PW8 Pick-Up Header

Published in September 2017
Introduction

This manual contains safety, maintenance, and service procedures for the PW8 Pick-Up Header for the following combines:

<table>
<thead>
<tr>
<th>Combine</th>
<th>Model</th>
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<td>Case IH</td>
<td>50/60/7088, 51/61/7130, 51/61/7140, 70/8010, 71/81/9120, 72/82/9230, and 72/82/9240</td>
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<tr>
<td>John Deere</td>
<td>96/97/9860STS, 96/97/9870, S650/660/670/680/690, 9660WTS, and T670</td>
</tr>
<tr>
<td>New Holland</td>
<td>All CR/CX Series</td>
</tr>
<tr>
<td>Versatile</td>
<td>RT490</td>
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</table>

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

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

Carefully read all the material provided before attempting to maintain, service, or use the machine.

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

A parts catalog, operator’s manual, and unloading and assembly instructions are provided with the header. The operator’s manual and parts catalog are stored in the manual case (A) attached to the back of the header.

Figure 1. Manual Case
Serial Number

If you require MacDon technical assistance, please have your serial number recorded and ready before you call.

The serial number plate (A) is located on the left endsheet.

For technical assistance please call: 1 (204) 831-4422.

Figure 2. Left Side (Rear View)
## List of Revisions

The following table lists the changes made from the previous version of this document:

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<td>JD 60 Series Harness MD #197176 superseded by MD #237991.</td>
<td>Wiring Adapter John Deere 60 Series (MD #237991), page 191</td>
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<td>Updated JD 60 Series Harness MD #237991 pin location information.</td>
<td>Wiring Adapter John Deere 60 Series (MD #237991), page 191</td>
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<td>Changed torque requirements for bleed plug replacement.</td>
<td>10.3.5 Bleeding Cylinders and Lines, page 217</td>
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<td>Added Auto Header Height Control topics for Case IH 5130/6130/7130 and 5140/6140/7140 mid-range combines.</td>
<td>12.1.3 Case IH 5130/6130/7130 and 5140/6140/7140 Mid-Range Combines, page 253</td>
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<tr>
<td>Added Pivoting Caster Wheel kit information.</td>
<td>14.4 Pivoting Caster Wheels Kit, page 316</td>
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1 Safety

1.1 Safety Alert Symbols

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

This symbol means:

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**

Carefully read and follow the safety message accompanying this symbol.

**Why is safety important to you?**

- Accidents disable and kill
- Accidents cost
- Accidents can be avoided
1.2 Signal Words

Three signal words, DANGER, WARNING, and CAUTION, are used to alert you to hazardous situations. Signal words are selected using the following guidelines:

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

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

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

**CAUTION**

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

Protect yourself.

- When assembling, operating, and servicing machinery, wear all protective clothing and personal safety devices that could be necessary for job at hand. Do **NOT** take chances. You may need the following:
  - Hard hat
  - Protective footwear with slip resistant soles
  - Protective glasses or goggles
  - Heavy gloves
  - Wet weather gear
  - Respirator or filter mask
- Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.

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

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

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

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

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

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

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

• Keep work area well lit.

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

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

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

To ensure your safety while maintaining machine:

- Review operator’s manual and all safety items before operation and/or maintenance of machine.
- Place all controls in Neutral, stop the engine, set the park brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, and/or repairing.
- Follow good shop practices:
  - Keep service areas clean and dry
  - Be sure electrical outlets and tools are properly grounded
  - Keep work area well lit

- Relieve pressure from hydraulic circuits before servicing and/or disconnecting machine.
- Make sure all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to hydraulic systems.
- Keep hands, feet, clothing, and hair away from all moving and/or rotating parts.
- Clear area of bystanders, especially children, when carrying out any maintenance, repairs, or adjustments.
- Install transport lock or place safety stands under frame before working under machine.
- If more than one person is servicing machine at same time, be aware that rotating a driveline or other mechanically-driven component by hand (for example, accessing a lube fitting) will cause drive components in other areas (belts, pulleys, and knives) to move. Stay clear of driven components at all times.
- Wear protective gear when working on machine.
- Wear heavy gloves when working on knife components.
1.5 Hydraulic Safety

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

- Wear proper hand and eye protection when searching for high-pressure hydraulic leaks. Use a piece of cardboard as a backstop instead of hands to isolate and identify a leak.
- If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.

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

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

1.6.1 Installing Safety Decals

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

Figure 1.14: Operator's Manual Decal
1.7 Safety Sign Locations

Figure 1.15: Header Decals – Case IH

Figure 1.16: Header Decals

A - MD #184370  
B - MD #166466  
C - MD #184372  
D - MD #184422  
E - MD #184420  
F - MD #237298
SAFETY

Figure 1.17: Header Decals – John Deere

A - MD #184370  B - MD #164466  C - MD #184372
D - MD #184422  E - MD #184420  F - MD #237298

Figure 1.18: Header Decals

A  B  C  D  E  F
SAFETY

Figure 1.19: Header Decals – New Holland

Figure 1.20: Header Decals
SAFETY

Figure 1.21: Header Decals – Versatile

A - MD #184370
D - MD #184422

B - MD #166466
E - MD #184420

C - MD #184372
F - MD #237298

Figure 1.22: Header Decals

A - MD #184370
D - MD #184422

B - MD #166466
E - MD #184420

C - MD #184372
F - MD #237298
SAFETY

Figure 1.23: Driveline and Hold-Down Decals – Case IH

A - MD #30316
B - MD #191099
C - MD #36651
D - MD #184422 (Behind Endshield)
E - MD #237229
F - MD #237254

Figure 1.24: Driveline and Hold-Down Decals
Figure 1.25: Driveline and Hold-Down Decals – John Deere

A - MD #30316  
D - MD #184422 (Behind Endshield)

B - MD #191099  
E - MD #237229

C - MD #36651  
F - MD #237254

Figure 1.26: Driveline and Hold-Down Decals
SAFETY

Figure 1.27: Driveline and Hold-Down Decals – New Holland

A - MD #30316  
D - MD #184422 (Behind Endshield)

B - MD #191099  
E - MD #237229

C - MD #36651  
F - MD #237254

Figure 1.28: Driveline and Hold-Down Decals
SAFETY

Figure 1.29: Driveline and Hold-Down Decals – Versatile

Figure 1.30: Driveline and Hold-Down Decals
1.8 Understanding Safety Signs

**MD #36651**

Rotating driveline

**DANGER**

- Rotating driveline contact can cause death—**keep away**!

Do not operate without:

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

**MD #166466**

High pressure oil hazard

**WARNING**

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

**MD #184370**

Crushing hazard

**CAUTION**

- Rest header on ground or engage cylinder safety props before going under unit.
- Failure to comply could result in death or serious injury.
**SAFETY**

**MD #184372**

General hazard pertaining to machine operation and servicing

**CAUTION**

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

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

**MD #184420**

Crushing hazard

**WARNING**

- To avoid injury from being pinned or crushed, stay clear of header while machine is operating or in motion. Failure to comply could result in death or serious injury.
MD #184422

Keep shields in place hazard

WARNING

- Do not place hand.
- To avoid injury, stop the engine and remove the key before opening power drive system shield.
- Keep all shields in place.

Figure 1.36: MD #184422

MD #237229

Header crushing hazard

WARNING

- Rest header on ground or engage cylinder safety props before going under unit.

Figure 1.37: MD #237229

MD #237254

Header entanglement hazard

CAUTION

- To avoid injury from entanglement with crop gathering elements, stand clear of header while machine is running.

Figure 1.38: MD #237254
SAFETY

MD #237298

Auger entanglement hazard

CAUTION

- To avoid injury from rotating auger, stand clear of auger while machine is running.
## 2 Product Overview

### 2.1 Header Specifications

<table>
<thead>
<tr>
<th>Components</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frame and Structure</strong></td>
<td></td>
</tr>
<tr>
<td>Width to edge of tires</td>
<td></td>
</tr>
<tr>
<td>Width (transport lights extended)</td>
<td>Refer to 2.2 Header Dimensions, page 22</td>
</tr>
<tr>
<td>Depth</td>
<td></td>
</tr>
<tr>
<td>Height (transport lights extended)</td>
<td>1366 kg (3006 lb.)</td>
</tr>
<tr>
<td>Weight (not including completion packages)</td>
<td>Case IH, New Holland, John Deere, Versatile</td>
</tr>
<tr>
<td>Carrier</td>
<td>Two amber transport</td>
</tr>
<tr>
<td>Lighting</td>
<td>Header mounted manual storage case</td>
</tr>
<tr>
<td>Manual storage</td>
<td></td>
</tr>
</tbody>
</table>

| **Pick-up**          |                                                                               |
| Actual picking width | Refer to 2.2 Header Dimensions, page 22                                       |
| Draper width         |                                                                               |
| Quantity of pick-up fingers | 392                           |
| Draper drives        | Two 97 cc (5.9 cu. in.) hydraulic motors                                       |

| **Auger**            |                                                                               |
| Diameter (including flighting) | 615 mm (24 in.)                                                           |
| Tube diameter        | 410 mm (16 in.)                                                             |
| Quantity of fingers  | 13–22                                                                       |
| Finger diameter      | 16 mm (5/8 in.) diameter induction hardened                                |
| Speed (combine dependent) | 141–204 rpm                        |

| **Driveline**        |                                                                               |
| Type                | Heavy duty PTO type, fully shielded with built-in clutch                     |
| Connections         | Locking collar                                                              |

| **Tires**            |                                                                               |
| Size                | 18-1/2 / 8-1/2 x 8                                                           |
| Pressure            | 240–310 kPa (35–45 psi)                                                      |

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

Figure 2.1: Header Dimensions

A - 565.8 cm (222-3/4 in.)
B - 516.9 cm (203-1/2 in.)
C - 452.3 cm (178-1/8 in.)
D - 476.6 cm (187-5/8 in.)
E - 531.8 cm (209-3/8 in.)

Figure 2.2: Header Dimensions

A - 246.1 cm (96-7/8 in.)
B - 251.3 cm (98-7/8 in.)
C - 154.4 cm (60-3/4 in.)
D - 138.1 cm (54-3/8 in.)
2.3 Component Identification

Figure 2.3: PW8 Header

A - Transport Light
D - Stripper Plate
G - Auger Pan
K - Manual Case
N - Draper Drive Motor
R - Reflector
U - Hold-Down
X - Rear Draper Deck

B - Endshield (Fixed)
E - Auger
H - Multicoupler Receptacle
L - Endshield (Latched)
P - Hold-Down Lift Cylinder
S - Handle
V - Hold-Down Fiberglass Rod
Y - Auger Flighting

C - Transition Frame
F - Auger Finger
J - Driveline
M - Hold-Down Cylinder Safety Prop
Q - Gauge Wheel
T - Draper Finger
W - Forward Draper Deck
2.4 Definitions

The following definitions 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>Bolt</td>
<td>A headed and externally threaded fastener that is designed to be paired with a nut.</td>
</tr>
<tr>
<td>CGVW</td>
<td>Combined Gross Vehicle Weight.</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 the fitting has been tightened to a point where the fitting is no longer loose.</td>
</tr>
<tr>
<td>F.F.F.T.</td>
<td>Flats from finger tight.</td>
</tr>
<tr>
<td>GVW</td>
<td>Gross Vehicle Weight.</td>
</tr>
<tr>
<td>hp</td>
<td>Horsepower.</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Industrial Council: A standards body that developed the standard sizing and shape for original 37° flared fitting.</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>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>Pick-Up Header</td>
<td>A machine that attaches to a combine that picks up grain that has been cut and laid in windrows.</td>
</tr>
<tr>
<td>PTO</td>
<td>Power take-off.</td>
</tr>
<tr>
<td>RoHS (Reduction of Hazardous Substances)</td>
<td>A directive by the European Union to restrict the 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 in one of the mating parts.</td>
</tr>
<tr>
<td>Soft joint</td>
<td>A joint made with the use of a fastener where the joining materials are compressible or experience relaxation over a period of time.</td>
</tr>
<tr>
<td>spm</td>
<td>Strokes per minute.</td>
</tr>
<tr>
<td>Tension</td>
<td>Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.).</td>
</tr>
<tr>
<td>T.F.F.T.</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>
</tbody>
</table>
### PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque angle</td>
<td>A tightening procedure where the fitting is assembled to a precondition (finger tight) and then the nut is turned further a number of degrees or a number of flats to achieve its final position.</td>
</tr>
<tr>
<td>Torque-tension</td>
<td>The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in the bolt or screw.</td>
</tr>
<tr>
<td>Tractor</td>
<td>Agricultural-type tractor.</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>Washer</td>
<td>A thin cylinder with a hole or slot located in the center and is to be used as a spacer, load distribution element or a locking mechanism.</td>
</tr>
</tbody>
</table>
3  General Procedures

3.1  Header Attachment and Detachment

This section includes instructions on attaching PW8 Pick-Up Headers to, and detaching from, the combines listed below. PW8 Pick-Up Headers are configured for each particular combine model.

Table 3.1 Attaching PW8 Header to Combine

<table>
<thead>
<tr>
<th>Combine</th>
<th>Refer to</th>
</tr>
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<tbody>
<tr>
<td>Case IH</td>
<td>3.1.1 Case IH, page 27</td>
</tr>
<tr>
<td>John Deere 60, 70, and S Series</td>
<td>3.1.2 John Deere 60, 70, S, and T Series, page 34</td>
</tr>
<tr>
<td>New Holland CR and CX</td>
<td>3.1.3 New Holland CR/CX Series Combine, page 40</td>
</tr>
<tr>
<td>Versatile</td>
<td>3.1.4 Versatile, page 46</td>
</tr>
</tbody>
</table>

3.1.1  Case IH

This section provides instructions for attaching/detaching the PW8 Pick-Up Header to/from Case IH 50/60/7088, 51/61/7130, 51/61/7140, 70/8010, 71/81/9120, 72/82/9230, and 72/82/9240 combines.

Attaching to Case IH Combine

⚠️ DANGER

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

1. Pull handle (A) on combine to raise hooks (B) on both sides of the feeder house.
2. Drive combine slowly up to header until feeder house saddle (A) is directly under the header top beam (B).

3. Raise feeder house slightly to lift header ensuring feeder house saddle (A) is properly engaged in header frame.

4. Stop engine, and remove key from ignition.

5. Lift lever (A) on header at left side of feeder house and push handle (B) on combine to engage locks (C) on both sides of the feeder house.

6. Push down on lever (A) so that slot in lever engages handle (B) to lock handle in place.

7. If locks (C) do not fully engage the spacer tube and bolt on the header, loosen nut (E) and adjust position of the spacer tube and bolt (D) as necessary (both sides). Tighten nut.

8. Loosen bolts (F) and adjust lock as required to obtain full lock on spacer tube and bolt (D) when lift lever (A) and handle (B) are engaged. Retighten bolts.
9. Rotate disc (B) on header driveline storage hook (A) and remove driveline from hook.

10. Pull back collar (A) on end of driveline and push onto combine output shaft (B) until collar locks.

11. Open cover (A) on header receptacle.

12. Push in lock button (B) and pull handle (C) upward to fully open position.

13. Remove coupler (D) from combine, and clean mating surfaces.
14. Position coupler (A) onto header receptacle and push handle (B) downward to engage coupler pins in receptacle.

15. Push handle to closed position until lock button (C) snaps out.

16. Open cover (D) on header electrical receptacle.

17. Remove electrical connector (E) from storage cup on combine.

18. Align lugs on electrical connector (E) with slots in receptacle, push connector onto receptacle, and turn collar on connector to lock it in place.

**Detaching from Case IH Combine**

⚠️ **DANGER**

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

1. Choose a level area, and position the header slightly off the ground.

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

3. Push in lock button (C), and pull handle (B) upward to release coupler (A).
4. Position coupler (A) onto storage plate (B) on combine.

5. Disconnect electrical connector (A) from header.

6. Place electrical connector (A) into storage cup (B) on combine.
7. Close cover on header electrical receptacle (A).
8. Push handle (B) on header down into storage position until lock button (C) snaps out.
9. Close cover (D).

10. Open driveshield (A) on combine.
11. Pull back collar (B) on driveline (C), and remove driveline from combine.
12. Slide driveline into storage hook (A) on header and rotate disc (B) to secure driveline.

13. Close driveshield (A) on combine.

14. Lift lever (A) and pull and lower handle (B) to disengage feeder house/header lock (C).

15. Lower feeder house until it disengages from header support.

16. Slowly back combine away from header.
3.1.2 John Deere 60, 70, S, and T Series

This section provides instructions for attaching/detaching the PW8 Pick-Up Header to/from John Deere 96/97/9860STS, 96/97/9870, S650/660/670/680/690, 9660WTS, and T670 combines.

**Attaching to John Deere 60, 70, S, and T Series Combine**

⚠️ **DANGER**

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

1. Push handle (A) on combine coupler toward feeder house to retract pins (B) at bottom corners of feeder house.

2. Drive combine slowly up to header until feeder house saddles (A) are directly under the header top beam (B).

3. Raise feeder house to lift header ensuring feeder house saddles (A) are properly engaged in header frame.

4. Position header slightly off the ground, stop engine, and remove key from ignition.
5. Open driveshield (A) on combine feeder house.

6. Rotate disc (B) on header driveline storage hook (A) and remove driveline from hook.

7. Pull back collar (A) on end of driveline and slide driveline on feeder house driveshaft until the collar locks.

8. Close feeder house driveshield.
9. Remove cover (A) from combine multicoupler receptacle.

10. Pull handle (A) on header to release multicoupler (B) from storage position, remove coupler, and push handle back into header to store.

11. Place coupler (A) onto combine receptacle.

12. Pull out knob (B) to release handle, and pull handle (C) to engage pins in coupler.
13. Pull handle (A) from vertical to fully horizontal position to fully engage multicoupler and to extend pins (B) at base of feeder house into the locking plates (C). Knob (D) will engage lock handle.

**NOTE:**
If handle does not move to fully horizontal position, check alignment of locking plates (A) on the header with locking pins (B) on both sides of the feeder house. If necessary, loosen nuts (C) and adjust plates (A) to line up with pins (B). Retighten nuts.

---

**Detaching from John Deere 60, 70, S, and T Series Combine**

⚠️ **DANGER**

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

1. Choose a level area, and position the header slightly off the ground.
2. Stop the engine and remove the key from the ignition.
3. Pull out knob (A) on combine multicoupler, and move handle (B) toward feeder house to release coupler (C) from combine and to retract locking pins at base of feeder house.

4. Lower handle (A) on header, and position coupler (B) onto header as shown.

5. Raise handle (A) to lock coupler.

6. Open feeder house driveshield (B).
7. Pull back collar (A) on driveline, and remove driveline from combine output shaft.

8. Slide driveline into storage hook (A) on header and rotate disc (B) to secure driveline.


10. Lower feeder house until saddle (B) disengages and clears header top beam (C).

11. Slowly back combine away from header.
3.1.3 New Holland CR/CX Series Combine

This section provides instructions for attaching/detaching the PW8 Pick-Up Header to/from all New Holland CR/CX Series combines.

**Attaching to New Holland CR/CX Series Combine**

![Figure 3.33: Feeder House Locks](image)

**DANGER**

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

1. Pull handle (A) on combine to raise hooks (B) on both sides of the feeder house.

2. Drive combine slowly up to header until feeder house saddle (A) is directly under the header top beam (B).

3. Raise feeder house to lift header, ensuring feeder house saddle (A) is properly engaged in header frame.

![Figure 3.34: Header on Combine](image)
4. Lift lever (A) on header at left side of feeder house and push handle (B) on combine so that hooks (C) engage pins (D) on both sides of the feeder house.

5. Push down on lever (A) so that slot in lever engages handle (B) to lock handle in place.

6. Loosen nut (E) and adjust position of pin (D) as necessary (both sides) if locks (C) do not fully engage pins (D) on header. Tighten nut.

7. Loosen bolts (F) and adjust lock as required to obtain full lock on pin (D) when lift lever (A) and handle (B) are engaged. Retighten bolts.

8. Rotate disc (B) on header driveline storage hook (A) and remove driveline from hook.
9. Pull back collar (B) on end of driveline and push onto combine output shaft (A) until collar locks.

10. Open cover (A).
11. Push in lock button (B) and pull handle (C) halfway up to open position.

12. Remove coupler (A) from storage location on combine and clean mating surface of coupler.
13. Position coupler onto header receptacle (A) and push handle (B) downward to engage pins into receptacle.

14. Push handle (B) to closed position until lock button (C) snaps out.

15. Open cover (D) on header electrical receptacle.

16. Remove electrical connector (E) from combine.

17. Align lugs on electrical connector (E) with slots in header receptacle, push connector onto receptacle, and turn collar on connector to lock it in place.

**Detaching from New Holland CR/CX Combine**

⚠️ **DANGER**

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

1. Choose a level area, and position the header slightly off the ground.

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

3. Push in lock button (C), and pull handle (B) upward to release coupler (A).

4. Remove coupler (A) from header receptacle.

---

*Figure 3.40: Attaching Coupler*

*Figure 3.41: Releasing Coupler*
5. Position coupler (A) onto storage plate (B) on combine.
6. Disconnect electrical connector from header, and place in storage cup (C) on combine.

7. Close cover (A) on header hydraulic receptacle, and cover (B) on electrical receptacle.
8. Push handle (C) on header down into storage position until lock button (D) snaps out.

9. Pull back collar (A) on driveline (B) and remove driveline from combine.
10. Slide driveline into storage hook (A) on header and rotate disc (B) to secure driveline.

11. Lift lever (A) and pull and lower handle (B) to disengage feeder house/header lock (C).

12. Lower feeder house until it disengages from header support.

13. Slowly back combine away from header.
3.1.4 Versatile

This section provides instructions for attaching/detaching the PW8 Pick-Up Header to/from Versatile RT490 combines.

**Attaching to Versatile Combine**

⚠️ **DANGER**

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

1. Check that pins (A) at lower corners of header opening are retracted.

2. Drive combine slowly up to header until feeder house posts (A) are directly under the header top brackets (B).

3. Raise feeder house to lift header, ensuring posts (A) are properly engaged around the header frame (B).

4. Position header slightly off the ground, stop the engine, and remove the key from the ignition.
5. Grasp handle (A) and slide pin (B) into the feeder house receptacle (C) until pin stop (D) drops down to lock the pin (see inset). Ensure pin is engaged on the opposite side of the feeder house.

6. If pin (B) does not align with feeder house receptacle (C), or if alignment of the header pan and bottom of feeder house opening is unacceptable, reposition the top beam by performing Step 7, page 47 to Step 12, page 48.

**NOTE:**
If pin aligns with feeder house receptacle (C), proceed to Step 14, page 48.

7. Measure the misalignment between pin (B) and the feeder house receptacle (C).

8. Lower header to the ground until the feeder house disengages the top beam.

9. Loosen the seven bolts (A) along the top beam (B) on the auger side of the header.

10. Loosen the seven bolts (A) along the top beam (B) on the back side of the header.
11. Move support channel (A) according to measurement in Step 7, page 47 to achieve proper alignment of locking pin and feeder house receptacle. Refer to Figure 3.49, page 47.

12. Tighten all bolts.


14. Rotate disc (B) on the header driveline storage hook (A), and remove driveline from the hook.

15. Pull back collar (A) at the end of driveline and push onto the combine output shaft (B) until collar locks.
16. Open cover (A) on header receptacle.

17. Push in lock button (B) and pull handle (C) upward to fully open position.

18. Remove coupler (A) from combine and clean mating surfaces.

19. Position coupler (A) onto header receptacle and push handle (B) downward to engage coupler pins into receptacle.

20. Push handle to closed position until lock button (C) snaps out.

21. Open cover (D) on header electrical receptacle.

22. Remove electrical connector (E) from storage cup on combine.

23. Align lugs on electrical connector (E) with slots in receptacle, push connector onto receptacle, and turn collar on connector to lock it in place.

**Detaching from Versatile Combine**

⚠️ **DANGER**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Choose a level area, and position the header slightly off the ground.

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

3. Push in lock button (C), and pull handle (B) upward to release coupler (A).

4. Remove coupler (A) from header receptacle.

5. Position coupler (A) onto storage plate (B) on combine.

6. Disconnect electrical connector from header, and place in storage cup (C) on combine.

7. Close cover (A) on header hydraulic receptacle, and cover (B) on electrical receptacle.

8. Push handle (C) on header down into storage position until lock button (D) snaps out.
9. Pull back collar on driveline (A) and remove driveline from combine.

10. Slide driveline into storage hook (A) on header and rotate disc (B) to secure driveline.

11. Rotate pin stop (C) from lowered position (see inset), and disengage pin (B) from feeder house using handle (A).
12. Start combine and lower header to ground until feeder house posts (A) disengage from header.

13. Slowly back combine away from header.
3.2 Header Operation

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

Proper operation reduces crop loss and increases productivity, and proper adjustments and timely maintenance will increase the length of service you receive from your machine.

The variables listed in Table 3.2, page 53 and detailed on the following pages will affect header performance.

You will quickly become adept at adjusting the machine to achieve the results you desire. Most of the adjustments have been preset at the factory, but the settings can be changed to suit crop conditions.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Refer to</th>
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3.2.1 Operating Speed

Performance of the pick-up header in various crop and field conditions largely depends upon the speed at which the drapers are turning and the forward speed of the combine.

- If the swath is pushed ahead, the draper speed is too low and some of the crop may remain unpicked.
- If the swath is torn apart and is pulled toward the combine header, the draper speed is too high and uneven combine feeding will occur.

Optimum pick-up speed for most conditions generally results when the swath is always being pushed slightly ahead.

Draper speed is adjusted from the combine cab by regulating oil flow to the pick-up hydraulic motors, typically by using the reel speed controls for the combine. The ratio of pick-up speed to combine ground speed can be set using the combine header controls. Refer to your combine operator’s manual.

**IMPORTANT:**

Do **NOT** overspeed pick-up. Overspeeding causes premature wear of drive components and adversely affects pick-up performance.

The following operating speed is suggested:

**Front and Rear Deck Aft Roller:** 51 rpm per 1.6 km/h (1 mph) of combine ground speed.
**Example:** For combining at 8 km/h (5 mph), the rear roller shaft should run at $51 \times (8/1.6) = 255$ rpm ($51 \times 5 \text{ mph} = 255 \text{ rpm}$).

**Adjusting Draper Speed**

Draper speed is determined by measuring the rpm of the aft roller on the rear pick-up deck.

1. Check the aft roller (A) rpm with a handheld tachometer and adjust with the reel speed control in the combine.

**NOTE:**

Some combines are equipped with a speed sensor (B) that displays the roller rpm inside the combine cab.

![Figure 3.65: Draper Roller and Speed Sensor](image)

### 3.2.2 Operating Height

**Header Height**

Header height is the distance between the deck pivot and the ground. Recommended operating height (A) is between 4 and 5 on the end plate decal or 305 mm (12 in.) above the ground.

