on Discs) ..............................................................74
3.15 Lubricating the Header .....................................................................................................................75
  3.15.1 Driveshields ................................................................................................................................75
    Opening the Driveshield: North American Headers ........................................................................75
    Closing the Driveshield: North American Headers .......................................................................75
    Opening the Driveshield: Export Headers ......................................................................................76
    Closing the Driveshield: Export Headers ......................................................................................76
3.15.2 Greasing Procedure ....................................................................................................................77
3.15.3 Lubrication Points .......................................................................................................................77

Chapter 4: Performing Predelivery Checks .......................................................................................81
  4.1 Checking Drive Belts .........................................................................................................................81
  4.2 Checking Header Float: M200 and M205 Windrowers ....................................................................83
  4.3 Checking Header Float: M1240 Windrowers ...............................................................................84
    4.3.1 Setting the Float: M1240 Windrower .......................................................................................84
  4.4 Checking Header Level ....................................................................................................................86
  4.5 Checking Conditioner Rolls ............................................................................................................88
    4.5.1 Checking Conditioner Roll Gap ...............................................................................................88
    4.5.2 Checking Conditioner Roll Timing .........................................................................................89
  4.6 Checking Gauge Rollers or Skid Shoes ............................................................................................91
  4.7 Preparing the Bevel Gearbox ............................................................................................................92
  4.8 Preparing the Conditioner Roll Timing Gearbox .............................................................................93
  4.9 Checking Lights ............................................................................................................................94
  4.10 Checking Manuals .........................................................................................................................95
  4.11 Running up the Header ................................................................................................................96

Chapter 5: Reference ............................................................................................................................97
  5.1 Torque Specifications .........................................................................................................................97
    5.1.1 SAE Bolt Torque Specifications ...............................................................................................97
    5.1.2 Metric Bolt Specifications .......................................................................................................99
    5.1.3 Metric Bolt Specifications Bolting into Cast Aluminum ........................................................101
    5.1.4 Flare-Type Hydraulic Fittings ................................................................................................102
    5.1.5 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable) ................................................................103
    5.1.6 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable) .....................................................105
    5.1.7 O-Ring Face Seal (ORFS) Hydraulic Fittings ........................................................................106
    5.1.8 Tapered Pipe Thread Fittings .................................................................................................107
  5.2 Conversion Chart ............................................................................................................................108
  5.3 Definitions .......................................................................................................................................109

Predelivery Checklist ...........................................................................................................................111
1 Safety

1.1 Signal Words

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

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

⚠️ WARNING
Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. It may also be used to alert against unsafe practices.

⚠️ CAUTION
Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may be used to alert against unsafe practices.
1.2 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.
1.3 Safety Signs

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

Figure 1.7: Operator’s Manual Decal
2 Unloading the Header

⚠️ CAUTION
To avoid injury to bystanders from being struck by machinery, do NOT allow people to stand in unloading area.

⚠️ CAUTION
Equipment used for unloading must meet or exceed the requirements specified below. Using inadequate equipment may result in chain breakage, vehicle tipping, or machine damage.

IMPORTANT:
Forklifts are normally rated for a load located 610 mm (24 in.) ahead of the back end of the forks. To obtain the forklift capacity at 1220 mm (48 in.), check with your forklift distributor.

Table 2.1 Lifting Vehicle

<table>
<thead>
<tr>
<th>Minimum Capacity</th>
<th>3630 kg (8000 lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Fork Length</td>
<td>198 cm (78 in.)</td>
</tr>
</tbody>
</table>

1. Remove hauler’s tie-down straps and chains.

⚠️ WARNING
Be sure forks are secure before moving away from load. Stand clear when lifting.

2. Approach header from its underside and slide forks in under the lifting framework as far as possible.

IMPORTANT:
If load is two units wide, take care to avoid contacting the other machine.

3. Raise header off the deck.
UNLOADING THE HEADER

4. Back up until the unit clears trailer, and slowly lower to 150 mm (6 in.) from the ground.
5. Take to storage or setup area.
6. Set machine down on secure, level ground.
7. If hydraulic motor and hoses are shipped separately on pallet, unload pallet.
8. Check for shipping damage and missing parts.

Figure 2.3: Moving Header with Forklift
3 Assembling the Header

3.1 Removing Underside Shipping Support and Installing Auger Pan

⚠️ CAUTION
Keep feet clear when removing final bolts.

1. Use a forklift to support stand.
2. Remove two bolts (A) on each end of support and remove shipping support (B). Lay support on ground.
3. Cut banding (A), and remove auger pan (B) and hardware from stand. Discard stand.
4. Locate the hardware bag strapped between auger pan (B) and the stand.
5. Position auger pan (A) against cutterbar lugs and install four 1/2 x 3.5 in. long bolts (B) and lock nuts. Do **NOT** fully tighten.

6. Check and make sure that auger pan is oriented as shown.

7. Check and make sure that center pan is position evenly before tightening. Tighten enough so nut is locked and pan can still pivot.

8. Retrieve plates (C) from hardware bag, and install as shown at each end of pan with four 1/2 x 1.0 in. bolts (D). Tighten hardware.

**NOTE:**
There may be a gap between the cutterbar lugs and the auger pan when tightening the hardware. The hardware does not need to pull the auger pan flush against the cutterbar lugs.
3.2 Installing Skid Shoes (Optional)

NOTE:
This kit may be installed later in the assembly sequence, but installation may be easier prior to laying the header down.

⚠️ DANGER
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.

1. Lower header to the ground, shut off engine, and remove key from ignition.
2. Unpack kit.
3. Install skid shoes. Refer to instruction supplied with kit.

Figure 3.4: Skid Shoe (Right Side Shown – Left Side Similar)
3.3 Installing Gauge Rollers (Optional)

NOTE:
This kit may be installed later in the assembly sequence, but installation may be easier prior to laying the header down.

1. Unpack gauge roller bundle and install gauge rollers. Refer to instruction supplied with kit.

![Figure 3.5: Gauge Roller (Right Side Shown – Left Side Similar)]
3.4 Lowering Header

CAUTION

Equipment used for lowering the header must meet or exceed the requirements specified below. Using inadequate equipment may result in chain breakage, vehicle tipping, or machine damage.

Table 3.1 Lifting Vehicle

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Overhead lifting quality 12.7 mm (1/2 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Working Load</td>
<td>2270 kg (5000 lb.)</td>
</tr>
</tbody>
</table>

1. Attach spreader bar (A) to forks.

   IMPORTANT:
   Length of spreader bar must be approximately 4.6 m (15 ft).

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast as the header is lowered to the ground.

2. Drive lifting vehicle to approach header from its underside.

3. Attach chains to hooks (B) on both sides of header.

   IMPORTANT:
   Chain length must be sufficient to provide a minimum 1.2 m (4 ft.) vertical chain height.

   IMPORTANT:
   Do NOT lift at hooks when unloading from trailer. This procedure is only for laying the machine over into working position.

4. Raise forks until lift chains are fully tensioned.
CAUTION

Stand clear when lowering the header.

5. Back up SLOWLY, while simultaneously lowering header until cutterbar rests on ground.

6. Remove chains from header.

Figure 3.7: Lowering Header to the Ground
3.5 Removing Shipping Stands

1. Cut and remove banding (A) from baffle.

2. Remove plate (A) from left shipping stand (B) and set aside with hardware for reinstallation.

Figure 3.8: Banding on Baffle

Figure 3.9: Shipping Stand (Left Side Shown – Right Side Opposite)
3. Remove the three bolts (A) securing left stand (B) to shipping channel plate and shield.

4. Remove bolt (A) securing shipping stand to header lifting arm.

5. Remove hairpin from pin (B).

6. Hold shipping stand, and remove pin (B).

7. Remove stand (C) and discard. Reinsert pin (B) in header lifting arm, and secure with lynch pin.

8. Repeat Step 3, page 14 to Step 7, page 14 for other stand.

9. Raise baffle (A) with handle, and temporarily secure in raised position with wire.
10. Remove two bolts (A) attaching shipping channel (B) to frame. Retain hardware.

