

R85
Rotary Disc 16-Foot Header for
Self-Propelled Windrower

Operator's Manual

214014 Revision B

Model Year 2017

Original Instruction


R85 Rotary Disc 16-Foot Self-Propelled Windrower Header



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Declaration of Conformity

		<h2 style="text-align: center;">EC Declaration of Conformity</h2>	
<p>[1] MacDon MacDon Industries Ltd. 680 Moray Street, Winnipeg, Manitoba, Canada R3J 3S3</p>		<p>[4] As Per Shipping Document</p>	
<p>[2] Rotary Disc Windrower Header</p>		<p>[5] June 20, 2016</p>	
<p>[3] MacDon R85</p>		<p>[6] _____ Christoph Martens Product Integrity</p>	

EN	BG	CZ	DA
<p>We, [1] Declare, that the product: Machine Type: [2] Name & Model: [3] Serial Number(s): [4] fulfills all the relevant provisions of the Directive 2006/42/EC. Harmonized standards used, as referred to in Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Place and date of declaration: [5] Identity and signature of the person empowered to draw up the declaration: [6] Name and address of the person authorized to elaborate the technical file: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germany) hartmut.hartmann@prodoku.com</p>	<p>Ние, [1] декларираме, че следният продукт: Тип машина: [2] Наименование и модел: [3] Серийен номер(а) [4] отговаря на всички приложими разпоредби на директива 2006/42/ЕО. Използвани са следните хармонизирани стандарти според чл. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Място и дата на декларацията: [5] Име и подпис на лицето, упълномощено да изготви декларацията: [6] Име и адрес на лицето, упълномощено да състави техническия файл: Хартмут Хартман Wersener Holz 2a D-49504 Lotte (Германия) hartmut.hartmann@prodoku.com</p>	<p>My, [1] Prohláším, že produkt: Typ zařízení: [2] Název a model: [3] Sériové(á) číslo(a): [4] splňuje všechna relevantní ustanovení směrnice 2006/42/EC. Byly použity harmonizované standardy, jak je uvedeno v článku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Místo a datum prohlášení: [5] Identita a podpis osoby oprávněné k vydání prohlášení: [6] Jméno a adresa osoby oprávněné k vyplnění technického souboru: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Německo) hartmut.hartmann@prodoku.com</p>	<p>Vi, [1] erklærer, at produktet: Maskintype [2] Navn og model: [3] Serienummer (-numre): [4] Opfylder alle bestemmelser i direktiv 2006/42/EF. Anvendte harmoniserede standarder, som henviser til i paragraf 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Sted og dato for erklæringen: [5] Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6] Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Tyskland) hartmut.hartmann@prodoku.com</p>
DE	ES	ET	FR
<p>Wir, [1] Erklären hiermit, dass das Produkt: Maschinentyp: [2] Name & Modell: [3] Seriennummer (n): [4] alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt. Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Ort und Datum der Erklärung: [5] Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6] Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Deutschland) hartmut.hartmann@prodoku.com</p>	<p>Nosotros [1] declaramos que el producto: Tipo de máquina: [2] Nombre y modelo: [3] Números de serie: [4] cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC. Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lugar y fecha de la declaración: [5] Identidad y firma de la persona facultada para draw redactar la declaración: [6] Nombre y dirección de la persona autorizada para elaborar el expediente técnico: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germany) hartmut.hartmann@prodoku.com</p>	<p>Meie, [1] deklareerime, et toode Seadme tüüp: [2] Nimi ja mudel: [3] Seerianumbrid: [4] vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele. Kasutatud on järgnevald harmoniseeritud standardeid, millele on viidatud ka punktis 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Deklaratsiooni koht ja kuupäev: [5] Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6] Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Saksamaa) hartmut.hartmann@prodoku.com</p>	<p>Nous soussignés, [1] Déclarons que le produit : Type de machine : [2] Nom et modèle : [3] Numéro(s) de série : [4] Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC. Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lieu et date de la déclaration : [5] Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6] Nom et adresse de la personne autorisée à constituer le dossier technique : Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Allemagne) hartmut.hartmann@prodoku.com</p>

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Figure 1: EC Declaration of Conformity, Page 1

EC Declaration of Conformity

IT	HU	LT	LV
<p>Noi, [1] Dichiaro che il prodotto: Tipo di macchina: [2] Nome e modello: [3] Numero(i) di serie: [4] soddisfa tutte le disposizioni rilevanti della direttiva 2006/42/CE.</p> <p>Utilizzo degli standard armonizzati, come indicato nell'Articolo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Luogo e data della dichiarazione: [5] Nome e firma della persona autorizzata a redigere la dichiarazione: [6] Nome e persona autorizzata a compilare il file tecnico: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germania) hartmut.hartmann@prodoku.com</p>	<p>Mi, [1] Ezennel kijelentjük, hogy a következő termék: Gép típusa: [2] Név és modell: [3] Szériaszám(ok): [4] teljesíti a következő irányelv összes vonatkozó előírásait: 2006/42/EK.</p> <p>Az alábbi harmonizált szabványok kerültek alkalmazásra a 7(2) cikkely szerint: EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>A nyilatkozattétel ideje és helye: [5] Azon személy kiléte és aláírása, aki jogosult a nyilatkozat elkészítésére: [6] Azon személy neve és aláírása, aki felhatalmazott a műszaki dokumentáció összeállítására: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Németország) hartmut.hartmann@prodoku.com</p>	<p>Mes, [1] Pareiškiamo, kad šis produktas: Mašinos tipas: [2] Pavadinimas ir modelis: [3] Serijos numeris (-iai): [4] atitinka taikomos reikalavimus pagal Direktyvą 2006/42/EB.</p> <p>Naudojami harmonizuoti standartai, kai nurodoma straipsnyje 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Deklaracijos vieta ir data: [5] Asmens tapatybės duomenys ir parašas asmens, įgalioto sudaryti šią deklaraciją: [6] Vardas ir pavardė asmens, kuris įgaliotas sudaryti šį techninį failą: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Vokietija) hartmut.hartmann@prodoku.com</p>	<p>Mēs, [1] Deklarēju, ka produkts: Mašīnas tips: [2] Nosaukums un modelis: [3] Sērijas numurs(-i): [4] Atbilst visām būtiskajām Direktīvas 2006/42/EK prasībām.</p> <p>Piemēroti šādi saskaņotie standarti, kā minēts 7. panta 2. punktā: EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Deklarācijas parakstīšanas vieta un datums: [5] Tās personas vārds, uzvārds un paraksts, kas ir pilnvarota sagatavot šo deklarāciju: [6] Tās personas vārds, uzvārds un adrese, kas ir pilnvarota sastādīt tehnisko dokumentāciju: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Vācija) hartmut.hartmann@prodoku.com</p>
<p>Wij, [1] Verklaren dat het product: Machinetype: [2] Naam en model: [3] Serienummer(s): [4] voldoet aan alle relevante bepalingen van de Richtlijn 2006/42/EC.</p> <p>Geharmoniseerde normen toegepast, zoals vermeld in Artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Plaats en datum van verklaring: [5] Naam en handtekening van de bevoegde persoon om de verklaring op te stellen: [6] Naam en adres van de geautoriseerde persoon om het technisch dossier samen te stellen: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Duitsland) hartmut.hartmann@prodoku.com</p>	<p>My niżej podpisani, [1] Oświadczamy, że produkt: Typ urządzenia: [2] Nazwa i model: [3] Numer seryjny/numery seryjne: [4] spełnia wszystkie odpowiednie przepisy dyrektywy 2006/42/WE.</p> <p>Zastosowałam/y następujące (zharmonizowane) normy zgodnie z artykułem 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Data i miejsce oświadczenia: [5] Imię i nazwisko oraz podpis osoby upoważnionej do przygotowania deklaracji: [6] Imię i nazwisko oraz adres osoby upoważnionej do przygotowania dokumentacji technicznej: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Niemcy) hartmut.hartmann@prodoku.com</p>	<p>Nós, [1] Declaramos, que o produto: Tipo de máquina: [2] Nome e Modelo: [3] Número(s) de Série: [4] cumpre todas as disposições relevantes da Directiva 2006/42/CE.</p> <p>Normas harmonizadas aplicadas, conforme referido no Artigo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Local e data da declaração: [5] Identidade e assinatura da pessoa autorizada a elaborar a declaração: [6] Nome e endereço da pessoa autorizada a compilar o ficheiro técnico: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Alemanha) hartmut.hartmann@prodoku.com</p>	<p>Noi, [1] Declarăm, că următorul produs: Tipul mașinii: [2] Denumirea și modelul: [3] Număr (numere) serie: [4] corespunde tuturor dispozițiilor esențiale ale directivei 2006/42/CE.</p> <p>Au fost aplicate următoarele standarde armonizate conform articolului 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Data și locul declarației: [5] Identitatea și semnătura persoanei împuternicite pentru întocmirea declarației: [6] Numele și semnătura persoanei autorizate pentru întocmirea cărții tehnice: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germania) hartmut.hartmann@prodoku.com</p>
<p>Mi, [1] izjavljujemo da proizvod Tip mašine: [2] Naziv i model: [3] Serijski broj(ovi): [4] Ispunjava sve relevantne odredbe direktive 2006/42/EC.</p> <p>Korišćeni su usklađeni standardi kao što je navedeno u članku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašćenog za sastavljanje deklaracije: [6] Ime i adresa osobe ovlašćene za sastavljanje tehničke datoteke: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Nemačka) hartmut.hartmann@prodoku.com</p>	<p>Mi, [1] Intygar att produkten: Maskintyp: [2] Namn och modell: [3] Serienummer: [4] uppfyller alla relevanta villkor i direktivet 2006/42/EG.</p> <p>Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Plats och datum för intyget: [5] Identitet och signatur för person med befogenhet att upprätta intyget: [6] Namn och adress för person behörig att upprätta den tekniska dokumentationen: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Tyskland) hartmut.hartmann@prodoku.com</p>	<p>Mi, [1] izjavljamo, da izdelek: Vrsta stroja: [2] Ime in model: [3] Serijska/-e številka/-e: [4] ustreza vsem zadevnim določbam Direktive 2006/42/ES.</p> <p>Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Kraj in datum izjave: [5] Istovetnost in podpis osebe, pooblaščenega za pripravo izjave: [6] Ime in naslov osebe, pooblaščenega za pripravo tehnične datoteke: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Nemčija) hartmut.hartmann@prodoku.com</p>	<p>My, [1] týmto prehlasujeme, že tento výrobok: Typ zariadenia: [2] Názov a model: [3] Výrobné číslo: [4] splňa príslušné ustanovenia a základné požiadavky smernice č. 2006/42/ES.</p> <p>Použité harmonizované normy, ktoré sa uvádzajú v článku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6] Meno a adresa osoby oprávnenej zostaviť technický súbor: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Nemecko) hartmut.hartmann@prodoku.com</p>

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Figure 2: EC Declaration of Conformity, Page 2

Noise Levels

The A-weighted sound pressure level inside the operator's station of a typical self-propelled vehicle (e.g., M205), when operated in conjunction with this R85 rotary disc header, **is 79 dBA**. This measurement was taken in accordance with ISO 5131. The sound pressure level depends upon the rotary disc speed, crop conditions, as well the exact type of self-propelled vehicle used to power the R85.

Introduction

This manual describes operating and maintenance procedures for the MacDon R85 Rotary Disc 16-Foot Self-Propelled Windrower Header.

Your new 16-foot rotary header can be attached to MacDon M200, M205, and M1240 Self-Propelled Windrowers and is designed to cut, condition, and lay in windrows a wide variety of grasses and hay crops.

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

Use this manual as your first source of information for the machine.

A parts catalog is also supplied with your new header. If you require more detailed service information, contact your MacDon Dealer.

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.

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

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

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

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

Store the operator's manual and the parts catalog in the plastic manual case (A) located at the right-hand side of the header.

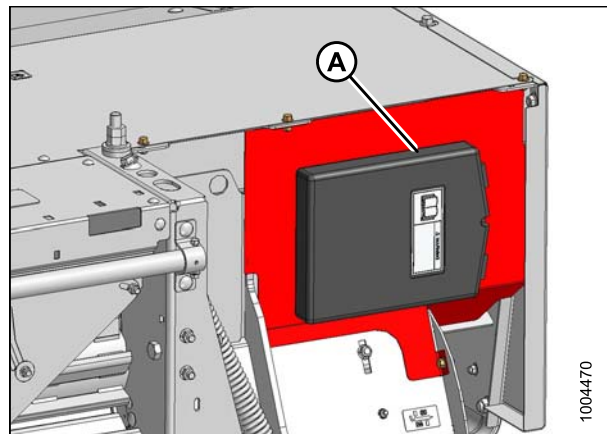


Figure 3: Manual Storage Case

Serial Number(s)

Record the serial number of the header in the space provided.

Header Serial No: _____

The serial number plate (A) is located on the top cover at the right side of the header.

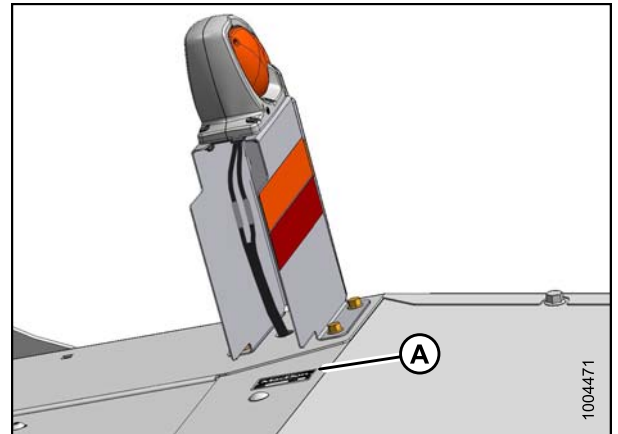


Figure 4: Serial Number Location – Self-Propelled

List of Revisions

At MacDon, we're continuously making improvements: occasionally these improvements impact product documentation. The following list provides an account of major changes from the previous version of this document.

Summary of Change	Location
Updated fluids and capacities table.	5.2 Recommended Fluids and Lubricants, page 120
Updated conversion chart.	8.2 Conversion Chart, page 198

TABLE OF CONTENTS

Declaration of Conformity	i
Noise Levels	iii
Introduction	iv
Serial Number(s)	v
List of Revisions	vi
1 Safety	1
1.1 Safety Alert Symbols	1
1.2 Signal Words	2
1.3 General Safety	3
1.4 Maintenance Safety	5
1.5 Hydraulic Safety	6
1.6 Safety Signs	7
1.6.1 Installing Safety Decals	7
1.7 Safety Decal Locations	8
1.8 Understanding Safety Signs	11
2 Product Overview	19
2.1 Definitions	19
2.2 Component Identification	21
2.3 Specifications	22
3 Operation	25
3.1 Owner/Operator Responsibilities	25
3.2 Operational Safety	26
3.3 Engaging and Disengaging the Header Safety Props	28
3.4 Driveshields	30
3.4.1 Opening the Driveshield: North American Headers	30
3.4.2 Closing the Driveshield: North American Headers	30
3.4.3 Opening the Driveshield: Export Headers	31
3.4.4 Closing the Driveshield: Export Headers	31
3.4.5 Removing Right Endshield	32
3.4.6 Installing Right Endshield	32
3.5 Cutterbar Doors	33
3.5.1 Opening the Cutterbar Doors: North America	34
3.5.2 Closing the Cutterbar Doors: North American Header	35
3.5.3 Opening the Cutterbar Doors: Export Header	36
3.5.4 Closing the Cutterbar Doors: Export Header	37
3.6 Daily Start-Up Check	39
3.7 Attaching the Header	41
3.7.1 Attaching the Forming Shield	41
3.7.2 Attaching Header to an M200 and M205 Self-Propelled Windrower	44
3.7.3 Attaching Hydraulic Center-Link: M1240 Windrowers	46
3.7.4 Attaching Hydraulic and Electrical Components: M1240 Windrowers	50
Routing Hydraulic Hoses and Electrical Components to M1240 Windrowers	51
Connecting Header Hydraulics Using Quick Couplers: M1240 Windrowers	52
Connecting Header Hydraulics Using Hard Plumbing: M1240 Windrowers	53
3.7.5 Attaching Hydraulic and Electrical Components: M205 Windrowers	55
3.7.6 Attaching Hydraulic and Electrical Components: M200 Windrowers	60
3.8 Detaching the Header	67
3.8.1 Detaching the Header: M205 Windrowers	67
3.8.2 Detaching the Header: M200 Windrowers	71
3.8.3 Detaching the Header: M1240 Windrowers	73
3.9 Break-In Period	79
3.10 Shutting down the Windrower	80
3.11 Transporting the Header	81

TABLE OF CONTENTS

3.12	Adjusting the Transport Lights	82
4	Operating the Header	83
4.1	Header Float	83
4.1.1	Checking Float.....	83
4.1.2	Adjusting Float for M200 and M205 Self-Propelled Windrowers.....	84
4.1.3	Removing and Restoring Float for M1240 Self-Propelled Windrowers.....	84
4.2	Roll Gap.....	86
4.2.1	Checking Roll Gap	86
4.2.2	Adjusting Roll Gap	87
4.3	Roll Tension	89
4.3.1	Adjusting Roll Tension	89
4.4	Roll Timing.....	90
4.4.1	Checking Roll Timing.....	90
4.4.2	Adjusting Roll Timing.....	91
4.5	Forming Shields	92
4.5.1	Adjusting the Side Deflectors	92
4.5.2	Adjusting the Rear Deflector (Fluffer Shield).....	94
4.5.3	Adjusting the Swath Baffle	94
4.6	Header Angle	96
4.7	Cutting Height	97
4.7.1	Adjusting Gauge Roller Height	97
4.7.2	Adjusting the Skid Shoe Height	97
4.8	Disc Speed.....	99
4.9	Ground Speed.....	100
4.10	Double Windrowing.....	101
4.11	Tall Crop Feed Plates.....	102
4.11.1	Removing the Tall Crop Feed Plates from Storage.....	102
	Installing Tall Crop Feed Plates under Driven Deflector	103
	Installing Tall Crop Feed Plates under Driveline Deflector	103
4.11.2	Removing Tall Crop Feed Plates	104
	Removing Tall Crop Feed Plates from under Driven Deflector	105
	Removing Tall Crop Feed Plates from under Driveline Deflector.....	105
4.11.3	Returning Tall Crop Feed Plates to Storage.....	106
4.12	Tall Crop Divider Option	107
4.12.1	Installing Tall Crop Divider.....	107
4.12.2	Removing Tall Crop Divider.....	108
4.13	Overshot Auger	110
4.13.1	Adjusting the Overshot Auger.....	110
4.14	Stripper Bars	113
4.14.1	Adjusting the Stripper Bar	113
4.15	Haying	116
4.15.1	Curing	116
4.15.2	Topsoil Moisture	116
4.15.3	Weather and Topography.....	116
4.15.4	Windrow Characteristics	116
4.15.5	Driving on Windrow	117
4.15.6	Raking and Tedding.....	117
4.15.7	Using Chemical Drying Agents.....	117
4.16	Unplugging the Header	118
5	Maintenance and Servicing	119
5.1	Preparation for Servicing.....	119
5.2	Recommended Fluids and Lubricants	120
5.3	Maintenance Requirements.....	121

TABLE OF CONTENTS

5.3.1	Maintenance Schedule/Record.....	121
5.3.2	Preseason/Annual Service.....	124
5.3.3	End-of-Season Service.....	124
5.3.4	Lubrication and Servicing.....	125
5.3.5	Greasing Procedure.....	125
5.3.6	Lubrication and Servicing Intervals.....	126
5.3.7	Lubricating the Cutterbar.....	131
	Draining the Cutterbar Lubricant.....	131
	Filling the Cutterbar Lubricant.....	133
5.3.8	Rock Guards.....	135
	Inspecting the Rock Guards.....	135
5.4	Cutterbar Disc Maintenance.....	136
5.4.1	Direction of Spindle Rotation.....	136
5.4.2	Inspecting the Cutterbar Discs.....	137
5.4.3	Removing a Cutterbar Disc.....	137
5.4.4	Installing a Cutterbar Disc.....	138
5.4.5	Cutterblades.....	139
	Inspecting Cutterblades.....	139
	Inspecting Cutterblade Hardware.....	141
	Replacing the Cutterblades.....	143
5.4.6	Accelerators.....	144
	Inspecting Accelerators.....	145
	Replacing Accelerators.....	145
5.4.7	Nut Shield.....	147
	Inspecting Nut Shield.....	147
	Replacing Nut Shield.....	148
5.4.8	Rotary Deflectors.....	148
	Inspecting Rotary Deflectors.....	148
	Removing the Driven Deflector.....	149
	Installing the Driven Deflector.....	150
	Removing the Driveline Deflector.....	150
	Installing the Driveline Deflector.....	151
5.4.9	Disc Spindles.....	152
	Replacing a Spindle Key.....	152
5.4.10	Cutterbar Doors.....	154
	Inspecting Curtains.....	154
	Inspecting Door Latches: North American Header.....	154
	Inspecting Door Latches: Export Header.....	154
	Adjusting Door Latches: Export Header.....	155
	Replacing Door Latches: Export Header.....	155
	Replacing Door Latch Brackets: Export Header.....	156
5.5	Drive Systems.....	157
5.5.1	Bevel Gearbox.....	157
	Changing the Bevel Gearbox Lubricant.....	157
5.5.2	Conditioner Drive Belt.....	158
	Inspecting the Conditioner Drive Belt.....	158
	Replacing the Conditioner Drive Belt.....	159
5.5.3	Conditioner Gearbox.....	161
	Changing the Conditioner Gearbox Lubricant.....	161
5.5.4	Header Drive Speed Sensor.....	163
	Adjusting the Header Drive Speed Sensor.....	163
	Replacing the Header Drive Speed Sensor.....	164
5.5.5	Auger Drive Belt.....	165
	Inspecting and Adjusting the Auger Drive Belts.....	165

TABLE OF CONTENTS

Replacing the Auger Drive Belts	166
5.5.6 Installing Sealed Bearings.....	169
5.6 Hydraulics	170
5.6.1 Hydraulic Motor.....	170
Removing the Hydraulic Motor.....	170
Installing the Hydraulic Motor.....	171
5.6.2 Hydraulic Hoses and Lines	172
5.7 Electrical System	173
5.7.1 Hazard Lights.....	173
Hazard Lights: Replacing Bulbs and Lenses.....	173
Hazard Lights: Replacing the Lamp Assembly.....	173
Hazard Lights: Replacing the Lamp Bracket	174
6 Options and Attachments	175
6.1 Options and Attachments: Kits	175
6.1.1 Adjustable Skid Shoe Kit.....	175
6.1.2 Cutterbar Repair Tool Kit.....	175
6.1.3 Double Windrow Attachment (DWA)Double Windrow Attachment - Self Propelled	176
6.1.4 Gauge Roller	176
6.1.5 Hydraulic Drive: 16-Foot for M200 Self-Propelled	176
6.1.6 Tall Crop Divider Kit.....	176
6.1.7 Tall Crop Feed Plate Kit	177
7 Troubleshooting	179
7.1 Header Performance.....	179
7.2 Mechanical Problems.....	182
8 Reference.....	185
8.1 Torque Specifications	185
8.1.1 SAE Bolt Torque Specifications	185
8.1.2 Metric Bolt Specifications.....	187
8.1.3 Metric Bolt Specifications Bolting into Cast Aluminum	190
8.1.4 Flare-Type Hydraulic Fittings.....	190
8.1.5 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable).....	192
8.1.6 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)	194
8.1.7 O-Ring Face Seal (ORFS) Hydraulic Fittings.....	195
8.1.8 Tapered Pipe Thread Fittings	197
8.2 Conversion Chart.....	198
Index	199

1 Safety

1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

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



Figure 1.1: Safety Symbol

1.2 Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

1.3 General Safety

CAUTION

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

Protect yourself.