![Figure 3.66: Operating Height](image)
Header height adjustments are made using the combine header height control. The numbered decals (A) on both sides of the header indicate the header operating height if the combine is not equipped with an in-cab header height display.

The position of the end plate (B) on the numbered decals (A) represents the header height. Setting the end plate position between 4 and 5 will achieve the recommended operating height of 305 mm (12 in.).

**NOTE:**
Position 1 represents the lowest header height and position 7 represents the highest.

If your combine is factory equipped with auto header height control (AHHC), refer to the following operating and adjustment information. If AHHC is not functioning properly, the sensor output voltage or header height range may require adjustment. For more information, refer to **12.1 Auto Header Height Control (AHHC), page 241**.

1. Ensure the optimum operating height is 305 mm (12 in.) off the ground under normal conditions and with the AHHC set to the **NEUTRAL** position.

2. Use the AHHC to change the pick-up operating height to suit your specific crop condition. Refer to your combine operator's manual for details.

3. If the AHHC sensor requires adjustment, refer to **12.1 Auto Header Height Control (AHHC), page 241**.

**Pick-Up Height**

Pick-up height (A) is the distance between the pick-up finger and the ground.

The recommended pick-up height is 25 mm (1 in.), but it may need to be adjusted to suit field conditions. The following symptoms indicate that an adjustment is necessary:

- If the pick-up leaves material in the swath, the pick-up height is too high.
- If the pick-up fingers are wearing quickly or are picking up dirt and stones, the pick-up height is too low.

**Adjusting Pick-Up Height**

⚠️ **DANGER**

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop engine and remove key before leaving the operator's seat, and always engage safety props before going under the machine for any reason.
1. Check that tire pressure is set to 240–310 kPa (35–45 psi).

2. Adjust the operating height (A) until the rear roller is 305 mm (12 in.) off the ground. Refer to Header Height, page 54.

3. Check the pick-up height (A). Refer to Pick-Up Height, page 55, and complete Steps 4, page 56 to 10, page 57, if adjustment is necessary.

4. Use the combine controls to fully raise the header and take the load off the wheels.

5. Engage the combine lift cylinder safety props.

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

7. Loosen the two bolts (A) securing the wheel spindle assembly (B) to the front of the pickup.

8. Rotate the wheel spindle assembly (B) to raise or lower the wheel and achieve the desired draper finger clearance to the ground.

   **NOTE:**
   The pick-up is factory-set to position number 2 to provide 25 mm (1 in.) clearance to the ground. Rotating the wheel spindle assembly (A) towards position 1 will lower the wheel and provide more finger to ground clearance. Rotating towards position 3 will raise the wheel and provide less finger to ground clearance.

10. Repeat Step 4, page 56 to Step 9, page 56 for the opposite side.

11. Adjust the auto header height control (AHHC) if necessary. Refer to 12.1 Auto Header Height Control (AHHC), page 241.

Unplugging the Header

**DANGER**

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

1. Stop forward movement of the combine and disengage the header.
2. Fully raise the hold-down.
3. Disengage the pick-up draper drive.

**IMPORTANT:**

- To prevent damage to the feeder motor, do **NOT** engage the feeder reverser for more than five seconds if the feeder and auger will not turn.
- To prevent damage to the hold-down rods, raise hold-down assembly before reversing the header.

4. Run the feeder backwards using the reverse controls inside the combine cab to clear the plug.

Storing the Header

Perform the following tasks before storing the header at the end of each operating season:

**CAUTION**

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

1. Clean the header thoroughly.
2. Store the machine in a dry, protected place if possible. If storing outside, cover the header with a waterproof canvas or other protective material.
3. Raise the header and engage the header lift cylinder safety props on combine.
4. Use blocks under the header (if possible) to take the weight off the tires.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Lubricate the header thoroughly, leaving excess grease on fittings to keep moisture out of bearings.
7. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
8. Check for worn components and repair as necessary.
9. Check for broken components and order replacements as required. Immediate repair of these items will save time and effort at the beginning of next season.
10. Replace or tighten any missing or loose hardware. Refer to 16.1 Torque Specifications, page 321.
3.2.3 Adjusting Header Float

Header float is factory set, but it can be adjusted if the wheel ground pressure is higher than desired or if it is too light and the wheels don’t follow ground terrain.

⚠️ DANGER

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

1. Attach the header to the combine feeder house and ensure it is latched securely. It is not necessary to hook up the driveline or hydraulics. Refer to the relevant combine attaching procedure:
   - Attaching to Case IH Combine, page 27
   - Attaching to John Deere 60, 70, S, and T Series Combine, page 34
   - Attaching to New Holland CR/CX Series Combine, page 40
   - Attaching to Versatile Combine, page 46

2. Lower combine feeder house so the front draper deck is rotated upwards to full floated-up position. Header frame will be close to the ground and coil spring will be fully collapsed.

   **NOTE:**
   Spring tension is factory-set to the second hole from the bottom on the float anchor.

3. Shut down the combine, and remove the key from the ignition.

4. Open the left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

   **NOTE:**
   The right side spring float assembly can be removed or adjusted without removing the right endshield. For improved accessibility, however, remove four M12 carriage bolts and hex flange nuts from the endshield support (not shown), and remove the right endshield.

---

**Figure 3.72: Left Endshield**
5. Check that all spring tension is released from the spring float assembly (A). Remove cotter pin (B), clevis pin (C), and three flat washers (D).

**NOTE:**
When spring tension is fully released, spring coils should be fully collapsed and the spring float assembly should rock from side to side when moved by hand. If pressure on the clevis pin persists, slightly raise or lower the header.

6. Move spring float assembly (A) to float anchor holes (B) to make wheel ground pressure lighter, or move spring float assembly to float anchor hole (C) to make wheel ground pressure heavier.

**IMPORTANT:**
The left and right spring float assemblies must be set to the same anchor hole position or draper deck damage could result.

**NOTE:**
If the spring float assembly (A) hole does not align with float anchor holes (B) and (C), raise or lower header as necessary.

7. Insert clevis pin (A) from the inboard side through the rod end of spring float assembly (B), three flat washers (C), and anchor (D) as shown. Secure with cotter pin (E).

8. Repeat procedure for opposite side of header, ensuring that left and right spring float assemblies are set to the same anchor hole position on header.

9. Close left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

10. Replace right endshield if previously removed.
3.3 Endshields

The endshields are molded polyethylene covers that are attached to the ends of the header. They provide shielding for the header drive components and also display the make of the combine. The left endshield is hinged to the endsheet and can be opened for routine maintenance or easily removed for major servicing. The right endshield is bolted directly to the header.

3.3.1 Opening Left Endshield

1. Lower header to ground, shut down engine, and remove key from ignition.

2. Use a slotted screwdriver to unlock endshield (B) by turning latch (A) counterclockwise until it stops (slightly more than one-half turn).

3. Grasp forward end of endshield (A) and pull open until support (B) engages and holds endshield in open position.
3.3.2 Closing Left Endshield

1. Move endshield (A) slightly, so support (B) can be moved out of the locked position.

2. Close endshield (A) ensuring magnet (B) and stop (C) in header frame are aligned. This will ensure that latch (D) aligns with receptacle (E).

   **NOTE:**
   Latch (D) and magnet (B) positions are factory-set and should not require adjustment.

3. If front of endshield needs to be raised or lowered, loosen nuts (B) on clips (C) at the back of the endshield (A), and reposition the endshield. Tighten the nuts (B).

   **IMPORTANT:**
   Do NOT overtighten nuts (B). Overtightening can damage the endshield.
4. Close the endshield (D) and use a slotted screwdriver to turn latch (A) clockwise until it stops (slightly more than one-half turn).

**NOTE:**
When latch is fully engaged, the slot will align with notch (C), and the endshield will draw tightly against the header.

5. Check that magnet (B) on endshield is against the header endsheet and aligned with the cutout in the frame, and that latch (A) is engaged.

### 3.3.3 Removing Left Endshield

1. Lower header to ground, shut down engine, and remove key from ignition.

2. Use a slotted screwdriver to unlock endshield (B) by turning latch (A) counterclockwise until it stops (slightly more than one-half turn).

3. Grasp forward end of endshield (A) and pull open until support (B) engages and holds endshield in open position.
4. Remove nut (A) securing support (B) to endshield (C), and move support (B) off the bolt.

5. Swing endshield (A) fully back and loosen nuts (B) on clips (C) at back of endshield so clips disengage slots in header frame.

6. Move endshield (A) away from header.

3.3.4 Installing Left Endshield

1. Hold endshield (A) up to frame and insert clips (C) into slots in header frame.

2. Tighten nuts (B) on clips (C) just enough to hold endshield in place.
3. Close endshield (A) ensuring magnet (B) and stop (C) in header frame are aligned. This will ensure that latch (D) aligns with receptacle (E).

**NOTE:**
Latch (D) and magnet (B) positions are factory-set and should not require adjustment.

4. If adjustment is necessary, loosen nuts on clips installed in Step 1, page 63 and reposition the endshield (A). Tighten nuts but do not overtighten. Over tightening nuts can damage the endshield.

5. Open the endshield (C) slightly so the support (B) can be installed onto endshield. Check that washer (D) is between the support and the endshield.

6. Install nut (A), leaving a gap of 8–10 mm (5/16–3/8 in.) between the nut and washer (D), which allows support (B) to move.

7. Close the endshield (D) and use a slotted screwdriver to turn latch (A) clockwise until it stops (slightly more than one-half turn).

**NOTE:**
When latch is fully engaged, the slot will align with notch (C), and the endshield will draw tightly against the header.

8. Check that magnet (B) on endshield is against the header endsheet and aligned with the cutout in the frame, and that latch (A) is engaged.
3.3.5 Removing Right Endshield

⚠️ DANGER

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

1. Lower header to ground, shut down engine, and remove key from ignition.
2. Remove bolts (A) attaching endshield lower brackets to header frame.
3. Remove bolts (B) attaching endshield upper brackets to header frame.

![Figure 3.90: Right Endshield](image)

3.3.6 Installing Right Endshield

1. Lower header to ground, shut down engine, and remove key from ignition.
2. Position endshield against the frame, and install bolts (B) and nuts to attach endshield upper brackets to frame. Do not tighten nuts.
3. Install bolts (A) and nuts to attach endshield lower brackets to frame.
4. Tighten all hardware.

![Figure 3.91: Right Endshield](image)
3.3.7 Replacing Endshield Brackets

⚠️ DANGER

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

NOTE:
The endshield does not have to be removed to replace the endshield bracket.

1. Locate the broken bracket (A).
2. Remove bolt (C) and nut securing endshield to bracket (A).
3. Remove bolt (B) and nut securing bracket (A) to header frame and remove bracket.
4. Position new bracket (A) and secure to header frame with bolt (B) and nut. Do not tighten.
5. Attach bracket (A) to endshield with bolt (C) and nut. Do not overtighten bolt to avoid warping or damaging the plastic endshield.
6. Tighten bolt (B) and nut.

Figure 3.92: Endshield Bracket (Endshield Removed for Clarity)
4 Auger System

The auger is a large tube with flighting and fingers that extend and retract. The auger feeds crop into the combine feeder house.

4.1 Parts Listing/Diagram for the Auger Assembly
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4.2 Parts Listing/Diagram for the Auger Assembly (2015 and Prior)
### AUGER SYSTEM

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1. Rework kit MD #237729 is required to replace part for Model Year 2015 units and earlier.
4.3 Checking Auger Position

The auger position is critical for a smooth, high-capacity flow of crop into the feeder house. It is factory-set for normal crop conditions, but it may require adjustment for different crops and conditions. Check the auger position prior to operating the pick-up header to ensure the auger rotates freely without touching the auger pan or stripper bars.

1. Ensure clearance (A) between the auger flighting (B) and pan (C) is 5–14 mm (3/16–9/16 in.).

2. Ensure clearance (A) between the auger fingers (B) and pan (C) is 20–25 mm (3/16–1 in.).
4.4 Adjusting Auger Position

The auger is adjustable on both ends in order to maintain uniform clearance across the entire width of the header.

⚠️ DANGER

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

1. Lower header to the ground, shut down combine, and remove key from ignition.

   NOTE:
   Access the auger/pan area from the top of the header.

2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

3. Loosen two bolts (A) on auger stops at both ends of header.

4. Loosen jam nuts (B) on adjuster bolts (C).

5. Turn adjuster bolt (C) to raise or lower auger.

6. Manually rotate the auger to check for interference and to check clearance between the auger flighting and auger pan. Adjust if necessary.

7. Tighten jam nuts (B) and downstop nuts (A).

8. Check clearance between auger flighting and stripper plates and adjust if necessary. Refer to 4.9 Stripper Plate Clearance, page 85.

Figure 4.3: Left Endshield

Figure 4.4: Left Side Auger Stop
Figure 4.5: Right Side Auger Stop
4.5 Removing Auger

⚠️ DANGER

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

1. Lower pick-up to the ground, and lower the hold-down completely.

2. Check that the float assembly clevis pins (A) are loose. If not, raise or lower the header slightly until the pins are loose.

3. Shut down combine, and remove key from ignition.

4. If necessary, detach the combine from the pick-up header. When detaching header, support it so the float assembly pins (A) remain loose.

5. Remove left endshield. Refer to 3.3.3 Removing Left Endshield, page 62.

6. Remove three nuts (A) and bolts (B) securing top panel (C) to frame. Remove panel.

7. Remove six nuts (A) and bolts (B) securing brace (C) to frame. Remove brace.
8. Remove two nuts (A) and bolts (B) securing top auger stop bracket (C). Remove brackets from both ends.

9. Wrap lifting strap around center of auger. Attach to hoist and lift until strap is tight around auger.

10. Remove auger arm clevis pin and washer (A) from both ends of the header to release the auger arm (B) from the frame.

11. Lift and tilt ONLY the left side of the auger until the auger and arm are free and above the frame.
12. Release the right side of the auger from the socket and lift until the auger and arm are free of the frame.
4.6 Installing Auger

⚠️ DANGER

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

1. Lower pick-up to the ground, and lower the hold-down completely.
2. Shut down combine, and remove key from ignition.
3. If necessary, detach combine from pick-up header.
4. Wrap lifting strap around center of auger. Attach to hoist and lift auger above frame.

5. Lower and tilt down ONLY the right side of the auger, and install the shaft. Make sure arm is in proper position.

6. Lower left side of auger into place. Maneuver the arm into proper position.
7. Install clevis pin and washer (A) through auger arm (B) and frame, and secure with cotter pin. Repeat at opposite end.

8. Install two nuts (A) and bolts (B) securing auger upstop bracket (C), and position as highly as possible to allow arm to move and float. Install brackets at both ends.

9. Install six nuts (A) and bolts (B) securing brace (C) to frame.

10. Check auger drive chain and adjust if necessary. Refer to Adjusting Auger Drive Chain Tension, page 162.
11. Install three nuts (A) and bolts (B) securing top panel (C) to frame.

12. Install left endshield. Refer to 3.3.4 Installing Left Endshield, page 63.
4.7 Auger Speed

The header is equipped with an auger drive sprocket to match the combine. The auger is chain-driven by a direct connection to the feeder house, and auger speed depends on the feeder house speed. You can adjust auger speeds from the combine to suit crop conditions. The header is shipped with a 14-tooth sprocket, but an optional 16-tooth sprocket (MD #152369) is available from MacDon Parts if required auger speed is not achievable from the combine.

Refer to 7.4.2 Auger Drive Sprockets, page 163 for instructions on changing the sprocket.
4.8 Auger Float

The auger has an upward float range of 74 mm (3 in.), but it can be locked to operate in rigid-header mode.

4.8.1 Locking Auger Float

⚠️ DANGER

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.

2. Open the left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

3. Loosen two bolts (A) on auger upstops (B) at the left side of header.

4. Slide the stops (B) downwards until they contact the rubber blocks (C) on the auger arm.

5. Tighten bolts (A).
6. Loosen two bolts (A) on auger upstops (B) at the right side of header.

7. Slide the stops (B) downwards until they contact the rubber blocks (C) on the auger arm.

8. Tighten bolts (A).

9. Close the left endshield (A). Refer to 3.3.2 Closing Left Endshield, page 61.
4.8.2 Unlocking Auger Float

⚠️ DANGER

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.
2. Open the left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

3. Loosen the two bolts (A) on auger upstops (B) at the left side of header.
4. Slide stops (C) upwards to desired float range.
5. Tighten bolts (A).
6. Loosen the two bolts (A) on auger upstops (B) at the right side of header.
7. Slide stops (C) upwards to desired float range.
8. Tighten bolts (A).

9. Close the left endshield (A). Refer to 3.3.2 Closing Left Endshield, page 61.
4.9 Stripper Plate Clearance

The header is equipped with a pair of stripper plates (A) located on either side of the center opening. The stripper plates are designed to minimize crop carryover behind the auger, but they require proper adjustment.

Stripper plate clearance is factory-set to 3–8 mm (1/8–5/16 in.).

NOTE:
- If the clearance between the flighting and stripper plates is too large, crop has a tendency to wrap around the auger and disrupt the crop flow into the combine.
- If the clearance is too little, the auger flighting may contact the stripper plates and cause excessive wear to the flighting and stripper plates.

4.9.1 Checking Stripper Plate Clearance

Check the stripper plate clearance whenever the auger position is changed, and adjust if necessary.

⚠️ DANGER

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.

2. Rotate the auger manually to check for interference and to check the clearance between the auger flighting (A) and stripper plates (B).

   NOTE:
   Access the auger/stripper plate area from the top of the header.

3. Run the header slowly, and listen for contact between the auger flighting (A) and the stripper plates (B). Gradually increase speed until the header is at full speed. If there is contact between the auger flighting and the stripper plates, adjust the stripper plate clearance. Refer to 4.9.2 Adjusting Stripper Plate Clearance, page 86.
4.9.2 Adjusting Stripper Plate Clearance

1. Loosen nuts (A) on the stripper plate (B), and adjust the stripper plate to achieve clearance (C) of 3–8 mm (1/8–5/16 in.).
2. Tighten nuts (A).
3. Recheck clearance.

4.9.3 Replacing Stripper Plates

Replace stripper plates and missing or damaged fasteners if specified clearance cannot be maintained.

⚠️ DANGER

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.

   **NOTE:**
   Access the auger/stripper plate area from the top of the header.
2. Remove four bolts and nuts (A) from stripper plate (B).
3. Replace stripper plate (B), secure with four bolts and nuts (A), but do not fully tighten.
4. Adjust the stripper plate (B) to achieve 3–8 mm (1/8–5/16 in.) clearance (C) to auger flighting.
5. Tighten nuts (A).
6. Recheck the clearance.
4.10 Parts Listing/Diagram for the Auger Internal Assembly
### AUGER SYSTEM

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2. Was previously clamp MD #152995, which as been superseded by clamp MD #237842. Clamp MD #237842 now has additional center hardware that helps increase the clamping around the shafts. To service units with clamp MD #152995, order Auger Clamps kit (MD #237912).

3. Auger Clamps kit (MD #237912) includes two finger support clamps (MD #237842), three bolts (MD #184659), three washers (MD #184711), and three nuts (MD #50101).

4. Split Finger Holder kit (MD #276839) provides all parts needed to replace one-piece finger holders with split finger holders. Kit includes five split finger holders (not serviced separately), ten spacers (not serviced separately), five hair pins (MD #123180), ten bolts (MD #252703), ten tee nuts (MD #197263), and instructions.
4.11 Auger Fingers

4.11.1 Replacing Auger Fingers

Periodically check auger for missing, bent, or severely worn fingers, and replace if necessary.

⚠️ DANGER

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

1. Raise the hold-down fully, and engage lift cylinder safety props.
2. Shut down the combine, and remove the key from the ignition.
3. Remove two screws (A) from the access cover (B) closest to the auger finger (C) being serviced, and remove access cover.

4. Reach inside the auger, remove hairpin (A), and pull auger finger (B) out of holder (C).
5. Reach inside the auger, swivel auger finger (B) away from holder (C), pull from plastic guide (D), and remove from auger through access hole.
6. From inside the auger, insert new auger finger (B) through plastic guide (D).
7. Insert auger finger (B) into holder (C), and secure auger finger in holder with hairpin (A). Install hairpin with closed end leading with respect to auger forward rotation.

Figure 4.31: Access Cover

Figure 4.32: Auger Fingers
8. Install access cover (B) using two screws (A) coated with Loctite®. Torque screws to 8.5 Nm (75 lbf-in).

**NOTE:**
If reusing hardware, apply a fresh coat of medium-strength thread locker.

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### 4.11.2 Replacing Auger Finger Guides

If the hole in the finger guide has elongated to the maximum length of 24 mm (15/16 in.), replace the finger guide.

⚠️ **DANGER**

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

1. Raise the hold-down fully, and engage lift cylinder safety props.
2. Shut down the combine, and remove the key from the ignition.
3. Remove two screws (A) from the access cover (B) closest to the finger guide being replaced, and remove access cover.
4. Remove auger finger (C). Refer to 4.11.1 Replacing Auger Fingers, page 89.
5. Remove two screws (A) from finger guide (B), and remove finger guide through access hole.

6. Reach inside the auger and install new finger guide (A) using existing screws (B) and tee nuts (C) as shown. Torque screws to 8.5 Nm (75 lbf·in).

7. Reinstall auger finger. Refer to 4.11.1 Replacing Auger Fingers, page 89.

8. Install access cover (B) using two screws (A) coated with Loctite®. Torque screws to 8.5 Nm (75 lbf·in).

**NOTE:**
If reusing hardware, apply a fresh coat of medium-strength thread locker.
4.11.3 Replacing Auger Finger Holder

Periodically check auger for damaged or severely worn finger holders and replace if necessary.

**DANGER**

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

1. Raise the hold-down fully, and engage lift cylinder safety props.
2. Shut down the combine, and remove the key from the ignition.
3. Remove two screws (A) and remove center access cover (B).

4. Remove two screws (A) and remove right access cover (B) if the finger holder requiring replacement is located on the right side of the auger, or remove two screws (C) and remove the left access cover (D) if the finger holder is located on the left side.
5. Reach inside the auger, remove hairpin (A) from the auger finger (B) requiring holder replacement, and pull auger finger out of holder (C).

6. Reach inside the auger, swivel auger finger (B) away from holder (C), pull from plastic guide (D), and remove from auger.

NOTE:
Depending on the number of auger fingers (B) installed in the auger, there may be spare holders (C) on the shaft. Look inside the drum to see if there are any spare holders. If there are spare holders already installed, completely remove the damaged holder. To access the spare holder, remove auger fingers accordingly.

IMPORTANT:
There must always be 24 holders (C) on the shaft; otherwise, the holders may slide over and cause the auger fingers (B) to fall into the drum during operation.

7. If the auger finger removed in Step 5, page 93 is on the right side of the auger, reach inside, and remove all the fingers between the damaged holder (A) and the right finger support clamp (B) as described in the following steps.

8. If the auger finger removed in Step 5, page 93 is on the left side of the auger, remove all the fingers between the damaged holder (C) and the left finger support clamp (D) as described in the following steps.

9. Reach inside the auger, remove two M10 hex head bolts, nuts, and washers (A), and remove finger support clamp (B) from the shaft.
10. Reach inside the auger, and slide the auger finger holders (A) off the end of the shaft (B).

11. Reach inside the auger, and slide new auger finger holders (A) onto the shaft (B).

12. Reach inside the auger, place finger support clamp (B) onto shafts, and secure with two M10 hex head bolts, nuts, and washers (A). Torque bolts to 54–61 Nm (40–45 lbf-ft).
13. Reach inside the auger, and reinstall auger fingers (B) through plastic guides (D) from the inside.

**NOTE:**
Replace worn or damaged auger fingers.

14. Insert auger fingers (B) into holders (C), and secure auger fingers in holder with hairpins (A). Install hairpins with closed end leading with respect to auger forward rotation.

15. Install access covers (A) using two screws (B) coated with Loctite®. Torque screws to 8.5 Nm (75 lbf-in).

**NOTE:**
If reusing hardware, apply a fresh coat of medium-strength thread locker.
4.12 Auger Flighting

Auger flighting is provided on all PW8 Pick-Up Headers. Depending on the combine configuration, auger flighting extensions may or may not be installed.

4.12.1 Replacing Flighting Extensions

With header removed from combine, proceed as follows:

1. Remove two access covers (A) from both side of the center of the auger.

2. Remove hardware (A) securing existing auger flighting extensions (B), and remove extensions. Retain hardware.

Figure 4.48: Auger Access Covers

Figure 4.49: Flighting Extension
3. Place the new flighting extension (A) on the auger and ensure that new flighting is positioned on the outboard side of the existing flighting (B).

4. Secure flighting extension (A) to auger using existing hardware (C).

   **NOTE:**
   Install bolts (C) with heads facing inboard and nuts facing outboard.

5. Repeat for opposite side.

6. Install access covers (A) using two screws (B) coated with Loctite®. Torque screws to 8.5 Nm (75 lbf·in).

7. Rotate the auger manually to check for interference and to check the clearance between the auger flighting and stripper plates. Ensure clearance is 3–8 mm (1/8–5/16 in.) and adjust if necessary. Refer to 4.9.2 *Adjusting Stripper Plate Clearance, page 86.*
5 Draper System

The drapers are used to convey crop into the feeder house of the combine.

5.1 Parts Listing/Diagram for Decks – Drapers and Rollers
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5. Comes complete with fingers installed.
5.2 Draper Belts

Periodically check the draper belts for signs of wear and damage. Replace drapers that have stretched, have cuts or tears, or have worn slats. Replace missing or damaged fasteners, damaged connector bars, and damaged straps.

5.2.1 Rear Deck

Removing Rear Draper Belt

⚠️ DANGER

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


2. Raise the header fully, and engage the combine lift cylinder safety props.

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

4. Release draper belt tension fully. Refer to Adjusting Rear Draper Belt Tension, page 104.

5. Remove seven M6 flange nuts (A), belt edge protector (B), and pronged elevator bolts (C) from belt (D) (if removing end belt).

6. Remove M6 flange nuts (A), connector bar (B), and pronged elevator bolts (C) from belt (D).
7. Remove M6 flange nuts (A) and straps (B) connecting adjacent belts.
8. Remove elevator bolts (C).
9. Remove draper belt (D).

Installing Rear Draper Belt

**NOTE:**
If replacing more than one belt, it may be easier to remove all the belts and assemble them on the ground before installing on the draper.

1. Wrap new draper belt (A) around the rollers with slats facing outwards.
   **IMPORTANT:**
   Arrow on belt must point in direction of rotation.

2. Connect draper belt (D) using M6 x 15-1/2 pronged elevator bolts (A).
3. Attach edge protector (B) to pronged elevator bolts (A), and secure with M6 flange nuts (C) (if installing end belt). Do **NOT** tighten.
4. Torque M6 flange nuts (C) to 4–5.6 Nm (37–50 lbf-in).
5. Install connector bars (A) onto bolts, and secure with M6 flange nuts (B).