11. Remove the two bolts (A) attaching shipping channel (B) to frame. Retain hardware.

12. Remove wire and lower baffle so that channel can be removed.

13. Remove and discard channel (B).

14. Reinstall two bolts (A) through frame and tighten.
15. Reinstall two bolts (A) and lock nuts into cover support and tighten.

![Figure 3.16: Frame with Shipping Stand Removed](image)

16. Remove hooks (A) at front corners. Reinstall hardware.

**NOTE:**
If tall crop divider option will be installed, do not reinstall hardware.

![Figure 3.17: Shipping Hook](image)

17. Remove wire, and lower baffle (A).

![Figure 3.18: Swath Baffle](image)
3.6 Installing Swath Baffle Lever

1. Retrieve adjuster plate and hardware previously removed from shipping stand (in 3.5 Removing Shipping Stands, page 13).

2. Position adjuster plate (A) over holes on side deflector, and install bolts (E) and nuts. Do **NOT** tighten.

3. Remove bolt (B).

4. Remove lynch pin from clevis pin (D), and remove clevis pin from lever (C).

5. Move swath baffle lever (C) to middle hole in bracket (A), and reinstall clevis pin (D) through lever and bracket.

6. Secure with lynch pin.

7. Tighten bolts (G).

   **NOTE:**
   Baffle position may need to be adjusted for proper pin engagement. Loosen bolts (E), and adjust bracket (F) and baffle as required. Tighten bolts (E).

8. Reinstall nut and bolt (B).
3.7 Unpacking Curtains

1. Remove two bolts (A) securing cutterbar doors to frame.

2. Remove shipping wire (B) from around curtains.

⚠️ WARNING

Ensure cutterbar is completely clear of foreign objects. These objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

3. For export headers, insert a screwdriver (or equivalent) through hole (A) in door into notch in latch (B) and push latch to disengage.

---

Figure 3.21: Cutterbar Door and Curtain Secured for Shipping (View From Below Cutterbar Door)

Figure 3.22: Export Headers: Latch on Cutterbar Doors
4. Lift at front of door to open position.
5. Check cutterbar area for debris and foreign objects. Ensure all material is removed.

6. Close cutterbar doors. Ensure that curtains hang properly and completely enclose cutterbar area. Minor creases in curtains will eventually straighten out.
7. For export headers, ensure latches (A) engage cutterbar doors.

8. Fasten latches (A) at corners of curtains.
9. Remove shipping edge trim (A).

10. Close the shields (B) over the two shipping tie-down holes and tighten nuts (C).

11. Remove shipping wire banding and protective packing (A) from hydraulic hoses.
3.8 Attaching Conditioner Cover

1. Remove bolts (A) and remove cover (B) from shipping position.

2. Replace bolts (A) into existing holes.

3. Remove six carriage bolts (A) along aft edge.
ASSEMBLING THE HEADER

4. Position cover (A) on hood as shown and secure with six carriage bolts (B) and lock nuts.

Figure 3.32: Cover Installed
### 3.9 Assembling Forming Shield

1. Unpack and remove shipping material from side deflectors (A).
2. Remove hardware bag (B).
3. Open the hardware bag.

4. Install rubber strap (A) to the side bracket (B) using bolt (C), washer (D), and nut (E).
5. Repeat for the other side.

6. Lay cover (A) upside down on a flat surface.
7. Install the center deflectors (B) using three bolts and nuts (C) on each side.

**NOTE:**
The narrow end of deflector (B) faces the front, and the deep end faces the rear.
8. Assemble side deflectors (C) to cover with 5/8 x 10 in. bolt (B), jam nut (E), washer (D), and nut (A).

9. Tighten flange nut (A) enough to hold deflectors (C) in position, but still allow deflectors to move.

10. Tighten jam nut (E) against cover while holding bolt (B).

11. Remove lynch pin (A) from adjuster rod (B), and position rod in hole in side deflector (C). Secure with lynch pin (A).

12. Repeat for other deflector.
13. Invert forming shield to installation position as shown.

![Figure 3.38: Forming Shield Right Side Up](image1)

14. **For M205 and M1240 Self-Propelled Windrowers:**
   Install hose support (A) to the left side of the top shield (B) and channel (C) using two bolts and nuts (D).

![Figure 3.39: Hose Support](image2)

15. **For M200 Self-Propelled Windrowers:** Install hose support (A) to the left forming shield (B) using two bolts (C) and flange nuts (D).

**NOTE:**
To operate the 4.9-meter (16-foot) header on an M200 windrower, installation of a motor/hose kit (MD #BS455) is required.

![Figure 3.40: Hose Support](image3)
NOTE:
If there are no mounting slots for the hose support, drill two 11 mm (7/16 in.) holes (A) through top shield (B) and channel (C).

Figure 3.41: Forming Shield Top View
A - Two 11 mm (7/16 in.) Holes  B - Top Shield
C - Channel          D - Header Forward
E - 320 mm (12.6 in.)  F - 144.8 mm (5.7 in.)
G - 19.5 mm (0.77 in.)
3.10 Installing Forming Shield

To install the forming shield, follow these steps:

1. To ease forming shield installation, remove header from windrower (if attached). Refer to your windrower operator’s manual for instructions.

2. Retrieve plate (A) and attachment hardware from forming shield bundle.

   **NOTE:**
   Hardware is supplied with forming shield bundle.

3. Attach plate (A) to windrower leg with two 1/2 x 5-1/4 in. hex bolts (B) and nuts. Repeat for opposite leg.

   **IMPORTANT:**
   Plate (A) is shown in standard position. If installing double windrow attachment (DWA), install plate in inverted position.

4. Install a 1/2 x 4 in. hex bolt (C) with spacer (D) and nut on each plate. Hardware is supplied with forming shield bundle.

5. Remove the two clevis pins (A) from forming shield forward end.

---

**Figure 3.42: Attaching Plate to Windrower Leg**

**Figure 3.43: Clevis Pin at Forward End of Forming Shield**
6. Position the forming shield (A) under the windrower frame.

7. Position the forming shield onto spacers (B) on windrower legs. Secure with clevis pins (A) and lynch pin.
ASSEMBLING THE HEADER

8. Lift the aft end of the forming shield and attach straps (B) to pins (A) on windrower frame. Install washer and hairpin to secure strap. Use the middle hole and adjust height to suit the crop.

9. Set the forming shield side deflectors to the desired width by repositioning adjuster bars (A). Use the same hole location on both sides.

10. Adjust rear fluffer deflector (C) to middle position. Loosen handles (B) if required.
3.11 Attaching Header to an M Series Windrower

The procedure for attaching the header to an M Series windrower varies depending on the type of center-link installed. The center-link consists of either a hydraulic cylinder that adjusts the header tilt or angle and is controlled with switches in the windrower cab, or a manually adjusted mechanical link.

An optional self-alignment kit controls the alignment of the center-link when attaching the link to the header.

Follow the appropriate procedure:

- 3.11.1 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link with Optional Self-Alignment, page 31
- 3.11.2 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link without Optional Self-Alignment, page 36
- 3.11.3 Attaching Header to an M200 Windrower: Mechanical Center-Link, page 41

**NOTE:**
Refer to your windrower operator’s manual for windrower operating instructions.

3.11.1 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link with Optional Self-Alignment

1. Remove hairpin (B) from clevis pin (A) and remove clevis pin from the header supports (C) on both sides of the header.

---

**CAUTION**

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and NOT in engaged position (A).
CAUTION

Check to be sure all bystanders have cleared the area.