- When assembling, operating, and servicing machinery, wear all the protective clothing and personal safety devices that could be necessary for the job at hand. 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 ear muffs or ear plugs to help protect against objectionable or loud noises.

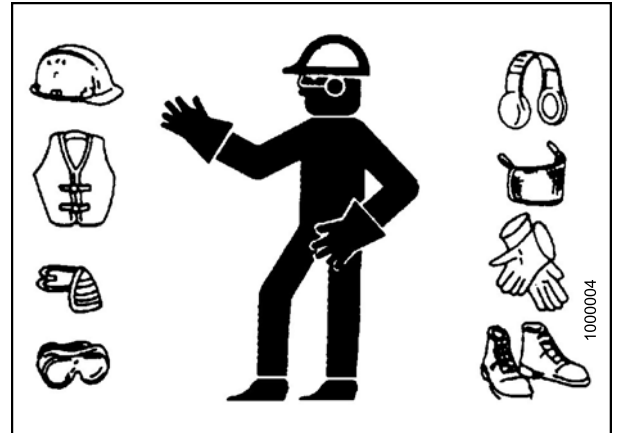


Figure 1.2: Safety Equipment

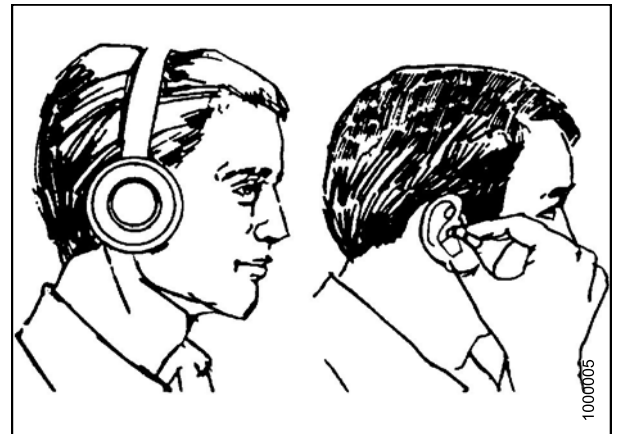


Figure 1.3: Safety Equipment

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

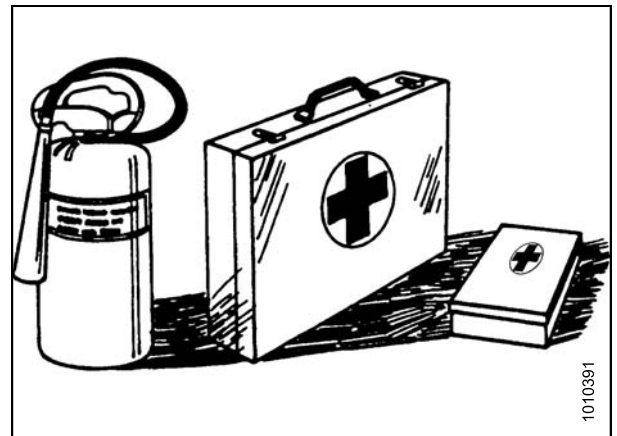


Figure 1.4: Safety Equipment

SAFETY

- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Make sure driveline guards can rotate independently of the shaft and can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.



Figure 1.5: Safety around Equipment

- Keep hands, feet, clothing, and hair away from moving parts. **NEVER** attempt to clear obstructions or objects from a machine while the engine is running.
- Do **NOT** modify the machine. Non-authorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- To avoid bodily injury or death from unexpected startup of machine, **ALWAYS** stop the engine and remove the key from ignition before leaving operator's seat for any reason.

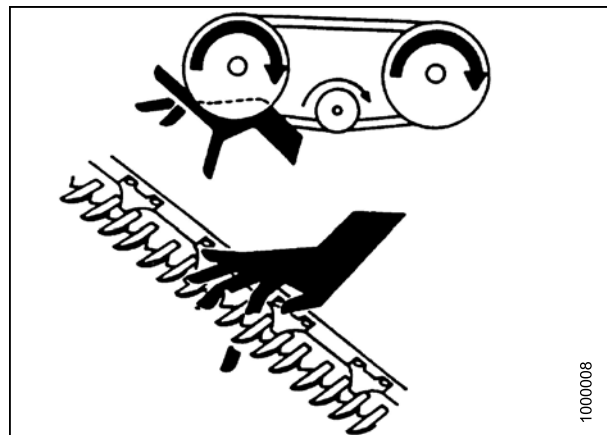


Figure 1.6: Safety around Equipment

- Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.
- Keep work area well lit.
- Keep machinery clean. Straw and chaff on a hot engine is a fire hazard. Do **NOT** allow oil or grease to accumulate on service platforms, ladders, or controls. Clean machines before storage.
- **NEVER** use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.
- When storing machinery, cover sharp or extending components to prevent injury from accidental contact.



Figure 1.7: Safety around Equipment

1.4 Maintenance Safety

To ensure your safety while maintaining the machine:

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



Figure 1.8: Safety around Equipment

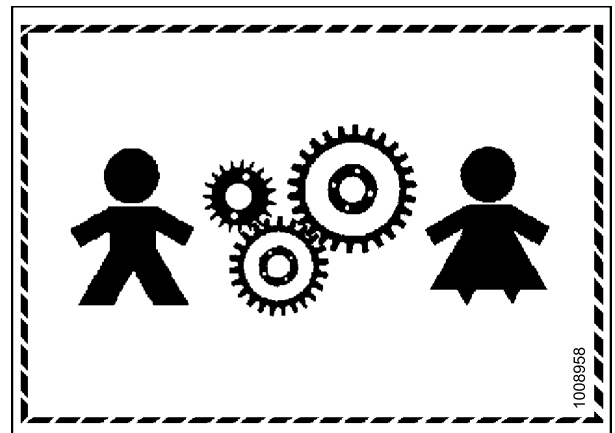


Figure 1.9: Equipment NOT Safe for Children

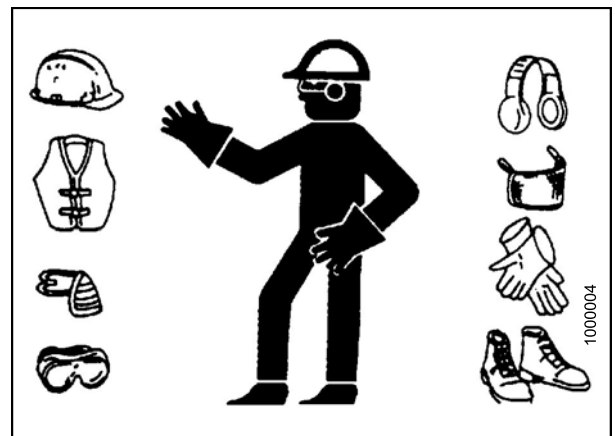


Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

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

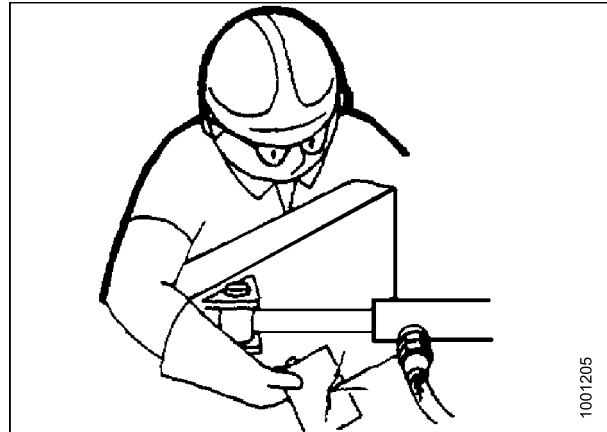


Figure 1.11: Testing for Hydraulic Leaks

- 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.



Figure 1.12: Hydraulic Pressure Hazard

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

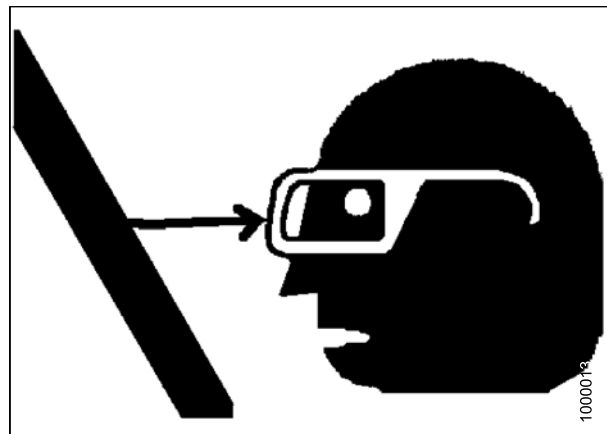


Figure 1.13: Safety around Equipment

1.6 Safety Signs

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

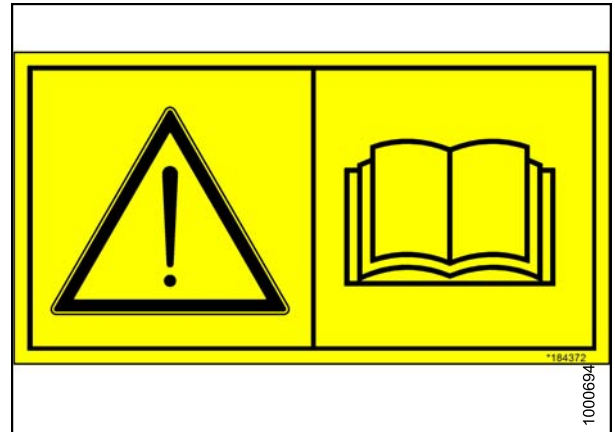


Figure 1.14: Operator's Manual Decal

1.6.1 Installing Safety Decals

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

SAFETY

1.7 Safety Decal Locations

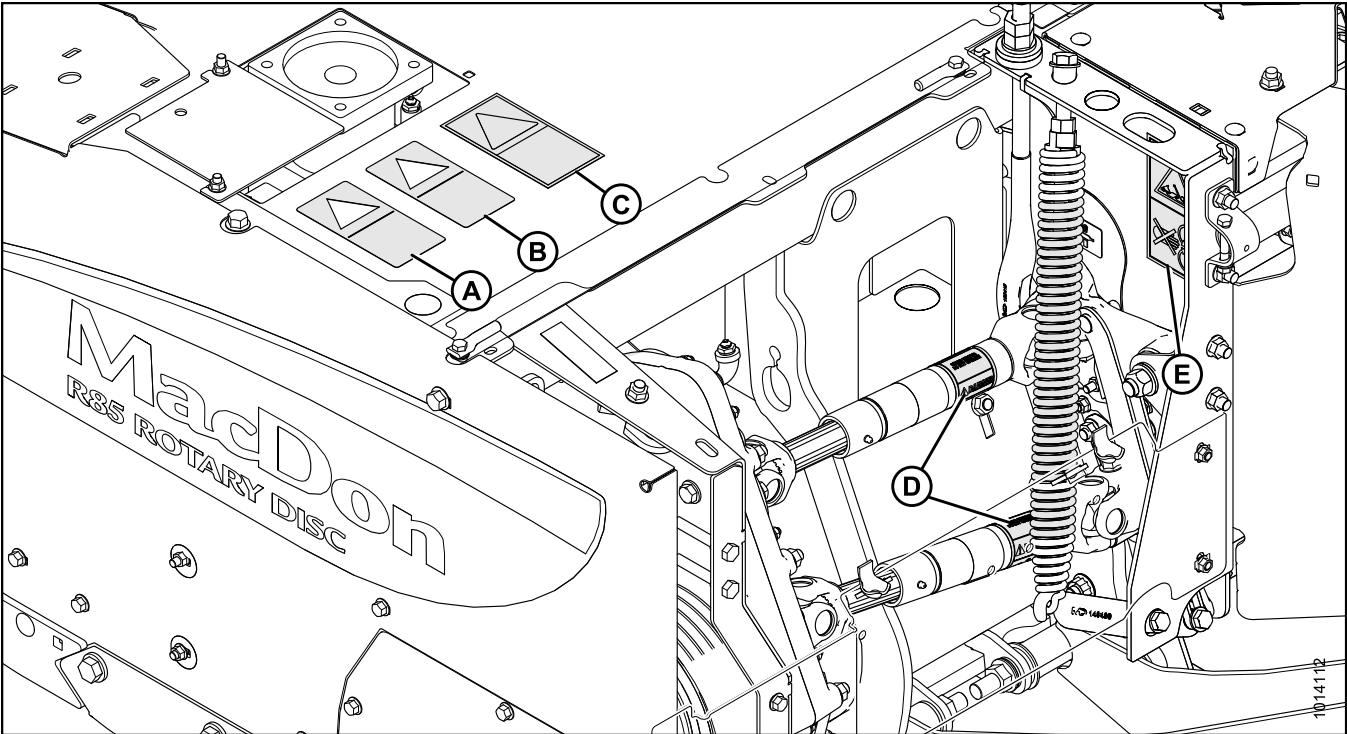


Figure 1.15: Safety Decal Locations

A - MD #174436
D - MD #194521

B - MD #113482
E - MD #184385

C - MD #194464

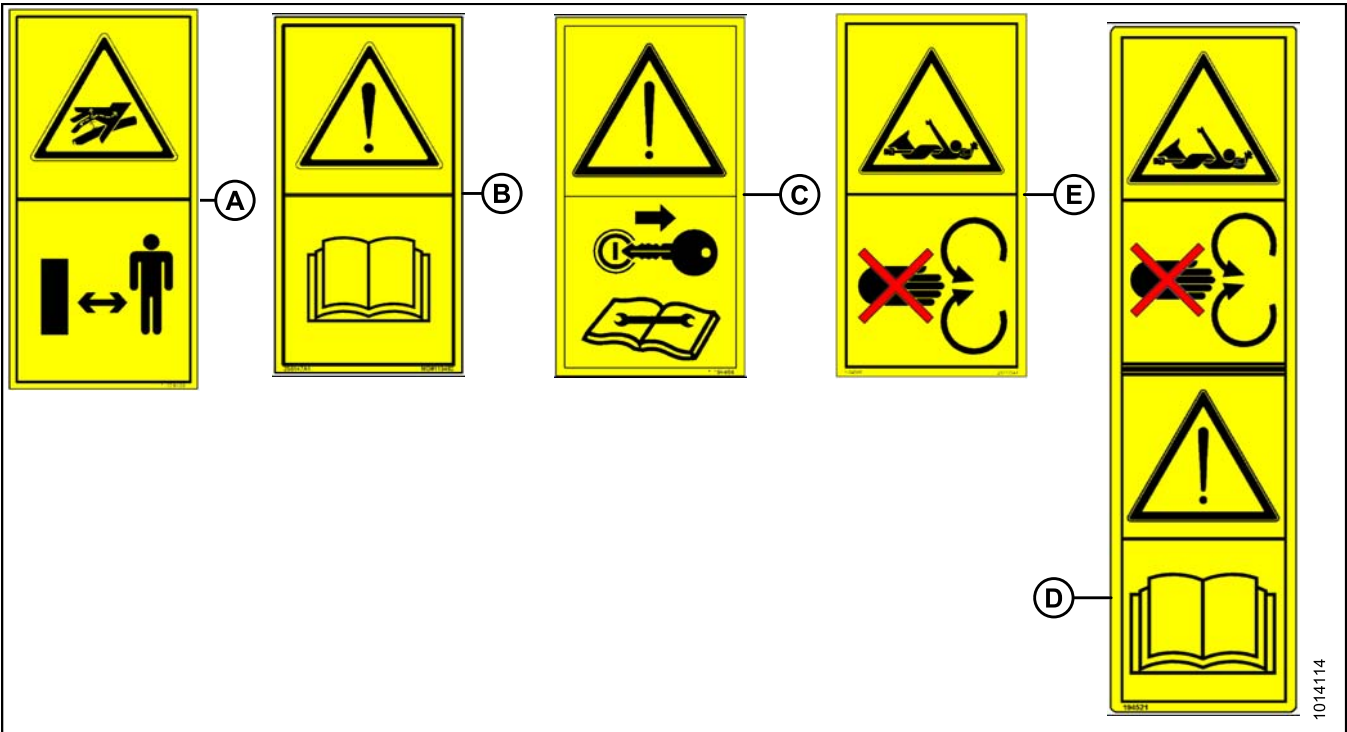
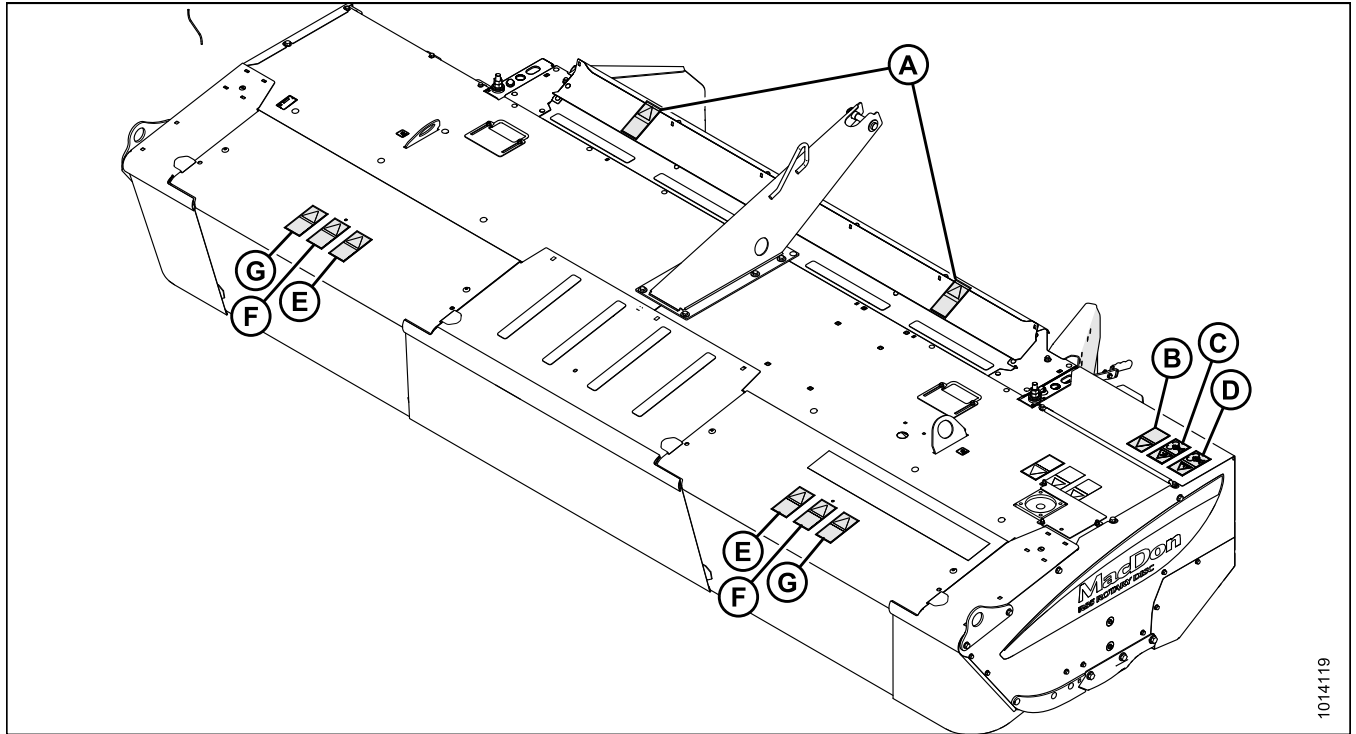