6. Torque M6 flange nuts (B) to 4–5.6 Nm (37–50 lbf-in).

7. Install two square neck elevator bolts (C) at each strap location.

8. Install straps (B) onto bolts, and secure with M6 flange nuts (A).

9. Torque M6 flange nuts (A) to 4–5.6 Nm (37–50 lbf-in).

10. Tension draper belts. Refer to Adjusting Rear Draper Belt Tension, page 104.

Checking Rear Draper Belt Tension

Draper belt tension is factory-set, but it should be checked before operating.

⚠️ DANGER

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

**NOTE:**

- Ensure there is visible sag in the underside of the draper.
- Drapers may be sticky when new. Apply talcum or baby powder to the drapers to help reduce the stickiness.

1. Raise the header fully, and engage the combine lift cylinder stops.
2. Stop the engine and remove the key from the ignition.
3. Ensure the rear draper (B) is properly tensioned. The rear draper should be visible and aligned with the indicator notch in slot (A).

**NOTE:**
Ensure draper tension is the same on both sides for optimum draper tracking.

4. Adjust draper tension if necessary. Refer to *Adjusting Rear Draper Belt Tension, page 104.*

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### Adjusting Rear Draper Belt Tension

The stepped position indicator gauges are used to precisely align each side of the front and rear decks. Each notch (A) represents an adjustment of 1 mm (3/64 in.).

---

1. Loosen two clamp bolts (A) on the left side.
2. Loosen jam nut (B).
3. Turn adjuster nut (C) to set draper tension. Proper tension is achieved when the draper lines up with indicator notch (D).

**IMPORTANT:**
Do **NOT** tighten draper above the indicator notch (D). Drapers only need to be tight enough to prevent slippage.

Overtightening drapers may result in the following:
- Joining bolts pulling out of draper
- Damage to the rollers or bearings
- Twisting and wrinkling of drapers
4. Tighten clamp bolts (A) and jam nut (B).
5. Note the position of indicator (E) and set the right side to the same position.

6. Loosen three clamp bolts (A) on the right side.

7. Loosen jam nut (B).

8. Turn adjuster nut (C) until the position of the indicator notch (D) is exactly the same as the left side.

9. Tighten clamp bolts (A) and jam nut (B).

5.2.2 Front Deck

Removing Front Draper Belt

⚠️ DANGER

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


2. Raise the header fully, and engage the combine lift cylinder safety props.

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

4. Release draper belt tension fully. Refer to Adjusting Front Draper Belt Tension, page 108.

5. Remove seven M6 flange nuts (A), belt edge protector (B), and pronged elevator bolts (C) from belt (D) (if removing end belt).

Figure 5.11: Right Side Rear Deck

Figure 5.12: End Draper Belt
6. Remove M6 flange nuts (A), connector bar (B), and pronged elevator bolts (C) from belt (D).

7. Remove M6 flange nuts (A), fingers (B), and straps (C) connecting adjacent belts.

8. Remove draper belt (D).

**Installing Front Draper Belt**

**NOTE:**
If replacing more than one belt, it may be easier to remove all the belts and assemble them on the ground before installing on the draper.

1. Wrap new draper belt (A) around the rollers with slats facing outwards.

   **IMPORTANT:**
   Arrow on belt must point in direction of rotation.
2. Connect draper belt (D) using M6 x 15-1/2 pronged elevator bolts (A).

3. Attach edge protector (B) to pronged elevator bolts (A), and secure with M6 flange nuts (C) (if installing end belt). Do not tighten.

4. Torque M6 flange nuts (C) to 4–5.6 Nm (37–50 lbf-in).

5. Install connector bars (A) onto bolts, and secure with M6 flange nuts (B).

6. Torque M6 flange nuts (B) to 4–5.6 Nm (37–50 lbf-in).

7. Connect draper belt by installing M6 x 16 square neck elevator bolts (A) at center locations, and M6 x 23 square neck elevator bolts (B) at finger (D) locations.

8. Install straps (C) and fingers (D) onto bolts, and secure with M6 flange nuts (E).

9. Torque M6 flange nuts (E) to 4–5.6 Nm (37–50 lbf-in).

10. Tension draper belts. Refer to Adjusting Front Draper Belt Tension, page 108.
Checking Front Draper Belt Tension

Draper belt tension is factory-set, but it should be checked before operating.

**DANGER**

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

**NOTE:**
- Ensure there is visible sag in the underside of the draper.
- Drapers may be sticky when new. Apply talcum or baby powder to the drapers to help reduce the stickiness.

1. Raise the header fully, and engage the combine lift cylinder stops.
2. Stop the engine and remove the key from the ignition.
3. Ensure the front draper (B) is properly tensioned. The front draper should be visible and aligned with the indicator notch in slot (A).

**NOTE:**
Ensure draper tension is the same on both sides for optimum draper tracking.

4. Adjust draper tension if necessary. Refer to Adjusting Front Draper Belt Tension, page 108.

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**Adjusting Front Draper Belt Tension**

The stepped position indicator gauges are used to precisely align each side of the front and rear decks. Each notch (A) represents an adjustment of 1 mm (3/64 in.).
1. Loosen three clamp bolts (A) on each side of the header.

2. Loosen jam nut (B) on the left side.

3. Turn adjuster nut (C) to set the draper tension. Proper tension is achieved when the draper lines up with indicator notch (D).

**IMPORTANT:**
Do NOT tighten draper above the indicator notch (D). Drapers only need to be tight enough to prevent slippage.
Overtightening drapers may result in the following:
- Joining bolts pulling out of draper
- Damage to the rollers or bearings
- Twisting and wrinkling of drapers

4. Note the position of the stepped position indicator gauge (E).

5. Loosen jam nut (A) on the right side of the header, and turn adjuster nut (B) until the position of stepped position indicator gauge (C) is identical to the left side.

6. Tighten three clamp bolts (A) and jam nut (B) on both sides of the header.
5.3 Draper Fingers and Guides

Replace any broken or worn fingers to maintain machine performance. Excessively worn fingers will reduce picking efficiency, resulting in losses that far exceed the cost of new fingers.

The guides, which maintain draper tracking, are located along the outboard edge on the inside of the right draper belt on both decks. If any guide is worn enough to cause large amounts of draper tracking/shifting, replace the guide. Check to make sure the guides are aligned perpendicular to the direction of draper travel. Excessively worn or misaligned guides can cause the drapers to shift and ride up on the frame causing premature draper edge wear and draper tearing.

**NOTE:**
It may be necessary to remove the draper belt when replacing the fingers/guides. Refer to *Removing Front Draper Belt, page 105* or *Removing Rear Draper Belt, page 101*.

5.3.1 Replacing Draper Fingers

⚠️ **DANGER**

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

1. Raise the hold-down fully, and engage lift cylinder safety props.
2. Raise the header fully, and engage the combine lift cylinder safety props.
3. Stop the engine, and remove the key from the ignition.
4. Remove M6 flange nut (A) securing finger (B) to the draper belt.
5. Remove finger (B) and replace with new finger.
7. Torque flange nut (A) to 4–5.6 Nm (37–50 lbf-in).

**NOTE:**
Hold finger to prevent turning while tightening nut.

5.3.2 Replacing Draper Guide

⚠️ **DANGER**

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

1. Raise the hold-down fully, and engage lift cylinder safety props.
2. Raise the header fully, and engage the combine lift cylinder safety props.
3. Stop the engine, and remove the key from the ignition.
4. Release draper belt (D) tension fully.

5. Pull the draper belt (D) away from the frame from under the deck to expose guide (C).

6. Remove the M6 flange nut (A) and washer (B) securing guide (C) to the draper belt (D). If guide is under a finger (E), remove the finger.

7. Remove guide (C) and elevator bolt (F). Discard the old guide.

8. Place a new guide (C) onto the M6 x 26 elevator bolt (F), and install onto the draper belt (D).

9. Install M6 washer (B) and flange nut (A).

10. Use an M6 x 30 elevator bolt (A) if guide (D) is in a finger location, and install the finger (B) before installing the flange nut (C).

11. Torque flange nut (C) to 4–5.6 Nm (37–50 lbf∙in). Hold the finger (B) or guide (D) to prevent turning while tightening flange nut.

   **IMPORTANT:**
   Ensure guides (D) are perpendicular to the direction of draper travel.

12. Rotate draper belt manually to access all the guides (D).

13. Tighten the draper belt. Refer to *Adjusting Rear Draper Belt Tension, page 104* or *Adjusting Front Draper Belt Tension, page 108*. 

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**Figure 5.25: Draper Guide (View from Lower Left Side of Machine)**

**Figure 5.26: Draper Guide (View from Lower Left Side of Machine)**
5.4 Draper Deck Roller Bearings

Each draper deck roller is supported by two self-aligning, non-greasable roller bearings (A). Replace the roller bearings if they are worn or damaged.

**NOTE:**
Top image is the right side of header, and bottom image is the left side of header.

5.4.1 Rear Deck

*Replacing Drive Roller Bearing on Left Side of Rear Deck*

⚠️ **DANGER**

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

1. Lower the hold-down fully.
2. Lower header to the ground until the two float springs are loose.
3. Stop the engine, and remove the key from the ignition.
4. Release draper belt tension fully. Refer to *Adjusting Rear Draper Belt Tension, page 104.*
5. Support the deck at both ends by placing a wooden block (A) under the frame close to the bearing.

6. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

7. Remove rear hydraulic motor (A). Refer to 7.3.3 Removing Rear Hydraulic Motor, page 154.
8. Turn the roller manually until setscrew (A) in lock collar (B) lines up with the recess in bearing support (C).

9. Loosen setscrew (A) in lock collar (B) using a 6 mm hex key. Rotate collar counterclockwise to loosen and remove collar.

10. Ensure deck is fully supported, and check that the float spring assembly is loose. You may need to raise the deck slightly to loosen the assembly.

11. Remove the four nuts (A) attaching bearing support (B) to frame.

   **NOTE:**
   Ensure that height controller is not damaged when removing bolts.

12. Pull bearing support (B) off roller shaft.

13. Swivel bearing (A) 90 degrees in support until outer race lines up with slots in bearing support.

14. Push out the bearing (A).
15. Line up new bearing (A) with slots in bearing support, and push bearing into bearing support.

16. Swivel bearing 90 degrees and slide it into groove inside bearing support.

17. Remove and install new bushing (A) (if necessary).

18. Place bearing support (B) on roller shaft (A).

19. Position base of bearing assembly against frame, and align mounting holes.
20. Install two M12 x 30 carriage bolts (A) in the upper holes and two M12 x 40 carriage bolts (B) in the lower holes. Bolt heads must face aft. Secure with lock nuts.

**NOTE:**
Ensure height controller is not damaged when installing bolts.

![Figure 5.37: Left Side Rear Deck](image)

21. Install lock collar (B) onto bearing, and rotate clockwise until tight.

22. Turn the roller manually until setscrew (A) in lock collar (B) lines up with the recess in bearing support (C).

23. Tighten setscrew (A) using a 6 mm hex key.


26. Tighten the draper belt. Refer to Adjusting Rear Draper Belt Tension, page 104.

**Replacing Drive Roller Bearing on Right Side of Rear Deck**

⚠ **DANGER**

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

1. Lower the hold-down fully.

2. Lower header to the ground until the two float springs are loose.

3. Stop the engine, and remove the key from the ignition.

4. Release draper belt tension fully. Refer to Adjusting Rear Draper Belt Tension, page 104.
5. Support the deck at both ends by placing a wooden block (A) under the frame close to the bearing.

6. Check that the float springs are loose.

7. Loosen nuts (A) on bearing support (B) on the right side of the header, remove draper speed sensor assembly, and move it clear of work area.

8. Remove screws (A), and remove cover (B) from inboard side of right endsheet to access the bearing mounting bolts.
9. Remove bolt (A), and remove speed sensor disc (B).

10. Turn the roller manually until setscrew (A) in lock collar (B) lines up with the recess in bearing support (C).

11. Loosen setscrew (A) in lock collar (B) using a 6 mm hex key. Rotate collar clockwise to loosen and remove collar.

12. Ensure deck is fully supported, and check that the float spring assembly is loose. You may need to raise the deck slightly to loosen the assembly.

13. Remove the four nuts (A) attaching bearing support (B) to the frame.

**NOTE:**
Ensure that height controller is not damaged when removing bolts.

14. Pull bearing support (B) off roller shaft.
15. Swivel bearing (A) 90 degrees in support until outer race lines up with slots in bearing support.

16. Push out the bearing (A).

17. Line up new bearing (A) with slots in bearing support, and push bearing into bearing support.

18. Swivel bearing 90 degrees and slide it into groove inside bearing support.

19. Remove and install new bushing (A) (if necessary).
20. Place bearing support (B) on roller shaft (A).

21. Position base of bearing support against frame, and align mounting holes.

22. Install two M12 x 30 carriage bolts (C) in the upper holes and two M12 x 40 carriage bolts (D) in the lower holes. Secure with lock nuts.

**NOTE:**
Ensure height controller is not damaged when installing bolts.

23. Install lock collar (A) onto the bearing. Lock the collar in direction of shaft rotation, and tighten setscrew (B).

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

24. Start combine, and raise header fully. Shut down combine, and remove key from ignition.

25. Remove wooden block.


27. Align the draper deck rollers. Refer to Aligning Rear Draper Deck Rollers, page 122.

28. Tension the drapers. Refer to Adjusting Rear Draper Belt Tension, page 104.

*Replacing Idler Roller Bearing on Left Side of Rear Deck*

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

1. Lower the hold-down fully.
2. Lower header to the ground until the two float springs are loose.
3. Stop the engine, and remove the key from the ignition.
4. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

5. Fully release draper belt tension. Refer to Adjusting Rear Draper Belt Tension, page 104.

6. Loosen setscrew in lock collar (A) using a 6 mm hex key.

7. Loosen lock collar (A) by rotating collar counterclockwise.

8. Support the roller with a wooden block, and loosen bolts (B) and (C) securing bearing to frame.

9. Remove nuts on bolts (B) and (C).

10. Pull bearing off roller shaft.

11. Place new bearing on roller shaft, and align mounting holes.

12. Install the M12 x 45 carriage bolt (B) in the forward hole and the M12 x 40 carriage bolt (C) in the aft hole. Ensure bolt heads face inboard, secure with lock nuts, but do not fully tighten.

13. Install lock collar (A) onto bearing. Lock the collar in direction of shaft rotation.

14. Tighten the setscrew using a 6 mm hex key.

15. Tension the drapers. Refer to Adjusting Rear Draper Belt Tension, page 104.

16. Close the endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

17. Align the draper deck rollers. Refer to Aligning Rear Draper Deck Rollers, page 122.
Replacing Idler Roller Bearing on Right Side of Rear Deck

**DANGER**

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

1. Lower the hold-down fully.
2. Lower header to the ground until the two float springs are loose.
3. Stop the engine, and remove the key from the ignition.
4. Remove right endshield if necessary. Refer to 3.3.5 Removing Right Endshield, page 65.
5. Fully release the draper belt tension. Refer to Adjusting Rear Draper Belt Tension, page 104.
6. Loosen setscrew in lock collar (A) using a 6 mm hex key.
7. Rotate lock collar (A) clockwise to loosen and remove collar.
8. Support the roller with a wooden block, and loosen bolts (B) and (C) securing bearing to frame.
9. Remove nuts on bolts (B) and (C).
10. Pull bearing off roller shaft.
11. Place new bearing on roller shaft and align mounting holes.
12. Install the M12 x 45 carriage bolt (B) in the forward hole and the M12 x 40 carriage bolt (C) in the aft hole. Ensure bolt heads face inboard, secure with lock nuts, but do not fully tighten.
13. Install lock collar (A) onto the bearing, and rotate lock collar counterclockwise until tight.
14. Tighten the setscrew using a 6 mm hex key.
15. Align the draper deck rollers. Refer to Aligning Rear Draper Deck Rollers, page 122.
16. Tension the drapers. Refer to Adjusting Rear Draper Belt Tension, page 104.
17. Replace right endshield if previously removed. Refer to 3.3.6 Installing Right Endshield, page 65.

**Aligning Rear Draper Deck Rollers**

Draper roller alignment is necessary for proper draper tracking. Perform this procedure after replacing a roller bearing.

**DANGER**

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.
2. Open left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.
3. Remove the front hydraulic motor (A). Refer to 7.3.1 Removing Front Hydraulic Motor, page 152.

4. Release the draper belt tension. Refer to Adjusting Front Draper Belt Tension, page 108.

5. Loosen the locking collar (A) and the three nuts (B) attaching the bearing flange to the frame on the left side of the header.

6. Loosen the locking collar (A) and the three nuts (B) attaching the bearing flange to the frame on the right side of the header.

7. Loosen locking bolt (C).
8. Turn adjuster nut (A) and draw the rear draper deck roller assembly into the header until the leading edge of the bearing support plate (B) lines up with the middle of the single cutout (C) on each side of the header.

9. Measure from the center of the rear drive roller to the center of the front driven roller. Set dimension (A) to 490 mm (19-5/16 in.) on each side of the header.

10. Tighten the locking collar (A) and the three nuts (B) attaching the bearing flange to the frame on the left side of the header.
11. Tighten the locking collar (A) and the three nuts (B) attaching the bearing flange to the frame on the right side of the header.

12. Tighten locking bolt (C).

13. Recheck measurement in Step 9, page 124 to ensure nothing moved while tightening the nuts on each side of the header.

14. Tension the draper belt. Refer to Adjusting Front Draper Belt Tension, page 108.

15. Reinstall the front hydraulic motor. Refer to 7.3.2 Installing Front Hydraulic Motor, page 153.

16. Close the left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

5.4.2 Front Deck

Replacing Drive Roller Bearing on Left Side of Front Deck

⚠️ DANGER

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

1. Lower the hold-down fully.

2. Lower header to the ground until the two float springs are loose.

3. Stop the engine, and remove the key from the ignition.

4. Open the left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.

5. Release the draper belt tension fully. Refer to Adjusting Front Draper Belt Tension, page 108.

6. Remove the front hydraulic motor (A). Refer to 7.3.1 Removing Front Hydraulic Motor, page 152.
7. Turn roller manually until setscrew on lock collar (A) is accessible.

8. Loosen setscrew using a 6 mm hex key, and turn lock collar (A) counterclockwise to loosen and remove collar.

9. Support the roller with a wooden block, and use an 18 mm socket to remove four M12 nuts from bolts (B) securing bearing housing (C) to frame.

10. Pull bearing and housing (A) off the roller shaft.

11. Remove two M12 bolts (A) securing bearing (B) to housing (C), and remove bearing.

12. Install new bearing (B) into housing (C) using two M12 x 40 carriage bolts (A) and lock nuts (D).
13. Place bearing housing (A) onto roller shaft (B), and secure using four M12 x 35 bolts (C) (with bolt heads facing inboard) and lock nuts (D). Tighten lock nuts.

14. Install lock collar (A) onto roller shaft, and turn clockwise until tight.

15. Remove support from under drive roller.

16. Turn roller manually until setscrew in lock collar (A) is accessible.

17. Tighten setscrew using a 6 mm hex key.

18. Remove wooden block.

19. Reinstall the front hydraulic motor. Refer to 7.3.2 Installing Front Hydraulic Motor, page 153.

20. Align the draper deck rollers. Refer to Aligning Front Draper Deck Rollers, page 130.

21. Tension the drapers. Refer to Adjusting Front Draper Belt Tension, page 108.

22. Close the left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

Replacing Drive Roller Bearing on Right Side of Front Deck

⚠️ DANGER

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

1. Lower the hold-down fully.
2. Lower header to the ground until the two float springs are loose.
3. Stop the engine, and remove the key from the ignition.
4. Release draper belt tension fully. Refer to Adjusting Front Draper Belt Tension, page 108.
5. Loosen setscrew in lock collar (A) using a 6 mm hex key.

6. Rotate lock collar (A) clockwise to loosen and remove collar.

7. Support the roller with wooden blocks, and loosen two bolts (B) securing bearing (C) to frame.

8. Remove existing bearing (C) from roller shaft.

9. Place new bearing on roller shaft and align mounting holes.

10. Install M12 x 40 mounting bolts (B) (if previously removed) with heads facing inboard, and secure with lock nuts.

11. Install lock collar (A) onto the bearing (C), and rotate lock collar counterclockwise until tight.

12. Tighten the setscrew using a 6 mm hex key.

13. Remove wooden block.


15. Tension the drapers. Refer to Adjusting Front Draper Belt Tension, page 108.

Replacing Front Deck Idler Roller Bearings

⚠️ DANGER

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

NOTE:
The following describes the bearing replacement procedure for the left side—the procedure for the right side is identical.

1. Stop the engine, and remove the key from the ignition.

2. Release draper belt tension fully. Refer to Adjusting Front Draper Belt Tension, page 108.
3. Loosen setscrew in lock collar (A) using a 6 mm hex key. Rotate lock collar (A) counterclockwise (clockwise for right side) to loosen and remove collar.

4. Support the roller with wooden blocks, and loosen two nuts on bolts (B) attaching bearing to frame.

5. Pull bearing assembly (A) off roller shaft and remove from frame.

6. Place new bearing assembly (A) onto roller shaft and bolts (B).

7. Position bearing against frame.

8. Install bolt (A) (if previously removed), and ensure shield (B) is in place.
9. Secure bearing (A) with lock nuts (B).

10. Install lock collar (C) onto bearing, and rotate lock collar clockwise (counterclockwise for right side) until tight.

11. Tighten the setscrew using a 6 mm hex key.

12. Remove wooden block.

13. Align the draper deck rollers. Refer toAligning Front Draper Deck Rollers, page 130.

14. Tension the drapers. Refer to Adjusting Front Draper Belt Tension, page 108.

 Aligning Front Draper Deck Rollers

Draper roller alignment is necessary for proper draper tracking. Perform this procedure after replacing a roller bearing.

⚠️ DANGER

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

1. Lower the header to the ground, shut down the combine, and remove the key from the ignition.

2. Open left endshield. Refer to3.3.1 Opening Left Endshield, page 60.

3. Remove the front hydraulic motor (A). Refer to7.3.1 Removing Front Hydraulic Motor, page 152.

4. Release the draper belt tension. Refer to Adjusting Front Draper Belt Tension, page 108.
5. Loosen the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame on the driven roller on each side of the header.

6. Loosen the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame.

7. Loosen the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame.
8. Turn adjuster nut (A) and draw the front draper deck roller assembly into the header until the edge of the header frame lines up with the middle of the second slot (C) above the draper tension indicator cutout.

9. Tighten the three clamp bolts (B) on each side of the header.

10. Measure from the center of the rear drive roller to the center of the front driven roller. Set dimension (A) to 490 mm (19-5/16 in.) on each side of the header.

11. If unable to achieve 490 mm (19-5/16 in.) for dimension (A) with the frame in the middle of the second slot, adjust the frame as necessary to achieve correct measurement.
12. Measure the distance (A) between the frame and nearest slot, and make sure the opposite side of frame is equal distance to the same slot.

13. Tighten the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame on the driven roller on each side of the header.
14. Tighten the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame.

15. Tighten the locking collar (A) and the two nuts (B) attaching the bearing flange to the frame.

16. Recheck measurement in Step 10, page 132 to ensure nothing moved while tightening the nuts on each side of the header.

17. Tension the draper belt. Refer to Adjusting Front Draper Belt Tension, page 108.

18. Reinstall the front hydraulic motor. Refer to 7.3.2 Installing Front Hydraulic Motor, page 153.

19. Close the left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.
5.5 Draper Speed Sensor

The draper speed sensor is mounted to a support on the right side of the header. It reads the speed of the driven roller on the rear deck. This section does NOT apply to Case IH and New Holland combines. For Case IH and New Holland combines, refer to your combine operator’s manual for further information.

5.5.1 Checking Draper Speed Sensor Position

The draper speed sensor position is factory-set, but it may require adjustment if problems occur with the draper speed system or when replacing sensor components. Check the draper speed sensor position prior to making any adjustments.

⚠️ DANGER

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

1. Stop the engine, and remove the key from the ignition.

3. Check clearance (A) between speed sensor and disc. The recommended clearance is 3 mm (1/8 in.). If clearance requires adjustment, refer to 5.5.2 Adjusting Draper Speed Sensor, page 136.

4. Check vertical alignment (A) of sensor (B) and sensor disc (C). If required, adjust support (D) inboard or outboard to adjust vertical alignment.
5.5.2 Adjusting Draper Speed Sensor

The draper speed sensor position is factory-set, but it may require adjustment if problems occur with the draper speed system or when replacing sensor components. Check the draper speed sensor position prior to making any adjustments. Refer to 5.5.1 Checking Draper Speed Sensor Position, page 135.

⚠️ DANGER

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

1. Lower header to the ground, and lower the hold-down completely.
2. Stop the engine, and remove the key from the ignition.
3. Hold sensor (B) with a wrench and loosen jam nut (C).
4. Turn jam nuts (C) and (A) to achieve the required sensor to disc clearance.
5. Tighten jam nuts (C) and (A).

![Figure 5.83: Draper Speed Sensor](image)

5.5.3 Replacing Draper Speed Sensor

The speed sensor may require replacement if it is malfunctioning or if service is being performed to adjacent components.

⚠️ DANGER

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

1. Lower header to the ground, and lower the hold-down completely.
2. Stop the engine, and remove the key from the ignition.
3. Remove lower jam nut (A), and pull sensor (B) from support (C).
4. Disconnect sensor (B) from harness, and remove top jam nut (D).
5. Attach new sensor (B) to harness, and install top jam nut (D) onto sensor.
6. Position sensor (B) in support (C), and secure with lower jam nut (A).
7. Adjust clearance between sensor and sensor disc. Refer to 5.5.2 Adjusting Draper Speed Sensor, page 136.

Figure 5.84: Draper Speed Sensor
5.6 Adjusting the Pan Seal Assembly

The pan seal assembly comes with an adjustable rubber flap. The raised flap position provides a tighter seal to the rear draper, but the draper connection hardware will eventually wear down the rubber flap. If plugging occurs between the rear draper and the pan seal bar, the rubber flap can be repositioned or removed to eliminate the pan seal.

⚠️ DANGER

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

1. Raise the header fully and engage the combine safety props.
2. Stop the engine and remove the key from the ignition.
3. To increase the pan seal:
   a. Remove eight M12 carriage bolts and hex flange nuts (A) from support (B) and pan seal bar (C), and remove rubber flap (D).
   b. Reposition rubber flap (D) from upper hole (F) to lower hole (E).
   c. Install eight M12 carriage bolts and hex flange nuts (A) through support (B), rubber flap, and pan seal bar (C), and torque to 54–68 Nm (40–50 lbf·ft).
4. To eliminate the pan seal:
   a. Remove eight M12 carriage bolts and hex flange nuts (A) from support (B) and pan seal bar (C), and remove rubber flap (D).
   b. Store rubber flap (D) for reinstallation, or flip rubber flap upside down, install eight M12 carriage bolts through support (B), hole (E) in rubber flap, and pan seal bar (C), and torque to 54–68 Nm (40–50 lbf·ft).