2. Start the engine and activate the HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

IMPORTANT:
If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

3. Activate the REEL UP switch (A) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

4. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.
5. Use the following GSL functions to position the center-link hook above the header attachment pin:
   - REEL UP (A) to raise the center-link
   - REEL DOWN (B) to lower the center-link
   - HEADER TILT UP (C) to retract the center-link
   - HEADER TILT DOWN (D) to extend the center-link

6. Adjust position of the center-link cylinder (A) with the REEL UP and REEL DOWN switches on the GSL until the hook is positioned above the header attachment pin.

   **IMPORTANT:**
   Hook release must be down to enable self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.

7. Lower center-link (A) onto the header with REEL DOWN switch until it locks into position (hook release [B] is down).

8. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.

   **CAUTION**
   Check to be sure all bystanders have cleared the area.

9. Press the HEADER UP switch (A) to raise header to maximum height.

10. If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
    a. Press and hold the HEADER UP switch until both cylinders stop moving.
    b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

   **NOTE:**
   It may be necessary to repeat this procedure if there is air in the system.
11. Engage safety props on both lift cylinders as follows:
   a. Stop engine and remove key from ignition.
   b. Pull lever (A) and rotate towards the header to release and lower safety prop (B) onto the lift cylinder.
   c. Repeat for opposite lift cylinder.

12. Install clevis pin (A) through support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

**IMPORTANT:**
Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.
ASSEMBLING THE HEADER

13. Remove clevis pin from storage position (B) in linkage and insert into hole (A) to engage float springs. Secure with hairpin.

14. Disengage safety prop by turning lever (A) downwards to release and lower stop until lever locks into vertical position.

15. Repeat for opposite safety prop.

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

16. Start the engine and activate the HEADER DOWN switch (A) on the GSL to fully lower the header.

17. Stop engine and remove key from ignition.
3.11.2 Attaching Header to an M200 or M205 Windrower: Hydraulic Center-Link without Optional Self-Alignment

⚠️ DANGER
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.

1. Remove hairpin (B) from clevis pin (A) and remove clevis pin from the header supports (C) on both sides of the header.

⚠️ CAUTION
To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and NOT in engaged position (A).
CAUTION
Check to be sure all bystanders have cleared the area.

2. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

3. Relocate pin (A) in frame linkage as required to raise the center-link (B) until the hook is above the attachment pin on the header.

IMPORTANT:
If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

4. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.
5. Use the following GSL functions to position the center-link hook above the header attachment pin:
   • HEADER TILT UP (A) to retract the center-link
   • HEADER TILT DOWN (B) to extend the center-link
6. Stop engine and remove key from ignition.

7. Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

   **IMPORTANT:**
   Hook release must be down to enable self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.

8. Check that center-link (A) is locked onto header by pulling upward on rod end (B) of cylinder.

---

**CAUTION**

Check to be sure all bystanders have cleared the area.

9. Start the engine.

10. Press the HEADER UP switch (A) to raise header to maximum height.

11. If one end of the header does NOT fully raise, rephase the lift cylinders as follows:
    a. Press and hold the HEADER UP switch until both cylinders stop moving.
    b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

   **NOTE:**
   It may be necessary to repeat this procedure if there is air in the system.
ASSEMBLING THE HEADER

12. Engage safety props on both lift cylinders as follows:
   a. Stop engine and remove key from ignition.
   b. Pull lever (A) and rotate towards the header to release and lower safety prop (B) onto the lift cylinder.
   c. Repeat for opposite lift cylinder.

13. Install clevis pin (A) through support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

   IMPORTANT:
   Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.
14. Remove clevis pin from storage position (B) in linkage and insert into hole (A) to engage float springs. Secure with hairpin.

15. Disengage safety prop by turning lever (A) downwards to release and lower stop until lever locks into vertical position.

16. Repeat for opposite safety prop.

⚠️ CAUTION
Check to be sure all bystanders have cleared the area.

17. Start the engine and activate the HEADER DOWN switch (A) on the GSL to fully lower the header.

18. Stop engine and remove key from ignition.
3.11.3 Attaching Header to an M200 Windrower: Mechanical Center-Link

⚠️ DANGER
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.

1. Remove hairpin (B) from clevis pin (A) and remove clevis pin from the header supports (C) on both sides of the header.

⚠️ CAUTION
To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and NOT in engaged position (A).

⚠️ CAUTION
Check to be sure all bystanders have cleared the area.

2. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.
3. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

4. Stop engine and remove key from ignition.
5. Loosen nut (A) and rotate barrel (B) to adjust length until the link is aligned with the header bracket.
6. Install clevis pin (C) and secure with cotter pin (D).
7. Adjust length of link to achieve proper header angle by rotating barrel (B). Tighten nut (A) against barrel (a slight tap with a hammer is sufficient).

⚠️ CAUTION
Check to be sure all bystanders have cleared the area.

8. Start the engine.
9. Press the HEADER UP switch (A) to raise header to maximum height.
10. If one end of the header does NOT fully raise, rephase the lift cylinders as follows:
   a. Press and hold the HEADER UP switch until both cylinders stop moving.
   b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

   NOTE:
   It may be necessary to repeat this procedure if there is air in the system.
11. Engage safety props on both lift cylinders as follows:
   a. Stop engine and remove key from ignition.
   b. Pull lever (A) and rotate towards the header to release and lower safety prop (B) onto the lift cylinder.
   c. Repeat for opposite lift cylinder.

12. Install clevis pin (A) through support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

   **IMPORTANT:**
   Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.
13. Remove clevis pin from storage position (B) in linkage and insert into hole (A) to engage float springs. Secure with hairpin.

14. Disengage safety prop by turning lever (A) downwards to release and lower stop until lever locks into vertical position.

15. Repeat for opposite safety prop.

⚠ CAUTION
Check to be sure all bystanders have cleared the area.

16. Start the engine and activate the HEADER DOWN switch (A) on the GSL to fully lower the header.

17. Stop engine and remove key from ignition.
3.12 Attaching Header to an M1 Series Windrower

The procedure for attaching the header to an M1 Series windrower varies depending on the type of center-link installed.

Follow the appropriate procedure:

- 3.12.1 Attaching Header to an M1240 Windrower: Hydraulic Center-Link with Optional Self-Alignment, page 45
- 3.12.2 Attaching Header to an M1240 Windrower: Hydraulic Center-Link without Optional Self-Alignment, page 50

NOTE:
Refer to your windrower operator’s manual for windrower operating instructions.

3.12.1 Attaching Header to an M1240 Windrower: Hydraulic Center-Link with Optional Self-Alignment

⚠️ DANGER
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.

1. Remove hairpin (B) from clevis pin (A), and remove pin from header support (C) on both sides of header.

   IMPORTANT:
   Remove protective cover from exhaust stack prior to starting engine.

⚠️ CAUTION
Check to be sure all bystanders have cleared the area.

2. Start engine.

⚠️ CAUTION
To prevent damage to the header lift linkages when lowering header lift legs without a header or weight box attached to the windrower, ensure the float springs tension is fully released.
NOTE:
If not prompted by the HPT display to remove header float, remove header float manually by doing the following:

3. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QuickMenu options.
4. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B), and press scroll knob to select.

5. On Float Adjust page, press soft key 3 (A) to remove 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 RESUME FLOAT.

6. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract header lift cylinders.
7. Press REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

IMPORTANT:
If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.
8. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue to drive slowly forward until feet engage the supports and header nudges forward.

9. Ensure that lift linkages are properly engaged in header legs.

10. Adjust position of the center-link cylinder (A) with the switches on the GSL until the hook (B) is above the header attachment pin.

**IMPORTANT:**
Hook release (C) must be down to enable self-locking mechanism. If the release is open (up), manually push it down after the hook engages the header pin.

11. Lower center-link (A) onto the header with REEL DOWN switch on GSL until it locks into position (hook release [C] is down). Refer to Figure 3.89, page 46 for GSL controls.

12. Check that the center-link is locked onto header by pressing the REEL UP switch on the GSL. Refer to Figure 3.89, page 46 for GSL controls.