Figure 1.16: Safety Decals

SAFETY



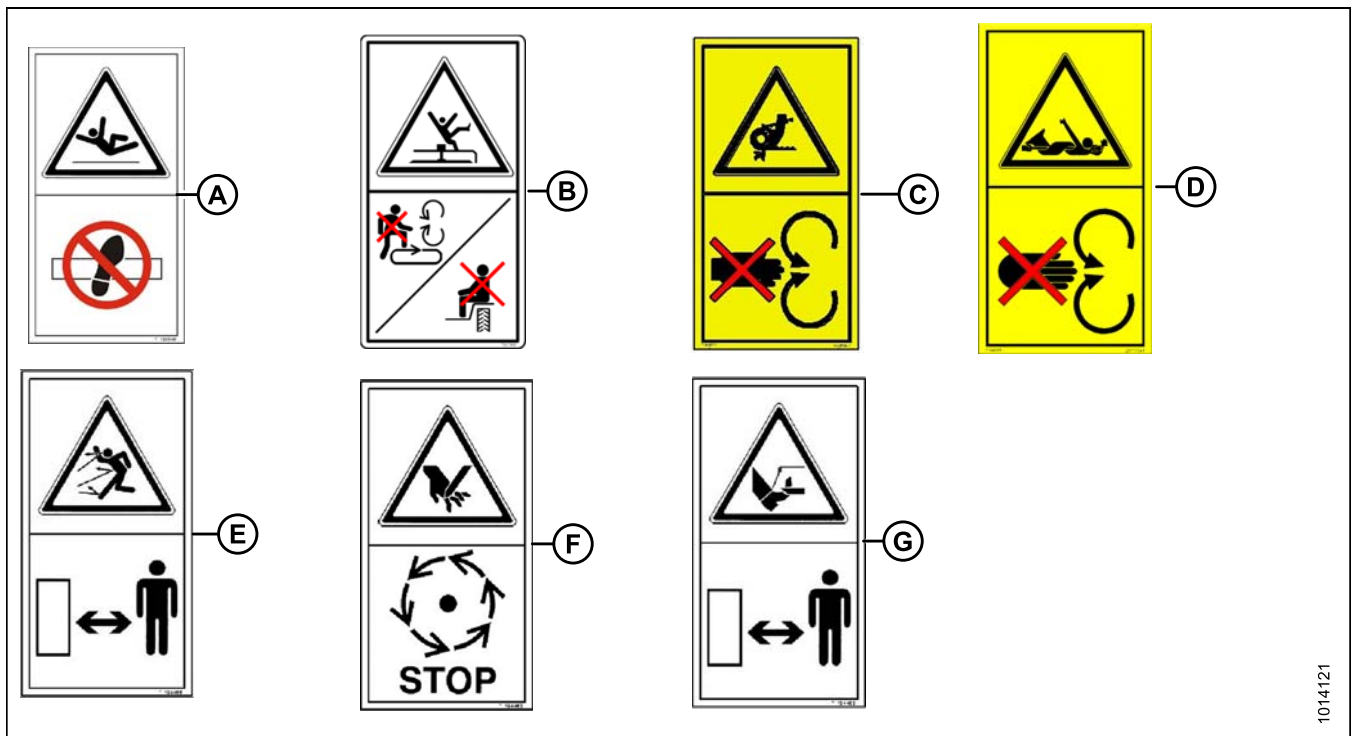
1014119

Figure 1.17: Safety Decal Locations

A - MD #190546
 D - MD #184385
 G - MD #194465

B - MD #247166
 E - MD #194466

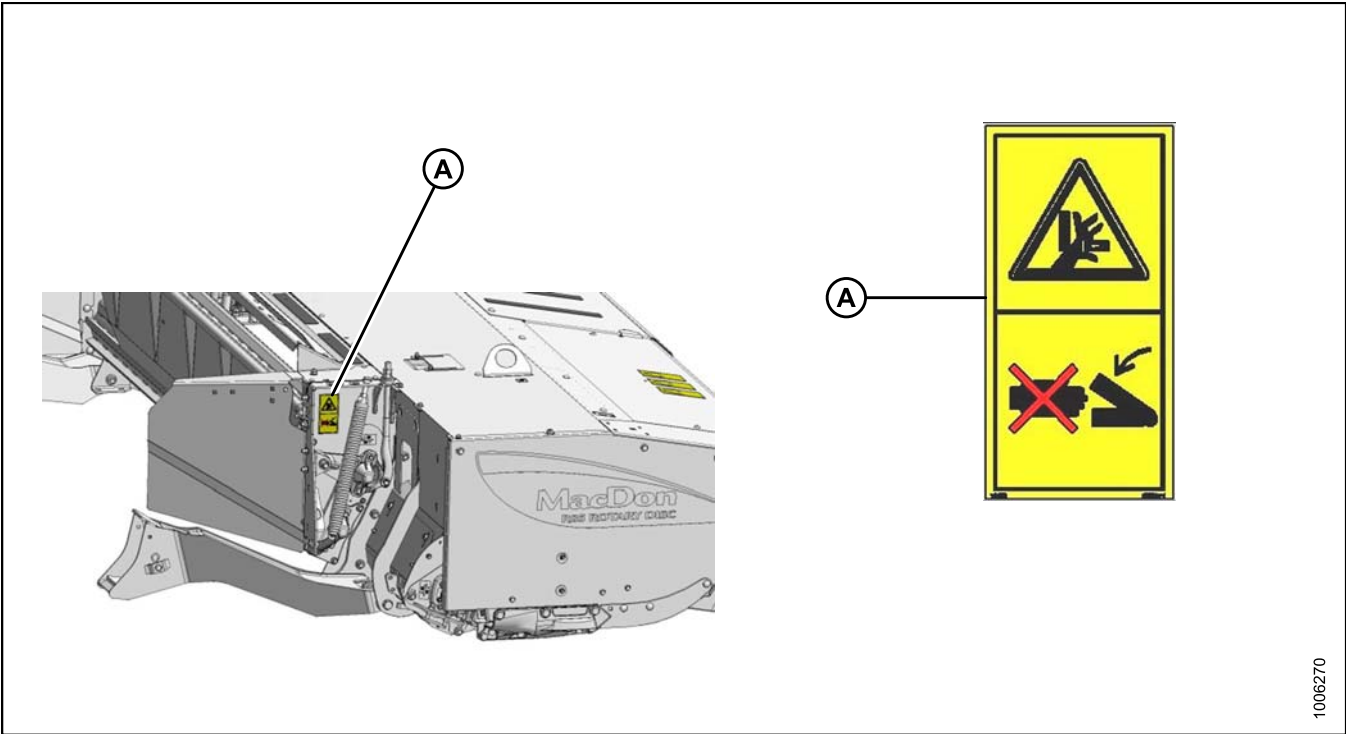
C - MD #184371
 F - MD #194463



1014121

Figure 1.18: Safety Decals

SAFETY



1006270

Figure 1.19: Safety Decal Locations

A - MD #184386

1.8 Understanding Safety Signs

MD #113482

General hazard pertaining to machine operation and servicing

CAUTION

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

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

MD #166466

High pressure oil hazard

WARNING

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

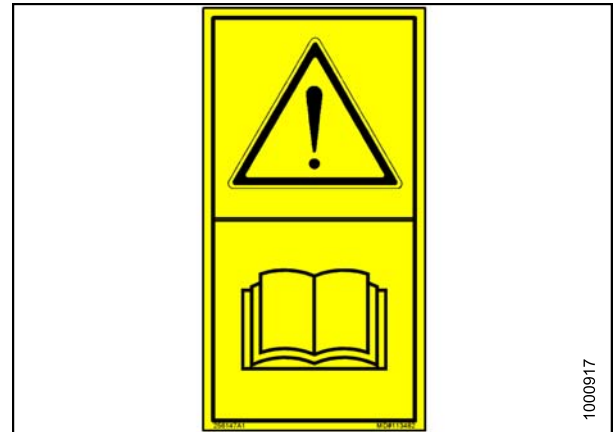


Figure 1.20: MD #113482



Figure 1.21: MD #166466

SAFETY

MD #174434

Header hazard

DANGER

- Rest header on ground or engage mechanical locks before going under unit.

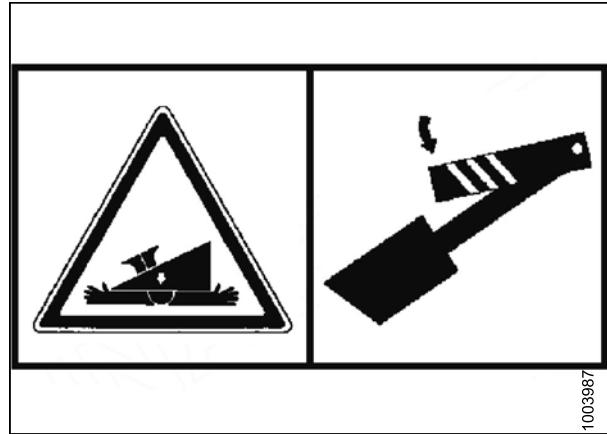


Figure 1.22: MD #174434

MD #184371

Open drive hazard

WARNING

- Guard missing. Do not operate.
- Keep all shields in place.



Figure 1.23: MD #184371

MD #184385

Pinch hazard

WARNING

- Keep away.
- Failure to comply could result in death or serious injury.



Figure 1.24: MD #184385

SAFETY

MD #184386

Pinch hazard

WARNING

- Failure to comply could result in death or serious injury.

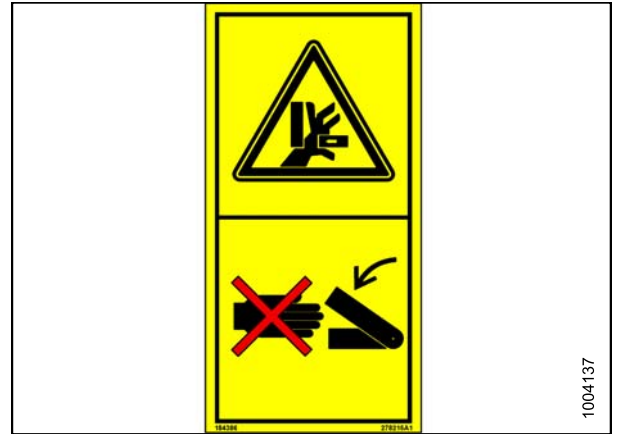


Figure 1.25: MD #184386

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 1.26: MD #184422

MD #190546

Slippery surface

WARNING

- Do not use this area as a step or platform.
- Failure to comply could result in serious injury or death.



Figure 1.27: MD #190546

SAFETY

MD #194462

Header crushing hazard

WARNING

- Install lock before going under unit.

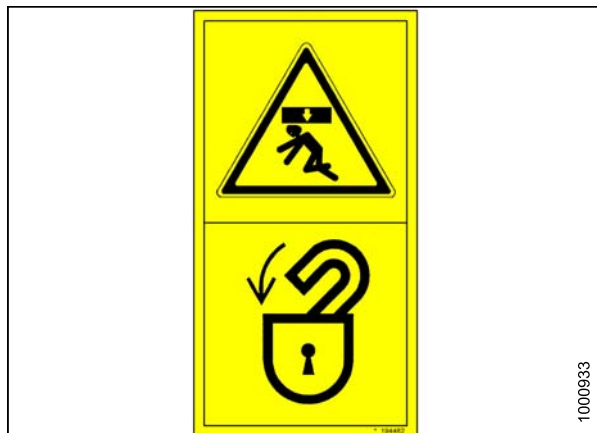


Figure 1.28: MD #194462

MD #194463

Rotating blades

WARNING

- Stop engine and remove the key before opening the header covers.
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off.



Figure 1.29: MD #194463

MD #194464

Shut down for service

WARNING

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

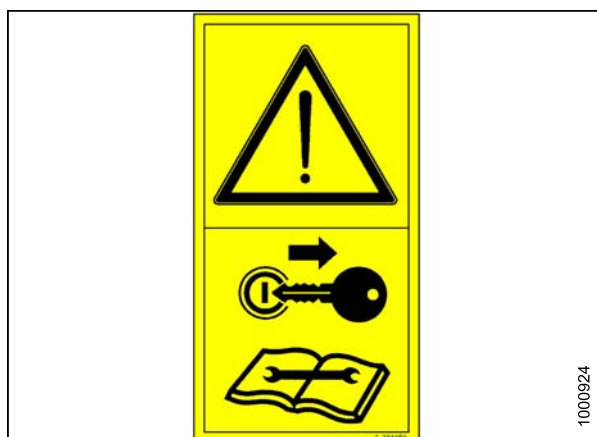


Figure 1.30: MD #194464

SAFETY

MD #194465

Rotating cutters

WARNING

- Stand clear.
- Stop the engine and remove the key.
-
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off.
- Failure to comply could result in serious injury or death.



Figure 1.31: MD #194465

MD #194466

Rotating parts under hood

WARNING

- Stand clear.
- Crop materials exiting at high speed.
- Stop machine, look, listen, and wait for all movement to stop before approaching.
- Failure to comply could result in death or serious injury.



Figure 1.32: MD #194466

SAFETY

MD #194521

Auger entanglement hazard

CAUTION

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

General hazard pertaining to machine operation and servicing.

CAUTION

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

MD #247166

Moving implement hazard

WARNING

- To avoid injury, do not mount or ride machine while the machine is in motion.

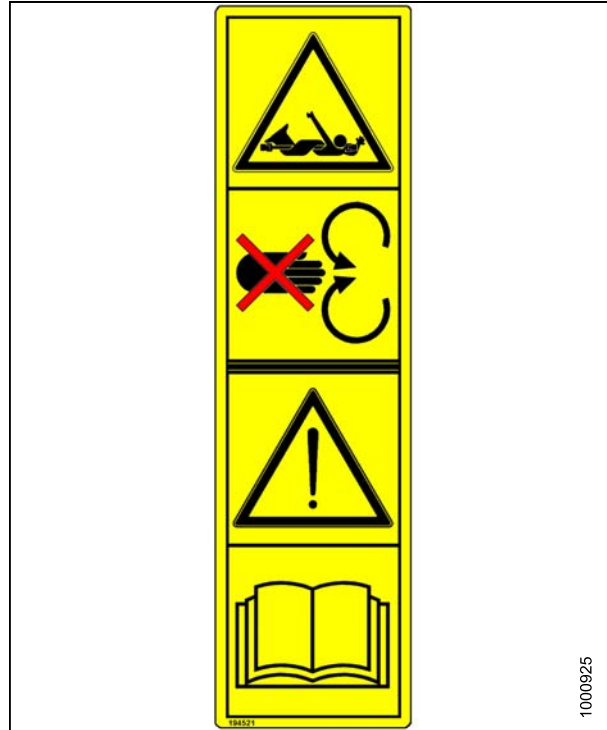


Figure 1.33: MD #194521



Figure 1.34: MD #247166

SAFETY

MD #247167

Rotating blades

WARNING

- Stop the engine and remove the key.
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off due to inertia.

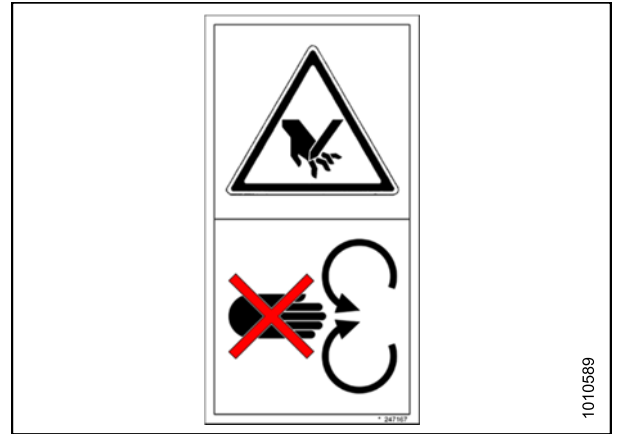


Figure 1.35: MD #247167

2 Product Overview

2.1 Definitions

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

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Cab-forward	Windrower operation with Operator and cab facing in direction of travel
CDM	Cab display module on a self-propelled windrower
Center-link	A hydraulic cylinder link between header and machine to which it is attached: It is used to change header angle
CGVW	Combined vehicle gross weight
DWA	Double Windrow Attachment
ECM	Engine control module
ECU	Electronic control unit
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
Export header	Header configuration typical outside North America
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other and fitting has been tightened to a point where fitting is no longer loose
FFFT	Flats from finger tight
GSL	Ground speed lever
GSS	Grass Seed Special
GVW	Gross vehicle weight
Hard joint	A joint made with the use of a fastener where joining materials are highly incompressible
Header	A machine that cuts and lays crop into a windrow and is attached to a self-propelled windrower
Hex key	A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive)
hp	Horsepower
ISC	Intermediate Speed Control
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
M-Series windrower	MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers
M1-Series windrower	MacDon M1240 windrowers
n/a	Not applicable

PRODUCT OVERVIEW

Term	Definition
Nut	An internally threaded fastener that is designed to be paired with a bolt
N-DETENT	The slot opposite the NEUTRAL position on operator's console
North American header	Header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low pressure port openings Threads on NPT fittings are uniquely tapered for an interference fit
ORB	O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors
ORFS	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
rpm	Revolutions per minute
R-Series header	MacDon R80 and R85 rotary disc headers
RoHS (Reduction of Hazardous Substances)	A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of mating parts
Self-Propelled (SP) Windrower	Self-propelled machine consisting of a power unit with a header
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
Truck	A four-wheel highway/road vehicle weighing no less than 3400 kg (7500 lb.)
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in Newton-meters (N·m) or foot-pounds (ft·lbf)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees or a number of flats to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or a locking mechanism
Windrower	Power unit of a self-propelled header
WCM	Windrower control module

2.2 Component Identification

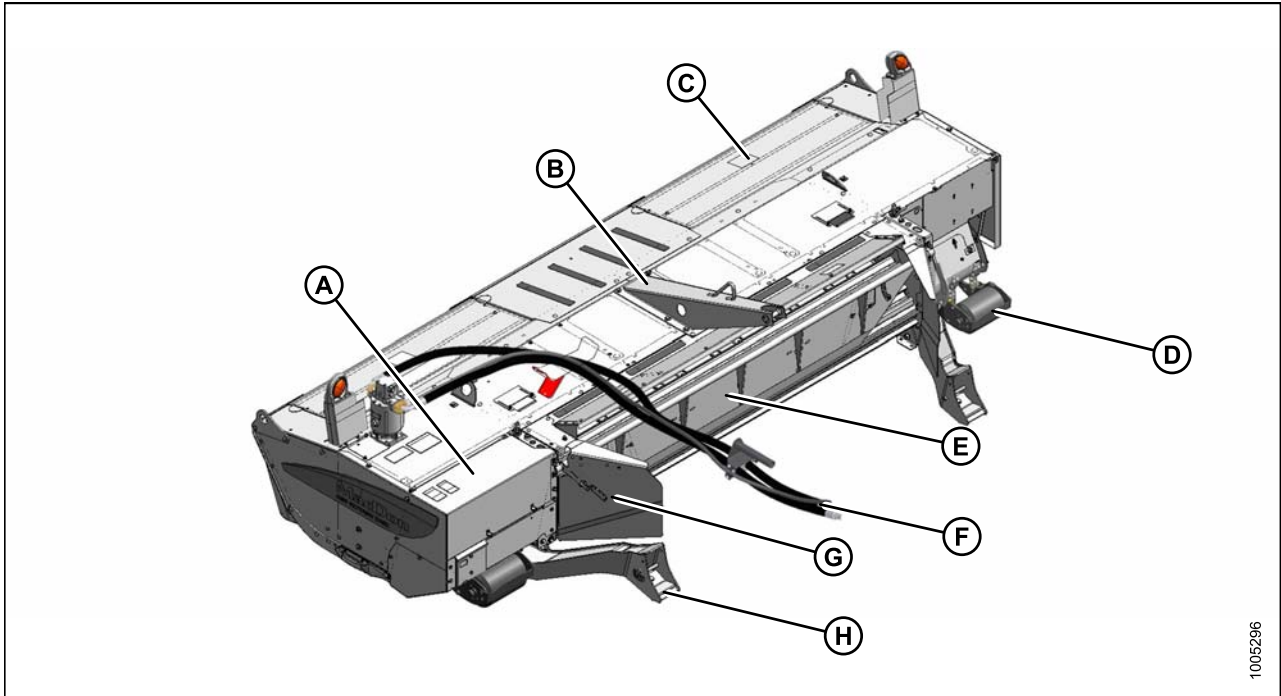


Figure 2.1: Component Identification

- | | | | |
|-----------------|-------------------------------------|--------------------|------------------------------|
| A - Driveshield | B - Tower | C - Door | D - Gauge Rollers (Optional) |
| E - Baffle | F - Hydraulic Hoses to SP Windrower | G - Baffle Control | H - Header Boot |