Figure 5.85: Pan Seal Assembly
6 Header Spring Float Assembly

6.1 Removing Header Spring Float Assembly

⚠️ DANGER

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

1. Attach the header to the combine feeder house and ensure it is latched securely. It is not necessary to hook up the driveline or hydraulics. Refer to the relevant combine attaching procedure:
   - Attaching to Case IH Combine, page 27
   - Attaching to John Deere 60, 70, S, and T Series Combine, page 34
   - Attaching to New Holland CR/CX Series Combine, page 40
   - Attaching to Versatile Combine, page 46

2. Lower combine feeder house so the front draper deck is rotated upwards to full floated-up position. Header frame will be close to the ground and coil spring will be fully collapsed.

   ✠ NOTE:
   Spring tension is factory-set to the second hole from the bottom on the float anchor.

3. Shut down the combine and remove the key from the ignition.

4. Open the left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

   ✠ NOTE:
   The right side spring float assembly can be removed or adjusted without removing the right endshield. For improved accessibility, however, remove four M12 carriage bolts and hex flange nuts from the endshield support (not shown), and remove the right endshield.

Figure 6.1: Left Endshield
5. Ensure all spring tension is released from the spring float assembly (A), remove cotter pin (B), clevis pin (C), and three flat washers (D).

**NOTE:**
When spring tension is fully released, spring coils should be fully collapsed and the spring float assembly should rock from side to side when moved by hand. If pressure on the clevis pin persists, slightly raise or lower the header.

**IMPORTANT:**
Note the spring float assembly position on the anchor, and ensure the left and right assemblies are set to the same anchor hole position during installation or draper deck damage could result.

7. Remove cotter pin (B), clevis pin (C), and three flat washers (D) from spring float assembly (A) at front anchor.

8. Remove spring float assembly (A).
6.2 Installing Header Spring Float Assembly

NOTE:
Spring tension is factory-set to the second hole from the bottom on the anchor.

1. Position rod end (D) of spring float assembly (A) onto anchor (B), and position opposite end of assembly onto front anchor (C).

**IMPORTANT:**
The word ROD is stamped onto the casting to indicate which side of the spring float assembly (A) contains the rod end (D) of the shock. Ensure the rod end (D) of the shock is installed onto anchor (B) as shown.

2. Insert clevis pin (A) from the inboard side through spring float assembly (B), three flat washers (C), and front anchor (D) as shown. Secure with cotter pin (E).
3. Align spring float assembly (A) with float anchor hole (B). Refer to 3.2.3 Adjusting Header Float, page 58 to change the header float setting.

**IMPORTANT:**
The left and right spring float assemblies must be set to the same anchor hole position or draper deck damage could result.

**NOTE:**
If the spring float assembly (A) hole does not align with anchor hole (B), raise or lower header as necessary.

4. Insert clevis pin (A) from the inboard side through the rod end of spring float assembly (B), three flat washers (C), and anchor (D) as shown. Secure with cotter pin (E).

5. Repeat procedure for opposite side of header, ensuring that left and right spring float assemblies are set to the same anchor hole position on header.

6. Close the left endshield. Refer to 3.3.2 Closing Left Endshield, page 61, and replace right endshield if previously removed.
7 Drive System

The drive system comprises a driveline connected directly to the combine feeder house to provide power to the chain driven auger system, and two draper drive hydraulic motors that provide power to the front and rear draper decks.

7.1 Header Driveshaft

Clean and grease header driveshaft splines (A) annually to prevent excessive corrosion and wear.

NOTE:
Remove header end of driveline to access splines. Refer to 7.2.1 Removing Header Driveline, page 144.
7.2 Header Driveline

7.2.1 Removing Header Driveline

⚠️ DANGER

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

1. Lower header to ground, shut down combine, and remove key from ignition.

2. Disconnect tethers (A) securing driveline guard to header.

3. Pull back guard (B) to expose collar (C) at the combine end of the driveline.

⚠️ CAUTION

To prevent injury, or damage to the driveline, hold the driveline so that it doesn’t fall to the floor.

4. Pull back collar (C) and pull driveline (D) off feeder house shaft while supporting end of driveline.

5. Pull back guard (A) to expose collar (B) at the header end of driveline. If necessary, loosen bolt (C) and move plate (D) to release guard.

6. Pull back collar (B), and pull driveline off header driveshaft.

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Figure 7.2: Combine End of Driveline

Figure 7.3: Header End of Driveline
7.2.2 Installing Header Driveline

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

⚠️ CAUTION
To prevent injury, or damage to the driveline, hold the driveline so that it doesn’t fall to the floor.

1. Lower header to ground, shut down combine, and remove key from ignition.

2. Pull back guard (A) to expose collar (B) at the header (notched) end of the driveline.

   NOTE:
The driveline may separate if not supported at both ends.

3. Pull back collar (B), and slide coupler onto splined input shaft (C) until it locks. Release collar (B).

4. Loosen bolt (D) and move plate (E) (if necessary) to provide sufficient clearance for driveline guard.

5. Line up notch (A) in the driveline’s rubber bellows with bolt (B) so the notch fits around casting (C) inside the auger drive compartment.
6. Sandwich the lip (A) on the driveline bellows between the hole in the endsheet and the casting (B).

7. Tighten bolt (C).

8. Pull back guard (B) to expose collar (C) at the combine end of the driveline (D).

9. Pull back collar (C), and push driveline (D) onto feeder house shaft until collar locks.

10. Attach tethers (A) to secure driveline guard to header.

7.2.3 Driveline Guard

Removing Driveline Guard

The driveline guard must remain attached to the driveline, but can be removed for maintenance purposes only.

⚠️ DANGER

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
NOTE:
The driveline does **NOT** need to be removed from the header in order to remove the driveline guard.

1. Stop the engine, and remove the key from the ignition.
2. Disconnect tethers (not shown) at ends of driveline.
3. If the driveline is in the storage position, rotate disc (B) on the driveline storage hook (A), and remove the driveline from the hook.

4. If the driveline is attached to the combine, remove the driveline from the combine by pulling the quick disconnect collar (A) to release the driveline yoke from the combine shaft. Refer to **7.2.1 Removing Header Driveline, page 144**.

5. Lift the combine end of the driveline (A) from the hook, and extend the driveline until it separates. Hold the adapter end of the driveline (B) to prevent it from dropping and hitting the ground.
6. Use a slotted screwdriver to release grease zerk/lock (A).

7. Rotate driveline guard locking ring (A) counterclockwise using a slotted screwdriver until lugs (B) line up with the slots in the guard.

8. Pull driveline guard off driveline.
Installing Driveline Guard

1. Slide driveline guard onto driveline, and line up slotted lug on locking ring (A) with arrow (B) on guard.

![Figure 7.13: Driveline Guard](image1.png)

2. Push driveline guard onto ring until locking ring is visible in slots (A).

![Figure 7.14: Driveline Guard](image2.png)

3. Use a slotted screwdriver to rotate ring (A) clockwise and lock ring in guard.

![Figure 7.15: Driveline Guard](image3.png)
4. Push grease zerk (A) back into guard.

5. Reassemble driveline.

NOTE: The splines are keyed to ensure proper alignment of the universals. Align weld (A) with missing spline (B) when reassembling.

6. Slide driveline into hook (A) on header and rotate disc (B) to secure driveline, or connect the driveline to the combine.

7. Attach tethers (not shown) to header.
7.2.4 Driveline Clutch

Replacing Driveline Clutch

Repair or replace the driveline clutch if it can no longer generate the necessary torque to operate the header. Refer to your PW8 Pick-Up Header Parts Catalog for replacement part numbers.

1. Remove the driveline from the header. Refer to 7.2.1 Removing Header Driveline, page 144.
2. Remove the driveline guard. Refer to Removing Driveline Guard, page 146.
3. Remove cross and bearings (A) connecting clutch (B) to driveline yoke (C).
4. Install new cross and bearings (A) and new clutch (B) onto existing driveline yoke (C).
5. Reinstall driveline guard. Refer to Installing Driveline Guard, page 149.
6. Reinstall driveline. Refer to 7.2.2 Installing Header Driveline, page 145.

7.2.5 Cleaning Driveline Splined Shaft

1. Remove the driveline guard. Refer to Removing Driveline Guard, page 146.
2. Clean internal and external splines.
3. Install driveline guard. Refer to Installing Driveline Guard, page 149.
7.3 Draper Drives

The two hydraulic drive motors do not require any maintenance.

7.3.1 Removing Front Hydraulic Motor

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.

2. Disconnect hydraulic hoses (A) from front motor on left side of header. Install caps onto hose ends, or wrap with plastic and move hoses away from work area.

   **IMPORTANT:**
   Keep hydraulic coupler tips and connectors clean. Allowing dirt, dust, water, or foreign material to enter the system is the major cause of hydraulic system damage. **Do NOT** attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.

3. Use a 13 mm socket wrench to remove two M8 hex flange nuts (B).

4. Pull hydraulic motor (A) from roller shaft.

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Figure 7.20: Front Hydraulic Motor – Left Side

Figure 7.21: Front Hydraulic Motor – Left Side
7.3.2 Installing Front Hydraulic Motor

1. Apply grease to splines of front hydraulic motor (A) shaft.

2. Install hydraulic motor (A) onto roller shaft (B) and install shoulder bolts (C).

3. Secure hydraulic motor with two M8 hex flange nuts (A) and torque to 50 Nm (37 lbf-ft) using a 13 mm socket wrench.

   **IMPORTANT:**
   Hydraulic motor must be able to move slightly during operation. Tighten to required torque only, and do **NOT** use washers or shims. It is normal for the motor to feel somewhat loose after torquing.

4. If installing a new motor, reuse hydraulic fittings (A) from original motor.
5. Reconnect hydraulic hoses (A) to motor.

7.3.3 Removing Rear Hydraulic Motor

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.
2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.
3. Disconnect hydraulic hoses (A) from motor. Install plugs onto hose ends, or wrap with plastic and move hoses away from work area. Loosen or remove adjacent cinch straps if necessary.

**IMPORTANT:**
Keep hydraulic coupler tips and connectors clean. Allowing dirt, dust, water, or foreign material to enter the system is the major cause of hydraulic system damage. Do **NOT** attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.

4. Remove two 10 mm shoulder bolts (B) using an 8 mm hex key.

5. Pull hydraulic motor (C) from roller shaft.

### 7.3.4 Installing Rear Hydraulic Motor

1. Apply grease (extreme pressure [EP] performance with 1.5–5% molybdenum disulphide, NLGI grade 2) to splines of hydraulic motor shaft (A).

2. Install hydraulic motor (B) onto roller shaft, and secure with two 10 mm shoulder bolts (C).

3. Torque bolts to 50 Nm (37 lbf-ft) using an 8 mm hex key.

**IMPORTANT:**
Hydraulic motor must be able to move slightly during operation. Tighten to required torque only, and do **NOT** use washers or shims. It is normal for the motor and the hardware to feel somewhat loose after torquing.

4. Install hydraulic fittings (D) from original motor (if installing new motor).

5. Reconnect hydraulic hoses (A) to motor.

6. Install previously removed cinch straps.

7. Close endshield. Refer to **3.3.2 Closing Left Endshield, page 61.**
7.3.5 Removing Hydraulic Motor Hoses

⚠️ DANGER

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

1. Lower header to the ground, and lower the hold-down completely.
2. Shut down the combine and remove the key from the ignition.
3. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.
4. Remove hose clips (A) and cinch straps (B).

Figure 7.30: Left Endshield

Figure 7.31: Left Side of Header
5. Disconnect and remove hydraulic hoses (A), (B), and (C) from drive motors (D) and (E). Install caps onto hose ends or wrap with plastic.

**IMPORTANT:**
Keep hydraulic coupler tips and connectors clean. Allowing dirt, dust, water, or foreign material to enter the system is the major cause of hydraulic system damage. Do **NOT** attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.

6. Remove cinch strap (A).
7. Disconnect hoses (B) and (C) from multicoupler (D).

8. Loosen three M12 hex flange nuts (A), and remove bottom beam cover (B).
9. Pull hoses out of bottom beam cover (B).
10. Pull hoses through hole (B) in endsheet and through hole (A) in frame.

7.3.6 Installing Hydraulic Motor Hoses

1. Route the two longer hoses (A) and (B) through hole (C) in endsheet and hole (D) in frame.

   **NOTE:**
   Angled fitting on hose (B) attaches to the pick-up rear drive motor. Hose (A) with yellow cable ties has identical fittings at both ends and attaches to the forward drive motor fitting that has a matching yellow cable tie.

2. Route hoses (A) and (B) through grommet (C) in bottom beam cover. Match colored cable ties and attach hoses (A) and (B) to multicoupler. If colored cable ties are missing, attach as follows:
   a. Attach longer hose (A) to forward port on forward drive motor and to connector (E) on multicoupler.
   b. Attach shorter hose (B) to aft port on rear drive motor and to connector (F) on multicoupler.
   c. Secure hoses with cinch strap (D).
3. Connect the shorter hose (A) to the hydraulic motors.

   **NOTE:**
   Angled fitting attaches to rear motor (B).

4. Secure hoses with clips (A) and cinch straps (B).

5. Install bottom beam cover (B), and tighten three M12 hex flange nuts (A) along lower edge of cover.

6. Close left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.
7.4 Auger Drive

The chain driven auger is powered by a driveshaft connected directly to the combine feeder house, and auger speed depends on the feeder house speed. You can adjust auger speeds from the combine to suit crop conditions. The header is shipped with a 14-tooth sprocket. An optional 16-tooth sprocket is available from MacDon Parts (MD #152369) if required auger speed is not achievable from the combine. Refer to 7.4.2 Auger Drive Sprockets, page 163 for procedure for changing sprockets.

7.4.1 Auger Drive Chain

Lubricating Auger Drive Chain

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.

2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

3. Apply a liberal amount of SAE 30 engine oil to the chain (A) every 10 hours.

4. Close left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.
Removing Auger Drive Chain

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.

2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

3. Turn the tensioner bolt (A) to release tension on chain (B) until chain can be removed from drive sprocket (D). Refer to Adjusting Auger Drive Chain Tension, page 162.

4. Remove chain from driven sprocket (C).
**Installing Auger Drive Chain**

1. Install chain (A) onto driven sprocket (B) and then onto drive sprocket (C).
2. Tighten chain. Refer to *Adjusting Auger Drive Chain Tension, page 162*.
3. Apply a liberal amount of SAE 30 engine oil to the chain (A).
4. Close left endshield. Refer to *3.3.2 Closing Left Endshield, page 61*.

**Adjusting Auger Drive Chain Tension**

To adjust the tension of the auger drive chain, follow these steps:

1. Loosen the two M16 hex flange nuts (A).
2. To access tensioner bolt (B), remove the plug from the access hole in the endsheet.
3. Turn tensioner bolt (B) to adjust the chain tension.
4. Rotate chain until the tightest point is at the mid-span, and ensure there is 11–15 mm (7/16–9/16 in.) of deflection (A) when a force of 44.5 N (10 lbf) is applied at the midspan.
5. Torque nuts (A) to 217 Nm (160 lbf-ft).

7.4.2 Auger Drive Sprockets

Removing Driven Sprocket

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.
2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60. If more access is required, remove endshield. Refer to 3.3.3 Removing Left Endshield, page 62.
4. Remove three M10 hex bolts (A) from tapered bushing (D) in sprocket (C) using a 16 mm wrench.
5. Reinstall two of the M10 hex bolts (A) into the threaded holes (B) in the tapered bushing (D).
6. Turn bolts into tapered bushing equal amounts in half-turn increments until the tapered bushing (D) becomes loose.
7. Remove tapered bushing (D) and sprocket (C) from shaft.
8. Retain keys from driveshaft and tapered bushing.
9. Clean and inspect components. Replace worn or damaged parts.

**Installing Driven Sprocket**

1. Apply anti-seize compound to the mating surfaces of driveshaft (A), tapered bushing (B), and sprocket (C).
2. Install keys into driveshaft (A) and tapered bushing (B).
3. Insert tapered bushing (B) into sprocket (C) while aligning key with keyway in sprocket.
4. Align key in driveshaft (A) with keyway in tapered bushing (B), and slide bushing and sprocket (C) onto driveshaft.
5. Remove two M10 hex bolts from threaded holes (B) in tapered bushing (D).
6. Reinstall three M10 hex bolts (A) through tapered bushing (D) and into sprocket (C). Do not tighten.
7. Align driven sprocket (A) with drive sprocket (B) using a straight edge. The sprockets are aligned when the two faces are within 1 mm (3/64 in.) of each other.

8. Torque three M10 hex bolts (A) in equal increments to 44 Nm (32 lbf·ft) while maintaining sprocket alignment.

9. Tap bushing (B) with a hammer and retorque. Repeat three times or until bolts no longer turn at 44 Nm (32 lbf·ft).

10. Check alignment of sprockets. If misaligned more than 1 mm (3/64 in.), proceed as follows:
   a. Measure and record the position of the tapered bushing (D) relative to the driveshaft.
   b. Remove the three M10 hex bolts (A) from tapered bushing (D).
   c. Reinstall two of the M10 hex bolts (A) into the threaded holes (B) in tapered bushing (D).
   d. Turn M10 hex bolts (A) into tapered bushing (D) equal amounts in half-turn increments until the tapered bushing and sprocket (C) are moveable.
   e. Reposition the tapered bushing (D) to account for the misalignment.
   f. Repeat Step 5, page 164 to Step 10, page 165.
   g. Check alignment of sprockets.
   h. Repeat Step 10, page 165 until sprockets are in proper alignment.
11. Install and tension chain. Refer to Installing Auger Drive Chain, page 162.

12. Close left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

Removing Drive Sprocket

⚠️ DANGER

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

1. Lower header to the ground, shut down the combine, and remove the key from the ignition.

2. Open left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

4. If header is not attached to combine, place a pry bar or equivalent through a hole in the driven sprocket (A) and against the frame to stop the driveshaft from rotating.
5. Remove cotter pin (B).
6. Remove M20 castle nut (C) and washer (D) from driveshaft.

8. Remove drive sprocket (A), using a puller if necessary.
9. Clean and inspect components. Replace worn or damaged parts.

Installing Drive Sprocket

1. Apply anti-seize compound to driveshaft (B) and drive sprocket (A) splines.
DRIVE SYSTEM

2. Install drive sprocket (A), washer (B), and castle nut (C) onto driveshaft.

3. Reinstall drive chain, but do not fully tension. Refer to *Installing Auger Drive Chain, page 162.*

4. If header is not attached to combine, place a pry bar or equivalent through a hole in the driven sprocket (A) and against the frame to stop the driveshaft from rotating.

5. Torque castle nut (A) to 68 Nm (50 lbf·ft). If slot in castle nut and hole in driveshaft are not aligned, continue to tighten castle nut to 81 Nm (60 lbf·ft). If alignment is still not achieved, back off castle nut until it is possible to install the cotter pin (B).

6. Install cotter pin (B) into driveshaft, and bend cotter pin around castle nut (A).

7. Set drive chain (C) tension. Refer to *Adjusting Auger Drive Chain Tension, page 162.*

8. Close left endshield. Refer to *3.3.2 Closing Left Endshield, page 61.*
8 Hold-Down

The hold-down is used to hold the crop in place as it travels across the drapers.

8.1 Parts Listing/Diagram for the Hold-Down Assembly
### HOLD-DOWN

<table>
<thead>
<tr>
<th>Ref</th>
<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
<th>Serial Number</th>
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<tr>
<td>1</td>
<td>197798</td>
<td>SUPPORT WELDMENT – HOLDDOWN</td>
<td>2</td>
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<td>2</td>
<td>197152</td>
<td>SUPPORT</td>
<td>29</td>
<td></td>
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<tr>
<td>3</td>
<td>184331</td>
<td>ROD – FIBERGLASS 3/8 IN. X 48 IN. BLACK</td>
<td>29</td>
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<tr>
<td>4</td>
<td>237334</td>
<td>SUPPORT – WITH AMBER REFLECTOR</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>197287</td>
<td>SUPPORT – WIND GUARD, WITH DECALS</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>197793</td>
<td>CHANNEL</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>136872</td>
<td>CLAMP – HALF, INSULATED</td>
<td>2</td>
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</tr>
<tr>
<td>8</td>
<td>112520</td>
<td>GROMMET 6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>152157</td>
<td>BOLT – RHSN M10 X 1.5 X 80-8.8-A3L</td>
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<tr>
<td>B</td>
<td>148645</td>
<td>NUT – HEX FLG STVR LOC M12 X 1.75-10-A3L</td>
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<tr>
<td>C</td>
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<td>BOLT – RHSN M12 X 1.75 X 25-8.8-A3L</td>
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<tr>
<td>D</td>
<td>167307</td>
<td>SCREW – HEX SOC HD M8 X 1.25 X 20-8.8-A2L</td>
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<td>E</td>
<td>135337</td>
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<td>F</td>
<td>50101</td>
<td>NUT – HEX FLG STVR LOC M10 X 1.5-10-A3L</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

6. Assemble grommet to hose (MD #237180) before installing grommet into support (MD #197287).
8.2 Hold-Down Position

Hold-down position refers to the position of the fiberglass rods (A) with respect to the swath and can be adjusted according to crop conditions.

The fiberglass rods (A) not only ensure that contact between the swath and pick-up belts is maintained, they also guide the crop under the auger. Applying constant downward pressure to the crop assists with pick-up performance.

Adjust the hold-down position using the combine reel height control according to the following crop conditions:

- (1) Short crop
- (2) Average crop
- (3) Heavy crop

**IMPORTANT:**
Before reversing the combine feeder house to unplug the feeder, fully raise the hold-down.
8.3 Adjusting Hold-Down Rod Angle

The angle between the fiberglass rods (C) and the hold-down support arms is factory-set to optimize crop flow into the combine. The factory setting should be satisfactory for most crop conditions, but the rods are adjustable if necessary.

1. Loosen two hex head M12 nuts (A) on both ends of the hold-down crossbar (B) until the crossbar rotates.
2. Rotate the crossbar (B) to the desired angle using handle (D).
3. Tighten nuts (A).

8.3.1 Replacing Fiberglass Rods

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

1. Lower hold-down, and lower header to the ground.
2. Shut down the combine and remove the key from the ignition.
3. Loosen flange nuts (B) securing hold-down bar to hold-down arms on outer rod (A), and loosen nut (C) next to rod.
4. Slide out existing rod, and replace with new rod. Ensure new rod (A) extends 10 mm (3/8 in.) (B) beyond plastic sleeve (C).

5. Tighten nuts (A) and (B).

6. Loosen adjacent nuts (B) on remaining rods (A), and repeat Step 4, page 173.

7. Tighten nuts (B).
8.4 Hold-Down Lift Cylinder Safety Props

Lift cylinder safety props are located at each hold-down support arm. The hold-down is controlled by the reel lift control located inside the combine cab. Activate the control to raise/lower the hold-down.

8.4.1 Engaging Hold-Down Lift Cylinder Safety Props

⚠️ DANGER

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

NOTE:

John Deere combines use the fore/aft circuit to control the hold-down cylinders.

IMPORTANT:

To prevent damage to hold-down support arms, do NOT transport header with cylinder safety props engaged.

1. Raise hold-down (A) to maximum height.

2. Remove retaining pin (A) from safety prop.

3. Raise safety prop (B) to engaged position.

4. Install retaining pin (A) onto safety prop (B).

5. Lower hold-down (C) onto safety prop (B).
8.4.2 Disengaging Hold-Down Lift Cylinder Safety Props

DANGER

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

IMPORTANT:
To prevent damage to hold-down support arms, do not transport header with cylinder safety props engaged.

1. Remove retaining pin (A) from safety prop.
2. Raise hold-down (C) to maximum height.
3. Lower safety prop (B) to disengaged position.
4. Install retaining pin (A) onto safety prop.

5. Lower hold-down (A).
8.5 Disassembling Hold-Down

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

1. Lower pick-up to the ground.
2. Lower the hold-down completely to relieve the hydraulic pressure in the lines.
3. Shut down the combine, and remove the key from the ignition.
4. Disconnect hydraulic hose (A) from master lift cylinder (B) on left end. Install caps onto hose ends or wrap with plastic.
5. Remove cotter pin and washer (C), and pull-out clevis pin (D) to release cylinder (B) from left hold-down arm.

6. Disconnect hydraulic hose (A) from slave cylinder (B) on right end. Install caps onto hose ends or wrap with plastic.
7. Remove cotter pin and washer (C), and pull-out clevis pin (D) to release cylinder (B) from right hold-down arm.

Figure 8.11: Master Cylinder – Left Side

Figure 8.12: Slave Cylinder – Right Side
8. Remove cotter pin and washer (A), and pull-out clevis pin and spacer (B) to release left side of the hold-down assembly (C).

9. Repeat for the right side of the hold-down assembly.

10. Remove entire hold-down assembly from pick-up header and place onto a flat surface (ground).

11. Remove screw (A) and hose clip (B).

12. Remove two nuts (C) and pull off left hold-down arm. Remove grommet, and slide slave cylinder hose out through hole in hold-down arm.

13. Repeat Step 11, page 177 and Step 12, page 177 for right side.
14. Remove 15 nuts (A) and bolts (B) to separate two halves of support.

15. Remove slave cylinder hose (C), fiberglass rods (D), and plastic sleeves (E) as required.
8.6 Assembling Hold-Down

1. Support bottom hold-down channel on both ends.

2. Place 29 plastic sleeves (A) onto bottom channel (B).

3. Place hose (C) over the plastic sleeves.

4. Secure top channel (D) in place with 15 nuts (E) and bolts (F).

   **IMPORTANT:**
   Do not tighten nuts at this time.

5. Secure reflector support (G) at each end.

6. Slide grommet (A) onto hose (B) prior to feeding hose through left hold-down arm (C).

7. Feed hose (B) through hole in left hold-down arm (C) and fit grommet (A) into hole.

8. Secure left hold-down arm (C) to channels with two nuts (D), and tighten the two nuts.

9. Repeat for right side.
10. Attach hose to left hold-down arm with hose clamp (A) and screw (B).

**IMPORTANT:**

**Left Side:** Leave 460 mm (18 in.) of slack in the hose from end of hose to center of clamp. Leave 490 mm (19 in.) of slack in the hose from center of clamp to grommet.

11. Attach hose to right hold-down arm (not shown) with hose clamp (A) and screw (B).

**IMPORTANT:**

**Right Side:** Leave 200 mm (8 in.) of slack in the hose from end of hose to center of clamp. Leave 450 mm (17-3/4 in.) of slack in the hose from center of clamp to grommet.