⚠️ **CAUTION**
Check to be sure all bystanders have cleared the area.


14. Press HEADER UP switch (A) to raise header to maximum height.

15. If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
   a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
   b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

16. Stop the engine, and remove the key.
17. Engage safety prop on lift cylinder as follows:
   a. Pull lever (A) and rotate toward header to release, and lower safety prop onto cylinder.
   b. Repeat for opposite lift cylinder.

   **IMPORTANT:**
   Ensure the safety props engage over the cylinder piston rods. If safety prop does not engage properly, raise header until prop fits over the rod.

18. Install clevis pin (A) through support and foot, and secure with hairpin (B). Repeat for opposite side.

   **IMPORTANT:**
   Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

19. Disengage safety prop by turning lever (A) downward to raise safety prop until lever locks into vertical position.

   **NOTE:**
   If safety prop will not disengage, raise header slightly.

20. Repeat for opposite side.

⚠️ **CAUTION**

Check to be sure all bystanders have cleared the area.
21. Start engine and press HEADER DOWN switch (A) on GSL to fully lower header.

22. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QuickMenu options.

23. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B), and press scroll knob to select.

24. Turn scroll knob (A) to highlight left or right float setting and press knob (A) to activate selection.

25. Rotate scroll knob (A) to adjust float setting and press knob when finished.

**IMPORTANT:**
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.

26. Stop the engine, and remove the key.

27. Grasp one end of the rotary header and lift. Lifting force should be 426–471 N (95–105 lbf) and should be the same at both ends.
3.12.2 Attaching Header to an M1240 Windrower: Hydraulic Center-Link without Optional Self-Alignment

⚠️ DANGER
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.

1. Relocate pin (A) in frame linkage as required to raise the center-link (B) until the hook is above the attachment pin on the header.
   
   **IMPORTANT:**
   If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

2. Remove hairpin (B) from clevis pin (A) and remove pin from header boots (C) on both sides of header.
   
   **IMPORTANT:**
   Remove protective cover from exhaust stack prior to starting engine.

⚠️ CAUTION
Check to be sure all bystanders have cleared the area.

CAUTION

To prevent damage to the header lift linkages when lowering header lift legs without a header or weight box attached to the windrower, ensure the float springs tension is fully released.

NOTE:
If not prompted by the HPT display to remove header float, remove header float manually by doing the following:

4. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QUICK MENU options.

5. Rotate scroll knob (A) to highlight the HEADER FLOAT symbol (B) and press scroll knob to select. Screen changes.

6. Press soft key 3 (A) to remove 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 RESUME FLOAT.
7. Press HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

8. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

9. Ensure that lift linkages are properly engaged in header legs.

10. Press HEADER TILT UP (A) and HEADER TILT DOWN (B) cylinder switches on the GSL to extend or retract center-link cylinder until the hook is aligned with the header attachment pin.

11. Stop engine and remove key from ignition.
ASSEMBLING THE HEADER

12. Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

**IMPORTANT:**
Hook release must be down to enable self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.

13. Check that center-link (A) is locked onto header by pulling upward on rod end (B) of cylinder.

⚠️ **CAUTION**

*Check to be sure all bystanders have cleared the area.*

14. Start engine and press the HEADER UP switch (A) to raise header to maximum height.

**NOTE:**
If one end of the header does **NOT** raise fully, rephase the cylinders as follows:

1. Press and hold the HEADER UP switch (A) until both cylinders stop moving.
2. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

15. Stop engine and remove the key from the ignition.

16. Engage safety prop on lift cylinder as follows:
   a. Pull lever (A) and rotate toward header to release, and lower safety prop onto cylinder.
   b. Repeat for opposite lift cylinder.

**IMPORTANT:**
Ensure the safety props engage over the cylinder piston rods. If safety prop does not engage properly, raise header until prop fits over the rod.
17. Install clevis pin (A) through support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

**IMPORTANT:**
Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

18. Disengage safety prop by turning lever (A) downward to raise safety prop until lever locks into vertical position.

**NOTE:**
If safety prop will not disengage, raise header slightly.

19. Repeat for opposite side.

---

**CAUTION**
Check to be sure all bystanders have cleared the area.

20. Start the engine and activate the HEADER DOWN switch (A) on the GSL to fully lower the header.
NOTE:
If not prompted by the HPT display to restore float, restore float manually by doing the following:

21. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QUICK MENU options.

22. Rotate scroll knob (A) to highlight the HEADER FLOAT symbol (B) and press to select. Screen changes.

23. Press soft key 3 (A) to 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 RESUME FLOAT.

24. Stop engine, and remove key.

3.13 Attaching Hydraulics and Electrical Connections

The procedure for attaching the header hydraulic and electrical connections depends on the windrower model. Refer to the appropriate procedure:

- 3.13.1 Attaching Hydraulic and Electrical Components: M205 Windrowers, page 56
- 3.13.2 Attaching Hydraulic and Electrical Components: M200 Windrowers, page 61
- 3.13.3 Attaching Hydraulics and Electrical: M1240 Windrowers, page 67

3.13.1 Attaching Hydraulic and Electrical Components: M205 Windrowers

⚠️ DANGER

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.

NOTE:

Factory-installed hard plumb connections are ideal for attaching an R85 disc header’s hydraulics on an M205 windrower. If an auger header or draper header will also be used on a disc header-ready M205 windrower, quick couplers can be ordered and installed to make switching between these headers easier.

Routing hydraulic hose bundle from header to windrower:

1. Move windrower left (cab-forward) platform (A) to OPEN position. For instructions, refer to the windrower operator’s manual.

---

1. Order two kits (MD #B5497) for use on an M205 windrower factory-configured for a disc header only. Order one kit (MD #B5497) for use on an M205 windrower factory-configured for auger and draper headers.
ASSEMBLING THE HEADER

2. Route hose bundle (A) from the header under the windrower frame, and insert pin (B) into hole in windrower frame.

3. Place hoses on support (C) and on the hose support on the forming shield (not shown).

4. Remove protective plugs (A) from ends of hydraulic hoses.

Figure 3.116: Hydraulic Hoses

Figure 3.117: Protective Shipping Plugs on R85 Hydraulic Hoses
Attaching hydraulics using quick coupler connections:

1. Remove coupler lock as follows:
   a. Remove lynch pin (A) and open up coupler lock (B).
   b. Remove lock from coupler.

2. Connect rear pump hose (A) to outboard line (D) on windrower using coupler (C).

3. Connect front pump hose (B) to inboard line (E) on windrower using coupler (C).
4. Position the lock onto the couplers so that retainer (A) rests under the fitting next to the sleeve on each coupler.

**NOTE:**
The retainer can be adjusted by loosening bolts (B). Tighten bolts after adjusting.

5. Lower holder (A) onto sleeves (B) so that the flats are positioned on the holder.

**NOTE:**
Holder can be adjusted by loosening bolts (C). Tighten bolts after adjusting.

6. Insert lynch pin (A) to secure the lock.
7. Attach case drain hose coupler at (B).
8. Proceed to Step 5, page 60 and Step 6, page 61.
**Attaching hydraulics using hard plumbing connections:**

1. Connect rear pump hose (A) to outboard line (F) on windrower using fitting (D).
2. Connect front pump hose (B) to inboard line (G) on windrower using fitting (D).
3. Torque fittings to 183 Nm (135 lbf·ft).
4. Attach case drain hose and coupler (C) to (E).

5. Connect the electrical harness to connector HC-2A (A) (located beside the forward valve block on the windrower).

**NOTE:**
The R85 disc header ships with a factory-installed electrical harness extension for compatibility with M1240 windrows. Remove the extension from the electrical harness before connecting to the M205 windrower.
6. Move windrower platform (A) to the CLOSED position. For instructions, refer to the windrower operator’s manual.

### 3.13.2 Attaching Hydraulic and Electrical Components: M200 Windrowers

**DANGER**

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.