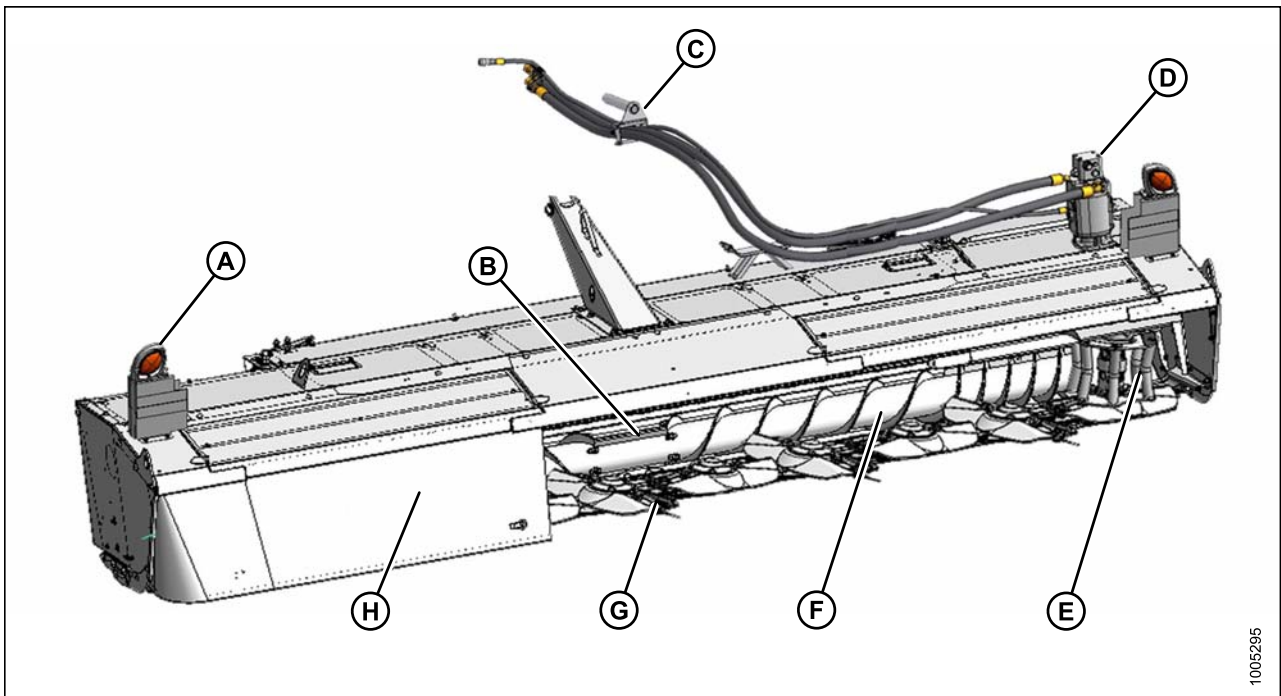


Figure 2.2: Component Identification

- | | | | |
|----------------------|-----------------------|-----------------------|-----------------|
| A - Transport Light | B - Conditioner Rolls | C - Hose Support | D - Drive Motor |
| E - Rotary Deflector | F - Overshot Auger | G - 10 Disc Cutterbar | H - Curtains |

PRODUCT OVERVIEW

2.3 Specifications

NOTE:

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

S: standard / O_F: optional (factory installed) / O_D: optional (dealer installed) / -: not available

	16-Foot R85
Cutterbar	
Effective cutting width	4827 mm (15.83 ft.)
Number of cutting discs	10
Number of blades per disc	2
11 degree bevel up knives	S
Inline spur gear cutterbar design	S
Geartrain protection - shearable key in spindle (all discs)	S
Tall crop feed plates (stored on header)	2
Austempered cutting discs	S
Knife tip speed	82.9 mps (184 mph)
Range of cutting disc rpm	1800–2600 rpm
Knife tip speed range	59.2–85.5 mps (131–189 mph)
Cutterbar spindle anti-wrap ring	S
Austempered rock guards	S
Hourglass converging impellers	S
Heat treated crop lifters	S
Cutting angle range	0-8° below horizontal
Cutting angle range - minimum cut height	19 mm (3/4 in.)
Adjustable gauge rollers	O
Adjustable shoes	O

PRODUCT OVERVIEW

	16-Foot R85
Overshot Auger	
Peripheral diameter	229 mm (9.0 in.)
Center tube diameter	152 mm (6.0 in.)
Rpm range:	720–1040
Three HB belt drive (with spring loaded idler)	S
Universal joint in auger center	S
Hay Conditioner	S
Drive: Bevel gearbox to 5 HA banded belt drive to enclosed timing gearbox and driveline	S
Roll type: Intermeshing steel bars	S
Roll length: 300 mm (118 in.)	S
Roll diameter 229 mm (9.0 in.) outside diameter on (179 mm) 7.0 in. O.D. tube	S
Roll diameter 233 mm (9.17 in.) outside diameter on 168.4 mm (6.63 in.) O.D. tube (SP)	S
Roll speed	730–1040 rpm
Forming Shield for 915 mm. (36 in.) windrow to 2540 mm (102 in.) wide swath	S
Header mounted adjustable baffle	S
Tractor mounted side deflector and rear baffle	S
Frame and Structure	
Two amber transport lights	S
Mounts to self-propelled windrower	S
Easy access doors to access cutterbar components	2
Transport width	4879 mm (192 in.)
Total weight complete with lift arms (estimated)	1955 kg (4300 lb.)
Drives	
M205 Windrower tractor to 106 cc (6.4 cu in.) Eaton heavy duty hydraulic motor	S
M205 maximum hydraulic power developed	174 kW (231 Hp)
Hydraulic Header Connection	
Hydraulic couplers for quick attachment	O _D

PRODUCT OVERVIEW

	16-Foot R85
Attachments and Accessories	
Double windrow attachment	O _D
Tall crop divider kit	O
Cutterbar repair tool kit	O

3 Operation

3.1 Owner/Operator Responsibilities

CAUTION

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

3.2 Operational Safety

CAUTION

Follow these safety precautions:

- Follow all safety and operational instructions given in your windrower operator's manuals. If you do not have an operator's manual, get one from your Dealer and read it thoroughly
- Never attempt to start the windrower's engine or operate the machine except from the windrower seat
- Check the operation of all controls in a safe clear area before starting work
- Do NOT allow riders on the windrower or header

CAUTION

- Never start or move the machine until you are sure all bystanders have cleared the area
- Avoid travelling over loose fill, rocks, ditches, or holes
- Drive slowly through gates and doorways
- If cutting ditch banks, use extreme caution. If the header hits an obstruction, the front of the windrower will usually swerve toward the ditch
- When working on inclines, travel uphill or downhill when possible. Be sure to keep the windrower transmission in gear when travelling downhill
- Never attempt to get on or off a moving machine
- Do NOT get off the windrower while the header is in operation
- To avoid bodily injury or death from unexpected startup of machine, always stop the windrower engine and remove the key before adjusting or removing plugged material from the machine.
- Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine

CAUTION

Follow proper shut down procedure:

- Engage the windrower brake
- Stop the engine and remove the key
- Wait for all movement to stop
- Engage the header safety props before inspecting a raised machine

 **CAUTION**

- Operate only in daylight or good artificial light
- Keep everyone several hundred feet away from your operation
- Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected with force from either end
- Extreme care must be exercised to avoid injury from thrown objects. Do NOT, under any circumstances, operate the header when other people are in the vicinity. Stones and other objects can be thrown great distances by the rotating cutting blades
- The cutterbar curtains are very important to reduce the potential for thrown objects. Always keep the cutterbar curtains down when operating the header. Replace the curtains if they become worn or damaged

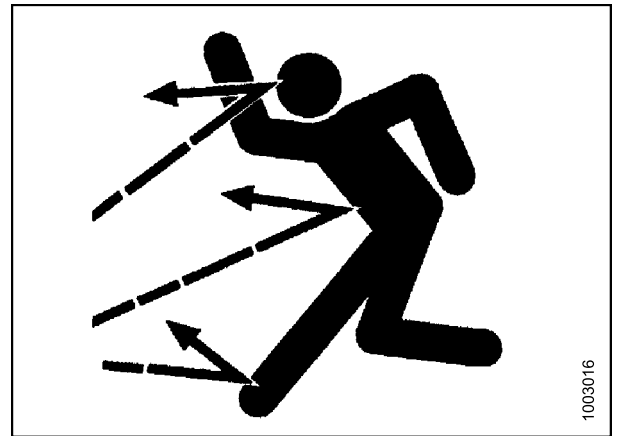


Figure 3.1: Ejected Objects Warning

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3.3 Engaging and Disengaging the Header Safety Props

Safety props are located on both header lift cylinders on the windrower.

⚠ DANGER

To avoid bodily injury from fall of raised header, always engage safety props when working on or around raised header, and before going under header for any reason.

Engage safety props as follows:

1. Start engine and press header up (A) switch to raise header to maximum height.
2. Rephase cylinders if one end of the header does not raise fully. If rephasing is required, proceed as follows:
 - a. Press and hold the header up (A) switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.
3. Pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for opposite cylinder.



Figure 3.2: Ground Speed Lever (GSL)

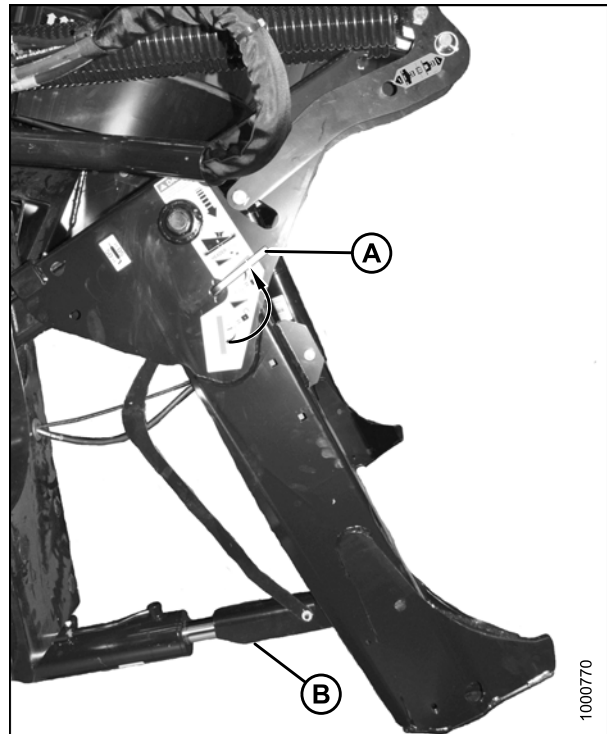


Figure 3.3: Safety Prop

OPERATION

Disengage safety props as follows:

1. Turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.
2. Start engine, choose a level area, and lower header to the ground.
3. Stop the engine and remove the key.

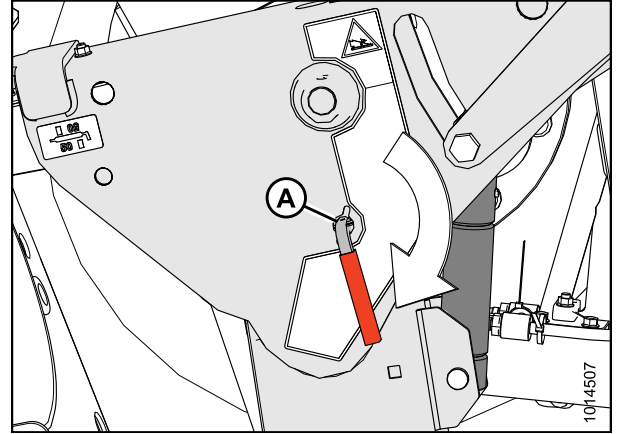


Figure 3.4: Safety Prop

3.4 Driveshields

⚠ WARNING

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

The Rotary Disc 16-Foot Header for Self-Propelled Windrowers comes in two configurations: one for use in North America and one for use outside of North America. Headers configured for use outside of North America are referred to as export headers. The configuration is specified in the title when necessary.

3.4.1 Opening the Driveshield: North American Headers

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

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

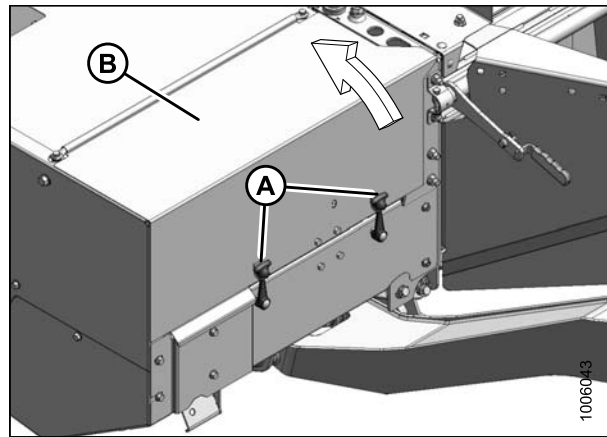


Figure 3.5: Driveshield

3.4.2 Closing the Driveshield: North American Headers

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

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

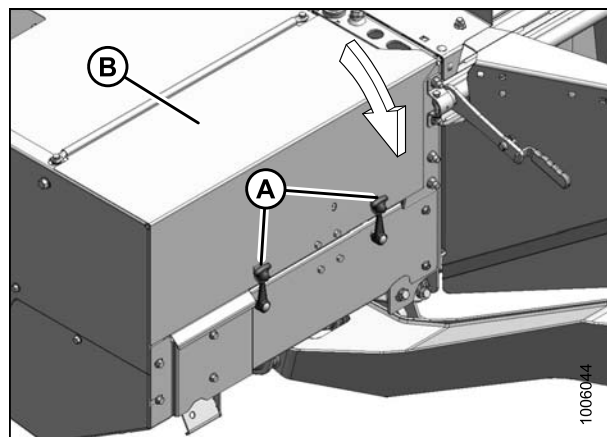


Figure 3.6: Driveshield

3.4.3 Opening the Driveshield: Export Headers

Follow these steps to open the driveshield on export headers:

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

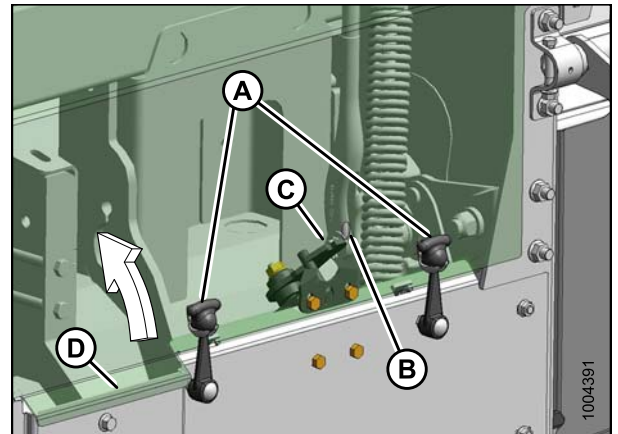


Figure 3.7: Driveshield

3.4.4 Closing the Driveshield: Export Headers

Follow these steps to close the driveshield on export headers:

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

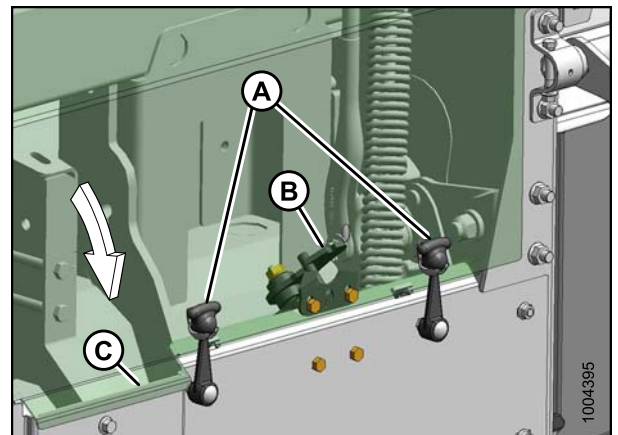


Figure 3.8: Driveshield

OPERATION

3.4.5 Removing Right Endshield

1. Remove three bolts (A) and remove right endshield (B).

NOTE:

Tall crop feed plates are supplied from the factory and stored behind the right endshield.

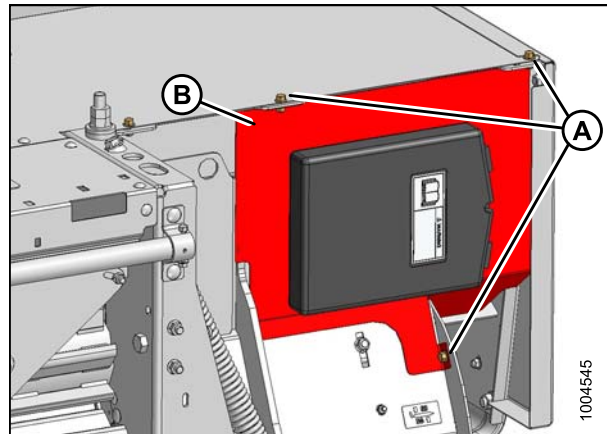


Figure 3.9: Right Endshield

3.4.6 Installing Right Endshield

1. Install right endshield (B) using three bolts (A).

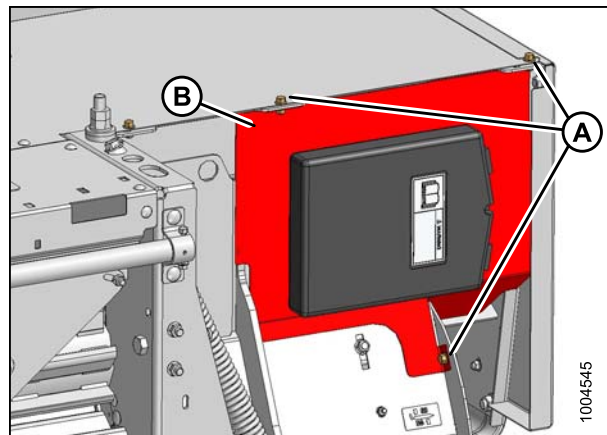


Figure 3.10: Right Endshield

3.5 Cutterbar Doors

The Rotary Disc 16–Foot Header for Self-Propelled Windrowers comes in two configurations: one for use in North America and one for use outside of North America. Headers configured for use outside of North America are referred to as export headers. The configuration is specified in the title when necessary.

CAUTION

Do NOT operate the machine without all the cutterbar doors down. The curtains should be installed and in good condition.

Two doors provide access to the cutterbar area.

Rubber curtains are attached to each door at the front corners and center fixed cover. Latches at the lower corners of each curtain keep the curtains together to minimize the risk of thrown objects.

The cutterbar curtains reduce the potential for thrown objects. Always keep curtains down when operating the header.

Replace worn or damaged curtains. Refer to your Dealer for replacement instructions.

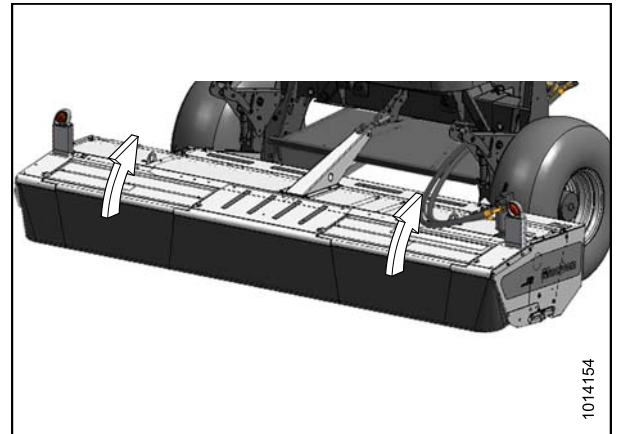


Figure 3.11: Cutterbar Doors

OPERATION

3.5.1 Opening the Cutterbar Doors: North America

Follow these steps to open the cutterbar doors on a North American header:

1. Unhook the curtain latches (A).

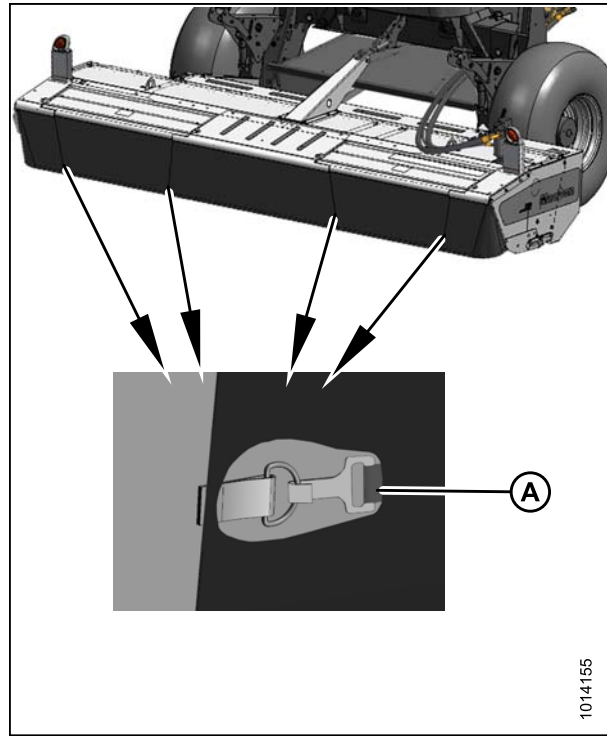


Figure 3.12: Curtain Latches

2. Lift front of door to the open position. The front cover safety latch (A) will automatically drop into position and keep the cover from falling closed again during maintenance.