12. Insert 29 fiberglass rods (C) into each plastic sleeve. Ensure rod extends 10 mm (3/8 in.) beyond plastic sleeve.

13. Flip assembly upside down, supported at the ends.

**NOTE:**

Center of span requires a 12 mm (1/2 in.) bow (downwards in the middle). This allows for a straightness tolerance once assembly is complete and placed back onto the machine. This results in the hold-down being straight when it’s reinstalled onto the machine.

14. Support center of span, once a 12 mm (1/2 in.) bow is achieved.

15. Torque 15 nuts (A) across channel to 18 Nm (160 lbf-in).

16. Place hold-down assembly onto pick-up frame.

17. Slide clevis pin and spacer (B) through left hold-down arm (C) and pick-up frame, and attach with cotter pin and washer (A).

18. Repeat for the right side of the hold-down assembly.
19. Slide clevis pin (D) through left hold-down arm and master cylinder (B), and attach cotter pin and washer (C).

20. Connect hydraulic hose (A) to master lift cylinder (B) on left end.

21. Slide clevis pin (D) through right hold-down arm and slave cylinder (B) and attach cotter pin and washer (C).

22. Connect hydraulic hose (A) to slave cylinder (B) on right end.
9 Schematics

9.1 Hydraulic Schematics

Figure 9.1: John Deere and Versatile

A - Pressure Line
D - Rear Motor (MD #152541)
G - Right Slave Cylinder (MD #197492)

B - Return Line
E - Front Motor (MD #152541)
F - Left Master Cylinder (MD #237381)

C - Hold-Down Raise and Lower Line
Figure 9.2: Case IH

A - Pressure Line  B - Return Line  C - Hold-Down Raise and Lower Line
D - Rear Motor (MD #152541)  E - Front Motor (MD #152541)  F - Left Master Cylinder (MD #237381)
G - Right Slave Cylinder (MD #197492)
9.2 Electrical Schematics

9.2.1 Main Electrical Harness (MD #237396)

Figure 9.3: MD #237396

Table 9.1 6-Position Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin 1 on 6-position plug</td>
<td>Pin 1 on 12-position receptacle</td>
<td>Reel speed sensor ground</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin 2 on 6-position plug</td>
<td>Pin 2 on 12-position receptacle</td>
<td>Reel speed sensor signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 6-position plug</td>
<td>Pin 3 on 12-position receptacle</td>
<td>Left height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 1 on 6-position plug</td>
<td>Pin 9 on 12-position receptacle</td>
<td>Right height sensor signal</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>WHT</td>
<td>16</td>
<td>Pin 5 on 6-position plug</td>
<td>Pin 5 on 12-position receptacle</td>
<td>Reel speed sensor power</td>
</tr>
<tr>
<td>6</td>
<td>6A</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 6-position plug</td>
<td>Pin 6 on 12-position receptacle</td>
<td>Right height sensor power</td>
</tr>
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### Table 9.2 12-Position Receptacle

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<th>Service</th>
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</thead>
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<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin 1 on 12-position receptacle</td>
<td>Pin 1 on 6-position plug</td>
<td>Reel speed sensor ground</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin 2 on 12-position receptacle</td>
<td>Pin 2 on 6-position plug</td>
<td>Reel speed sensor signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 12-position receptacle</td>
<td>Pin 3 on 6-position plug</td>
<td>Left height sensor ground</td>
</tr>
<tr>
<td>3A</td>
<td>BRN</td>
<td></td>
<td>16</td>
<td>Pin 3 on 12-position receptacle</td>
<td>Pin 3 on 3-position plug</td>
<td>Right height sensor ground</td>
</tr>
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<td>Pin 1 on 3-position plug</td>
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<tr>
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<td>Pin 12 on 12-position receptacle</td>
<td>Pin 2 on 2-position plug (Left turn)</td>
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### Table 9.3 3-Position Plug

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<th>Service</th>
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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 3-position plug</td>
<td>Pin 6 on 12-position receptacle</td>
<td>Left height sensor ground</td>
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<tr>
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<td>4</td>
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<td>16</td>
<td>Pin 2 on 3-position plug</td>
<td>Pin 4 on 12-position receptacle</td>
<td>Left height sensor signal</td>
</tr>
<tr>
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<td>BRN</td>
<td>16</td>
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<td>Right height sensor ground</td>
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Table 9.4 2-Position Plug (Right Turn)

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<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 2-position plug</td>
<td>Pin 6 on 12-position receptacle</td>
<td>Right turn</td>
</tr>
<tr>
<td>2</td>
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<td>ORG</td>
<td>16</td>
<td>Pin 2 on 2-position plug</td>
<td>Pin 12 on 12-position receptacle</td>
<td>Ground lights</td>
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Table 9.5 3-Position Plug (Left Turn)

<table>
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<th>Color</th>
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<th>Service</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 2-position plug</td>
<td>Pin 6 on 12-position receptacle</td>
<td>Left turn</td>
</tr>
<tr>
<td>2</td>
<td>12A</td>
<td>ORG</td>
<td>16</td>
<td>Pin 2 on 2-position plug</td>
<td>Pin 12 on 12-position receptacle</td>
<td>Ground lights</td>
</tr>
</tbody>
</table>

9.2.2 John Deere

For harness legends, refer to the following topics:

- MD #237396: 9.2.1 Main Electrical Harness (MD #237396), page 185
- MD #152982: Left Header Height Harness (MD #152982), page 190
- MD #237991: Wiring Adapter John Deere 60 Series (MD #237991), page 191
- MD #197184: Sensor Harness John Deere (Right Side) (MD #197184), page 193
John Deere Electrical Schematic

A - Combine Connect
E - Left Tail/Turn Light
J - Left Header Height Connect

B - Header Connect
F - Right Header Height/Reel Speed Connect
K - Right Header Height/Reel Speed Connect

C - Header Connect
G - Right Tail/Turn Light
L - Reel Speed

D - Left Header Height Connect
H - Left Header Height
M - Right Header Height
**Left Header Height Harness (MD #152982)**

Figure 9.4: Left Header Height (MD #152982)

![Diagram of 3-Pin Receptacle and 3-Pin Plug]

**Table 9.6 3-Pin Receptacle**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From Procedure</th>
<th>To Procedure</th>
<th>Service</th>
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<td>PNK</td>
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<td>Pin 1 on 3-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Power</td>
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<td>2</td>
<td>GRY</td>
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<td>Pin 2 on 3-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Ground</td>
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**Table 9.7 3-Pin Plug**

<table>
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<th>Awg</th>
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<td>A</td>
<td>PNK</td>
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<td>Pin A on 3-pin plug</td>
<td>Pin 1 on 3-pin receptacle</td>
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<tr>
<td>B</td>
<td>B</td>
<td>GRY</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Signal</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Ground</td>
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Table 9.8 12-Pin Plug

<table>
<thead>
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<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin 1 on 12-pin plug</td>
<td>Pin 10 on 31-pin connector</td>
<td>Sensor return</td>
</tr>
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<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin 2 on 12-pin plug</td>
<td>Pin 8 on 31-pin connector</td>
<td>Speed sensor signal</td>
</tr>
<tr>
<td>3</td>
<td>1A</td>
<td>GRN</td>
<td>16</td>
<td>Pin 3 on 12-pin plug</td>
<td>Pin 10 on 31-pin connector</td>
<td>Sensor return</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 4 on 12-pin plug</td>
<td>Pin 7 on 31-pin connector</td>
<td>Left height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 12-pin plug</td>
<td>Pin 20 on 31-pin connector</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 9 on 12-pin plug</td>
<td>Pin 9 on 31-pin connector</td>
<td>Right height sensor signal</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 10 on 12-pin plug</td>
<td>Pin 14 on 31-pin connector</td>
<td>Right turn</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 11 on 12-pin plug</td>
<td>Pin 13 on 31-pin connector</td>
<td>Left turn</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>BLACK</td>
<td>16</td>
<td>Pin 12 on 12-pin plug</td>
<td>Pin 12 on 31-pin connector</td>
<td>Ground</td>
</tr>
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</table>
## Table 9.9 31-Pin Connector

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>14</td>
<td>LGRN</td>
<td>16</td>
<td>Pin 4 on 31-pin connector</td>
<td>Pin 28 on 31-pin connector</td>
<td>Header recognition</td>
</tr>
<tr>
<td>14A</td>
<td></td>
<td>LGRN</td>
<td>16</td>
<td>Pin 4 on 31-pin connector</td>
<td>Pin 18 on 31-pin connector</td>
<td>Header recognition</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 7 on 31-pin connector</td>
<td>Pin 4 on 12-pin plug</td>
<td>Left height sensor signal</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin 8 on 31-pin connector</td>
<td>Pin 2 on 12-pin plug</td>
<td>Speed sensor signal</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 9 on 31-pin connector</td>
<td>Pin 9 on 12-pin plug</td>
<td>Right height sensor signal</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin 10 on 31-pin connector</td>
<td>Pin 1 on 12-pin plug</td>
<td>Sensor return</td>
</tr>
<tr>
<td>1A</td>
<td></td>
<td>GRN</td>
<td>16</td>
<td>Pin 10 on 31-pin connector</td>
<td>Pin 3 on 12-pin plug</td>
<td>Sensor return</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>BLK</td>
<td>16</td>
<td>Pin 12 on 31-pin connector</td>
<td>Pin 12 on 12-pin plug</td>
<td>Ground</td>
</tr>
<tr>
<td>13</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 13 on 31-pin connector</td>
<td>Pin 11 on 12-pin plug</td>
<td>Left turn</td>
</tr>
<tr>
<td>14</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 14 on 31-pin connector</td>
<td>Pin 10 on 12-pin plug</td>
<td>Right turn</td>
</tr>
<tr>
<td>18</td>
<td>14A</td>
<td>LGRN</td>
<td>16</td>
<td>Pin 17 on 31-pin connector</td>
<td>Pin 4 on 31-pin connector</td>
<td>Header recognition</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 20 on 31-pin connector</td>
<td>Pin 6 on 12-pin plug</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>28</td>
<td>14</td>
<td>LGRN</td>
<td>16</td>
<td>Pin 28 on 31-pin connector</td>
<td>Pin 4 on 31-pin connector</td>
<td>Header recognition</td>
</tr>
</tbody>
</table>
Sensor Harness John Deere (Right Side) (MD #197184)

Figure 9.6: Sensor Harness John Deere (Right Side) (MD #197184)

Table 9.10 6-Pin Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From Description</th>
<th>To Description</th>
<th>Service Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin 1 on 6-pin receptacle</td>
<td>Pin A on 2-pin plug</td>
<td>Reel speed sensor ground</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin 2 on 6-pin receptacle</td>
<td>Pin B on 2-pin plug</td>
<td>Reel speed sensor signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor power</td>
</tr>
</tbody>
</table>
Table 9.11 3-Pin Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Height sensor ground</td>
</tr>
</tbody>
</table>

Table 9.12 2-Pin Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>GRN</td>
<td>16</td>
<td>Pin A on 2-pin plug</td>
<td>Pin 1 on 6-pin receptacle</td>
<td>Reel speed sensor ground</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>YEL</td>
<td>16</td>
<td>Pin B on 2-pin plug</td>
<td>Pin 2 on 6-pin receptacle</td>
<td>Reel speed sensor signal</td>
</tr>
</tbody>
</table>

9.2.3 Case, New Holland CR/CX

For harness legends, refer to the following topics:
- MD #237396: 9.2.1 Main Electrical Harness (MD #237396), page 185
- MD #152982: Left Header Height Harness (MD #152982), page 196
- MD #152983: Left Header Height Harness 10 Volt (MD #152983), page 197
- MD #152553: Right Header Height Harness (MD #152553), page 198
- MD #152552: Right Header Height Harness 10 Volt (MD #152552), page 199
- MD #197178: Wiring Harness (MD #197178), page 200
Left Header Height Harness (MD #152982)

Figure 9.7: Left Header Height (MD #152982)

Table 9.13 3-Pin Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Power</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>GRY</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 9.14 3-Pin Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Power</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>GRY</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Signal</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Ground</td>
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</table>
Left Header Height Harness 10 Volt (MD #152983)

Figure 9.8: Left Header Height (MD #152983)

Table 9.15 3-Pin Receptacle

<table>
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<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Pin 1 on 3-pin plug</td>
<td>Power</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>ORG</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin 2 on 3-pin plug</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin 3 on 3-pin plug</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 9.16 3-Pin Plug

<table>
<thead>
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<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 3-pin plug</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Power</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>ORG</td>
<td>16</td>
<td>Pin 2 on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Ground</td>
</tr>
</tbody>
</table>
Right Header Height Harness (MD #152553)

Figure 9.9: Right Header Height Harness (MD #152553)

![Diagram of Right Header Height Harness](image)

### Table 9.17 6-Pin Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor power</td>
</tr>
</tbody>
</table>

### Table 9.18 3-Pin Plug

<table>
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<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Height sensor ground</td>
</tr>
</tbody>
</table>
Right Header Height Harness 10 Volt (MD #152552)

Figure 9.10: Right Header Height Harness (MD #152552)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor power</td>
</tr>
</tbody>
</table>

Table 9.20 3-Pin Plug

<table>
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<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Height sensor ground</td>
</tr>
</tbody>
</table>
Wiring Harness (MD #197178)

Figure 9.11: Wiring Harness (MD #197178)

Table 9.21 12-Position Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 12-position plug</td>
<td>Pin 6 on 31-position receptacle</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 4 on 12-position plug</td>
<td>Pin 1 on 31-position receptacle</td>
<td>Left header height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 12-position plug</td>
<td>Pin 5 on 31-position receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 9 on 12-position plug</td>
<td>Pin 2 on 31-position receptacle</td>
<td>Right header height sensor signal</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 10 on 12-position plug</td>
<td>Pin 28 on 31-position receptacle</td>
<td>Right turn</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 11 on 12-position plug</td>
<td>Pin 22 on 31-position receptacle</td>
<td>Left turn</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>BLK</td>
<td>16</td>
<td>Pin 12 on 12-position plug</td>
<td>Pin 30 on 31-position receptacle</td>
<td>Turn ground</td>
</tr>
</tbody>
</table>
### Table 9.22 6-Position Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From Receptacle</th>
<th>To Receptacle</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td>BLK</td>
<td>16</td>
<td>Pin A on 6-position</td>
<td>Pin 13 on 31-position</td>
<td>Header type ground</td>
</tr>
<tr>
<td>E</td>
<td>27</td>
<td>YEL</td>
<td>16</td>
<td>Pin B on 6-position</td>
<td>Pin 27 on 31-position</td>
<td>Header type</td>
</tr>
<tr>
<td>F</td>
<td>32</td>
<td>PNK</td>
<td>16</td>
<td>Pin C on 6-position</td>
<td>Pin 12 on 31-position</td>
<td>Header type power</td>
</tr>
</tbody>
</table>

### Table 9.23 31-Position Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From Receptacle</th>
<th>To Receptacle</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 1 on 31-position</td>
<td>Pin 4 on 12-position</td>
<td>Left header height sensor signal</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 2 on 31-position</td>
<td>Pin 9 on 12-position</td>
<td>Right header height sensor signal</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 5 on 31-position</td>
<td>Pin 6 on 12-position</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 6 on 31-position</td>
<td>Pin 3 on 12-position</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>PNK</td>
<td>16</td>
<td>Pin 12 on 31-position</td>
<td>Pin C on 6-position</td>
<td>Header type power</td>
</tr>
<tr>
<td>13</td>
<td>33</td>
<td>BLK</td>
<td>16</td>
<td>Pin 13 on 31-position</td>
<td>Pin A on 6-position</td>
<td>Header type ground</td>
</tr>
<tr>
<td>22</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 22 on 31-position</td>
<td>Pin 11 on 12-position</td>
<td>Left turn</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
<td>YEL</td>
<td>16</td>
<td>Pin 27 on 31-position</td>
<td>Pin B on 6-position</td>
<td>Header type</td>
</tr>
<tr>
<td>28</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 28 on 31-position</td>
<td>Pin 10 on 12-position</td>
<td>Right turn</td>
</tr>
<tr>
<td>30</td>
<td>12</td>
<td>BLK</td>
<td>16</td>
<td>Pin 30 on 31-position</td>
<td>Pin 12 on 12-position</td>
<td>Turn ground</td>
</tr>
</tbody>
</table>

### 9.2.4 Versatile

For harness legends, refer to the following topics:

- MD #237396: 9.2.1 Main Electrical Harness (MD #237396), page 185
- MD #152982: Left Header Height Harness (MD #152982), page 204
- MD #152553: Right Header Height Harness (MD #152553), page 205
- MD #197178: Wiring Harness (MD #197178), page 200
Left Header Height Harness (MD #152982)

Figure 9.12: Left Header Height (MD #152982)

Table 9.24 3-Pin Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PNK</td>
<td>16</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Power</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>GRY</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 9.25 3-Pin Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 1 on 3-pin receptacle</td>
<td>Power</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>GRY</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Signal</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 2 on 3-pin receptacle</td>
<td>Ground</td>
</tr>
</tbody>
</table>
Right Header Height Harness (MD #152553)

Figure 9.13: Right Header Height Harness (MD #152553)

Table 9.26 6-Pin Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Pin C on 3-pin plug</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Pin B on 3-pin plug</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Pin A on 3-pin plug</td>
<td>Height sensor power</td>
</tr>
</tbody>
</table>

Table 9.27 3-Pin Plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin A on 3-pin plug</td>
<td>Pin 6 on 6-pin receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>ORG</td>
<td>16</td>
<td>Pin B on 3-pin plug</td>
<td>Pin 4 on 6-pin receptacle</td>
<td>Height sensor signal</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin C on 3-pin plug</td>
<td>Pin 3 on 6-pin receptacle</td>
<td>Height sensor ground</td>
</tr>
</tbody>
</table>
**Wiring Harness (MD #197178)**

Figure 9.14: Wiring Harness (MD #197178)

**Table 9.28 12-Position Plug**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 3 on 12-position plug</td>
<td>Pin 6 on 31-position receptacle</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 4 on 12-position plug</td>
<td>Pin 1 on 31-position receptacle</td>
<td>Left header height sensor signal</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 6 on 12-position plug</td>
<td>Pin 5 on 31-position receptacle</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 9 on 12-position plug</td>
<td>Pin 2 on 31-position receptacle</td>
<td>Right header height sensor signal</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 10 on 12-position plug</td>
<td>Pin 28 on 31-position receptacle</td>
<td>Right turn</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 11 on 12-position plug</td>
<td>Pin 22 on 31-position receptacle</td>
<td>Left turn</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>BLK</td>
<td>16</td>
<td>Pin 12 on 12-position plug</td>
<td>Pin 30 on 31-position receptacle</td>
<td>Turn ground</td>
</tr>
</tbody>
</table>
## Table 9.29 6-Position Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>33</td>
<td>BLK</td>
<td>16</td>
<td>Pin A on 6-position receptacle</td>
<td>Pin 13 on 31-position receptacle</td>
<td>Header type ground</td>
</tr>
<tr>
<td>E</td>
<td>27</td>
<td>YEL</td>
<td>16</td>
<td>Pin B on 6-position receptacle</td>
<td>Pin 27 on 31-position receptacle</td>
<td>Header type</td>
</tr>
<tr>
<td>F</td>
<td>32</td>
<td>PNK</td>
<td>16</td>
<td>Pin C on 6-position receptacle</td>
<td>Pin 12 on 31-position receptacle</td>
<td>Header type power</td>
</tr>
</tbody>
</table>

## Table 9.30 31-Position Receptacle

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
<th>Color</th>
<th>Awg</th>
<th>From</th>
<th>To</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>GRY</td>
<td>16</td>
<td>Pin 1 on 31-position receptacle</td>
<td>Pin 4 on 12-position plug</td>
<td>Left header height sensor signal</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>ORG</td>
<td>16</td>
<td>Pin 2 on 31-position receptacle</td>
<td>Pin 9 on 12-position plug</td>
<td>Right header height sensor signal</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>PNK</td>
<td>16</td>
<td>Pin 5 on 31-position receptacle</td>
<td>Pin 6 on 12-position plug</td>
<td>Height sensor power</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>BRN</td>
<td>16</td>
<td>Pin 6 on 31-position receptacle</td>
<td>Pin 3 on 12-position plug</td>
<td>Height sensor ground</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>PNK</td>
<td>16</td>
<td>Pin 12 on 31-position receptacle</td>
<td>Pin C on 6-position receptacle</td>
<td>Header type power</td>
</tr>
<tr>
<td>13</td>
<td>33</td>
<td>BLK</td>
<td>16</td>
<td>Pin 13 on 31-position receptacle</td>
<td>Pin A on 6-position receptacle</td>
<td>Header type ground</td>
</tr>
<tr>
<td>22</td>
<td>11</td>
<td>DBLU</td>
<td>16</td>
<td>Pin 22 on 31-position receptacle</td>
<td>Pin 11 on 12-position plug</td>
<td>Left turn</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
<td>YEL</td>
<td>16</td>
<td>Pin 27 on 31-position receptacle</td>
<td>Pin B on 6-position receptacle</td>
<td>Header type</td>
</tr>
<tr>
<td>28</td>
<td>10</td>
<td>LBLU</td>
<td>16</td>
<td>Pin 28 on 31-position receptacle</td>
<td>Pin 10 on 12-position plug</td>
<td>Right turn</td>
</tr>
<tr>
<td>30</td>
<td>12</td>
<td>BLK</td>
<td>16</td>
<td>Pin 30 on 31-position receptacle</td>
<td>Pin 12 on 12-position plug</td>
<td>Turn ground</td>
</tr>
</tbody>
</table>
10 Hydraulic System

10.1 Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks. Replace any leaking or damaged hoses.

For hold-down systems, refer to the following:

- 10.4.1 Removing Master Cylinder Hose, page 222
- 10.4.2 Installing Master Cylinder Hose, page 224

For draper drive systems, refer to the following:

- 7.3.5 Removing Hydraulic Motor Hoses, page 156
- 7.3.6 Installing Hydraulic Motor Hoses, page 158

⚠️ WARNING

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

⚠️ WARNING

Use a piece of cardboard or paper to search for leaks.

IMPORTANT:

Keep hydraulic coupler tips and connectors clean. Allowing dirt, dust, water, or foreign material to enter the system is the major cause of hydraulic system damage. Do NOT attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.
10.2 Hydraulic Testing and Repair

10.2.1 Hydraulic Testing Equipment

Throughout the life of the machine, several hydraulic tests may be required to properly diagnose hydraulic problems.

IMPORTANT:
Always use proper test equipment and procedures when replacing relief valves. If a relief valve is stuck or has been inadvertently turned up, the pump housing can burst. Test equipment should be plumbed in with the needle valve in the open position, and the return line from the test equipment routed to the T3 or T4 case drain line (direct return to tank).

Minimum test equipment

The minimum required testing equipment is shown. The equipment can be assembled from common hydraulic components available from any local hydraulic shop.

- Flow meter capable of handling 0–182 L/min (0–40 gpm)

  NOTE:
  When using a flow meter with a needle valve, ensure it is fully open during the tests.

- Needle valve
- #10 JIC 37 flare (tube) male/male straight fitting
- #12 JIC 37 flare (tube) male/male straight fitting
- Two 1 m (3 ft.) x 25 mm (1 in.) diameter hydraulic hoses with a minimum 27,579 kPa (4000 psi) working pressure

  NOTE:
  The ends of the hoses must be adaptable to both #10 and #12 female tube fittings.

- 0–34,474 kPa (0–5000 psi) pressure gauge
- A set of 1/2 in. pioneer flat couplers (MD #135206 [female and male])
- A set of 3/4 in. pioneer flat couplers (MD #135205 [male] and MD #135204 [female])

Assemble the above components so that the flow gauge is at the output end of the circuit, the pressure gauge is at the input end of the circuit, and the needle valve is in the middle.
**Additional test equipment**

**The Parker Service Master Easy 340 Test Meter kit**

This kit is the recommended precision testing equipment. Refer to your authorized Parker retailer for more information (www.parker.com).

The Parker Service Master Easy meter is ideal for use with both hydraulic and pneumatic systems. This multichannel instrument has the ability to store up to 1,000,000 data points relating to pressure, flow, temperature, and rotational speed. The kit includes the following:

- Parker Service Master Easy 340 Test Meter
- Case
- Two transducers
- Two transducer cables
- Power supply
- Sensowin 6.0 software
- USB interface cable
- Operator’s manual

**MacDon service kit (MD #183709)**

This kit is used to check the neutral setting on the traction drive pump.

The kit includes the following:

**Table 10.1 MacDon Service Kit Contents**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD #183609</td>
<td>Gauge complete with fitting and boot</td>
<td>2</td>
</tr>
<tr>
<td>MD #183707</td>
<td>Hydraulic hose</td>
<td>2</td>
</tr>
<tr>
<td>MD #183525</td>
<td>Hydraulic coupling (M16 x 2)</td>
<td>6</td>
</tr>
<tr>
<td>MD #252705</td>
<td>Hydraulic coupling</td>
<td>2</td>
</tr>
</tbody>
</table>

---

7. MacDon Service Kit (MD #183709)
10.3 Replacing Hold-Down Hydraulic Cylinders

The hold-down is raised and lowered by two single-acting hydraulic cylinders. Cylinder operation is adversely affected by air in the system or cylinder seal failure. Repair or replace cylinders if either of these issues arise.

10.3.1 Removing Master Cylinder

⚠️ DANGER

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

1. Lower the header and hold-down completely. Continue pressing the hold-down lower switch for 5–10 seconds to remove any pressure in the system.
2. Stop the engine and remove the key from the ignition.
3. Open the left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.
4. Remove cotter pins and washers from clevis pins (B) and (D).
5. Raise hold-down (C) by hand, and use a prop device to support hold-down and take the weight off the cylinder (A).
6. Remove clevis pin (D) at barrel end of cylinder. Cylinder will drop free from hold-down arm.

7. Insert a block of wood (A) between the hold-down arm (B) and the pick-up (C) to keep the hold-down elevated and clear of the work area.
8. Remove clevis pin (A) at rod end of cylinder, and remove cylinder and safety prop (B).

9. Cut cable ties on hoses (A) and (B), and disconnect hoses from cylinder. Install caps onto hose ends or wrap with plastic.

10.3.2 Installing Master Cylinder

1. Remove the two 90 degree elbows (A) and (B) from previously removed master cylinder. Refer to 10.3.1 Removing Master Cylinder, page 212.

2. Remove plugs from new master cylinder ports.

3. Install elbows (A) and (B) onto new master cylinder as shown. Align elbow (B) as shown (C). Tighten jam nuts on elbows.
4. Connect hose (A) from slave cylinder to elbow (C) at rod (aft) end, and hose (B) from header to elbow (D) at barrel (forward) end. Tighten fittings ensuring hose (B) is routed parallel to the cylinder.