**IMPORTANT:**

To operate the 4.9-meter (16-foot) header on an M200 windrower, a hydraulic drive kit (MD #B5455) is required. Install kit in accordance with the supplied kit instructions.
1. Disengage and rotate lever (A) counterclockwise to the UP position.
2. Remove cap (B) securing the electrical connector to the frame.

3. Move hose bundle (A) from the windrower, and rest the bundle on the header.
4. Position the hose support with lower bolt (A) in the forward hole, as shown. Loosen both bolts and adjust as required.

5. Route hose bundle (A) from the windrower through support (B) on header.

6. Route header return and pressure hose bundle (C) through support (B) on header to the windrower.

7. Secure hose bundles with three cinch straps (B).

8. Lower and lock lever (A).
ASSEMBLING THE HEADER

9. Move the windrower’s left side (cab-forward) platform (A) to the OPEN position to access the valve blocks.

10. Remove caps from pressure (M2) and return (R2) ports on the header drive manifold (A) and discard.

   **IMPORTANT:**
   Keep open lines and ports clean.

11. Remove fitting at pressure port (A) and discard.
ASSEMBLING THE HEADER


13. Remove O-ring from cap (A) and install over JIC threads on fitting at return port (R2) on header drive manifold.

14. Install female coupler (B) from hose in return port (R2) on header drive manifold.

15. Install male 45° fitting (C) and male coupler (D) from hose in pressure port (M2) on header drive manifold.

NOTE:
Male fitting and coupler may need to be disassembled prior to installing on valve block.
16. Connect pressure hose (A) to male coupler in port (M2) on header drive manifold.

17. Connect return hose (B) to female coupler in port (R2) on header drive manifold.

**NOTE:**
If the windrower is equipped with a reverser valve for an auger header, replace the 90° fitting on return hose (B) with a 45° fitting.

18. Remove caps and plugs from hoses and lines.

19. Connect the pressure (A), return (B), and case drain (C) hoses from windrower to fittings on header as shown.

20. Connect electrical harness (D) from windrower to connector on header.
21. Move platform (A) to the CLOSED position. For instructions, refer to the windrower operator’s manual.

3.13.3 Attaching Hydraulics and Electrical: M1240 Windrowers

NOTE:
Factory-installed hard plumb connections are ideal for attaching an R85 disc header’s hydraulics on an M1240 windrower. If an auger header or draper header will also be used on a disc header-ready M1240 windrower, quick couplers can be ordered and installed to make switching between these headers easier.

1. Approach platform/stair unit (A) on left cab-forward side of windrower and ensure cab door is closed.

2. Push latch (B), and pull platform (A) toward walking beam until it stops and latch engages.

2. Order two (MD #B6277) kits for use on an M1240 windrower factory-configured for a disc header only. Order one (MD #B6277) kit for use on an M1240 windrower factory-configured for auger and draper headers.
3. Route hose bundle (A) from header to under windrower frame.

**NOTE:**
Route hoses as straight as possible and avoid rub/wear points that could damage hydraulic hoses.

4. Insert pin (B) into hole (C) in windrower frame, and place hose bundle on support (D).

5. Remove protective plugs (A) from ends of hydraulic hoses.

6. Use a clean rag to remove dirt and moisture from the couplers.

7. Disconnect hose (A) from windrower receptacle (B) and place in storage cup (C) on multicoupler.

**NOTE:**
R85 hoses can be connected with either quick-disconnect or hard plumbed fittings. Refer to Step 8, page 69 for quick-disconnect hydraulic connections, and to Step 9, page 69 for hard plumbed hydraulic connections.
ASSEMBLING THE HEADER

8. Refer to the following to connect hydraulic hoses with quick-disconnect fittings to the windrower:

   **NOTE:**
   If hoses are not equipped with quick-disconnect fittings, they can be attached directly to the windrower fittings as described in Step 9, page 69.
   
   a. Use a clean rag to remove dirt and moisture from the couplers.
   
   b. Connect the disc pressure hose (A) with red plastic tie to receptacle (B).
   
   c. Connect the disc return hose (C) to receptacle (D).
   
   d. Connect the case drain hose (E) to receptacle (F).
   
   e. Connect the electrical harness to receptacle (G).

   **NOTE:**
   Ensure the hydraulic hoses have sufficient slack to clear the multicoupler without coming into contact with it. If necessary, increase slack in the hoses by loosening the hose holder at the windrower frame and moving the hoses as required.

9. Refer to the following to directly connect the hydraulic hoses with hard plumbed fittings to the windrower:

   a. Use a clean rag to remove dirt and moisture from the couplers.
   
   b. Attach the disc pressure hose (A) to fitting on frame and torque to 205–226 Nm (151–167 lbf·ft).
   
   c. Connect the disc return hose (B) to fitting on frame and torque to 205–226 Nm (151–167 lbf·ft).
   
   d. Connect the case drain hose (C) to fitting on frame and tighten.
   
   e. Connect the electrical harness to receptacle (D).

   **NOTE:**
   Ensure the hydraulic hoses have sufficient slack to clear the multicoupler (E) without coming into contact with it. If necessary, increase slack in the hoses by loosening the hose holder at the windrower frame and moving the hoses as required.
10. Push latch (B) to unlock the platform (A).
11. Pull platform (A) towards the cab until it stops and latch (B) engages.

Figure 3.145: Left Cab-Forward Platform
3.14 Installing Other Options
Install options (if supplied with shipment) in accordance with the instructions supplied with each kit.

3.14.1 Installing Tall Crop Divider
To install the tall crop divider kit (MD #B5509), follow these steps:

⚠️ DANGER
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.

1. Lower header fully.
2. Stop the engine, and remove the key.
3. Unpack kit.
4. Open cutterbar doors.

5. Remove four bolts (A) from divider (B).

**NOTE:**
Mounting holes in header should be vacant. Remove fasteners, if necessary.
6. Position left divider (B) on header left front corner, and install with four bolts (A) and nuts in existing holes. Tighten hardware.

7. Repeat for right side.

8. Lower cutterbar doors.

### 3.14.2 Installing Double Windrow Attachment (DWA)

Refer to instructions supplied with kit.
3.14.3 Installing Skid Shoes (Optional)

⚠️ DANGER
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.

1. Lower header to the ground, shut off engine, and remove key from ignition.
2. Unpack kit.
3. Install skid shoes. Refer to instruction supplied with kit.

![Figure 3.150: Skid Shoe (Right Side Shown – Left Side Similar)](image)

3.14.4 Installing Gauge Rollers (Optional)

⚠️ DANGER
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.

1. Unpack gauge roller bundle and install gauge rollers. Refer to instruction supplied with kit.

![Figure 3.151: Gauge Roller (Right Side Shown – Left Side Similar)](image)
3.14.5 Installing Tall Crop Feed Plates

Two plates (A) are supplied with each header and can be installed if required. They are stored behind the right side driveshield. Installation instructions are included in the operator’s manual.

![Figure 3.152: Tall Crop Feed Plates Storage Location (Driveshield Removed for Clarity)]

3.14.6 Installing Nut Protectors (for Blade Hardware on Discs)

Twelve nut protector caps (A) are supplied as standard equipment with each header. These are shipped bolted to the tall crop feed plates.

The nut protectors can be used in place of the crop accelerators (factory installed on each disc) when cutting in light crop conditions to reduce air turbulence, thereby improving the quality of cut.

![Figure 3.153: Nut Protector Storage Location]
3.15 Lubricating the Header

The header has been lubricated at the factory. However, you should lubricate the header prior to delivery to offset the effects of weather during outside storage and transport, and to familiarize yourself with the header.

3.15.1 Driveshields

⚠️ WARNING

Do NOT operate the machine with the driveshields open. High-speed rotating components may throw debris and could result in death or serious injury.

Access to the header drive systems requires opening the driveshield at the left end of the header. When a procedure only applies to one configuration, the configuration is specified in the procedure title.