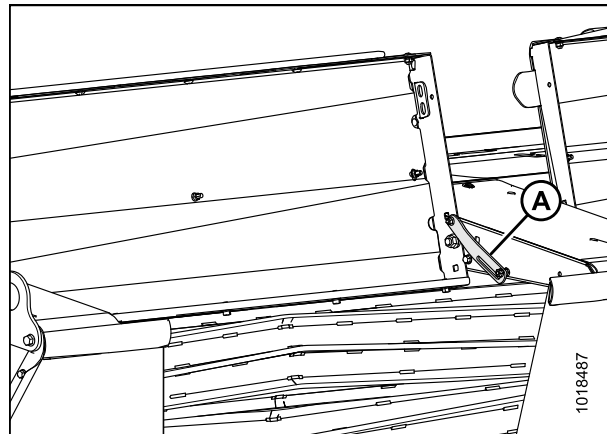


Figure 3.13: Cutterbar Doors

3.5.2 Closing the Cutterbar Doors: North American Header

Follow these steps to close the cutterbar doors on a North American header:

⚠ CAUTION

To avoid injury, keep hands and fingers away from corners of doors when closing.

1. Holding the door open, lift the safety door latch (A) to disengage its lock, then move the door down to its closed position over the cutterbar.

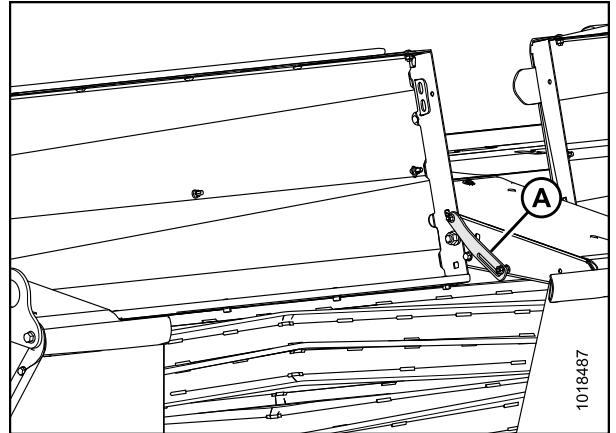


Figure 3.14: Cutterbar Doors

2. Hook curtain latches (A).

NOTE:

Ensure that curtains hang properly and completely enclose cutterbar area.

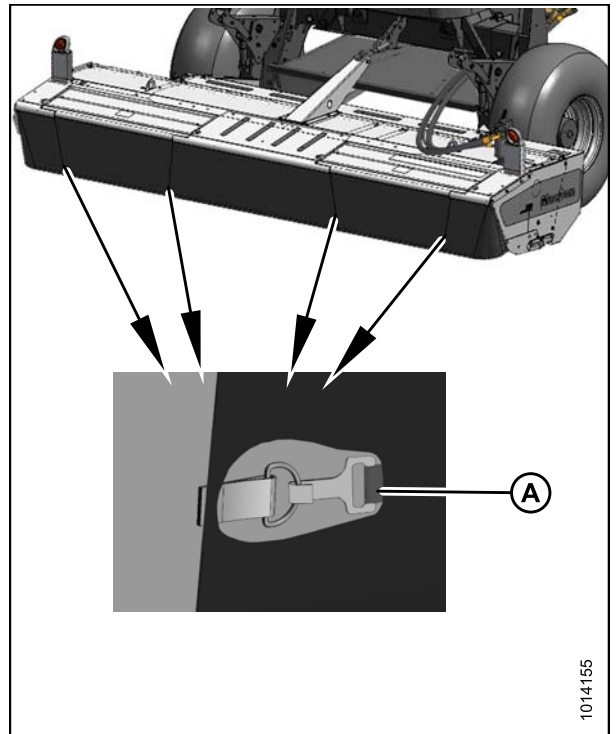


Figure 3.15: Curtain Latches

OPERATION

3.5.3 Opening the Cutterbar Doors: Export Header

Follow these steps to open the cutterbar doors on an export header:

1. Unhook curtain latches (A).

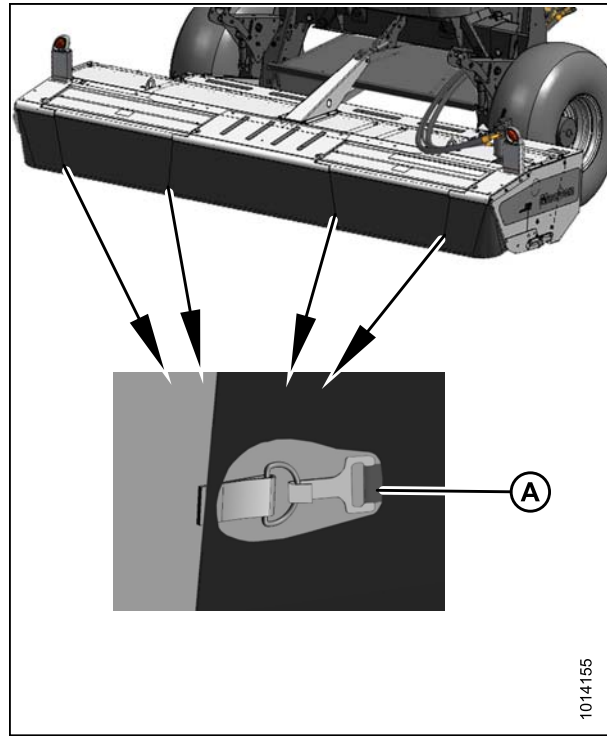


Figure 3.16: Curtain Latches

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OPERATION

2. Insert a screwdriver (or equivalent) through hole (A) in door into notch in latch (B) and push latch to disengage.
3. Lift at front of door to open.

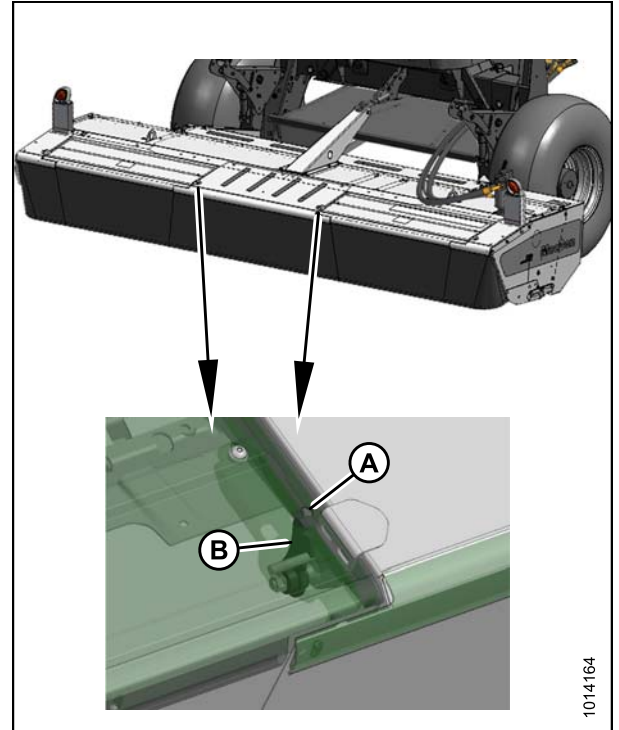


Figure 3.17: Cutterbar Door Latch

3.5.4 Closing the Cutterbar Doors: Export Header

To close the cutterbar doors on an export header follow these steps:

 **CAUTION**

To avoid injury, keep hands and fingers away from corners of doors when closing.

OPERATION

1. Pull at top and move to closed position. Ensure latch (A) has engaged the door.

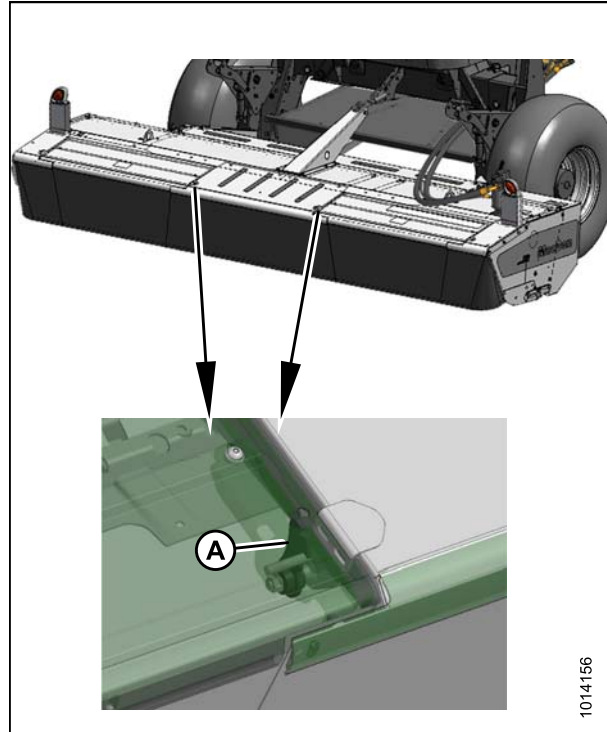


Figure 3.18: Cutterbar Door Latch

2. Hook curtain latches (A).

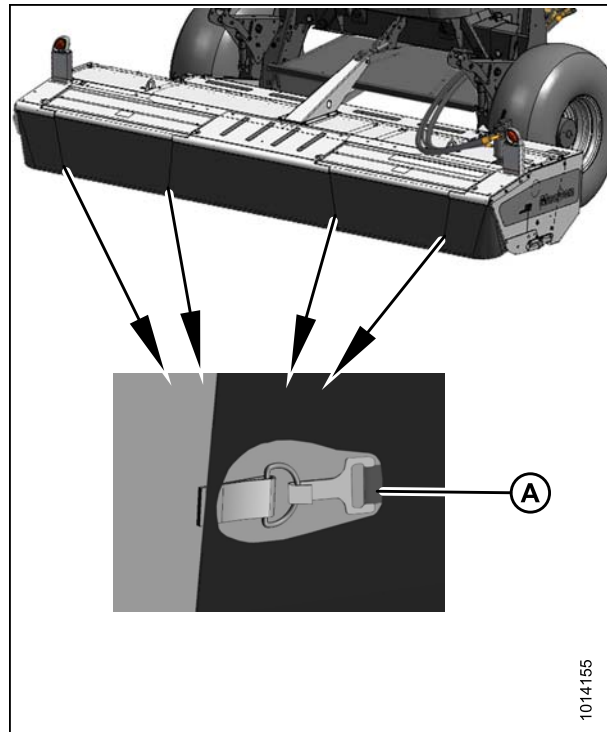


Figure 3.19: Curtain Latches

3.6 Daily Start-Up Check

CAUTION

- Be sure windrower and header are properly attached, all controls are in NEUTRAL, and windrower brake is engaged.
- Clear the area of other persons, pets etc. Keep children away from machinery. Walk around the header to be sure no one is under, on or close to it.
- Wear close fitting clothing and protective shoes with slip resistant soles. As well, carry with you any protective clothing and personal safety devices that COULD be necessary through the day. Don't take chances.
- Remove foreign objects from the machine and surrounding area.

You may need the following:

- A hard hat
- Protective footwear with slip resistant soles
- Protective glasses or goggles
- Heavy gloves
- A respirator or filter mask
- Wet weather gear

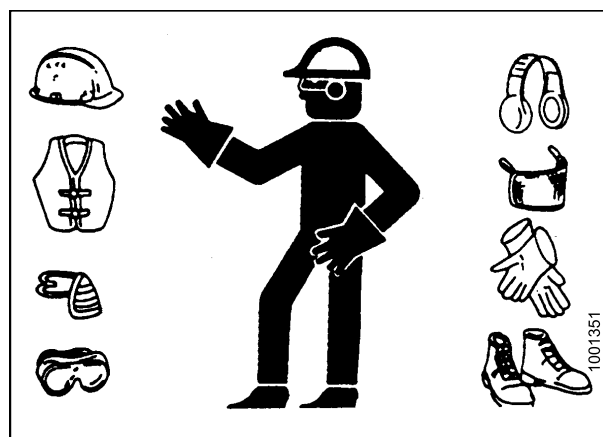


Figure 3.20: Safety Equipment

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



Figure 3.21: Safety Equipment

OPERATION

Do the following each day before start-up:

1. Check the machine for leaks or any parts that are missing, broken, or not working correctly.

NOTE:

Use proper procedure when searching for pressurized fluid leaks. Refer to [5.6.2 Hydraulic Hoses and Lines, page 172](#).

2. Clean all lights and reflective surfaces on the machine. Check lights for proper operation.
3. Perform all daily maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

3.7 Attaching the Header

3.7.1 Attaching the Forming Shield

DANGER

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

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

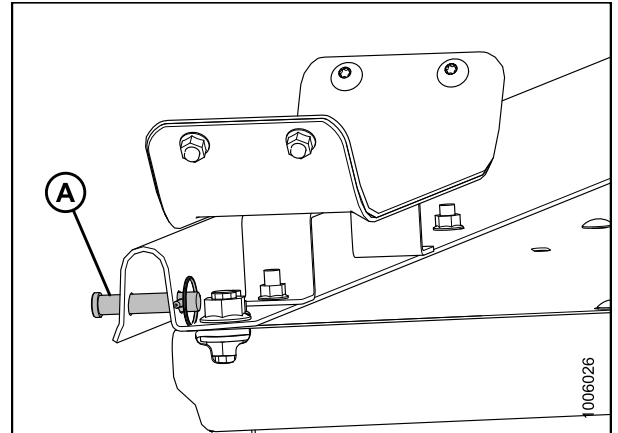


Figure 3.22: Forming Shield

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

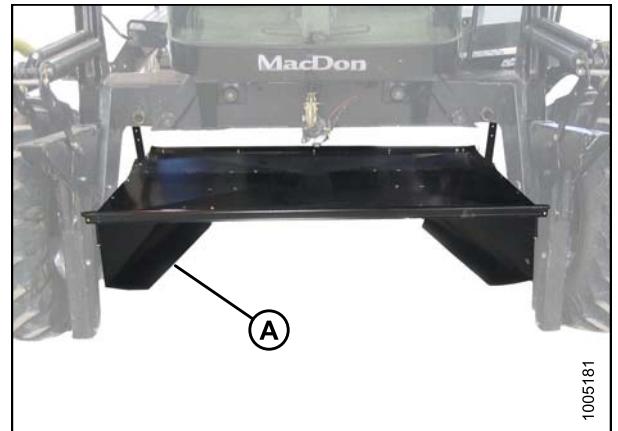


Figure 3.23: Forming Shield under Windrower Frame

OPERATION

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

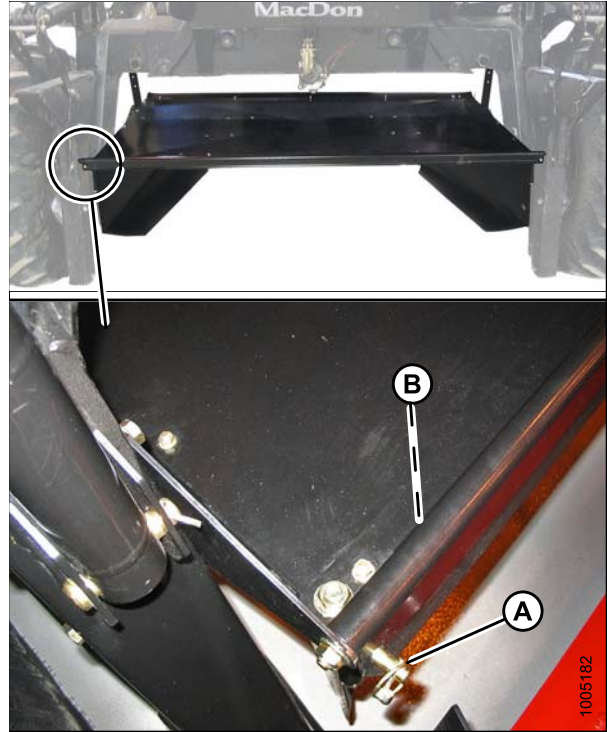


Figure 3.24: Attaching Forming Shield to Windrower Legs

IMPORTANT:

Forming shield plate (A) is shown in standard position. If installing double windrow attachment (DWA), install plate in inverted position.

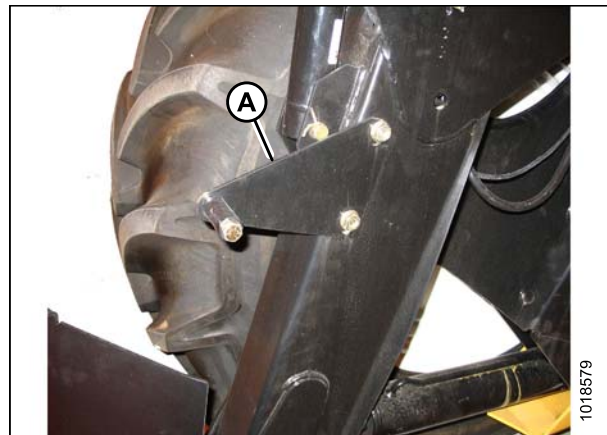


Figure 3.25: Forming Shield under Windrower Frame

OPERATION

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

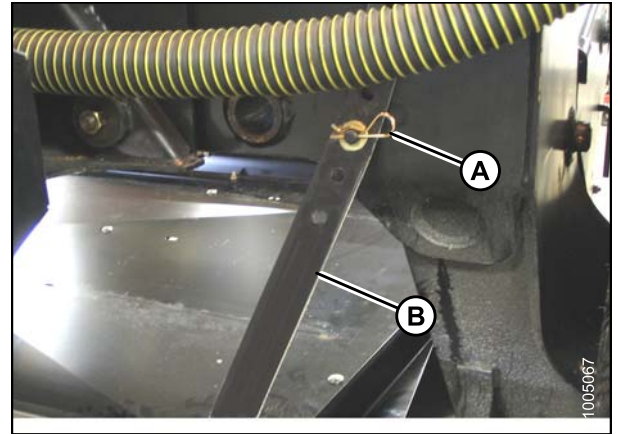


Figure 3.26: Forming Shield Strap

7. Set the forming shield side deflectors to the desired width by repositioning the adjuster bars (A). Use the same hole location on both sides.
8. Adjust the rear fluffer deflector (C) to the middle position. Loosen handles (B) if required.
9. Attach the R85 header to the windrower. Refer to the windrower operator's manual, and then return to this manual to complete the attachment.
10. Connect the hydraulics and electrical harness.
 - For M1240, refer to [3.7.4 Attaching Hydraulic and Electrical Components: M1240 Windrowers, page 50](#).
 - For M205, refer to [3.7.5 Attaching Hydraulic and Electrical Components: M205 Windrowers, page 55](#).
 - For M200, refer to [3.7.6 Attaching Hydraulic and Electrical Components: M200 Windrowers, page 60](#).

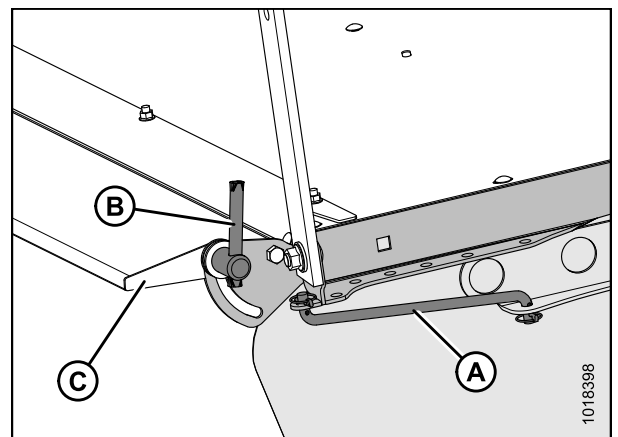


Figure 3.27: Forming Shield Adjuster Bar

3.7.2 Attaching Header to an M200 and M205 Self-Propelled Windrower

To attach the header to a self-propelled windrower, follow these steps:

1. Remove hairpin from pin (A) and remove pin from the left and right header boots (B).

⚠ CAUTION

Ensure all bystanders have cleared the area.

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

3. Slowly drive the windrower forward so that the feet (A) enter the header boots (B). Continue to drive slowly forward until feet engage the boots and header nudges forward.
4. If a manual center-link is installed, raise it up by hand and extend it until it reaches the header. Install the pin to secure the center-link to the header.
5. Adjust the manual center-link until a dimension of 737 mm (29 in) (pin to pin) is achieved.