5. Position rod end of cylinder (A) and safety prop into cylinder support bracket, and secure with the shorter clevis pin (B). Ensure clevis pin head faces outboard.

6. Secure clevis pin (B) with washer and cotter pin (not shown).

7. Lift hold-down arm (C) until clevis pin (D) can be installed through lift arm and barrel end of cylinder. Ensure clevis pin head faces outboard.

8. Secure clevis pin (D) with washer and cotter pin (not shown).

9. Secure hoses with cable ties (not shown).

10. Remove previously inserted block of wood.

11. Bleed cylinders and lines. Refer to 10.3.5 Bleeding Cylinders and Lines, page 217.

12. Close the left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

### 10.3.3 Removing Slave Cylinder

1. Lower the header and hold-down completely. Continue pressing the hold-down lower switch for 5–10 seconds to remove any pressure in the system.

⚠️ **DANGER**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
2. Stop the engine and remove the key from the ignition.
3. Remove cotter pins and washers from clevis pins (B) and (D).
4. Raise hold-down (C) by hand, use a prop device to support hold-down and take the weight off the cylinder (A), and remove clevis pin (D) at barrel end of cylinder. Cylinder will drop free from hold-down arm.

5. Use a lifting device to lift and support the hold-down arm (A) to allow removal of the cylinder.

6. Remove clevis pin (A) at rod end of cylinder, and remove cylinder and safety prop (B).
HYDRAULIC SYSTEM

7. Disconnect hydraulic hose (A) from cylinder. Install cap onto hose end, or wrap with plastic.

10.3.4 Installing Slave Cylinder

1. Remove the 45 degree elbow (A) from the previously removed slave cylinder. Refer to 10.3.3 Removing Slave Cylinder, page 214.

2. Remove plug from new slave cylinder port.

3. Install elbow (A) onto new slave cylinder as shown. Ensure fitting is in line with cylinder, and tighten jam nut on elbow.

4. Connect hose (A) from master cylinder to elbow (B), and tighten fitting.
5. Position rod end of cylinder (A) and safety prop into cylinder support bracket, and secure with the shorter clevis pin (B). Ensure clevis pin head faces outboard.

6. Secure clevis pin (B) with washer and cotter pin (not shown).

7. Lift hold-down arm (C) until clevis pin (D) can be installed through lift arm and barrel end of cylinder. Ensure clevis pin head faces outboard.

8. Secure clevis pin (D) with washer and cotter pin (not shown).

9. Remove block of wood inserted in 10.3.3 Removing Slave Cylinder, page 214.

10. Bleed cylinders and lines. Refer to 10.3.5 Bleeding Cylinders and Lines, page 217.

**10.3.5 Bleeding Cylinders and Lines**

Air must be removed from the system for the hydraulics to perform properly. The following procedure explains how to bleed hydraulic cylinders and lines. Bleed the hydraulics after initial installation, if the unit has been idle for a significant period of time, or if the hydraulic system requires adjustment.

⚠️ **CAUTION**

High-pressure hydraulic oil can cause serious injuries such as burns, cuts, and tissue damage. Always take precautions when working with hydraulic oil. Wear safety goggles, gloves, and thick clothing. Seek immediate medical attention if cut or burned.

1. Raise the hold-down fully using the combine reel lift control.

2. Engage the hold-down safety props (A) on both sides of header. Ensure safety props are fully rotated over center so they remain engaged.

3. Lower the hold-down onto the safety props (A) to relieve the hydraulic pressure in the lines.
4. Remove the bleed port plug (not shown) completely.

**IMPORTANT:**
Remove the bleed port plug completely before applying hydraulic pressure. If the bleed port plug is only loosened, the hydraulic oil pressure will damage the plug’s O-ring.

5. Hold a plastic container up to the bleed port to collect hydraulic oil.

6. Activate the combine reel lift control to apply hydraulic pressure to the system until the air bubbles disappear and a steady stream of oil flows from the bleed port. Release the lift control to relieve hydraulic pressure.

7. Replace the bleed port plug and torque to 0.8 Nm (7 lbf-in).

8. Raise the hold-down fully, and disengage the hold-down safety props.

9. Cycle the cylinder 5–10 times by fully extending and fully retracting the cylinder. Ensure the hold-down is level when raising and lowering, and the slave and master cylinders are in sync. Repeat the bleeding process if necessary.

10. Lower the hold-down.
10.3.6 Cylinder – Master (MD #237381)

Figure 10.22: Master Cylinder (MD #237381)

Table 10.2 Cylinder MD #237381 and Seal Repair Kit MD #197498\(^8\) Parts List

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>BARREL – CYLINDER</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>NUT – ROD</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>PISTON</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>ROD – CYLINDER, CHROME</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>GLAND</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>O-RING – SEAL, URETHANE 90A, #214, 1.000 X 1.250 X 0.125 (PISTON)</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>O-RING – SEAL, NBR70A, #012, 0.375 X 0.500 X 0.063 (PISTON)</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>O-RING – SEAL, NBR70A, #217, 1.188 X 1.438 X 0.125 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>J</td>
<td>BACK-UP – SEAL, URETHANE, #217, 1.188 X 1.438 X 0.040 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>ROD SEAL – 605H, 0.750 X 1.000 X 0.250 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>L</td>
<td>ROD WIPER SEAL – CASED, 0.750 X 1.000 X 0.125, NITRILE</td>
<td>1</td>
</tr>
</tbody>
</table>

---

8. Items included in seal repair kit may not be purchased individually.
HYDRAULIC SYSTEM

10.3.7 Cylinder – Slave (MD #197492)

Figure 10.23: Slave Cylinder (MD #197492)

Table 10.3 Cylinder MD #197492 and Seal Kit MD #197500® Parts List

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>BARREL – CYLINDER</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>NUT – ROD</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>PISTON</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>ROD – CYLINDER, CHROME</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>GLAND</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>GREASE ZERK</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>LOADED U-CUP SEAL – POLYPAK B, 0.750 X 1.000 X 0.250 (PISTON)</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>O-RING – SEAL, NBR70A, #012, 0.375 X 0.500 X 0.063 (PISTON)</td>
<td>1</td>
</tr>
<tr>
<td>J</td>
<td>O-RING – SEAL, NBR70A, #213, 0.938 X 1.188 X 0.125 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>BACK-UP – SEAL, URETHANE, #213, 0.938 X 1.188 X 0.040 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>L</td>
<td>ROD SEAL – 605H, 0.750 X 1.000 X 0.250 (GLAND)</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>ROD WIPER SEAL – Cased, 0.750 X 1.000 X 0.125, NITRILE</td>
<td>1</td>
</tr>
</tbody>
</table>

9. Items included in seal kit may not be purchased individually.
10.3.8 Disassembling Cylinders (Master and Slave Cylinders)

Cleanliness is extremely important when disassembling these cylinders. Work in a clean area.

NOTE:
Before disassembly, drain the hydraulic fluid from the cylinder.

For parts and placement, refer to 10.3.6 Cylinder – Master (MD #237381), page 219 or 10.3.7 Cylinder – Slave (MD #197492), page 220.

1. Remove the cylinder. Refer to 10.3.1 Removing Master Cylinder, page 212 or 10.3.3 Removing Slave Cylinder, page 214.
2. Secure the cylinder in place, taking care not to deform or damage the cylinder barrel or cylinder rod.
3. Manually extend the cylinder rod to allow for clearance, and thread the gland out of the cylinder barrel.
4. Pull the cylinder rod, gland, and piston out of the cylinder barrel.
5. Remove the rod nut.
6. Remove the piston and gland from the cylinder rod.
7. Remove the seals from the piston and gland.
8. Clean the piston, gland, chrome cylinder rod, and cylinder barrel using a degreasing agent.
9. Inspect the parts for any signs of wear or defect, and replace the seal kit or cylinder if necessary.

10.3.9 Reassembling Cylinders (Master and Slave Cylinders)

Cleanliness is extremely important when disassembling these cylinders. Work in a clean area.

For parts and placement, refer to 10.3.6 Cylinder – Master (MD #237381), page 219 or 10.3.7 Cylinder – Slave (MD #197492), page 220.

1. Install replacement seal kit MD #197498 (master cylinder) or MD #197500 (slave cylinder), or replace entire cylinder if necessary.
2. Secure cylinder barrel in place, taking care not to deform or damage the cylinder barrel.
3. Install new seals on the piston and gland, and lubricate them with clean hydraulic fluid.
4. Install the piston and gland onto the cylinder rod, taking care not to damage the seals.
5. Replace nut onto rod and tighten.
6. Install the cylinder rod, gland, and piston into the cylinder barrel.
7. Thread the gland into the cylinder barrel, and manually retract the cylinder rod into the barrel.
10.4 Replacing Cylinder Hoses

10.4.1 Removing Master Cylinder Hose

⚠️ DANGER

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

1. Lower the header to the ground.
2. Lower the hold-down completely to release all the hydraulic pressure in the system.
3. Stop the engine and remove the key from the ignition.
4. Open the left endshield (A). Refer to 3.3.1 Opening Left Endshield, page 60.

5. Disconnect hydraulic hose (A) from master lift cylinder (B). Install caps onto hose ends or wrap with plastic.

---

**Figure 10.26: Left Endshield**

**Figure 10.27: Left Side Master Cylinder**
HYDRAULIC SYSTEM

6. Loosen or remove hose clips (A), and undo cinch straps (B).

7. Pull hose through grommet (C).

8. Disconnect hydraulic hose (A) from multicoupler.

9. Loosen three bolts (A) and remove cover (B).

10. Pull hose out of cover (B).
11. Remove grommet (A) to remove hydraulic hose (if necessary).

12. Pull hose through grommet (A) in endsheet.

10.4.2 Installing Master Cylinder Hose

1. Feed hose (A) through grommet (B) in endsheet.
2. Feed hose through clips (C) and grommet (D) to master cylinder.
3. Feed hose (A) through grommet (B).

4. Connect hose (A) to multicoupler.

5. Connect hose (A) to master cylinder (B), and secure hose to master cylinder with cable tie (C).

6. Secure hose with clips (A) and cinch straps (B).
HYDRAULIC SYSTEM

7. Install bottom beam cover (B) and tighten bolts (A).

8. Close endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

9. Bleed cylinders and lines. Refer to 10.3.5 Bleeding Cylinders and Lines, page 217.

10.4.3 Removing Slave Cylinder Hose

The entire hold-down assembly must be disassembled to remove the slave cylinder hose. Refer to 8.5 Disassembling Hold-Down, page 176.
10.5 Disassembling Hydraulic Motor (MD #152541)

**IMPORTANT:**
Cleanliness is extremely important when repairing motors – always work in a clean area. Clean port areas and exterior surfaces of motor before disconnecting hydraulic lines. Remove and inspect key if used. Check shaft and key slot and remove burrs, nicks, and sharp edges. Drain oil from motor before disassembly.

1. Place motor in a vise and clamp across the edge of the flange with the output shaft facing downwards.

**NOTE:**
Clamp using a protective device on the vise such as special soft jaws, pieces of hard rubber, or blocks of wood.

2. Remove cap screw (A) and seal washer (B) (if applicable).
3. Remove end cap (C).
4. Remove seal (D) from end cap (C).
5. Remove gerotor (E).
6. Remove seal (F) from gerotor (E).
7. Remove drive spacer (G) (if applicable).
8. Remove drive.
9. Remove spacer plate.
10. Remove seal from housing.
11. Remove output shaft from housing.
12. Remove needle thrust bearing from shaft or housing.
13. Reposition motor in vise and clamp across ports as shown. Do not clamp on the side of the housing—excessive clamping pressure on the sides of the housing can cause distortion.

14. Remove the cap screws from the mounting flange. Cap screws are installed with Loctite® and will require 35–45 Nm (300–400 lbf·in) of torque to break loose and 11 Nm (100 lbf·in) of torque to remove. Do NOT use impact wrench on Loctite® screws. This could result in rounded heads or broken sockets.

NOTE:
If torque required to loosen set screws exceeds 35–45 Nm (300–400 lbf·in), apply heat to housing.

Tip
The Loctite® will partially melt when heated reducing the amount of torque required to remove the set screws. Use a small-flame propane torch to heat a small area of the housing where the set screws are installed, being careful not to overheat the housing.
Gradually apply torque to set screws while applying heat for 8–10 seconds. Remove heat from housing as soon as the set screws break loose. Continue turning set screws until completely removed.

15. Remove flange (A) from housing.

IMPORTANT:
Some motors may have a quad seal and backup ring in place of the pressure seal. The quad seal and back-up ring are no longer available and are replaced by the pressure seal. They are interchangeable, but some precautions must be taken to ensure proper installation. Follow the reassembly instructions.
16. Use a seal removal tool to remove exclusion seal (J), back-up ring (E), and pressure seal (F) from flange.

**IMPORTANT:**
Be careful not to scratch the seal cavity outside diameter (O.D.) or this could create a leak.

**NOTE:**
One of three types of metal plug and seal (A) plug a machined hole in the housing. It is not necessary to remove the plug or replace the seal unless leaking occurs around the plug.

17. Remove leaking plug (A) by inserting a 5 mm hex key through the port opening and pushing it out. The 009 plug is not interchangeable with 007 or 008 plugs.
10.6 Reassembling Hydraulic Motor (MD #152541) – Shaft End

Use seal kit MD #184877.

Before reassembly, perform the following inspections and procedures:

- Clean all metal parts in clean solvent and blow dry using compressed air (observe all OSHA safety guidelines). Do NOT wipe dry with cloth or paper towel to prevent lint or other matter from getting into the hydraulic system. Do NOT use sand paper, files, or grinders on any parts.
- Check the keyway and chamfered area of the shaft for burrs, nicks, or sharp edges that could damage seals when reassembling the bearing housing.
- Use new seals when reassembling the motor.
- Lubricate all seals with petroleum jelly.
- Inspect motor housing and all other components for any scoring, damage, or excessive wear. If there is any damage to any of the components, discard and replace the motor.

IMPORTANT:
Do NOT stretch seals before installing them.

1. Install drain plug and seal (if previously removed). Lubricate new seal before installing onto plug. Some plugs have two O-ring grooves but require only one O-ring (install O-ring in groove closest to outside end of plug). Push plug into housing until plug and housing are flush. Be careful not to damage seal.

**NOTE:**
Use Eaton seal installation tool #600470 (007 motors) or #600523 (008 and 009 motors).

2. Install exclusion seal (B) into flange. Carefully press exclusion seal into place.

3. Check pressure seal seat (F) in mounting flange for scratches or other marks that might damage the shaft pressure seal (A). Check mounting flange for cracks that could cause leakage.

4. Lubricate internal diameter (I.D.) of seal tube (D) and outer diameter (O.D.) of shaft pressure seal (A) with a light film of clean petroleum jelly. Align small I.D. end of seal tube with pressure seal seat (F) in mounting flange.

5. Install back-up ring (G) and shaft pressure seal (A) into tube with lips of pressure seal facing upwards.

6. Insert seal driver (C) into tube and firmly push pressure seal seat (F) with a rotating action.

**NOTE:**
Use of primer is optional. With primer, Loctite® curing time is approximately 15 minutes. Without primer, curing time is approximately six hours.
7. Apply three or four drops of Loctite® sealant (A) to the top of the threads for each of the four holes in the housing (B). Do not allow any parts applied with Loctite® to come into contact with any other metal parts. Wipe off excess Loctite® from the housing face using a non-petroleum base solvent.

**NOTE:**
Do not apply Loctite® to threads more than 15 minutes before installing screws. If housing stands for more than 15 minutes, repeat application (no additional cleaning or removal of previously applied Loctite® is necessary).

8. Place a protective sleeve or bullet over the shaft before installing the flange and seal assembly.

9. Lubricate the space between the exclusion seal (B), pressure seal (C), and lips of both seals.

10. Install flange by rotating slowly while pushing down over the shaft. Be careful not to invert or damage seals.

11. Remove bullet and clamp motor in vise.

**NOTE:**
Clamp using a protective device on the vise such as special soft jaws, pieces of hard rubber, or blocks of wood.

12. Ensure the shaft cannot fall out. Install dry screws and immediately torque them to 28 Nm (250 lbf-in) using an alternating tightening pattern. If using primer, allow to cure for 10–15 minutes. Without using primer, allow to cure for six hours before subjecting the motor to high-torque reversals. For all other applications, you can run the motor immediately.
NOTE:
If using new screws, make sure they are the correct length: 22 mm (7/8 in.) under head length. Refer to parts list for correct part number.
10.7 Reassembling Hydraulic Motor (MD #152541) – Gerotor End

1. Position motor in a vise and clamp across the ports with the gerotor (A) end facing upwards. Do not clamp on side of housing (E).

   **NOTE:**
   Clamp using a protective device on the vise such as special soft jaws, pieces of hard rubber, or blocks of wood.

2. Apply a light coat of clean petroleum jelly to seals. Do **NOT** stretch seals before installing them into groove.

3. Pour approximately 35 cc (2 in³) of clean hydraulic oil into output shaft cavity.

4. Install 73 mm (2-7/8 in.) internal diameter (I.D.) seal into housing seal groove. Avoid twisting seal.

---

**Figure 10.48: Motor and Gerotor Assembly**

- A - Gerotor
- B - Gerotor Seal
- C - Drive
- D - Spacer Plate
- E - Housing
- F - Forward Valving Slot
- G - Star Point
- H - Timing Dot Shaft
- J - Counterclockwise when Timing is Oriented as Above
- K - Clockwise when Timing is Oriented as Above
10.8 Aligning Hydraulic Motor (MD #152541) Internal Timing

1. Install drive (C) using a felt tip marker to mark one drive tooth. Align marked tooth with timing dot (H) on shaft.

   **NOTE:**
   If drive is not symmetrical, install larger splined end into shaft.

2. Install spacer plate (D).

3. Install 73 mm (2-7/8 in.) internal diameter (I.D.) seal into gerotor (A) seal groove. Carefully place gerotor onto spacer plate (D) with the seal side facing the spacer plate.

4. Rotate gerotor (A) to line up with the bolt holes. Be careful not to disengage star from drive (C) or disturb gerotor seal (B).

5. Install drive spacer if applicable.

6. Install 73 mm (2-7/8 in.) seal in end cap. Carefully place end cap on gerotor (A).

7. Install cap screws and seal washers (if applicable) into end cap. Torque screws to 5 Nm (40 lbf·in). Make sure seals are properly seated and torque screws 27–28 Nm (235–250 lbf·in) following the torquing sequence shown.
11 Electrical System

Electricity is supplied from the combine, and it is used to power the sensors and lights. If a harness connector is damaged, refer to the Electrical Connectors Parts Catalog (MD #169641) for replacement part numbers.

11.1 Electrical Components

11.1.1 Header Height Controller (MD #158069)
Mounting torque: 0.11 Nm (0.97 lbf-in)
Rotation: 120° counterclockwise
Power rating: 0.15 watts
Total resistance: 5000 ohms

Figure 11.1: Controller (MD #158069)
A - Power
B - Signal
C - Ground

11.1.2 Speed Sensor (MD #184437)
Mounting torque: Tighten jam nut to 12 Nm (9 lbf-ft)
Total resistance: 1600 ohms
Clearance to sensor disc: 3 mm (1/8 in.)

Figure 11.2: Speed Sensor (MD #184437)
A - Ground
B - Signal
11.1.3 Clearance Lamp (MD #138150)

Clearance lamps are located on both sides of the header and use a male bullet for power and a female bullet for ground.

Replacement Bulb: 21W (12V)
Replacement Lens: MD #139630

Figure 11.3: Clearance Lamp (MD #138150)
11.2 Lights

The transport lights, located at each end of the header, are used when driving the combine on the road with the header attached.

- Use electrical tape and wire clips to prevent wires from dragging or rubbing.
- Keep lights clean, and replace defective bulbs.
- Replace the light housing if it is cracked or broken.

11.2.1 Adjusting Transport Lights

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

1. Lower header to the ground, shut off combine, and remove key from ignition.
2. If repositioning is required, swivel the lights with hand force.
3. If the swivel is too loose or too tight, loosen jam nut (A) and turn nut (B) so the light maintains its position and can be moved with hand force. Do NOT overtighten.
4. Tighten jam nut (A).

![Figure 11.4: Transport Light](image)

11.2.2 Replacing Transport Light Bulb

Transport lights are an important safety feature. Keep lights clean, and replace defective bulbs.

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

1. Lower header to the ground, shut off combine, and remove key from ignition.
2. Remove two screws (A) using a Phillips screwdriver.
3. Pry off the lens (B).
4. Push in and slightly turn bulb counterclockwise. Remove the bulb.
5. Place the new bulb in the socket, push in, and turn clockwise until bulb stops.
6. Replace lens (B) and secure with two screws (A).

![Figure 11.5: Transport Light](image)

11.2.3 Replacing Lens

Transport lights are an important safety feature. Keep lenses clean, and replace if cracked or broken.

⚠️ DANGER

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

1. Lower header to the ground, shut off combine, and remove key from ignition.
2. Remove two screws (A) using a Phillips screwdriver.
3. Pry off the lens (B).
4. Install new lens (B), and secure with two screws (A).

![Figure 11.6: Transport Light](image)
11.2.4 Replacing Lamp Housing

Transport lights are an important safety feature. Replace housing if cracked or broken.

⚠️ **DANGER**

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

1. Lower header to the ground, shut off combine, and remove key from ignition.
2. Pull wiring harness (A) out of lamp bracket, and locate connectors inside the wiring harness.
3. Disconnect light wiring from harness.
4. Remove four nuts (B), and remove lamp (C) from bracket.
5. Install new lamp (C) on bracket, and secure with four nuts (B).
6. Connect lamp wiring to harness (A), and route wires inside plastic covering. Seal with black tape.
7. Ensure that wiring harness is not damaged, and secure harness inside lamp bracket.
8. Check operation of new lamp.

![Figure 11.7: Transport Light](image)
12 Auto Header Height Control (AHHC)

12.1 Auto Header Height Control (AHHC)

MacDon’s auto header height control (AHHC) feature works in conjunction with the AHHC option available on certain combine models.

NOTE:
This section does not apply to Versatile combines.

Sensors installed at each end of the PW8 Pick-Up Header send a signal to the combine allowing it to maintain a consistent cutting height as the header follows ground contours.

PW8 Pick-Up Headers are factory-equipped for AHHC; however, before using AHHC feature, you must do the following:

1. Ensure that AHHC sensor’s output voltage range is appropriate for combine. For more information, refer to 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247.
2. Prepare combine to use AHHC feature.
3. Calibrate AHHC system so that combine can correctly interpret data from height sensors on header. Once calibration is complete, you are ready to use AHHC feature in the field. For each combine, certain operation settings can be used to improve performance of AHHC feature.

NOTE:
If your PW8 Pick-Up Header is not equipped to work with a specific combine model, you will need to install appropriate combine completion package. Completion packages come with instructions for installing height sensors.

Refer to the following instructions for your specific combine model:

- 12.1.4 Case IH 7010/8010, 7120/8120/9120, 7230/8230/9230, and 7240/8240/9240 Combines, page 258
- 12.1.6 John Deere 70 Series Combines, page 272
- 12.1.7 John Deere S and T Series Combines, page 278
- 12.1.8 New Holland Combines CX/CR Series (CR Series – Model Year 2014 and Earlier), page 289
- 12.1.9 New Holland Combines (CR Series – Model Year 2015 and Later), page 297

12.1.1 Height Sensors

The PW8 Pick-Up Header is equipped with two height sensors—one at each end of header. The height sensors do not require maintenance, but they may need to be repaired or replaced due to normal wear and tear.

The sensors may require calibration if there are problems with pick-up height control. Refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.
Removing Header Height Sensor Assembly (Left Side)

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

1. Lower header to ground, shut down combine, and remove key from ignition.
2. Open left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.
3. Disconnect wire harness (A).
4. Push up on rod end clip (B). Slide linkage rod (C) out of rod end clip (B).

Figure 12.2: Header Height Sensor Assembly – Left Side
5. Remove nuts and bolts (A).
6. Remove sensor (B) and control arm (C).

**NOTE:**
Note orientation of control arm, this will be required for reassembly.

---

**Installing Header Height Sensor Assembly (Left Side)**

1. Install control arm (C). Ensure that flat side is facing towards header.
2. Install sensor (B), center bolts in slots, and secure with nuts (A).
3. Slide linkage rod (C) into rod end clip (B). Secure rod end clip by pressing it onto linkage rod (C).
5. Close left endshield. Refer to **3.3.2 Closing Left Endshield, page 61**.
Removing Header Height Control System (Right Side)

⚠️ DANGER

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

1. Raise hold-down and engage lift cylinder safety props.
2. Lower header to ground, shut down combine, and remove key from ignition.
3. Locate access panel on inside of right end frame.
   Remove two bolts (A) from access panel (B).
4. Remove access panel (B).

5. Disconnect wire harness (A).
6. Push up on rod end clip (B). Slid linkage rod (C) out of rod end clip (B).
7. Remove nuts and bolts (A).
8. Remove sensor (B) and control arm (C).
   **NOTE:**
   Note orientation of control arm, this will be required for reassembly.

9. Locate plug (A) on outboard side of endsheet and remove plug to gain access to nut (B) securing long control arm to frame.
10. Remove nut (B).

11. Remove long control arm (A) complete with linkage rod, rod end clip, and activator arm.
Installing Header Height Sensor Assembly (Right Side)

1. Install long control arm (A) complete with linkage rod, rod end clip, and activator arm.

2. Install nut (B).

3. Install hole plug (A).

4. Install control arm (C). Ensure that flat side is facing towards header.

5. Install sensor (B), center bolts in slots, and secure with nuts (A).
6. Slide linkage rod (C) into rod end clip (B). Secure rod end clip by pressing it onto linkage rod (C).

7. Connect wire harness (A).

8. Install access panel (B), and secure it with bolts (A).

12.1.2 Height Sensor Output Voltage Range – Combine Requirements

The height sensor output must be within a specific voltage range for each combine or the auto header height control (AHHC) feature will not work properly.

<table>
<thead>
<tr>
<th>Combine</th>
<th>Low Voltage Limit</th>
<th>High Voltage Limit</th>
<th>Minimum Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case IH 7/8010, 5/6/7088, 7/8/9120, 5/6/7130, 5/6/7140, 7/8/9230, 7/8/9240</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>2.5 V</td>
</tr>
<tr>
<td>John Deere 60/70/S/T Series</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>2.5 V</td>
</tr>
<tr>
<td>New Holland CR/CX – 5 V system</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>2.5 V</td>
</tr>
<tr>
<td>New Holland CR/CX – 10 V system</td>
<td>3.0 V</td>
<td>7.0 V</td>
<td>4.1–4.4 V</td>
</tr>
</tbody>
</table>

NOTE:
For instructions on manually checking voltage range, refer to Manually Checking Voltage Range, page 248.
**Manually Checking Voltage Range**

In some combines, output voltage range of auto header height control (AHHC) sensors can be checked from cab. For instructions, refer to combine operator’s manual or AHHC instructions later in this document.