Opening the Driveshield: North American Headers

Follow these steps to open the driveshield on North American headers:

1. Release rubber latches (A).
2. Lift shield (B).

Closing the Driveshield: North American Headers

Follow these steps to close the driveshield on North American headers:

1. Lower shield (B) so that pins at lower end of shield engage holes in lower panel.
2. Engage rubber latches (A).
ASSEMBLING THE HEADER

Opening the Driveshield: Export Headers
Follow these steps to open the driveshield on export headers:

1. Release rubber latches (A).
2. Insert a screwdriver (or equivalent) through hole in shield (B) and into the notch in latch (C) and disengage latch.
3. Open driveshield (D).

![Figure 3.156: Driveshield](image)

Closing the Driveshield: Export Headers
Follow these steps to close the driveshield on export headers:

1. Lower shield (C) so that pins at lower end of shield engage holes in the lower panel, and latch (B) re-engages the driveshield.
2. Engage rubber latches (A).

![Figure 3.157: Driveshield](image)
3.15.2 Greasing Procedure

⚠️ DANGER

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.

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

1. Wipe grease fitting with a clean cloth 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.

![Grease Interval Decal](image)

Figure 3.158: Grease Interval Decal

3.15.3 Lubrication Points

To identify the various locations that require lubrication, refer to the following illustrations.

**NOTE:**

Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI grade 2) lithium base except where noted.
3. 10% moly grease is recommended for driveline shaft slip joint only.
ASSEMBLING THE HEADER

Figure 3.160: Lubrication Points

A - Roll Shaft Bearings (Two Places)
B - Optional Gauge Roll Bearings (Two Places) – Both Sides
C - Belt Tensioner Pivot (One Place)
D - Auger Bearing (One Place)
4 Performing Predelivery Checks

⚠️ DANGER

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.

IMPORTANT:

To avoid machine damage, check that no shipping dunnage has fallen down between auger and pans.

1. Perform final checks and adjustments as listed on the yellow sheet attached to back of this instruction, to ensure the machine is field-ready. Refer to the referenced pages as indicated on the checklist for detailed instructions.

2. The completed checklist should be retained either by the Operator or the Dealer.

4.1 Checking Drive Belts

Drive belt tensions have been properly set at the factory and should not require further adjustment. Check as follows:

1. Open driveshield. For instructions, refer to 3.15.1 Driveshields, page 75.

Figure 4.1: Driveshield
2. Check that adjuster nut (A) is tight and that conditioner drive belt (B) is tensioned.
3. Check that end of slots (C) are aligned with plate (D).

![Figure 4.2: Conditioner Drive Belt Tension](image)

**CAUTION**

Check to be sure all bystanders have cleared the area.

4. Start engine.
5. Raise header fully, turn off engine, and remove key. Engage header safety props.
6. To check auger belt tension, spring length (A) should measure 262 mm (10.3 in.).
7. Lower header and close driveshield.

![Figure 4.3: Auger Belt Tension](image)
4.2 Checking Header Float: M200 and M205 Windrowers

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

1. Start engine and lower header to ground, and ensure header lift cylinders are fully retracted.

2. Adjust the header angle/tilt to mid-range position with the switches (A) and (B) on the windrower ground speed lever (GSL).

3. Set the float fine adjustment to mid-range with the windrower float adjustment system in the cab. Refer to the windrower operator’s manual.

⚠️ DANGER

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.

4. Stop engine, and remove key from ignition.

5. Check float by grasping the front corner of header and lifting. The force to lift should be 426–471 N (95–105 lbf), and should be approximately the same at both ends.

6. Perform the following steps to adjust the float (if necessary):
   a. Start engine, and raise header fully.
   b. Shut down engine, and remove the key.
   c. Turn drawbolt (A):
      • Clockwise to INCREASE float (make header lighter)
      • Counterclockwise to DECREASE float (make header heavier)
   d. Recheck the float.

Figure 4.4: Header Tilt Switches

Figure 4.5: Float Adjustment
4.3 Checking Header Float: M1240 Windrowers

**DANGER**

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.

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 426–471 N (95–105 lbf) and should be the same at both ends.

6. Restart the engine and adjust float as required. Refer to 4.3.1 Setting the Float: M1240 Windrower, page 84.

**NOTE:**
Increasing the float value on the HPT makes the header feel lighter.

### 4.3.1 Setting the Float: M1240 Windrower

The float can be set for windrowing with the cutterbar on the ground or with the cutterbar off the ground (normally used with the draper header).

**Cutterbar on 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 windrower operator’s manual.
2. Lower header until 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 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.

**IMPORTANT:**
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 **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.
4.4 Checking Header Level

To check and adjust header level, follow these steps:

⚠️ DANGER

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.

1. Park windrower on level ground, and raise header off ground approximately 150 mm (6 in.).

2. Shut off engine, and check that clearances (A) between header and ground at each end of the header are approximately the same.

3. If header does NOT need levelling, skip remaining steps. If header DOES need levelling, proceed as follows:

   IMPORTANT:
   The header float springs are NOT used to level the header.

4. Observe which side of header is the high side and which is the low side.

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

5. Start the engine, and raise header fully.

6. Stop engine, and remove key.

7. **M Series windrowers only**: Move float engagement pin from hole (A) to hole (B) at front of linkage.

---

**Figure 4.10: Levelled Header**

**Figure 4.11: Header Lift Linkage**
8. Place wooden blocks (A) under header cutterbar and header support.


\textbf{CAUTION}

Check to be sure all bystanders have cleared the area.

10. Start engine, and lower header onto blocks so that header lift linkage (A) lifts at windrower leg and off of shims.

11. Shut down engine, and remove key.

12. On the high side linkage (A), remove nut, washer, and bolt (C) that attach shims (B) to link.

13. Remove one or both shims (B), and reinstall the hardware (C).

14. Raise header approximately 150 mm (6 in.) off ground, and check level of header.

15. If additional levelling is required, install the removed shim on the opposite linkage (low side).

\textbf{NOTE:}

Float does NOT require adjustment after levelling header.
4.5 Checking Conditioner Rolls

4.5.1 Checking Conditioner Roll Gap

⚠️ DANGER

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.

NOTE:
If roll gap is not set correctly, refer to the header operator’s manual for adjustment procedure.

1. Fully lower the header.

2. Open the driveshield. Refer to Opening the Driveshield: North American Headers, page 75 or Opening the Driveshield: Export Headers, page 76.

3. Check the size of the gap (B) between the conditioner rolls.

4. Check the amount of thread (A) protruding from jam nut. Length of protrusion should be 30 mm (1-3/16 in.), equal to 25 mm (1 in.) of roll gap.

NOTE:
Measurement (A) is a starting point. The conditioner roll gap will need to be adjusted during operation according to crop conditions. Refer to the header operator’s manual for adjustment procedure.
4.5.2 Checking Conditioner Roll Timing

⚠️ DANGER

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.

1. Lower the header fully to the ground.
2. Shut down the engine and remove the key.
3. Header should be on the ground and windrower should be shut down. Ensure key is removed from ignition.
4. Open driveshield. For instructions, refer to 3.15.1 Driveshields, page 75.

5. Remove bolt (A) and nut, and remove gauge (B) from flanged frame member.
PERFORMING PREDELIIVERY CHECKS

6. From the rear of the header, position gauge at center of rolls as shown, and manually turn rolls to limits of gauge. Rolls will engage the gauge if timing is correct.

7. Manually turn rolls to release gauge.

⚠️ WARNING
Remove gauge from rolls and return it to storage location before starting machine.