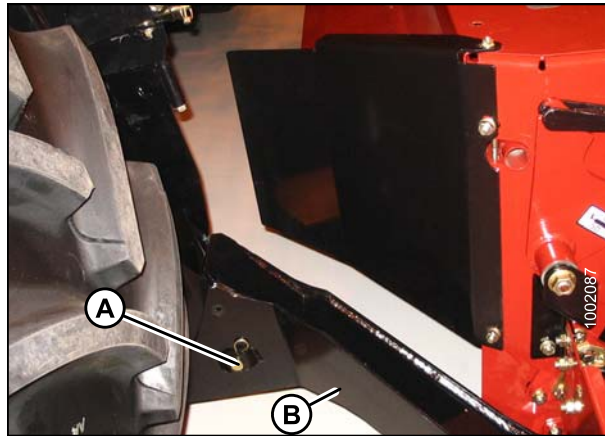


Figure 3.28: Header Boots

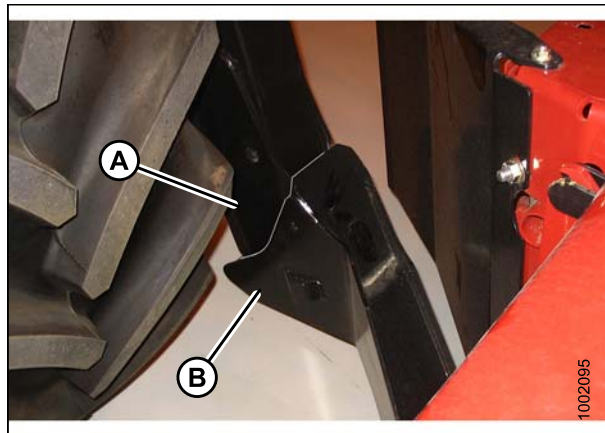


Figure 3.29: Header Boots

OPERATION

6. If the hydraulic center-link is installed, use the HEADER TILT cylinder switches on the GSL to position center-link cylinder (A) so it can connect to the header.
7. Push down on the rod end of the link cylinder until the hook engages pin (B) on header. Then, retract it until it is locked.

NOTE:

If the optional center-link assist cylinder is installed, activate the cylinder from the cab using the reel lift switches to lower the center-link onto header. Then retract the center-link to secure it to the header.

8. Raise the header fully with the HEADER UP switch on the GSL. Stop engine and remove key.

⚠ DANGER

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

9. Engage safety props on both lift cylinders.
10. Install pin (A) through each boot and foot and secure with hairpin.

IMPORTANT:

Ensure pin (A) is fully inserted and hairpin is installed behind the bracket.

11. Remove pin (A) from its storage position in linkage and insert it into hole (B) to engage float springs. Secure with hairpin.
12. Disengage safety props.
13. Start engine and activate the HEADER LIFT cylinder switch on the GSL to lower header fully. Stop engine and remove key.
14. Connect header drive hydraulics and electrical harness to header.

NOTE:

Refer to the header operator's manual for instructions on attaching the hydraulics and electrical to the rotary header.

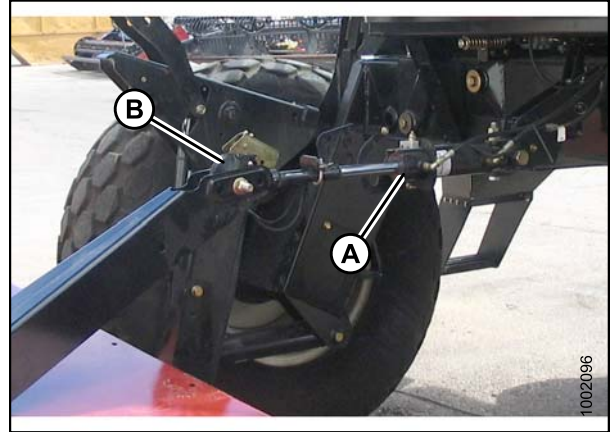


Figure 3.30: Center-Link

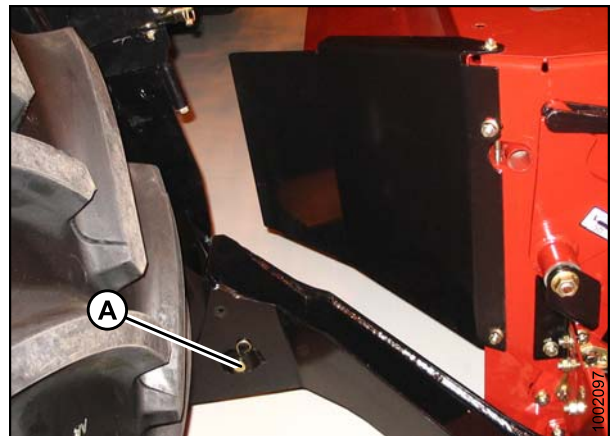


Figure 3.31: Header Boots

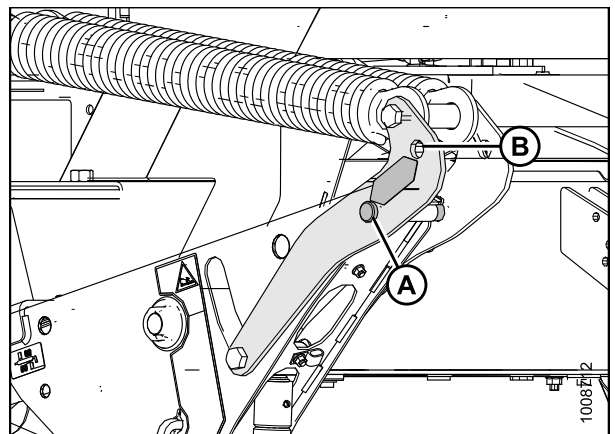


Figure 3.32: Float Pins

3.7.3 Attaching Hydraulic Center-Link: M1240 Windrowers

To attach an R85 header to a windrower, follow these steps:

⚠ DANGER

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

1. **For hydraulic center-link without self-alignment:**

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

IMPORTANT:

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

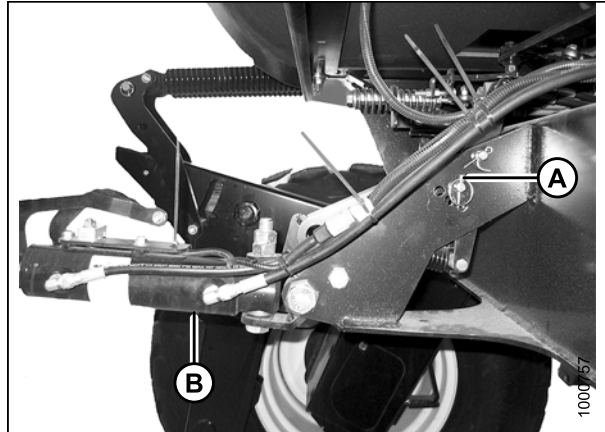


Figure 3.33: Hydraulic Center-Link without Self-Alignment Kit

2. Remove hairpin (B) from clevis pin (A) and remove pin from header boot (C) on both sides of header.

⚠ CAUTION

Check to be sure all bystanders have cleared the area.

3. Start engine.

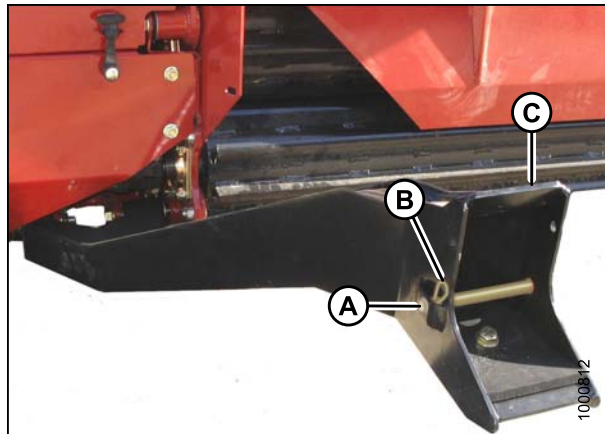


Figure 3.34: Header Boot

CAUTION

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

NOTE:

If not prompted by the harvest performance tracker (HPT) display to remove float, remove float manually. Refer to [4.1.3 Removing and Restoring Float for M1240 Self-Propelled Windrowers](#), page 84.

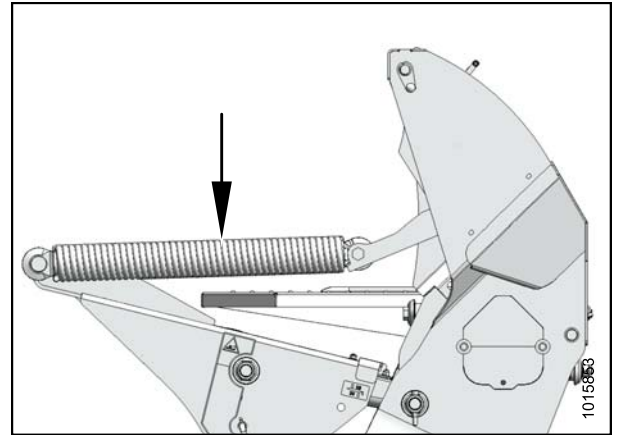


Figure 3.35: Header Float Spring

4. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract header lift cylinders.
5. **For hydraulic center-link with self-alignment:** Press the REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

IMPORTANT:

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

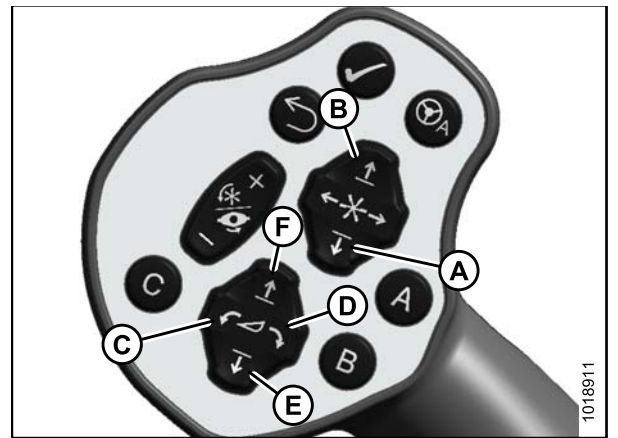


Figure 3.36: Ground Speed Lever

- | | |
|----------------------|--------------------|
| A - Reel Down | B - Reel Up |
| C - Header Tilt Down | D - Header Tilt Up |
| E - Header Down | F - Header Up |

6. Drive the windrower slowly forward until the windrower feet (A) enter the header boots (B). Continue to drive slowly forward until feet engage the boots and header nudges forward.
7. Ensure that lift linkages are properly engaged in header legs.

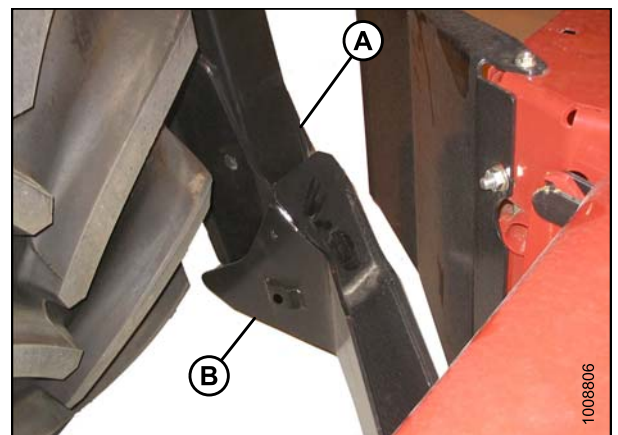


Figure 3.37: Header Boot

OPERATION

8. For hydraulic center-link with optional self-alignment:

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

IMPORTANT:

Hook release (C) must be down to enable self-locking mechanism.

- b. If the hook release (C) is open (up), stop engine and remove key from ignition then manually push hook release (C) down after hook engages header pin.
- c. Lower center-link (A) onto the header with REEL DOWN switch on the GSL until it locks into position (hook release [C] is down).
- d. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.

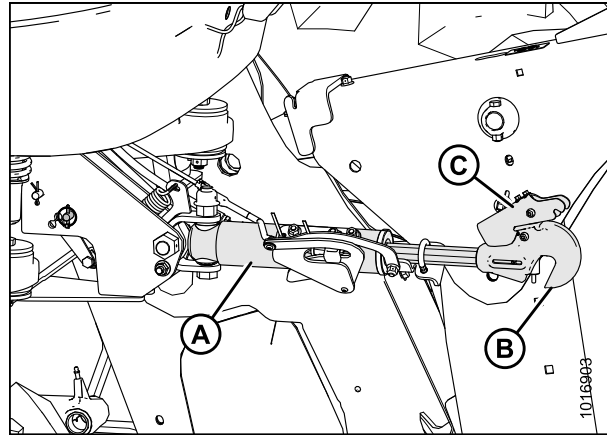


Figure 3.38: Center-Link

9. For hydraulic center-link without self-alignment:

- a. Press HEADER TILT UP or HEADER TILT DOWN cylinder switches on the GSL to extend or retract center-link cylinder until the hook is aligned with the header attachment pin.
- b. Stop engine and remove key.
- c. Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

IMPORTANT:

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

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

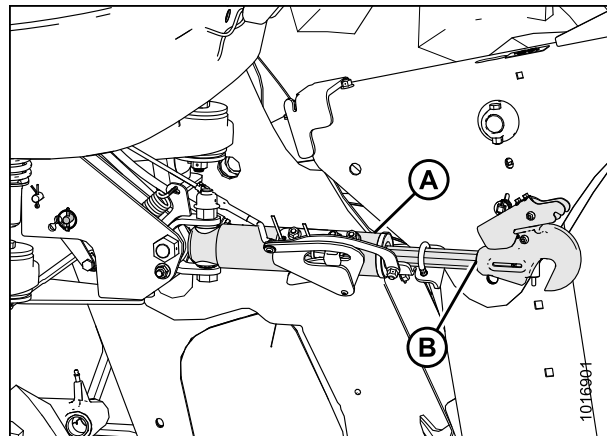


Figure 3.39: Hydraulic Center-Link

OPERATION

CAUTION

Check to be sure all bystanders have cleared the area.

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

NOTE:

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

- a. Press and hold the HEADER UP switch (A) until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.
11. Stop engine, and remove the key.
 12. Engage safety prop on the windrower's lift cylinder as follows:
 - a. Pull lever (A) and rotate toward header to release, and lower safety prop onto cylinder.
 - b. Repeat for opposite lift cylinder.

IMPORTANT:

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

13. Install clevis pin (A) through boot and foot and secure with hairpin (B). Repeat for opposite side.

IMPORTANT:

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



Figure 3.40: Ground Speed Lever

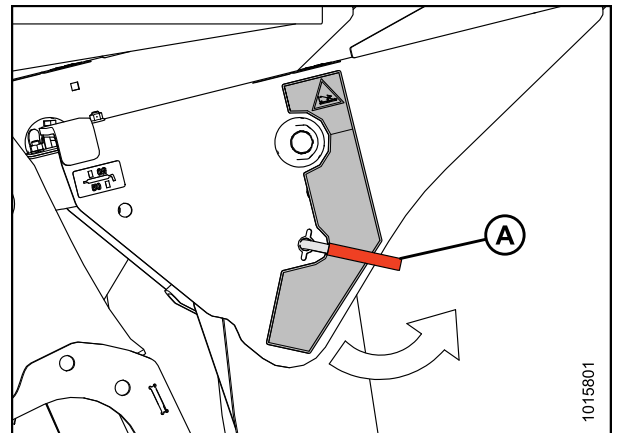


Figure 3.41: Cylinder Safety Prop

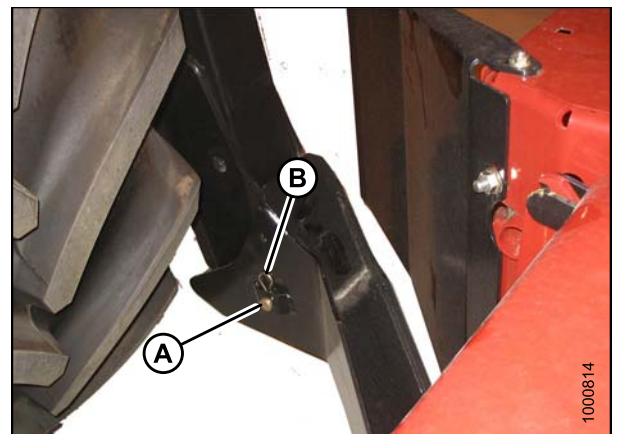


Figure 3.42: Header Boot

OPERATION

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

NOTE:

If safety prop will not disengage, raise header to release the prop.

- Repeat for opposite side.

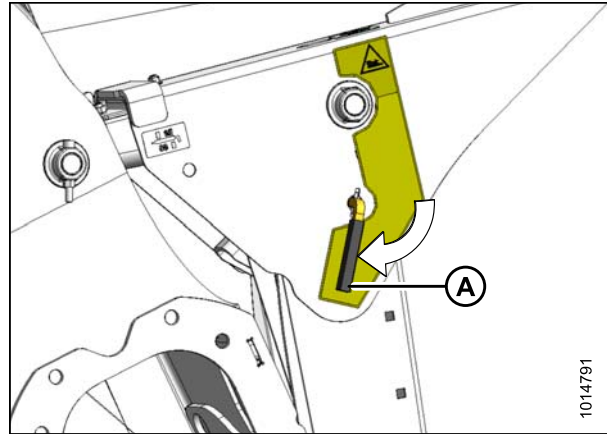


Figure 3.43: Cylinder Safety Prop

CAUTION

Check to be sure all bystanders have cleared the area.

- Start engine and press HEADER DOWN switch (A) on GSL to fully lower header.

NOTE:

If not prompted by the HPT display to restore float, restore float manually. Refer to [4.1.3 Removing and Restoring Float for M1240 Self-Propelled Windrowers](#), page 84.

- Stop engine and remove key.
- Proceed to [3.7.4 Attaching Hydraulic and Electrical Components: M1240 Windrowers](#), page 50.

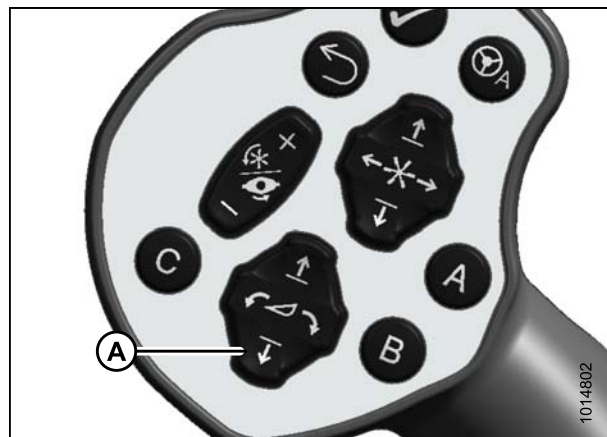


Figure 3.44: Ground Speed Lever

3.7.4 Attaching Hydraulic and Electrical Components: M1240 Windrowers

Your M1240 Self-Propelled Windrower may be configured with either quick coupler or hard plumb connections for the R85 Header.

Refer to the following procedures for routing and connecting M1240 and R85 hydraulic and electrical components:

- [Routing Hydraulic Hoses and Electrical Components to M1240 Windrowers](#), page 51
- [Connecting Header Hydraulics Using Quick Couplers: M1240 Windrowers](#), page 52
- [Connecting Header Hydraulics Using Hard Plumbing: M1240 Windrowers](#), page 53

OPERATION

Routing Hydraulic Hoses and Electrical Components to M1240 Windrowers

To route the R85 Header hydraulic hoses and electrical harness to the M1240 Self-Propelled Windrower, follow these steps.

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

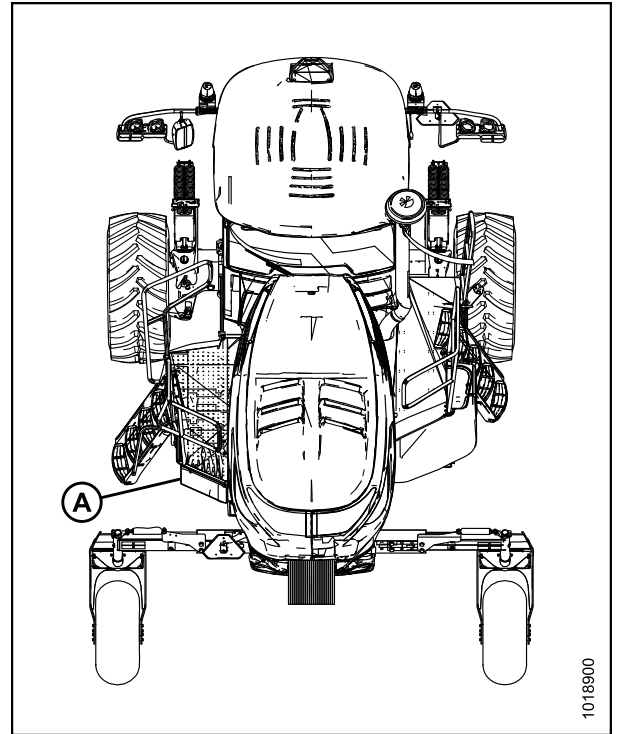


Figure 3.45: Windrower with LH Platform in Open Position

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

NOTE:

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

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

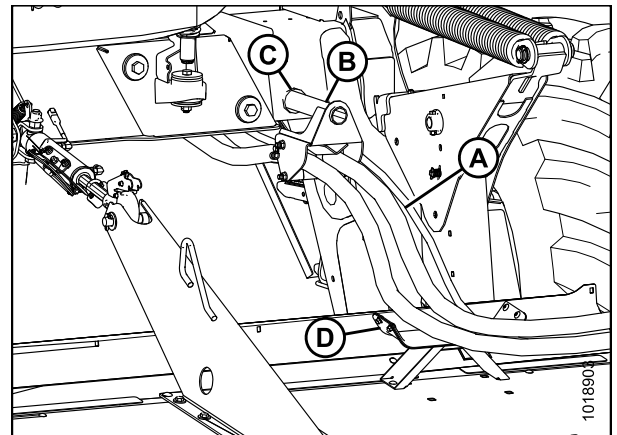


Figure 3.46: Hydraulic Hoses

4. If your M1240 Windrower has factory-installed quick connect couplers, refer to [Connecting Header Hydraulics Using Quick Couplers: M1240 Windrowers, page 52](#) for connection instructions.
If your M1240 Windrower has factory-installed hard plumb connections, refer to [Connecting Header Hydraulics Using Hard Plumbing: M1240 Windrowers, page 53](#) for connection instructions.