1. Position header until header wheels are approximately 150 mm (6 in.) above ground.

   **NOTE:**
   Ensure float spring is fully extended. Refer to 3.2.3 Adjusting Header Float, page 58. If float spring is not fully extended during next step, voltage may go out of range during operation causing a malfunction of AHHC system.

2. Shut down combine. Position key so that power is supplied to sensors.

3. Open left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.

4. Remove right endshield. Refer to 3.3.5 Removing Right Endshield, page 65.

5. Locate left height sensor (A).

   **NOTE:**
   Sensor and connector may not be exactly as shown.

6. With connector plugged into sensor, measure voltage between orange signal wire (B) in middle position on connector, and ground (brown) wire (C) at one side of connector. This is the maximum voltage for left sensor.

![Figure 12.16: Left Height Sensor](image-url)
7. Locate access panel (A) on inside of right end frame.

8. Remove two bolts (A) from access panel (B).
9. Remove access panel (B).
10. Locate right height sensor (A).

**NOTE:**
Sensor may not be exactly as shown, and view of harness is from inboard side of endsheet.

11. With connector plugged into sensor, measure voltage between signal (orange) wire (B) in middle position on connector and ground (brown) wire (C) on one side of connector. This is maximum voltage for right sensor.

12. Start combine and fully lower combine feeder house. The float springs should be fully compressed. Shut down combine. Position key so that power is supplied to sensors.

13. Repeat voltage measurements for both sensors. These are the minimum voltages.


15. If sensor voltage is outside low and high limits, or if voltage range is less than specified value, adjustments are required. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 or Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

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**Adjusting Header Height Sensor Voltage Range (Left Side)**

⚠️ **DANGER**

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

1. Lower header to ground, shut down combine, and remove key from ignition.

2. Open left endshield. Refer to 3.3.1 Opening Left Endshield, page 60.
3. Loosen nuts (A).

4. Rotate control (B) until desired voltage range is achieved. Refer to 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247.

   **NOTE:**
   If voltage range is too large or too small, you may need to relocate linkage rod (C) to a different hole in sensor control arm (D). If that doesn’t work, relocate linkage rod (C) to a different hole in sensor control arm (E).

5. Close left endshield. Refer to 3.3.2 Closing Left Endshield, page 61.

---

**Adjusting Header Height Sensor Voltage Range (Right Side)**

⚠️ **DANGER**

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

1. Raise hold-down and engage lift cylinder safety props.
2. Lower header to ground, shut down combine, and remove key from ignition.
3. Locate access panel (A) on inside of right end frame.
4. Remove two bolts (A) from access panel (B).
5. Remove access panel (B).

7. Rotate sensor (B) until desired voltage range is achieved. Refer to 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247.

**NOTE:**
If voltage range is too large or too small, you may need to relocate linkage rod (C) to a different hole in sensor control arm (D). If that doesn’t work, relocate linkage rod (C) to a different hole in sensor control arm (E).

8. Once complete, install access panel (B) and secure it with bolts (A).
12.1.3 Case IH 5130/6130/7130 and 5140/6140/7140 Mid-Range Combines

Setting up the Header on the Combine Display (Case IH 5130/6130/7130; 5140/6140/7140)

1. On the main page of the combine display, select TOOLBOX (A).

2. Select the HEAD 1 tab (A). The HEADER SETUP page displays.

3. From the CUTTING TYPE menu (B), select PLATFORM.

4. Select the HEAD 2 tab (A). The HEADER SETUP 2 page displays.

5. From the HEADER PRESSURE FLOAT menu (B), select NOT INSTALLED.
6. From the BELT DRIVE TYPE menu (A), select
   • 1 - for most pickup headers
   • 2 - for 16 ft. Rake-Up pickup headers
   • 3 - for SwathMaster pickup headers

   **NOTE:**
   Proper belt drive selection optimizes auto-belt to ground speed.

---

**Checking Voltage Range from Combine Cab (Case IH 5130/6130/7130; 5140/6140/7140)**

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.
2. On the main page of the combine display, select DIAGNOSTICS (A). The DIAGNOSTICS page opens.
4. From the GROUP menu (B), select HEADER.

5. From the PARAMETER menu, select LEFT HEIGHT/ TILT SENSOR (A).

6. The SETTINGS page updates to display the voltage in the VALUE/STATUS field (A). Lower the feeder house fully, and then raise it 305 mm (12 in.) off the ground to view the full range of voltage readings.

7. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

Calibrating Auto Header Height Control (Case IH 5130/6130/7130, 5140/6140/7140)

NOTE:
This procedure applies to combines with a software version below 28.00. For instructions on calibrating the AHHC for combines with software version 28.00 or above, refer to Calibrating Auto Header Height Control (Case Combines with Version 28.00 or Higher Software), page 264.
AUTO HEADER HEIGHT CONTROL (AHHC)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Ensure all header electrical and hydraulic connections are made.
2. Lower the combine feeder house all the way down (the feeder house will stop moving).
3. Hold the DOWN button for 2 seconds.
4. Push the RAISE button and hold it until the feeder house travels all the way up. It will stop 61 cm (2 feet) above ground for 5 seconds, then it will resume lift. This is an indication that calibration is successful.

Figure 12.33: Calibrate Auto Header Height

Setting Preset Cutting Height (Case 5130/6130/7130, 5140/6140/7140)
To set preset cutting height, follow these steps:

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Engage separator and header.
2. Manually raise or lower header to desired cutting height.
3. Press 1 on button (A). A yellow light next to the button will illuminate.

Figure 12.34: Case Combine Console
4. Manually raise or lower header to a second desired cutting height.

5. Press 2 on button (A). A yellow light next to the button will illuminate.

Up and down arrows should now appear in the MANUAL HEIGHT box (A) on the RUN 1 page on the combine display. This indicates that the auto header height control (AHHC) is functioning.

6. To enable the presets, activate AHHC button (A) to place the header on the ground. To enable the first present, tap the button once. To enable the second preset, tap the button twice.

To lift the header to maximum working height, hold the SHIFT button on the back of the ground speed lever (GSL) while tapping AHHC button (A).
7. The maximum working height can be adjusted on the HEADER SETUP page on the combine display. Enter the desired height in the MAXIMUM WORKING HEIGHT field (A).

8. If you need to change the position of the one of the presets, you can fine tune this setting with button (A) on the combine console.

12.1.4 Case IH 7010/8010, 7120/8120/9120, 7230/8230/9230, and 7240/8240/9240 Combines

Checking Voltage Range from Combine Cab (Case 8010)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

1. Raise header until header wheels are 150 mm (6 in.) above ground.
AUTO HEADER HEIGHT CONTROL (AHHC)

2. Select DIAG (A) on Universal display MAIN page. The DIAG page displays.


4. Select HDR HEIGHT/TILT (A). The SENSOR page displays.
5. Select LEFT SEN (A). The exact voltage is displayed. Raise and lower header to see full range of voltage readings.

6. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

Checking Voltage Range from Combine Cab (Case IH 7010/8010; 7120/8120/9120; 7230/8230/9230; 7240/8240/9240)

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.
2. Select DIAGNOSTICS (A) on MAIN page. The DIAGNOSTICS page opens.

3. Select SETTINGS. The SETTINGS page opens.

4. Select GROUP drop-down arrow (A). The GROUP dialog box displays.

6. Select LEFT HEADER HEIGHT SEN (A), and then select GRAPH button (B). The exact voltage is displayed at top of page. Raise and lower header to see full range of voltage readings.

7. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

Calibrating Auto Header Height Control (Case IH 7010/8010; 7120/8120/9120; 7230/8230/9230; 7240/8240/9240)

NOTE:
This procedure applies to combines with a software version below 28.00. For instructions on calibrating the AHHC for combines with software version 28.00 or above, refer to Calibrating Auto Header Height Control (Case Combines with Version 28.00 or Higher Software), page 264.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Ensure all header electrical and hydraulic connections are made.
2. Select TOOLBOX on MAIN page, and then select HEADER.
3. Set appropriate HEADER STYLE.
4. Set AUTO REEL SPEED SLOPE.

5. Set HEADER PRESSURE FLOAT to NO if equipped, and ensure REEL DRIVE is HYDRAULIC.

6. Install REEL FORE-BACK (if applicable).

7. Set HEIGHT SENSITIVITY to desired value. The recommended starting point is 180.

8. Install FORE-AFT CONTROL and HDR FORE-AFT TILT (if applicable).

10. Ensure HEADER TYPE is PICK-UP.

**NOTE:**
If recognition resistor is plugged in to header harness, you will not be able to change this.

11. Set cutting type to PLATFORM.

12. Set appropriate HEADER WIDTH and HEADER USAGE.

---

**Calibrating Auto Header Height Control (Case Combines with Version 28.00 or Higher Software)**

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Select TOOLBOX on MAIN page, and then select HEADER SETUP.

2. Locate HEADER SUB TYPE field. It will be located on either HEAD 1 or HEAD 2 tab.


4. Locate HEADER SENSORS and HEADER PRESSURE FLOAT fields. They will be located on either HEAD 1 or HEAD 2 tab.

5. Select ENABLE (A) in HEADER SENSORS field.

6. Select NO (B) in HEADER PRESSURE FLOAT field.
7. Ensure AUTO HEIGHT icon (A) appears on monitor and is displayed as shown at (B). When header is set for cutting on ground, this verifies that combine is correctly using potentiometers on header to sense ground pressure.

**NOTE:**
AUTO HEIGHT field (B) may appear on any of RUN tabs and not necessarily on RUN 1 tab.

8. Select CALIBRATION on combine display, and press right arrow navigation key to enter information box.

9. Select HEADER (A), and press ENTER. The CALIBRATION dialog box opens.

**NOTE:**
You can use up and down navigation keys to move between options.

10. Follow calibration steps in order in which they appear in dialog box. As you proceed through calibration process, display will automatically update to show next step.

**NOTE:**
Pressing ESC key during any of steps or letting system sit idle for more than three minutes will cause calibration procedure to stop.

**NOTE:**
Refer to your combine operator’s manual for an explanation of any error codes.

11. When all steps have been completed, CALIBRATION SUCCESSFUL message is displayed on page. Exit CALIBRATION menu by pressing ENTER or ESC key.
NOTE:
If float was set heavier to complete ground calibration procedure, adjust to recommended operating float after calibration is complete.

12. If unit does not function properly, conduct maximum stubble height calibration.

Setting Preset Cutting Height (Case 7010/8010, 7120/8120/9120, 7230/8230/9230, 7240/8240/9240)

To set preset cutting height, follow these steps:

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Engage separator and header.
2. Manually raise or lower header to desired cutting height.
3. Press SET #1 switch (A). The HEADER HEIGHT MODE lamp (C), next to SET #1 switch, turns on.
4. Manually raise or lower header to a second desired cutting height.
5. Press SET #2 switch (B). The HEADER HEIGHT MODE lamp (D), next to SET #2 switch, turns on.
6. To swap between set points, press HEADER RESUME (A).
7. To pick up header at headlands, press HEADER RESUME (A) twice. To lower, press HEADER RESUME (A).

NOTE:
You can fine adjust these set points by using FINE ADJUST switch ([E] in the previous illustration).

NOTE:
Pressing HEADER RAISE/LOWER switch will disengage AUTO HEIGHT mode. Press HEADER RESUME to re-engage.
12.1.5 John Deere 60 Series Combines

Checking Voltage Range from Combine Cab (John Deere 60 Series)

The auto header height sensor output must be within a specific range, or feature will not work properly.

<table>
<thead>
<tr>
<th>Combine</th>
<th>Low Voltage Limit</th>
<th>High Voltage Limit</th>
<th>Minimum Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Deere 60 Series</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>3.0 V</td>
</tr>
</tbody>
</table>

Check sensor’s output voltage range from combine cab according to instructions that follow.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.

2. Press diagnostic button (D) on HHS monitor (the button with open book with wrench on top of it). dIA appears on monitor.

3. Press up button (A) until EO1 appears on monitor (these are header adjustments).

4. Press ENTER button (C).

5. Press up (A) or down (B) until 22 is displayed on top portion of monitor. This is voltage reading of sensor.

6. Start combine and lower feeder house to ground until feeder house stops moving.
NOTE:
You may need to hold HEADER DOWN switch for a few seconds to ensure feeder house is entirely down.

7. Check sensor reading on monitor.
8. Raise header so it is just off ground and check sensor reading again.
9. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

Calibrating Auto Header Height Control (John Deere 60 Series)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

1. Start combine.
2. Press DIAGNOSTIC button (A) on monitor. DIA appears on monitor.
3. Press CAL button (B). DIA-CAL appears on monitor.

Figure 12.62: John Deere Combine Display
AUTO HEADER HEIGHT CONTROL (AHHC)

4. Press UP or DOWN buttons until HDR appears on monitor.
5. Press ENTER button. HDR H-DN appears on monitor.
6. Fully lower feeder house to ground.
   **NOTE:**
   You may need to hold HEADER DOWN switch for a few seconds to ensure feeder house is fully lowered.

7. Press CAL button (A) to save calibration of header. HDR H-UP appears on monitor.
8. Raise header three feet off ground and press CAL (A) button. EOC appears on monitor.
9. Press ENTER button (B) to save calibration of header. Your AHHC is now calibrated.
   **NOTE:**
   If an error code appears during calibration, sensor is out of voltage range and will require adjustment. Refer to Calibrating Auto Header Height Control (John Deere 60 Series), page 268.
   **NOTE:**
   After calibration is complete, adjust combine operation settings to ensure proper field operation.

Turning Accumulator Off (John Deere 60 Series)

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.
1. Press DIAGNOSTIC button (A) on monitor. DIA appears on the monitor.

2. Press UP button (B) until EO1 appears on monitor, and press ENTER (D). This is header adjustment.

3. Press UP (B) or DOWN (C) button until 132 is displayed on top portion of monitor. This is reading for accumulator.

4. Press ENTER (D) to select 132 as accumulator reading (this will allow you to change display to a three-digit number so it has a 0 in it, for example, x0x).

5. Press UP (B) or DOWN (C) button until desired number is displayed, and press CAL (E) button.

6. Press ENTER (D) to save changes. The accumulator is now deactivated.

**Setting Sensing Grain Header Height to 50 (John Deere 60 Series)**

**NOTE:**

Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

To set sensing grain header height, follow these steps:

1. Press DIAGNOSTIC button (A) on monitor. DIA appears on the monitor.

2. Press UP button (B) until EO1 appears on monitor, and press ENTER (D). This is header adjustment.

3. Press UP (B) or DOWN (C) button until 128 is displayed on top portion of monitor. This is reading for the sensor.

4. Press ENTER (D) to select 128 as sensor reading (this will allow you to change display to a three-digit number so it has a 50 in it).

5. Press UP (B) or DOWN (C) button until desired number is displayed, and press CAL (E) button.

6. Press ENTER (D) to save the changes. The height is now set.
NOTE:
Do NOT use active header float function (A) in combination with MacDon auto header height control (AHHC)—the two systems will counteract one another. The header symbol (B) on display should NOT have a wavy line under it and should appear exactly as shown on Active Header Control Display in Figure 12.67, page 271.

Setting Sensitivity of Auto Header Height Control (John Deere 60 Series)
This is also known as dead band adjustment.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press DIAGNOSTIC button (A) on monitor. DIA appears on the monitor.
2. Press UP button (B) until EO1 appears on monitor, and press ENTER (D). This is header adjustment.
3. Press UP (B) or DOWN (C) button until 112 is displayed on monitor. This is your sensitivity setting.

NOTE:
The lower the reading, the higher the sensitivity. Ideal operating range is typically between 50 and 80.

4. Press ENTER (D) to select 112 as sensitivity setting (this will allow you to change first digit of number sequence).
5. Press UP (B) or DOWN (C) until desired number is displayed, then press CAL (E) button. This will bring you to second digit. Repeat this procedure until desired setting is achieved.
6. Press ENTER (D) to save changes.

NOTE:
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.
Adjusting Threshold for Drop Rate Valve (John Deere 60 Series)

This procedure explains how to adjust point at which restrictor valve opens allowing full flow to lift cylinders.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press DIAGNOSTIC button (A) on monitor. DIA appears on the monitor.
2. Press UP button (B) until EO1 appears on monitor and press ENTER (C). This is header adjustment.
3. Press UP (B) or DOWN button (E) until 114 is displayed on top portion of monitor. This is setting that adjusts when fast drop rate starts with respect to dead band.

NOTE:
The default setting is 100. Ideal operating range is typically between 60 and 85.

4. Press ENTER (C) to select 114 as fast drop rate (this will allow you to change first digit of number sequence).
5. Press UP (B) or DOWN (E) until desired number is displayed, then press CAL button (D). This will bring you to second digit. Repeat this procedure until desired setting is achieved.
6. Press ENTER (C) to save changes.

NOTE:
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.

12.1.6 John Deere 70 Series Combines

Checking Voltage Range from Combine Cab (John Deere 70 Series)

The auto header height sensor output must be within a specific range, or feature will not work properly.

<table>
<thead>
<tr>
<th>Combine</th>
<th>Low Voltage Limit</th>
<th>High Voltage Limit</th>
<th>Minimum Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Deere 70 Series</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>3.0 V</td>
</tr>
</tbody>
</table>

Check sensor’s output voltage range from combine cab according to instructions that follow.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.
2. Press HOME PAGE button (A) on main page of combine display.

3. Ensure three icons (A) depicted in illustration at right appear on combine display.

4. Use scroll knob (A) to highlight middle icon (the green i) and press check mark button (B) to select it. This will display Message Center.
5. Use scroll knob to highlight DIAGNOSTIC ADDRESSES (A) from right column, and then select it by pressing check mark button.

6. Use scroll knob to highlight drop down box (B), and press check mark button to select it.

7. Use scroll knob to highlight LC 1.001 VEHICLE (A), and then press check mark button to select it.

8. Use scroll knob to highlight down arrow (A) and press check mark button to scroll through list until 029 DATA (B) is displayed and voltage reading (C) appears on combine display.

9. Start combine and fully lower feeder house to the ground.

   **NOTE:**

   You may need to hold HEADER DOWN switch for a few seconds to ensure feeder house is fully lowered.

10. Check sensor reading on monitor.
11. Raise header so it is just off ground and recheck sensor reading.

12. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

**Calibrating Feeder House Speed (John Deere 70 Series)**

The feeder house speed must be calibrated before you calibrate auto header height control (AHHC) system. Refer to combine operator’s manual for instructions.

**Calibrating Auto Header Height Control (John Deere 70 Series)**

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

**⚠️ CAUTION**

Check to be sure all bystanders have cleared the area.

1. Start combine.
2. Press button located fourth from left along top of monitor (A) to select icon that resembles an open book with a wrench on it (B).
3. Press top button (A) a second time to enter diagnostics and calibration mode.

4. Select HEADER in box (A) by scrolling down to box using scroll knob, and then pressing check mark button (knob and button are shown in Figure 12.78, page 276).
5. Scroll down to lower right icon that resembles an arrow in a diamond (B) and press check mark button to select it.
6. Follow steps listed on combine display to perform the calibration.

**NOTE:**
If an error code appears on page, sensor is not in correct working range. Refer to *Checking Voltage Range from Combine Cab (John Deere 70 Series)*, page 272 to check and adjust range.

**Setting Sensitivity of Auto Header Height Control (John Deere 70 Series)**

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press button (A) twice and current sensitivity setting will appear on combine display (the lower the reading, the lower the sensitivity).

2. Use scroll knob (B) to adjust sensitivity setting. The adjustment will be saved automatically.

**NOTE:**
If page remains idle for a short period of time, it will automatically return to previous page. Pressing check mark button (C) also will return combine display to previous page.
NOTE:
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.

Figure 12.80: John Deere Combine Display

Adjusting Manual Header Raise/Lower Rate (John Deere 70 Series)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press button (A) and current raise/lower rate setting will appear on monitor (the lower reading, slower rate).

2. Use scroll knob (B) to adjust rate. The adjustment will be saved automatically.

NOTE:
If page remains idle for a short period of time, it will automatically return to previous page. Pressing check mark button (C) will also return monitor to previous page.

Figure 12.81: John Deere Combine Control Console
NOTE:
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.

12.1.7 John Deere S and T Series Combines

Checking Voltage Range from Combine Cab (John Deere S and T Series)
The auto header height sensor output must be within a specific range, or feature will not work properly.

<table>
<thead>
<tr>
<th>Combine</th>
<th>Low Voltage Limit</th>
<th>High Voltage Limit</th>
<th>Minimum Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Deere S and T Series</td>
<td>0.7 V</td>
<td>4.3 V</td>
<td>3.0 V</td>
</tr>
</tbody>
</table>

Check sensor’s output voltage range from combine cab according to instructions that follow.

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator's manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.
2. Press CALIBRATION icon (A) on main page of combine display. The CALIBRATION page appears.
3. Press DIAGNOSTIC READINGS icon (A) on CALIBRATION page. The DIAGNOSTIC READINGS page appears. This page provides access to calibrations, header options, and diagnostic information.

4. Select AHHC RESUME (A) and a list of calibration options appears.

5. Select AHHC SENSING option.

6. Press icon that resembles an arrow in a box (A). The AHHC SENSING menu appears and five pages of information are displayed.
7. Press icon (A) until it reads Page 5 near top of the page and following sensor readings appear:
   - LEFT HEADER HEIGHT
   - CENTER HEADER HEIGHT
   - RIGHT HEADER HEIGHT

   A sensor is installed at each end of PW8 Pick-Up Header. These sensors send a signal to combine to allow it to maintain a consistent cutting height as header follows ground contours.

8. Start combine and fully lower feeder house to the ground.

   **NOTE:**
   You may need to hold HEADER DOWN switch for a few seconds to ensure feeder house is fully lowered.

9. Check sensor reading on monitor.

10. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

**Calibrating Feeder House Fore/Aft Tilt Range (John Deere S and T Series)**

This procedure applies only to model year 2015 and later John Deere S and T Series combines.

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

The feeder house fore/aft tilt is controlled by buttons (C) and (D) at back of hydro handle.
NOTE:
The feeder house fore/aft tilt controls can be changed to work with buttons E and F by pressing hydro handle icon (A) and then selecting FEEDER HOUSE FORE/AFT TILT from drop-down menu (B) on combine display.

To calibrate feeder house fore/aft tilt range, follow these steps:

1. Press DIAGNOSTIC icon (A) on main page of combine display. The CALIBRATION page displays.

2. Select CALIBRATIONS drop-down menu (A) to view list of calibration options.
3. Press arrow (A) to cycle up though calibration options and select FEEDER HOUSE FORE/AFT TILT RANGE.


5. Follow instructions that appear on combine display. As you proceed through calibration process, display will automatically update to show next step.

NOTE:
If an error code appears during calibration, sensor is out of voltage range and will require adjustment. Refer to Checking Voltage Range from Combine Cab (John Deere S and T Series), page 278.

Calibrating Auto Header Height Control (John Deere S and T Series)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.
AUTO HEADER HEIGHT CONTROL (AHHC)

1. Press DIAGNOSTIC icon (A) on main page of monitor. The CALIBRATION page appears.

2. Select THRESHING CLEARANCE (A) and a list of calibration options appears.

3. Select FEEDER HOUSE SPEED (A) and calibrate.

4. Select HEADER (B) and calibrate.
5. Press icon (A) with either FEEDER HOUSE SPEED or HEADER selected and icon will turn green.

6. Click button (A) and instructions will appear on screen to guide you through remaining calibration steps.

NOTE:
If an error code appears during calibration, one or both of sensors is out of voltage range and will require adjustment. Refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

Setting Sensitivity of Auto Header Height Control (John Deere S and T Series)

NOTE:
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press button (A) twice and current sensitivity setting will appear on combine display.
2. Press – or + icon (A) to adjust rates.

**NOTE:**
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.

---

**Adjusting Manual Header Raise/Lower Rate (John Deere S and T Series)**

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press button (A) and current sensitivity setting will appear on monitor.
2. Press – or + icon (A) to adjust rates.

**NOTE:**
The numbers depicted on displays in these illustrations are for reference purposes only; they are not intended to represent specific settings for your equipment.

---

**Setting Preset Cutting Height (John Deere S and T Series)**

**NOTE:**
Changes may have been made to combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Press COMBINE – HEADER SETUP icon (A) on main page. The COMBINE – HEADER SETUP page appears. This page is used to set various header settings such as reel speed, header width, and height of feeder house for acre counter engagement.

3. Select icons for auto height sensing (A) and return to cut (B).

4. Turn on header engagement switch (A) and move header to desired preset position.

5. Position can be fine tuned with knob (B).

6. Hold joystick button 2 (A) until the icon flashes on monitor (B).

7. To store another preset, repeat Steps 4, page 287 and 6, page 287 for button 3 (C).
8. Select an appropriate ground pressure setting. Preset button 2 (B) on joystick for a light ground pressure setting in muddy or soft soil conditions, or preset button 3 (C) for a heavy ground pressure setting in harder soil conditions and a faster ground speed.  

NOTE:  
Preset button 1 (A) is reserved for header lift on headland and is not used for ground cutting.

9. Use control knob (A) to scroll through different button options.  

NOTE:  
When auto header height control (AHHC) is engaged, AHHC icon (A) appears on monitor and number indicating which button was pressed (B) is displayed on the screen.
12.1.8 New Holland Combines CX/CR Series (CR Series – Model Year 2014 and Earlier)

NOTE:
For New Holland CR models 6.80, 6.90, 7.90, 8.90, 9.90, and 10.90, refer to 12.1.9 New Holland Combines (CR Series – Model Year 2015 and Later), page 297.

Checking Voltage Range from Combine Cab (New Holland)

NOTE:
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.

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

1. Raise header until header wheels are 150 mm (6 in.) above ground.
2. Select DIAGNOSTICS (A) on main page. The DIAGNOSTICS page displays.
3. Select SETTINGS. The SETTINGS page displays.
4. Select GROUP drop-down arrow (A). The GROUP dialog box displays.
5. Select HEADER HEIGHT/TILT (A). The PARAMETER page displays.

6. Select LEFT HEADER HEIGHT SEN (A), and then select GRAPH button (B). The exact voltage is displayed at top of page.

7. Raise and lower header to see full range of voltage readings.

8. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

**Engaging Auto Header Height Control (New Holland CR/CX Series)**

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.
1. Select HEADER LATERAL FLOAT on combine display, and press ENTER.

2. Use up and down navigation keys to move between options, and select INSTALLED.

3. Select HEADER AUTOFLOAT, and press ENTER.

4. Use up and down navigation keys to move between options, and select INSTALLED.

**Calibrating Auto Header Height Control (New Holland CR/CX Series)**

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.