8. Replace gauge (B) in header with bolt (A) and nut.

9. Check timing flange bolts (A) are tight.

**NOTE:**
If rolls are out of time, refer to the header operator’s manual for procedure to adjust.

4.6 Checking Gauge Rollers or Skid Shoes

DANGER

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

1. Raise header, and engage header safety props.
2. Both gauge rollers or skid shoes should be set at the same position.

Figure 4.22: Skid Shoe

Figure 4.23: Gauge Roller
4.7 Preparing the Bevel Gearbox

To prepare the bevel gearbox and check the oil level, follow these steps:

1. Adjust header height and angle so that top of header is horizontal.
2. Open the driveshield.

3. Cut cable ties and remove bags (A) and (B) from the breather pipe elbows.

4. Remove plug from breather pipe (A) and replace with breather cap in bag. Discard bag and plug.
5. Remove check plug (B) to check oil level. Oil should slightly run out when removed.

**NOTE:**
If the oil level is low, top up with a 75W90 synthetic gear lubricant with high thermal stability conforming to API GL-5 minimum (SAE J2360 preferred) specifications such as Traxon E Synthetic 75W90 gear oil.
4.8 Preparing the Conditioner Roll Timing Gearbox

To prepare the conditioner gearbox and check the oil level, follow these steps:

1. Open the driveshield.

2. Adjust the header height and angle until the top of the conditioner gearbox (A) is level with the ground (B).

3. Cut cable ties and remove bags (A) and (B) from the breather pipe elbows.

4. Remove the plug from breather pipe (A) and replace it with the breather cap in bag. Discard bag and plug.

5. Remove check plug (B) to check oil level. Oil should slightly run out when removed.

**NOTE:**

If the oil does not run out, top up with a 75W90 synthetic gear lubricant with high thermal and oxidation stability conforming to API GL-5 minimum (SAE J2360 preferred) specifications such as Traxon E Synthetic 75W90 gear oil.
4.9 Checking Lights

The hazard lights are mounted on both ends of the header, and activated by a switch in the windrower cab.

1. Check for operation during run-up.
2. Ensure light mountings (A) are secure and check lights (B) for damage.

Figure 4.30: Hazard Light
4.10 Checking Manuals

The following manuals should be stored in the manual storage case (A) on the right side of the header:

4.11 Running up the Header

⚠️ DANGER

- Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected from either end with force.
- Take extreme care to avoid injury from thrown objects. Do NOT, under any circumstances, operate the rotary header when other people are nearby.
- Check cutterbar area carefully for loose parts and hardware on the cutterbar. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.
- The cutterbar curtains are very important to reduce the potential for thrown objects. Always keep these curtains down when operating the rotary header. Replace the curtains if they become worn or damaged.

⚠️ DANGER

Before investigating an unusual sound or attempting to correct a problem, shut off engine, engage parking brake, and remove key.

⚠️ CAUTION

Never start or move the machine until you are sure all bystanders have cleared the area.

Refer to the windrower operator’s manual for windrower operating instructions.

NOTE:

Higher engine rpm may be required to engage the header. Do NOT exceed 1800 rpm.

1. Start the windrower.
2. Set header 152–305 mm (6–12 in.) above the ground and adjust center-link to mid-position.
3. Run the machine slowly for 5 minutes, watching, and listening from THE OPERATOR’S SEAT for binding or interfering parts.
4. Run the machine at operating speed for 15 minutes. Listen for any unusual sounds or abnormal vibration.
5. Perform the run-up check as listed on the Predelivery Checklist (yellow sheet attached to this instruction) to ensure the machine is field-ready.
6. Retain the Checklist and (if desired), retain this instruction for future reference.
5 Reference

5.1 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).

### 5.1.1 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 5.1 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 5.1: Bolt Grades](image)

A - Nominal Size
B - SAE-8
C - SAE-5
D - SAE-2
Table 5.2 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 5.3 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 5.4 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>Minimum</td>
<td>Maximum</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>

5.1.2 Metric Bolt Specifications

Table 5.5 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>Minimum</td>
<td>Maximum</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 5.6 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 5.7 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 5.8 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>7.0</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>

5.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 5.9 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>
5.1.4 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 5.10, page 102.

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 5.10 Flare-Type Hydraulic Tube Fittings

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^4)</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>

\(^4\) Torque values shown are based on lubricated connections as in reassembly.
5.1.5 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.

2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.

3. Check that O-ring (A) is **NOT** on threads and adjust if necessary.

4. Apply hydraulic system oil to O-ring (A).

5. Install fitting (B) into port until back up washer (D) and O-ring (A) contact part face (E).

6. Position angle fittings by unscrewing no more than one turn.

7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).

8. Check final condition of fitting.
Table 5.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value$^5$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>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>

REFERENCE

5. Torque values shown are based on lubricated connections as in reassembly.
5.1.6 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is NOT on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand-tight.
5. Torque fitting (C) according to values in Table 5.12, page 105.
6. Check final condition of fitting.

<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.
5.1.7 O-Ring Face Seal (ORFS) Hydraulic Fittings

1. Check components to ensure that sealing surfaces and fitting threads are free of burrs, nicks, scratches, or any foreign material.

2. Apply hydraulic system oil to O-ring (B).

3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).

4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.

5. Torque fittings according to values in Table 5.13, page 106.

   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 5.13 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(^7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>-3</td>
<td>Note(^8)</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(^8)</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>

---

7. Torque values and angles shown are based on lubricated connection as in reassembly.
8. O-ring face seal type end not defined for this tube size.
Table 5.13  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(^9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>-14</td>
<td>Note(^8)</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>

5.1.8  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 (T.F.F.T.) values are shown in Table 5.14, page 107. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

**NOTE:**
Overtorque failure of fittings may not be evident until fittings are disassembled.

Table 5.14 Hydraulic Fitting Pipe Thread

<table>
<thead>
<tr>
<th>Tapered Pipe Thread Size</th>
<th>Recommended T.F.F.T.</th>
<th>Recommended F.F.F.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8–27</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/4–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/8–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/2–14</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/4–14</td>
<td>1.5–2.5</td>
<td>12–18</td>
</tr>
<tr>
<td>1–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/4–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
</tbody>
</table>

\(^9\) Torque values and angles shown are based on lubricated connection as in reassembly.
### 5.2 Conversion Chart