OPERATION

Connecting Header Hydraulics Using Quick Couplers: M1240 Windrowers

To connect the M1240 Self-Propelled Windrower hydraulic hoses and electrical cords to the R85 Header, follow these steps.

1. Use a clean rag to remove dirt and moisture from the couplers.
2. Make the following hydraulic and electrical connections to the windrower:
 - a. Connect the disc pressure hose (A) marked with a red cable tie (B) with coupler (C) and torque to 205–226 N·m (151–167 ft·lbf)
 - b. Connect the disc return hose (D) with coupler (E) and torque to 205–226 N·m (151–167 ft·lbf)
 - c. Connect the case drain hose (F) to fitting (G)
 - d. Connect the electrical harness to plug (H)

NOTE:

Elbow fittings on quick couplers should be set at a 30° angle to allow hoses to pass by the multicoupler without coming into contact with it.

NOTE:

The hydraulic hoses should have enough slack in them to pass by the multicoupler (J) without coming into contact with it. This will keep the hoses from rubbing against the multicoupler and protect them from becoming damaged or worn. You can increase slack in the hoses by loosening and adjusting the hose holder on the front windrower leg and pulling the hoses backwards toward the windrower.

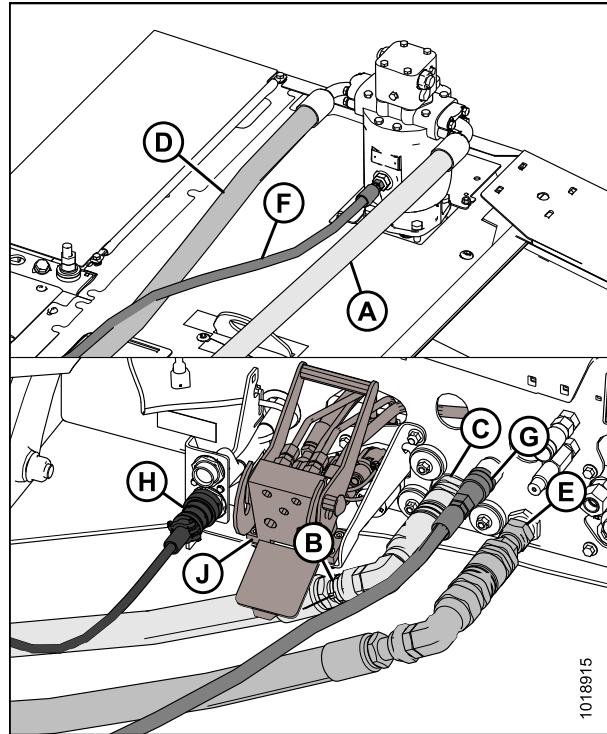


Figure 3.47: Hydraulic and Electrical Connections on M1240 Windrower (Parts Removed for Clarity)

OPERATION

3. Move the left-hand windrower platform (A) to the CLOSED position. For instructions, refer to the windrower operation's manual.

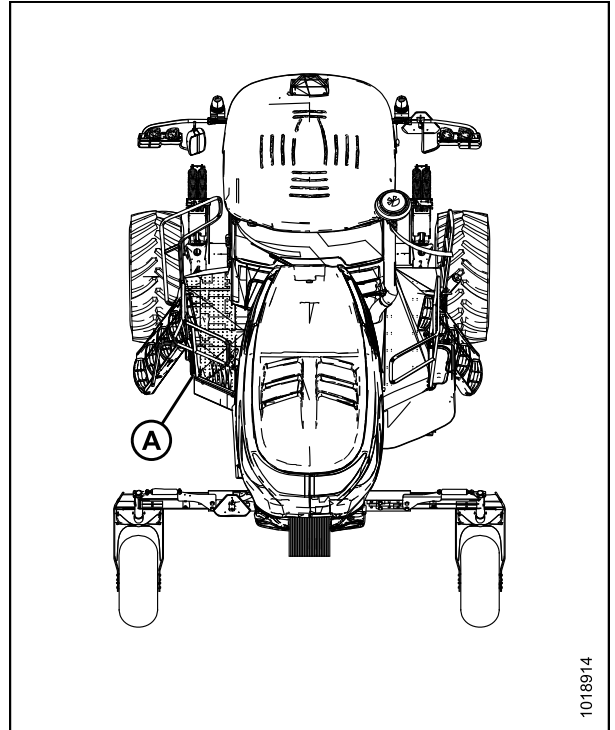


Figure 3.48: Windrower with LH Platform in Closed Position

Connecting Header Hydraulics Using Hard Plumbing: M1240 Windrowers

Hard plumbing helps reduce the potential for leaks at the hydraulic connection sites and helps the header drive run more efficiently. To connect the M1240 Self-Propelled Windrower to the R85 Header with hard plumbing, follow these steps.

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

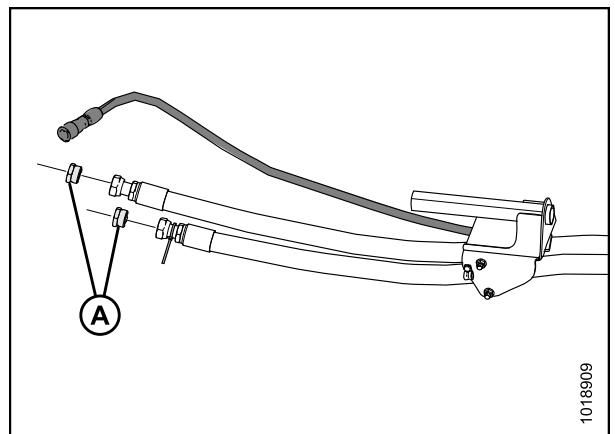


Figure 3.49: Protective Shipping Plugs on R85 Hydraulic Hoses (Windrower Not Shown for Clarity)

OPERATION

2. Use a clean rag to remove dirt and moisture from the couplers on the windrower and remove protective plugs (A) from the hard plumbing (B).

NOTE:

Hard plumbing should be factory-set to 30° to allow hoses to pass by the multicoupler.

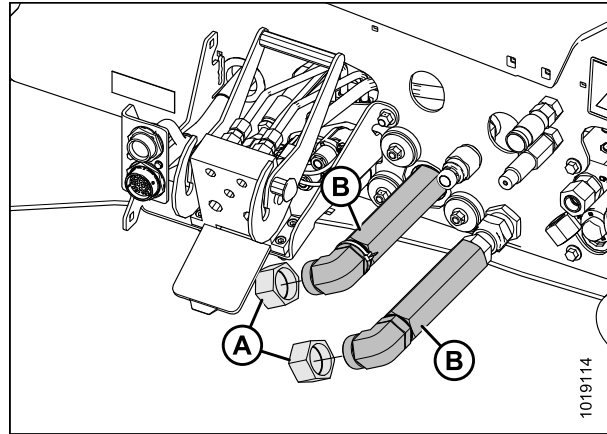


Figure 3.50: Protective Shipping Plugs on M1240 Hard Plumbing Connections (Parts Removed for Clarity)

3. Make the following hydraulic and electrical connections to the windrower:
 - a. Connect the disc pressure hose (A) marked with a red cable tie (B) to hard plumb fitting marked with a red cable tie (C) and torque to 205–226 N·m (151–157 ft·lbf)
 - b. Connect the disc return hose (D) to hard plumb fitting (E) and torque to 205–226 N·m (151–167 ft·lbf)
 - c. Connect the case drain hose (F) to fitting (G)
 - d. Connect the electrical harness to plug (H)

NOTE:

The hydraulic hoses should have enough slack in them to pass by the multicoupler (J) without coming into contact with it. This will keep the hoses from rubbing against the multicoupler and protect them from becoming damaged or worn. You can increase slack in the hoses by loosening and adjusting the hose holder on the front windrower leg and pulling the hoses backwards toward the windrower.

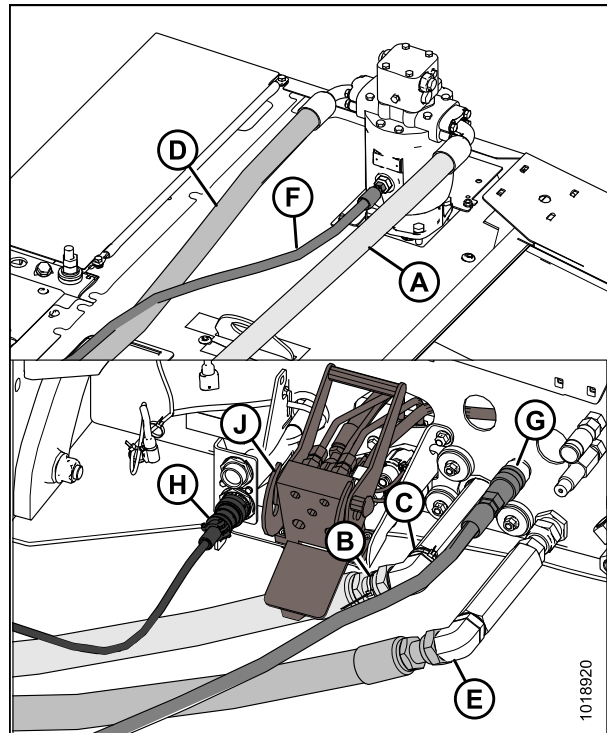


Figure 3.51: Hydraulic and Electrical Connections on Header and M1240 Windrower using Hard Plumbing (Parts Removed for Clarity)

OPERATION

4. Move the windrower platform (A) to the CLOSED position. For instructions, refer to the windrower operator's manual.

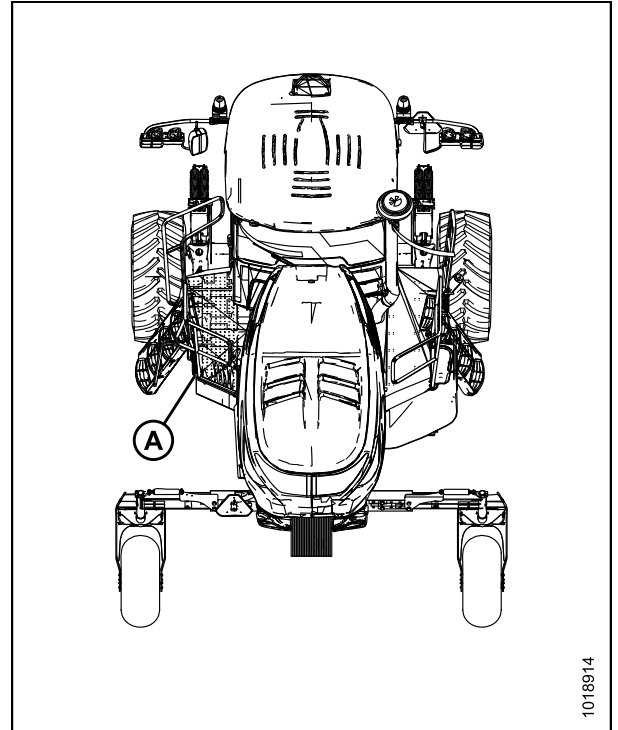


Figure 3.52: Windrower with LH Platform in Closed Position

3.7.5 Attaching Hydraulic and Electrical Components: M205 Windrowers

DANGER

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

Refer to your windrower operator's manual for procedures to mechanically attach the header to the windrower. Refer to the following procedures for electrical and hydraulic connections:

OPERATION

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

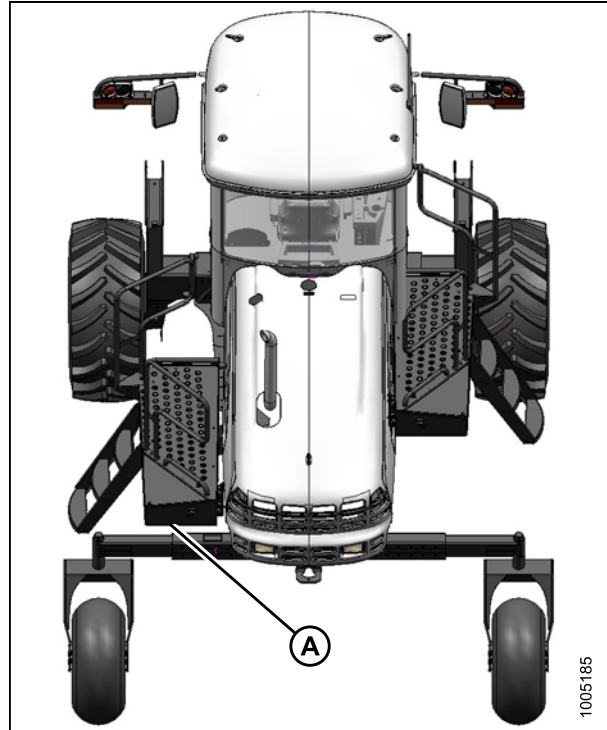


Figure 3.53: Windrower with LH Platform in Open Position

2. Route the hose bundle (A) from the header under the windrower frame, and insert pin (B) into hole in windrower frame.
3. Place hoses on support (C) and on the hose support on the forming shield (not shown).
4. If optional couplers and lock are installed on hoses and lines, proceed as follows. Otherwise, proceed to Step 13., page 59.

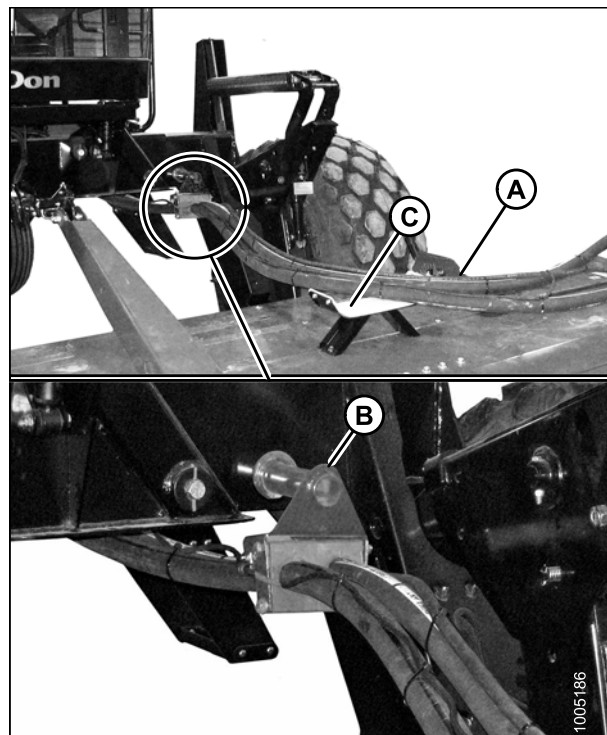


Figure 3.54: Hydraulic Hoses

OPERATION

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

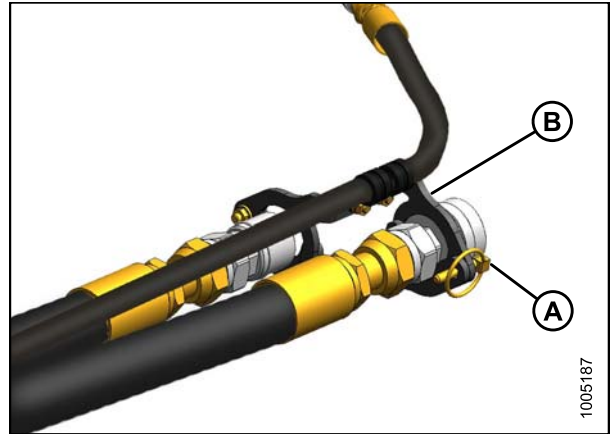


Figure 3.55: Hydraulic Couplers with Coupler Lock

6. Connect the rear pump hose (A) to outboard line (D) on windrower using coupler (C).
7. Connect the front pump hose (B) to the inboard line (E) on windrower using coupler (C).

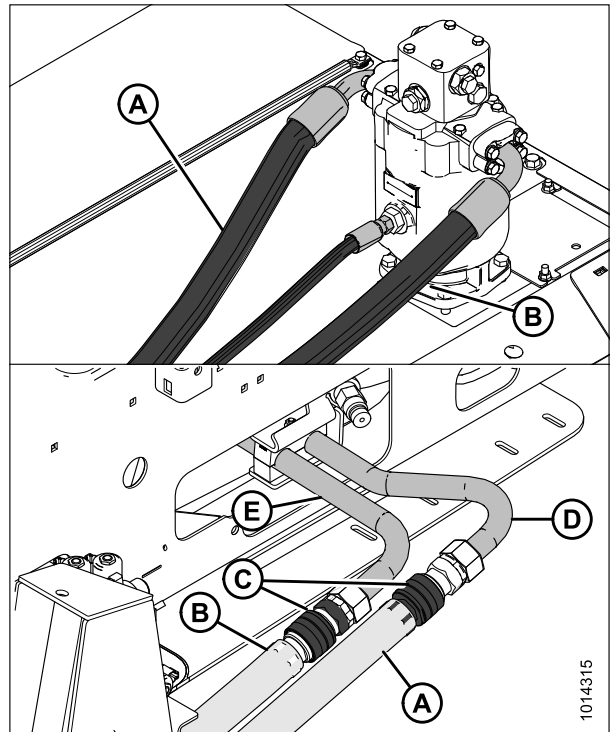


Figure 3.56: Hose Routing and Connections

OPERATION

- Position the lock onto the couplers so that retainer (A) rests under the fitting next to the sleeve on each coupler.

NOTE:

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

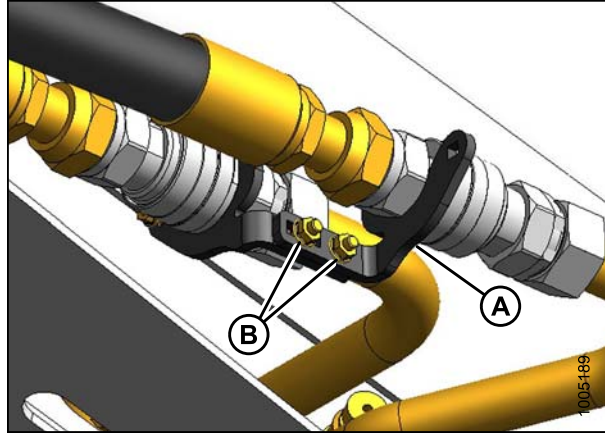


Figure 3.57: Hydraulic Couplers with Coupler Lock

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

NOTE:

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

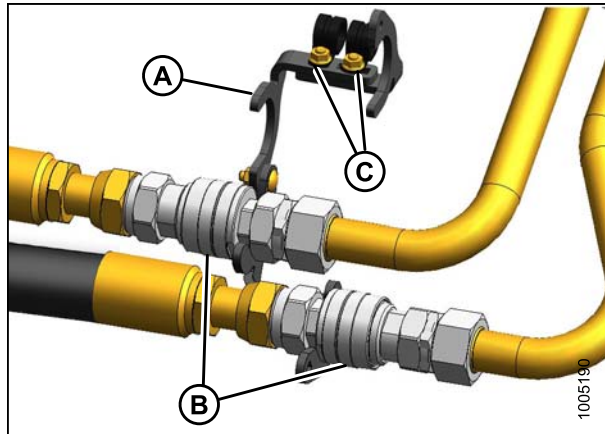


Figure 3.58: Hydraulic Couplers with Coupler Lock

- Insert lynch pin (A) to secure the lock.
- Attach case drain hose coupler at (B).
- Proceed to Step [17.](#), [page 59](#).

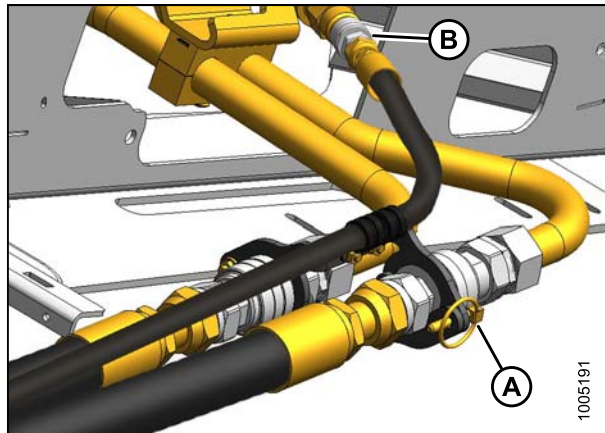


Figure 3.59: Hydraulic Couplers with Case Drain Hose

OPERATION

13. Connect the rear pump hose (A) to outboard line (F) on windrower using fitting (D).
14. Connect the front pump hose (B) to the inboard line (G) on windrower using fitting (D).
15. Torque fittings to 183 N·m (135 ft·lbf).
16. Attach case drain hose and coupler (C) to (E).