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

Check following conditions before starting header calibration procedure:
- The header is attached to combine.
- The combine is on level ground, with header level to ground.
- The engine is running.
- The combine is not moving.
- No faults have been received from Header Height Controller (HHC) module.
- Header/feeder is disengaged.
To calibrate the AHHC, follow these steps:

1. Select CALIBRATION on combine display, and press right arrow navigation key to enter information box.
2. Select HEADER (A), and press ENTER. The CALIBRATION dialog box opens.
   
   **NOTE:**
   You can use up and down navigation keys to move between options.

3. Follow calibration steps in order in which they appear in dialog box. As you proceed through calibration process, display will automatically update to show next step.
   
   **NOTE:**
   Pressing ESC key during any of steps or letting system sit idle for more than three minutes will cause calibration procedure to stop.
   
   **NOTE:**
   Refer to your combine operator’s manual for an explanation of any error codes.

4. When all steps have been completed, CALIBRATION SUCCESSFUL message is displayed on page. Exit CALIBRATION menu by pressing ENTER or ESC key.
   
   **NOTE:**
   If float was set heavier to complete ground calibration procedure, adjust to recommended operating float after calibration is complete.

5. If unit does not function properly, conduct maximum stubble height calibration.

**Calibrating Maximum Stubble Height**

This procedure describes how to calibrate the area counter to stop or start counting at the correct height. Program header to a height that will never be reached while cutting. The area counter will stop counting when header is above programmed height, and will begin counting when header is below programmed height.

Select height of header that corresponds to description above.
AUTO HEADER HEIGHT CONTROL (AHHC)

IMPORTANT:
- If value is set too low, area may NOT be counted since header is sometimes raised above this threshold although combine is still cutting.
- If value is set too high, area counter will keep counting even when header is raised (but below this threshold) and combine is no longer cutting crop.

⚠️ CAUTION

Check to be sure all bystanders have cleared the area.

1. Select MAXIMUM STUBBLE HEIGHT calibration dialog box. As you proceed through calibration process, display will automatically update to show next step.

   ![Figure 12.120: New Holland Calibration Dialog Box](image)

2. Move header to correct position using header up or down control switch on multifunction handle.

3. Press ENTER to continue. As you proceed through calibration process, display will automatically update to show next step.

4. Press ENTER or ESC to close calibration page. The calibration is now complete.

   ![Figure 12.121: New Holland Calibration Dialog Box](image)

Adjusting Header Raise Rate (New Holland CR/CX Series)

If necessary, header raise rate (the first speed on HEADER HEIGHT rocker switch of multifunctional handle) can be adjusted.

NOTE:
Changes may have been made to the combine controls or display since this document was published. Refer to combine operator’s manual for updates.
AUTO HEADER HEIGHT CONTROL (AHHC)

1. Select HEADER RAISE RATE on combine display.
2. Use + or – buttons to change setting.
3. Press ENTER to save new setting.

**NOTE:**
The raise rate can be changed from 32 to 236 in steps of 34. The factory setting is 100.

![Figure 12.122: New Holland Combine Display](image)

**Setting Header Lower Rate to 50 (New Holland CR/CX Series)**
If necessary, header lower rate (the automatic header height control button or second speed on header height rocker switch of multifunction handle) can be adjusted.

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Select HEADER LOWER RATE on combine display.
2. Use + or – buttons to change setting to 50.
3. Press ENTER to save new setting.

**NOTE:**
The lower rate can be changed from 2 to 247 in steps of 7. It is factory-set to 100.

![Figure 12.123: New Holland Combine Display](image)

**Setting Sensitivity of Auto Header Height Control to 200 (New Holland CR/CX Series)**

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to combine operator’s manual for updates.

⚠️ **CAUTION**
Check to be sure all bystanders have cleared the area.
1. Engage threshing and feeder house.
2. Select HEIGHT SENSITIVITY on combine display screen.
3. Use + or – buttons to change setting to 200.
4. Press ENTER to save new setting.

**NOTE:**
The sensitivity can be changed from 10 to 250 in steps of 10. It is factory-set to 100.

---

### Setting Preset Cutting Height (New Holland CR/CX Series)

To set preset cutting height, follow these steps:

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to combine operator’s manual for updates.

1. Engage threshing mechanism and feeder with switches (A) and (B).
2. Set HEADER MEMORY rocker switch (D) in STUBBLE HEIGHT/AUTOFLOAT MODE position (A) or (B).
3. Lower header to desired cutting height using HEADER HEIGHT AND HEADER LATERAL FLOAT rocker switch (C).
4. Press AUTOMATIC HEADER HEIGHT CONTROL button (E) for a minimum of two seconds to store height position. A beep will confirm setting.

**NOTE:**
It is possible to store two different header height values by using HEADER MEMORY rocker switch (D) in STUBBLE HEIGHT/AUTOFLOAT MODE position (A) or (B).

5. To change one of memorized header height set points while combine is in use, use HEADER HEIGHT AND HEADER LATERAL FLOAT rocker switch (C) (slow up/down) to raise or lower header to desired value. Press AUTOMATIC HEADER HEIGHT CONTROL button (E) for a minimum of 2 seconds to store new height position. A beep will confirm setting.

**NOTE:**
Do **NOT** press too hard on AUTOMATIC HEADER HEIGHT CONTROL button (E), or float mode will be disengaged.
NOTE:
It is not necessary to press rocker switch (D) again after adjusting.

Configuring Reel Fore-Aft, Header Tilt, and Header Type (New Holland CR Series)
This procedure applies only to 2016 New Holland CR models 6.90, 7.90, 8.90, and 9.90.

NOTE:
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.

1. Simultaneously press both UNLOAD (A) and RESUME (B) buttons on hydro handle.

2. On HEAD 1 page, change CUTTING TYPE from FLEX to PLATFORM as shown at (A).
3. On HEAD 2 page, change HEADER SUB TYPE from DEFAULT to 80/90 as shown at (A).

There are now two different buttons for ON GROUND presets. The toggle switch that was present on previous models is now configured as shown at right. MacDon headers only require first two buttons (A) and (B). The third button down (C) is not configured.

12.1.9 New Holland Combines (CR Series – Model Year 2015 and Later)

This section applies only to 2015 and later CR models (6.80, 6.90, 7.90, 8.90, 9.90, and 10.90). For other New Holland combine models, refer to 12.1.8 New Holland Combines CX/CR Series (CR Series – Model Year 2014 and Earlier), page 289.

Engaging Auto Header Height Control (New Holland CR Series)

This procedure applies only to 2015 and later CR models (6.80, 6.90, 7.90, 8.90, 9.90, and 10.90).

NOTE:
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.

1. Select TOOLBOX (A) on main page. The TOOLBOX page displays.
2. Simultaneously press both UNLOAD (A) and RESUME (B) buttons on hydro handle.


4. Select CUTTING TYPE drop-down arrow (B) and change CUTTING TYPE to PLATFORM (C).

5. Select HEADER SUB TYPE drop-down arrow (A). The HEADER SUB TYPE dialog box displays.
6. Select 80/90 (A).

7. Select HEAD 2 (A). The HEADER SETUP 2 page displays.

8. Select AUTOFLOAT drop-down arrow and set AUTOFLOAT to INSTALLED (A).

9. Select AUTO HEADER LIFT drop-down arrow and set AUTO HEADER LIFT to INSTALLED (B).

   **NOTE:**
   With AUTO HEADER LIFT installed and AHHC engaged, header will lift up automatically when you pull back on GSL.

10. Set values for MANUAL HHC RAISE RATE (C) and MANUAL HHC LOWER RATE (D) for best performance according to ground conditions.
11. Set values for HHC HEIGHT SENSITIVITY (A) and HHC TILT SENSITIVITY (B) for best performance according to ground conditions.

Figure 12.136: New Holland Combine Display

Checking Voltage Range from Combine Cab (New Holland CR Series)

NOTE:
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.

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

1. Position header 150 mm (6 in.) above ground.
2. Select DIAGNOSTICS (A) on main page. The DIAGNOSTICS page displays.

Figure 12.137: New Holland Combine Display

4. Select HEADER HEIGHT/TILT (A) from GROUP drop-down menu.

5. Select HEADER HEIGHT SENS. L (B) from PARAMETER drop-down menu.

6. Select GRAPH (A). The exact voltage (B) is displayed at top of page.

7. Raise and lower header to see full range of voltage readings.

8. If sensor voltage is not within low and high limits shown in 12.1.2 Height Sensor Output Voltage Range – Combine Requirements, page 247, or if range between low and high limits is insufficient, you need to make adjustments. For instructions, refer to Adjusting Header Height Sensor Voltage Range (Left Side), page 250 and Adjusting Header Height Sensor Voltage Range (Right Side), page 251.

**Calibrating Auto Header Height Control (New Holland CR Series)**

**NOTE:**
Changes may have been made to the combine controls or display since this document was published. Refer to the combine operator’s manual for updates.
CAUTION
Check to be sure all bystanders have cleared the area.

Check following conditions before starting header calibration procedure:

- The header is attached to combine.
- The combine is on level ground, with header level to ground.
- The engine is running.
- The combine is not moving.
- No faults have been received from Header Height Controller (HHC) module.
- Header/feeder is disengaged.
- Lateral float buttons are NOT pressed.
- ESC key is NOT pressed.

To calibrate AHHC, follow these steps:

1. Select CALIBRATIONS (A) on main page. The CALIBRATION page displays.

2. Select CALIBRATION drop-down arrow (A).
3. Select HEADER (A) from list of calibration options.

4. Follow calibration steps in order in which they appear on screen. As you proceed through calibration process, display will automatically update to show next step.

   **NOTE:**
   Pressing ESC key during any of steps or letting system sit idle for more than three minutes will cause calibration procedure to stop.

   **NOTE:**
   Refer to your combine operator’s manual for an explanation of any error codes.

5. When all steps have been completed, CALIBRATION COMPLETED message is displayed on screen.

   **NOTE:**
   If float was set heavier to complete ground calibration procedure, adjust to recommended operating float after calibration is complete.
Setting Auto Height (New Holland CR Series)

This procedure applies only to 2015 and later CR models (6.80, 6.90, 7.90, 8.90, 9.90, and 10.90).

The console has two buttons used for auto height presets. The toggle switch that was present on previous models is now configured as shown at right. MacDon headers only require first two buttons (A) and (B). The third button (C) is not configured.

To set auto height, follow these steps:

1. Engage separator and header.
2. Select RUN SCREENS (A) on main page.
3. Select RUN tab that shows MANUAL HEIGHT.

**NOTE:**
The MANUAL HEIGHT field may appear on any of RUN tabs. When an auto height set point button is pressed, display will change to AUTO HEIGHT (A).

4. Lower header to ground.

5. Select one of auto height set point buttons shown in Figure 12.146, page 304.
   - Press SET 1 button for lower position
   - Press SET 2 button for higher position

---

**Setting Maximum Work Height (New Holland CR Series)**

This procedure applies only to 2015 and later CR models (6.80, 6.90, 7.90, 8.90, 9.90, and 10.90).

1. Select TOOLBOX (A) on main page. The TOOLBOX page displays.
   
2. Select FEEDER (A). The FEEDER SETUP page displays.

3. Select MAXIMUM WORK HEIGHT field (B).
4. Set MAXIMUM WORK HEIGHT to desired value.
5. Press SET and then press ENTER.

12.1.10 Sensor Operation

The position sensors supplied with auto header height control (AHHC) system are 1000 ohm (1 k) industrial series sensors containing sealed connectors. Normal operating signal voltages for sensors fall between 10% (0.5VDC) and 90% (4.5VDC).

- A sensor operating with a signal voltage below 5% is considered to be shorted
- A sensor with a signal voltage above 95% is considered to be open

An increase in sensor voltage correlates to an increase in header height.

Each sensor is constructed with a power wire and a ground wire. Inside sensor, these two wires are connected by a high resistance filament band (C). The resistance measured across power (A) and ground (B) wires should read a constant value between 800 and 1200 ohms (0.8–1.2 k) with nominal reading being 1000 ohms (1 k).
In addition to power (A) and ground (B) wires, a signal wire (C) is connected internally to a movable wiper that is attached to an external arm and sweeps high resistance filament band. As external arm is rotated and wiper is moved toward or away from power wire connection, measured resistance at signal wire (C) changes.

The resistance measured across signal and ground wires should increase uniformly from a low 80–100 ohms (0.08–0.1 k) to a high 800–1200 ohms (0.8–1.2 k). This can be observed if an ohm meter is connected across signal and power wires and sensor shaft rotated. When an input voltage is applied to high resistance filament band through power wire (A), output (or measured) voltage in signal wire (C) is changed by this variable resistance.

**NOTE:**
Ground and power wires may differ depending on combine.
13 Wheels and Tires

There are two wheels and tires on the PW8 Combine Pick-Up Header, one on each side of the header.

⚠️ DANGER
- Never install a tube in a cracked wheel rim.
- Never weld a wheel rim.
- Make sure all the air is removed from the tire before removing the tire from the rim.
- Never use force on an inflated or partially inflated tire. Make sure the tire is correctly seated before inflating to operating pressure.
- Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the job. Take the tire and rim to a qualified tire repair shop.
- If the tire is overinflated or is incorrectly positioned on the rim, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can propel the tire in any direction and endanger anyone in the area.
- Do NOT exceed the maximum inflation pressure indicated on the tire label.
- Replace the tire if it is worn or damaged beyond repair.

13.1 Removing Wheel

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

1. Lower header onto blocks with wheels raised slightly above the ground.
2. Stop the engine, and remove the key from the ignition.
3. Remove wheel nut (B) using a 30 mm socket wrench.
4. Pull wheel (A) off spindle.

Figure 13.1: Left Side Wheel
13.2 Inflating Tire

Maintain correct tire pressure to achieve desired cutting height. Check tire pressure daily.

Table 13.1 Tire (MD #152724)

<table>
<thead>
<tr>
<th>Tire</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.50 x 8.50-8</td>
<td>240–310 kPa (35–45 psi)</td>
</tr>
</tbody>
</table>
13.3 Installing Wheel

1. Ensure lock washer (A) is installed onto spindle.

2. Install wheel (A) onto spindle and secure with wheel nut (B). Torque to 108 Nm (80 lbf·ft).
14 Options and Attachments

14.1 Hold-Down Performance Kit

The Hold-Down Performance kit assists with the delivery of light crop onto the pick-up, especially when the fingers have difficulty picking up the crop and have a tendency to throw the crop forward.

The kit attaches to the hold-down bar and consists of a series of spring wires that rotate or lock by moving the center nut and project forward and downward into the crop.

Attachment hardware and installation instructions are included in the kit.

MD #B5475

Instruction MD #169464

![Figure 14.1: Hold-Down Performance Kit](image-url)
14.2 Combine Completion Package Kits

PW8 Combine Pick-Up Headers are factory configured for particular combine makes, models, and feeder house sizes. If the header is being switched to a different make of combine or is not factory configured for any combine, a Combine Completion Package kit is required.

Combine Completion Package kits provide the necessary parts and hardware to modify headers to accommodate different combine models with various feeder house sizes. Attachment hardware and installation instructions are included in the kits.

<table>
<thead>
<tr>
<th>Combine Make</th>
<th>Bundle #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case IH, New Holland</td>
<td>MD #B6374</td>
</tr>
<tr>
<td>Case IH, New Holland (Model Year 2016 and Prior)</td>
<td>MD #B5469</td>
</tr>
<tr>
<td>John Deere</td>
<td>MD #B5471</td>
</tr>
<tr>
<td>Versatile</td>
<td>MD #B6027</td>
</tr>
</tbody>
</table>

Figure 14.2: Combine Completion Package Kit – Case IH and New Holland

Figure 14.3: Combine Completion Package Kit – John Deere

Figure 14.4: Combine Completion Package Kit – Versatile
14.3 Auger Dent Repair Kit

This kit allows Operators to repair dents close to the finger/guide area that the feed auger may have sustained during regular use.

Attachment hardware and installation instructions are included in the kit.

MD #237563
Instruction MD #147606

Figure 14.5: Auger Dent Repair Kit
14.4  **Pivoting Caster Wheels Kit**

The Pivoting Caster Wheel kit will provide better tracking when towing the header. Attachment hardware and installation instructions are included in the kit.

MD #B6315

Instruction MD #214233

![Figure 14.6: Caster Wheel Kit](image)
# Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material overshoots the table auger</td>
<td>Draper speed too high</td>
<td>Reduce draper speed until pick-up is just pushing the swath.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Material overshoots the table auger</td>
<td>Incorrect header height</td>
<td>Measure and adjust header height to 305 mm (12 in.) from the center of the rear draper roller to the ground.</td>
<td>Header Height, page 54</td>
</tr>
<tr>
<td>Material overshoots the table auger</td>
<td>Improperly adjusted hold-down rods</td>
<td>Adjust the rod tube so the tips of the rods are close enough to the draper belts to prevent overshoot.</td>
<td>8.3 Adjusting Hold-Down Rod Angle, page 172</td>
</tr>
<tr>
<td>Swath forms a ball and rolls to the right or left where it is eventually lost off the end of the pick-up</td>
<td>Draper speed too high</td>
<td>Reduce draper speed until pick-up is just pushing the swath.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Swath forms a ball and rolls to the right or left where it is eventually lost off the end of the pick-up</td>
<td>Light crop flowing forward and fingers unable to move swath rearward</td>
<td>Add optional Hold-Down Performance kit MD #B5475.</td>
<td>14.1 Hold-Down Performance Kit, page 313</td>
</tr>
<tr>
<td>Shelling in delicate crops</td>
<td>Draper speed too high</td>
<td>Reduce draper speed until pick-up is just pushing the swath.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Shelling in delicate crops</td>
<td>Improperly adjusted hold-down</td>
<td>Raise the hold-down assembly high enough to clear the swath.</td>
<td>8.2 Hold-Down Position, page 171</td>
</tr>
<tr>
<td>Header leaves material in the field</td>
<td>Pick-up teeth are set too high</td>
<td>Raise wheels to lower the pick-up height.</td>
<td>Pick-Up Height, page 55</td>
</tr>
<tr>
<td>Header leaves material in the field</td>
<td>Draper speed too low</td>
<td>Increase draper speed.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Header leaves material in the field</td>
<td>Pick-up is running too fast (pulling swath apart)</td>
<td>Slow down the pick-up until it is just pushing the swath.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Header is picking a large amount of dirt and stones</td>
<td>Draper speed too high</td>
<td>Reduce draper speed until pick-up is just pushing the swath.</td>
<td>Adjusting Draper Speed, page 54</td>
</tr>
<tr>
<td>Header is picking a large amount of dirt and stones</td>
<td>Pick-up height too low</td>
<td>Lower wheels to raise the pick-up height.</td>
<td>Pick-Up Height, page 55</td>
</tr>
<tr>
<td>Symptom</td>
<td>Problem</td>
<td>Solution</td>
<td>Refer to</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Material stalls on the header before the auger can pull it into the feeder house</td>
<td>Rough header pan surface</td>
<td>Polish the header pan with emery cloth or buffing wheel.</td>
<td>—</td>
</tr>
<tr>
<td>Material stalls on the header before the auger can pull it into the feeder house</td>
<td>Incorrect header height</td>
<td>Adjust header height.</td>
<td><em>Header Height, page 54</em></td>
</tr>
<tr>
<td>Material stalls on the header before the auger can pull it into the feeder house</td>
<td>Incorrect face plate angle</td>
<td>Header face plate can be adjusted on some combine headers. Adjust combine header tilt so when header is at operating height, the header floor pan and ground are parallel. (Note: Adjust header tilt to Corn Setting from Grain Setting.)</td>
<td>Refer to your combine operator’s manual.</td>
</tr>
<tr>
<td>Draper belts tracking incorrectly</td>
<td>Incorrect tension</td>
<td>Tension draper belts.</td>
<td>• <em>Adjusting Front Draper Belt Tension, page 108</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• <em>Adjusting Rear Draper Belt Tension, page 104</em></td>
</tr>
<tr>
<td>Draper belts tracking incorrectly</td>
<td>Dirt/crop buildup on rollers</td>
<td>Remove draper belts and remove dirt/crop buildup from roller surface and roller groove.</td>
<td>5.2 Draper Belts, page 101</td>
</tr>
<tr>
<td>Draper belts tracking incorrectly</td>
<td>Belts are sometimes tacky when new</td>
<td>Apply talcum or baby powder onto belts to reduce tackiness. Belts may also need to be run loose for the first few hours of break-in.</td>
<td>—</td>
</tr>
<tr>
<td>Belts stalling when loaded with crop material</td>
<td>Draper belts are too loose</td>
<td>Increase belt tension.</td>
<td>• <em>Adjusting Front Draper Belt Tension, page 108</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• <em>Adjusting Rear Draper Belt Tension, page 104</em></td>
</tr>
<tr>
<td>Hold-down slave cylinder lags behind master on lift</td>
<td>Air in system</td>
<td>Bleed cylinders.</td>
<td>10.3.5 <em>Bleeding Cylinders and Lines, page 217</em></td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold-down master cylinder lags behind slave on descent and ahead of slave on lift</td>
<td>Obstruction preventing cylinder movement</td>
<td>Check lift cylinder and lift arm attachments.</td>
<td>—</td>
</tr>
<tr>
<td>Hold-down master cylinder lags behind slave on descent and ahead of slave on lift</td>
<td>Air in system</td>
<td>Bleed cylinders.</td>
<td>10.3.5 Bleeding Cylinders and Lines, page 217</td>
</tr>
<tr>
<td>Hold-down master cylinder lags behind slave on descent and ahead of slave on lift</td>
<td>Flow is too restricted</td>
<td>Check hoses and lines.</td>
<td>10.1 Hydraulic Hoses and Lines, page 209</td>
</tr>
<tr>
<td>Slave cylinder remains extended more than 13 mm (1/2 in.) when hold-down is fully lowered</td>
<td>Air in system</td>
<td>Bleed cylinders.</td>
<td>10.3.5 Bleeding Cylinders and Lines, page 217</td>
</tr>
<tr>
<td>Hold-down remains raised and will not lower</td>
<td>Safety prop is engaged</td>
<td>Disengage safety prop.</td>
<td>8.4.1 Engaging Hold-Down Lift Cylinder Safety Props, page 174</td>
</tr>
<tr>
<td>Hold-down remains raised and will not lower</td>
<td>Hydraulics not connected properly</td>
<td>Ensure hydraulic lines are connected properly and not damaged.</td>
<td>10.1 Hydraulic Hoses and Lines, page 209</td>
</tr>
<tr>
<td>Driveline clutch is slipping</td>
<td>Clutch is worn</td>
<td>Replace clutch.</td>
<td>Replacing Driveline Clutch, page 151</td>
</tr>
<tr>
<td>Driveline clutch is slipping</td>
<td>Obstruction in auger</td>
<td>Shut off combine, remove key, and remove obstruction.</td>
<td>Unplugging the Header, page 57</td>
</tr>
</tbody>
</table>
| Pick-up wheels bounce over bumps                                        | Header height is too high               | Lower header until rear pick-up roller is 305 mm (12 in.) above the ground. | • Header Height, page 54  
• 3.2.3 Adjusting Header Float, page 58  |
16 Reference

16.1 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).

### 16.1.1 Metric Bolt Specifications

Table 16.1 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>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>

Figure 16.1: Bolt Grades
Table 16.2 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>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 16.3 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>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 16.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf·in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.1</td>
<td>2.3</td>
</tr>
<tr>
<td>4-0.7</td>
<td>3.1</td>
<td>3.4</td>
</tr>
<tr>
<td>5-0.8</td>
<td>6.3</td>
<td>7</td>
</tr>
<tr>
<td>6-1.0</td>
<td>10.7</td>
<td>11.8</td>
</tr>
<tr>
<td>8-1.25</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>10-1.5</td>
<td>51</td>
<td>57</td>
</tr>
<tr>
<td>12-1.75</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>14-2.0</td>
<td>143</td>
<td>158</td>
</tr>
<tr>
<td>16-2.0</td>
<td>222</td>
<td>246</td>
</tr>
<tr>
<td>20-2.5</td>
<td>434</td>
<td>480</td>
</tr>
<tr>
<td>24-3.0</td>
<td>750</td>
<td>829</td>
</tr>
</tbody>
</table>

16.1.2 Metric Bolt Specifications Bolting into Cast Aluminum

Table 16.5 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</td>
</tr>
<tr>
<td></td>
<td>(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>
16.1.3 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 16.6, page 324.

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 16.6 Flare-Type Hydraulic Tube Fittings

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^{11})</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>

---

\(^{11}\) Torque values shown are based on lubricated connections as in reassembly.
16.1.4 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 16.7 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value$^{12}$</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>

12. Torque values shown are based on lubricated connections as in reassembly.
16.1.5 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 16.8, page 327.
6. Check final condition of fitting.

![Figure 16.9: Hydraulic Fitting](image)

Table 16.8 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value</th>
<th>Nm</th>
<th>lbf-ft (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
<td>6</td>
<td>*53–62</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
<td>12</td>
<td>*106–115</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
<td>19</td>
<td>14–15</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
<td>21</td>
<td>15–24</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
<td>26</td>
<td>19–21</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
<td>46</td>
<td>34–37</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>75–82</td>
<td>75</td>
<td>55–60</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>120–132</td>
<td>120</td>
<td>88–97</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
<td>176</td>
<td>130–142</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>221–243</td>
<td>221</td>
<td>163–179</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>270–298</td>
<td>270</td>
<td>199–220</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>332–365</td>
<td>332</td>
<td>245–269</td>
</tr>
</tbody>
</table>

---

13. Torque values shown are based on lubricated connections as in reassembly.
16.1.6 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 16.9, page 328.

   **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>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Tube O.D. (in.)</th>
<th>Torque Value¹⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>Note¹⁵</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>Note¹⁵</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>

14. Torque values and angles shown are based on lubricated connection as in reassembly.
15. O-ring face seal type end not defined for this tube size.

REFERENCE
### Table 16.9 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&lt;sup&gt;16&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14</td>
<td>Note&lt;sup&gt;15&lt;/sup&gt;</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>

<sup>16</sup> Torque values and angles shown are based on lubricated connection as in reassembly.

### 16.1.7 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 16.10, page 329. Make sure that tube end of a shaped connector (typically 45º or 90º) 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 16.10 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>
### 16.2 Conversion Chart

**Table 16.11 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></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>
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Recommended Fluids and Lubricants

Keep your machine operating at top efficiency by using only clean lubricants and by ensuring the following:

- Use clean containers to handle all lubricants.
- Store lubricants in an area protected from dust, moisture, and other contaminants.

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Specification</th>
<th>Description</th>
<th>naUse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease</td>
<td>SAE multi-purpose</td>
<td>High temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base</td>
<td>As required, unless otherwise specified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extreme pressure (EP) performance with 1.5–5% molybdenum disulphide (NLGI Grade 2) lithium base</td>
<td>Drive motor shaft</td>
</tr>
<tr>
<td>Oil</td>
<td>SAE 30</td>
<td>—</td>
<td>Auger drive chain</td>
</tr>
</tbody>
</table>