Table 5.15 Conversion Chart

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SI Units (Metric)</th>
<th>Factor</th>
<th>Inch-Pound Units (Imperial)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td>Factor</td>
</tr>
<tr>
<td>Area</td>
<td>hectares</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>Newtons</td>
<td>N</td>
<td>x 0.2248 =</td>
</tr>
<tr>
<td>Length</td>
<td>millimeters</td>
<td>mm</td>
<td>x 0.0394 =</td>
</tr>
<tr>
<td>Length</td>
<td>meters</td>
<td>m</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Power</td>
<td>kilowatts</td>
<td>kW</td>
<td>x 1.341 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascals</td>
<td>kPa</td>
<td>x 0.145 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>megapascals</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 meters</td>
<td>Nm</td>
<td>x 0.7376 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meters</td>
<td>Nm</td>
<td>x 8.8507 =</td>
</tr>
<tr>
<td>Temperature</td>
<td>degrees Celsius</td>
<td>ºC</td>
<td>(ºC 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>liters</td>
<td>L</td>
<td>x 0.2642 =</td>
</tr>
<tr>
<td>Volume</td>
<td>milliliters</td>
<td>ml</td>
<td>x 0.0338 =</td>
</tr>
<tr>
<td>Volume</td>
<td>cubic centimeters</td>
<td>cm³ or cc</td>
<td>x 0.061 =</td>
</tr>
<tr>
<td>Weight</td>
<td>kilograms</td>
<td>kg</td>
<td>x 2.2046 =</td>
</tr>
</tbody>
</table>
### 5.3 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>API</td>
<td>American Petroleum Institute</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society of Testing and Materials</td>
</tr>
<tr>
<td>Bolt</td>
<td>A headed and externally threaded fastener that is designed to be paired with a nut</td>
</tr>
<tr>
<td>Cab-forward</td>
<td>Windrower operation with Operator and cab facing in direction of travel</td>
</tr>
<tr>
<td>CDM</td>
<td>Cab display module on a self-propelled windrower</td>
</tr>
<tr>
<td>Center-link</td>
<td>A hydraulic cylinder link between header and machine used to change header angle</td>
</tr>
<tr>
<td>CGVW</td>
<td>Combined gross vehicle weight</td>
</tr>
<tr>
<td>DWA</td>
<td>Double Windrow Attachment</td>
</tr>
<tr>
<td>ECM</td>
<td>Engine control module</td>
</tr>
<tr>
<td>ECU</td>
<td>Electronic control unit</td>
</tr>
<tr>
<td>Engine-forward</td>
<td>Windrower operation with Operator and engine facing in direction of travel</td>
</tr>
<tr>
<td>Export header</td>
<td>Header configuration typical outside North America</td>
</tr>
<tr>
<td>Finger tight</td>
<td>Finger tight is a reference position where sealing surfaces or components are making contact with each other, and fitting has been tightened to a point where fitting is no longer loose</td>
</tr>
<tr>
<td>FFFT</td>
<td>Flats from finger tight</td>
</tr>
<tr>
<td>GSS</td>
<td>Grass Seed Special</td>
</tr>
<tr>
<td>GVW</td>
<td>Gross vehicle weight</td>
</tr>
<tr>
<td>Hard joint</td>
<td>A joint made with use of a fastener where joining materials are highly incompressible</td>
</tr>
<tr>
<td>Header</td>
<td>A machine that cuts and lays crop into a windrow and is attached to a self-propelled windrower</td>
</tr>
<tr>
<td>Hex key</td>
<td>A 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>ISC</td>
<td>Intermediate Speed Control</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>M Series windrower</td>
<td>MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers</td>
</tr>
<tr>
<td>M1 Series windrower</td>
<td>MacDon M1170 and M1240 windrowers</td>
</tr>
<tr>
<td>n/a</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Nut</td>
<td>An internally threaded fastener that is designed to be paired with a bolt</td>
</tr>
<tr>
<td>N-DETENT</td>
<td>The slot opposite the NEUTRAL position on operator’s console of M Series windrowers.</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>ORB</td>
<td>O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors</td>
</tr>
<tr>
<td>ORFS</td>
<td>O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring seal</td>
</tr>
<tr>
<td>rpm</td>
<td>Revolutions per minute</td>
</tr>
<tr>
<td>R Series header</td>
<td>MacDon R80 and R85 disc headers</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>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>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>Truck</td>
<td>A four-wheel highway/road vehicle weighing no less than 3400 kg (7500 lb.)</td>
</tr>
<tr>
<td>Tension</td>
<td>Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)</td>
</tr>
<tr>
<td>TFFT</td>
<td>Turns from finger tight</td>
</tr>
<tr>
<td>Torque</td>
<td>The product of a force X lever arm length, usually measured in Newton-meters (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 a locking mechanism</td>
</tr>
<tr>
<td>Windrower</td>
<td>Power unit of a self-propelled header</td>
</tr>
<tr>
<td>WCM</td>
<td>Windrower control module</td>
</tr>
</tbody>
</table>
Predelivery Checklist

Perform these checks and adjustments before delivering the machine to your Customer. If adjustments are required, refer to the appropriate page number in this manual. The completed Checklist should be retained by either the Operator or the Dealer.

⚠️ WARNING
Do NOT operate the machine with the driveshields open. High speed rotating components may throw debris and could result in death or serious injury.

⚠️ CAUTION
Carefully follow the instructions given. Be alert for safety-related messages that bring your attention to hazards and unsafe practices.

Header Serial Number:

<table>
<thead>
<tr>
<th>✓ Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for shipping damage or missing parts. Be sure all shipping dunnage is removed.</td>
<td>—</td>
</tr>
<tr>
<td>Check for loose hardware. Tighten to required torque if applicable.</td>
<td>5.1 Torque Specifications, page 97</td>
</tr>
<tr>
<td>Check main drive belt tension.</td>
<td>4.1 Checking Drive Belts, page 81</td>
</tr>
<tr>
<td>Check auger drive belt tension.</td>
<td>4.1 Checking Drive Belts, page 81</td>
</tr>
<tr>
<td>Check header angle. Set center-link to middle of adjustment range.</td>
<td>3.11 Attaching Header to an M Series Windrower, page 31</td>
</tr>
<tr>
<td>Check header float: 426–471 N (95–105 lbf).</td>
<td>4.2 Checking Header Float: M200 and M205 Windrowers, page 83</td>
</tr>
<tr>
<td>Check if header is level.</td>
<td>4.4 Checking Header Level, page 86</td>
</tr>
<tr>
<td>Check if side forming shields are evenly set to desired position.</td>
<td>3.10 Installing Forming Shield, page 28</td>
</tr>
<tr>
<td>Check if rear fluffer deflector is about halfway down.</td>
<td>3.10 Installing Forming Shield, page 28</td>
</tr>
<tr>
<td>Check if swath baffle lever is set about halfway.</td>
<td>3.7 Unpacking Curtains, page 18</td>
</tr>
<tr>
<td>Check if gauge rollers/skid shoes are evenly set.</td>
<td>4.6 Checking Gauge Rollers or Skid Shoes, page 91</td>
</tr>
<tr>
<td>Check that bevel gearbox lube level.</td>
<td>4.7 Preparing the Bevel Gearbox, page 92</td>
</tr>
<tr>
<td>Check if bevel gearbox breather is installed.</td>
<td>4.7 Preparing the Bevel Gearbox, page 92</td>
</tr>
<tr>
<td>Check conditioner roll timing gearbox lube level.</td>
<td>4.8 Preparing the Conditioner Roll Timing Gearbox, page 93</td>
</tr>
<tr>
<td>Check if conditioner roll timing gearbox breather is installed.</td>
<td>4.8 Preparing the Conditioner Roll Timing Gearbox, page 93</td>
</tr>
</tbody>
</table>
### Table .16   Predelivery Checklist (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease all bearings and drivelines.</td>
<td>3.15 Lubricating the Header, page 75</td>
</tr>
<tr>
<td>Check conditioner roll gap and timing.</td>
<td>4.5 Checking Conditioner Rolls, page 88</td>
</tr>
<tr>
<td>Check if roll intermesh hardware is securely tightened.</td>
<td>4.5 Checking Conditioner Rolls, page 88</td>
</tr>
<tr>
<td>Check if cutterbar curtains are hanging properly.</td>
<td>3.7 Unpacking Curtains, page 18</td>
</tr>
<tr>
<td>Check hydraulic hose and wiring harness routing.</td>
<td>—</td>
</tr>
<tr>
<td>Check cutterbar area carefully for loose parts and hardware on the</td>
<td>—</td>
</tr>
<tr>
<td>cutterbar.</td>
<td></td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td></td>
</tr>
<tr>
<td>These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.</td>
<td></td>
</tr>
<tr>
<td>Run-Up Procedure</td>
<td>4.11 Running up the Header, page 96</td>
</tr>
<tr>
<td>Check hydraulic hose and wiring harness routing for clearance when</td>
<td>—</td>
</tr>
<tr>
<td>raising or lowering header.</td>
<td></td>
</tr>
<tr>
<td>Check that hazard lights are functional.</td>
<td>4.9 Checking Lights, page 94</td>
</tr>
<tr>
<td>Post Run-Up Check. Stop Engine.</td>
<td></td>
</tr>
<tr>
<td>Check belt drives for idler alignment and heated bearings.</td>
<td>4.1 Checking Drive Belts, page 81</td>
</tr>
<tr>
<td>Check for hydraulic leaks.</td>
<td>—</td>
</tr>
<tr>
<td>Check that header manuals are storage compartment on the right side</td>
<td>4.10 Checking Manuals, page 95</td>
</tr>
<tr>
<td>of the header.</td>
<td></td>
</tr>
</tbody>
</table>

**Date Checked:** [Date]  
**Checked by:** [Name]