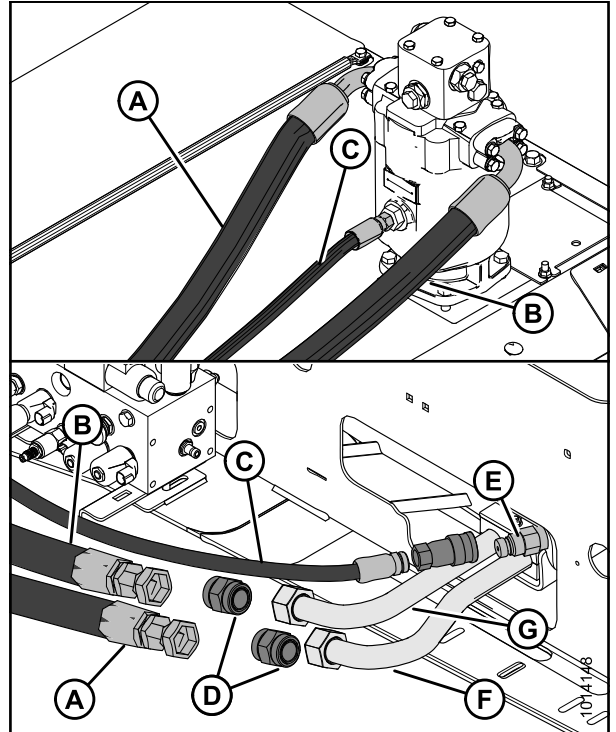


Figure 3.60: Hose Routing and Connections

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

NOTE:

Valve block hidden to show the electrical connector.

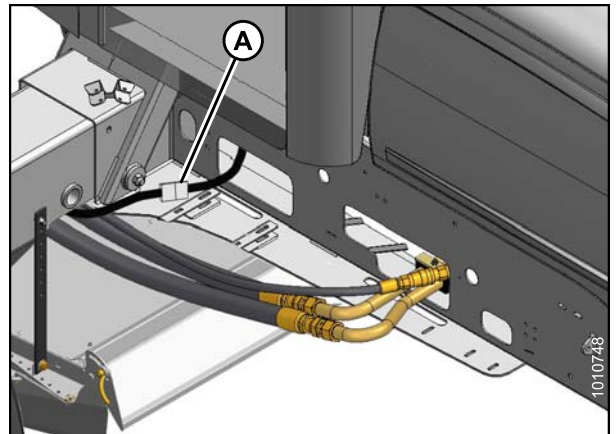


Figure 3.61: Electrical Connection

OPERATION

18. Move the windrower platform (A) to the CLOSED position. For instructions, refer to the windrower operator's manual.

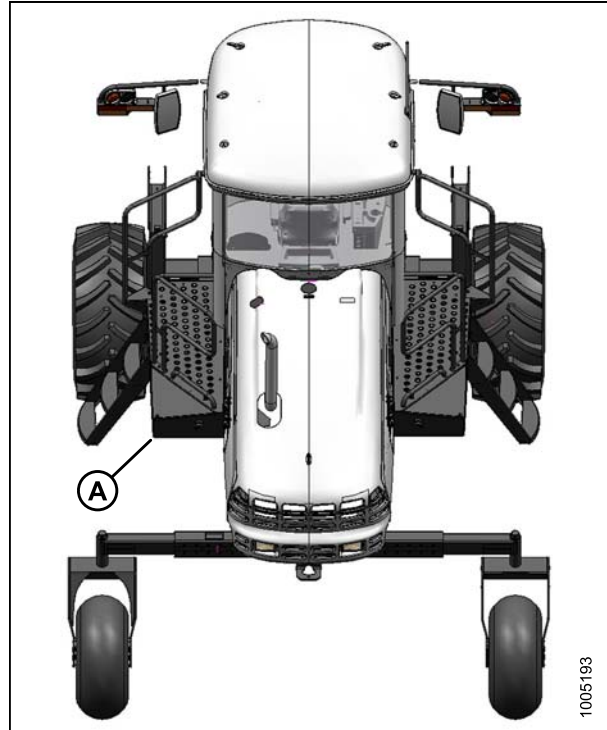


Figure 3.62: Windrower with LH Platform in Closed Position

3.7.6 Attaching Hydraulic and Electrical Components: M200 Windrowers

DANGER

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

Refer to [3.7 Attaching the Header, page 41](#) for procedure to mechanically attach the header to the windrower. Refer to the following procedures for electrical and hydraulic connections:

To operate the 16-foot header on an M200 windrower, installation of a motor/hose kit (MD #B5455) is required.

If required, obtain the kit through your MacDon Dealer. Install kit in accordance with the supplied instructions.

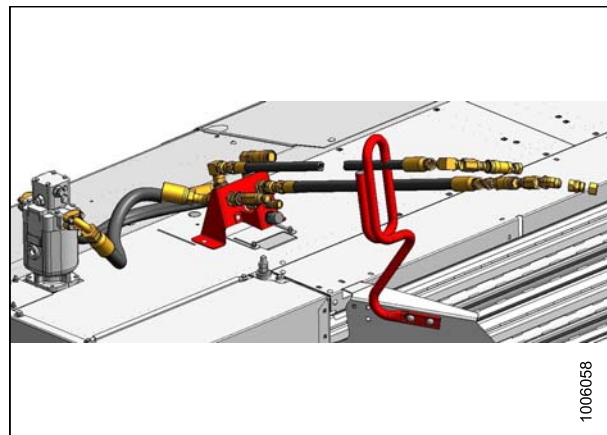


Figure 3.63: MD #B5455 Hydraulic Drive Kit

OPERATION

1. Disengage and rotate lever (A) counterclockwise to the UP position.
2. Remove the cap (B) securing the electrical connector to the frame.

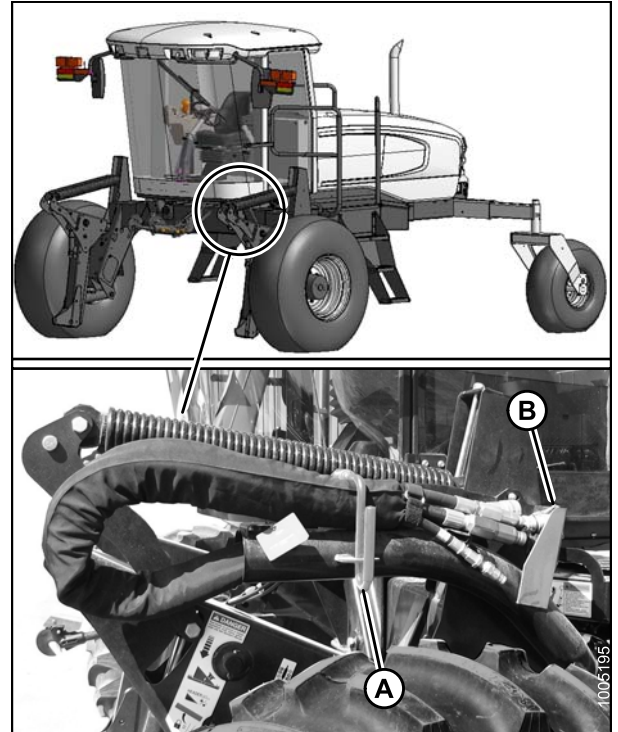


Figure 3.64: Hose Bundle

3. Move hose bundle (A) from the windrower and rest the bundle on the header.

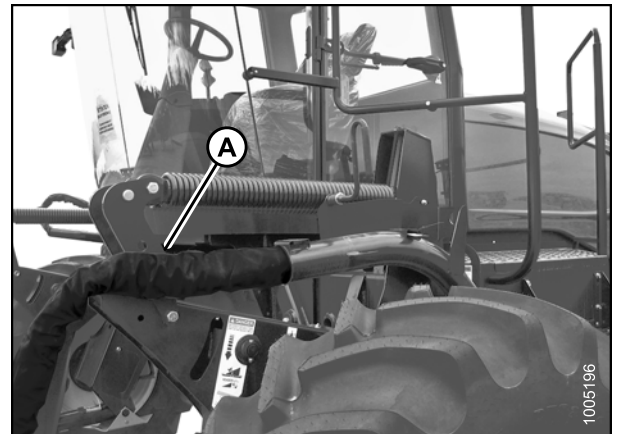


Figure 3.65: Hose Bundle

OPERATION

4. Position the hose support with the lower bolt (A) in the forward hole, as shown. Loosen both bolts and adjust as required.

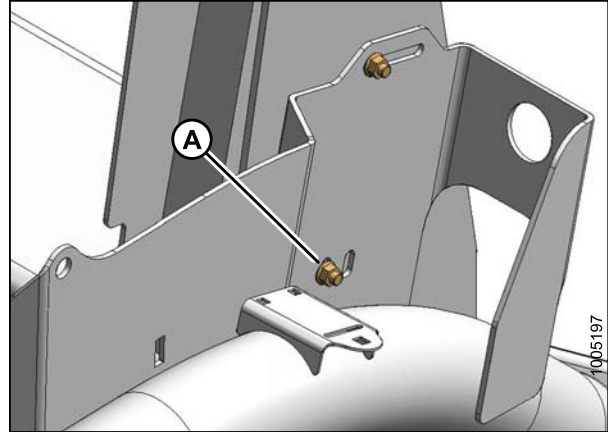


Figure 3.66: Hose Support

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

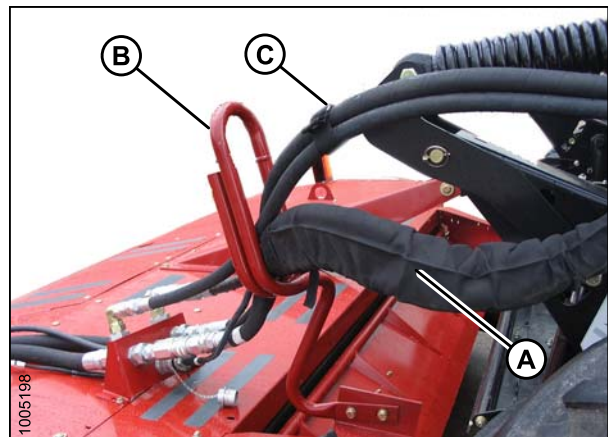


Figure 3.67: Hose Bundle with 16-Ft. Header

7. Secure hose bundles with three cinch straps (B).
8. Lower and lock lever (A).

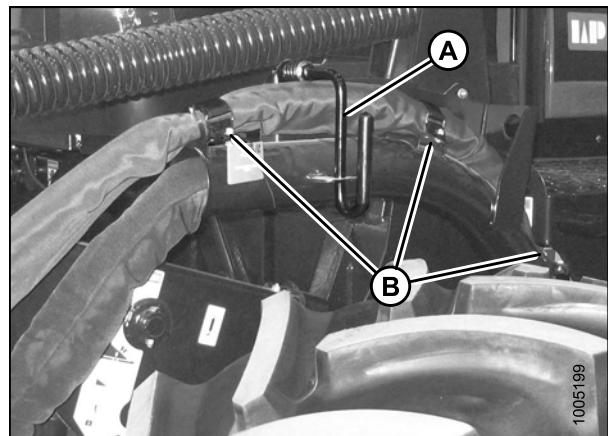


Figure 3.68: Hose Bundle

OPERATION

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

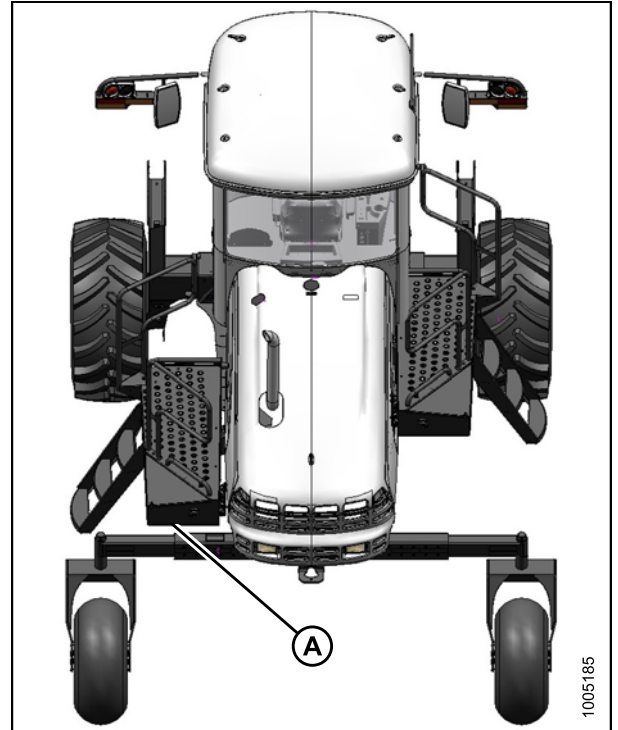


Figure 3.69: Windrower with LH Platform in Open Position

10. Remove caps from pressure (A) and return (B) ports on valve (C) and discard.

IMPORTANT:

Keep open lines and ports clean.

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

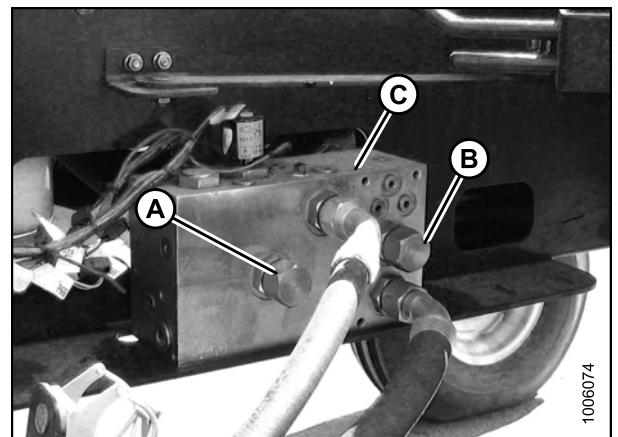


Figure 3.70: Hydraulic Connections

OPERATION

12. Disconnect fittings at end of hose bundle (A).
Discard caps.

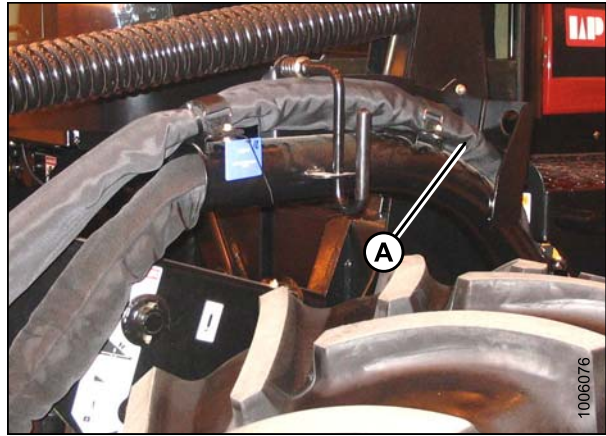


Figure 3.71: Hose Bundle

13. Remove O-ring (A) from cap and install over JIC threads on fitting at return port (B).
14. Install female coupler (C) from hose in return port (B).
15. Install male 45° fitting (D) and male coupler (E) from hose in pressure port (F).

NOTE:

Male fitting and coupler may need to be disassembled prior to installing on valve block.

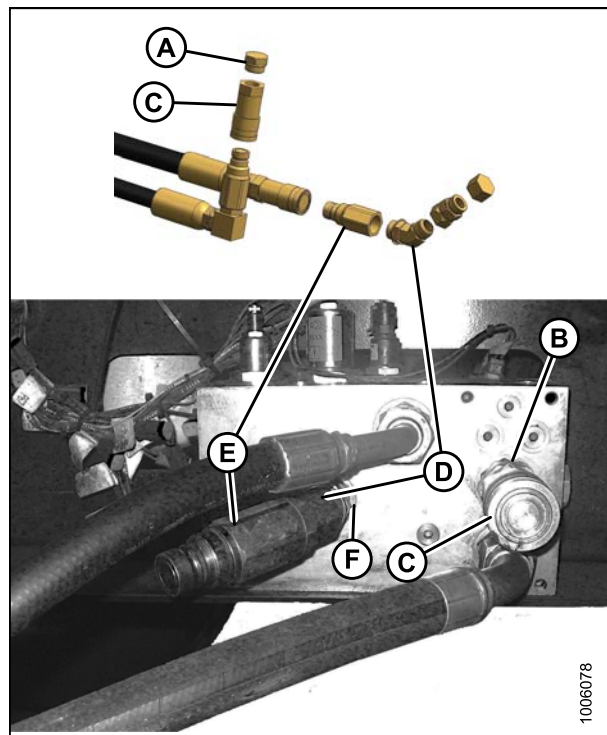


Figure 3.72: Hydraulic Connections

OPERATION

16. Connect hoses from header to fittings as shown.

NOTE:

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

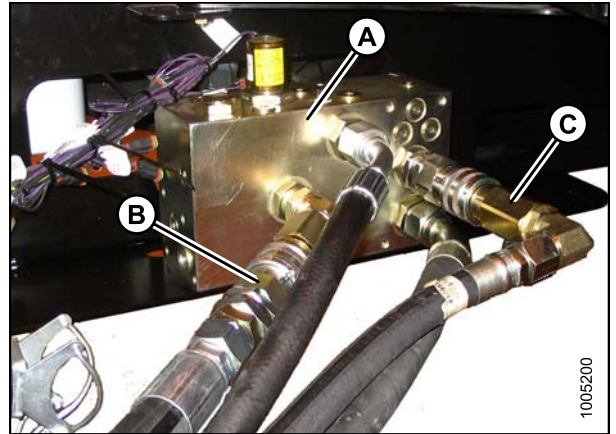


Figure 3.73: Hydraulic Connections

A - Middle Valve Block B - Pressure
C - Return

17. Remove caps and plugs from hoses and lines.
18. Connect the pressure (A), return (B), and case drain (C) hoses from windrower to fittings on header as shown.
19. Connect electrical harness (D) from windrower to connector on header.

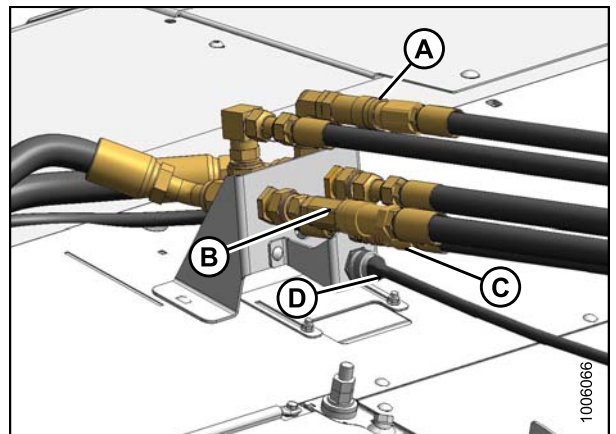


Figure 3.74: Header Connections

OPERATION

20. Move platform (A) to the CLOSED position. For instructions, refer to the windrower operator's manual.

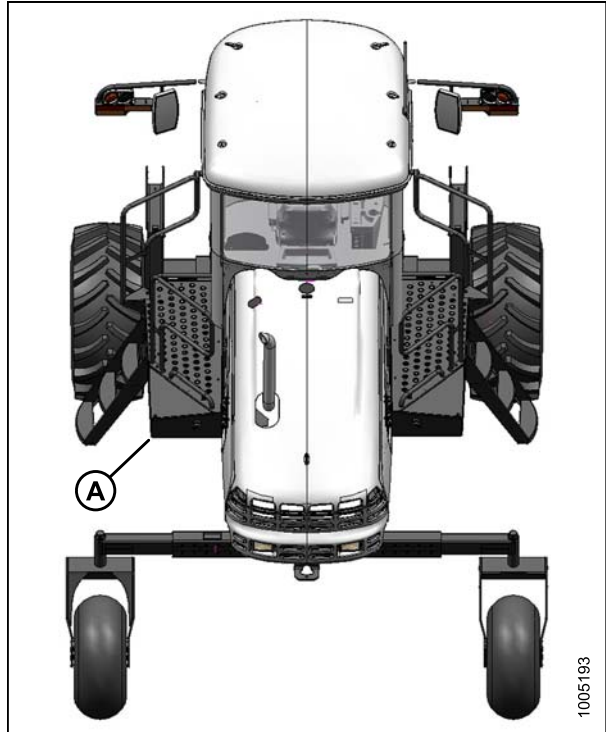


Figure 3.75: Top View of Windrower

3.8 Detaching the Header

3.8.1 Detaching the Header: M205 Windrowers

Refer to your windrower operator's manual for procedure to mechanically detach the header from a windrower. Refer to the following procedure to disconnect electrical and hydraulic systems:

DANGER

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

1. Lower header to ground. If ground is soft, place blocks under header.
2. Stop the engine and remove the key.
3. Move the left side (cab-forward) platform (A) to the open position. For instructions, refer to the windrower operator's manual.

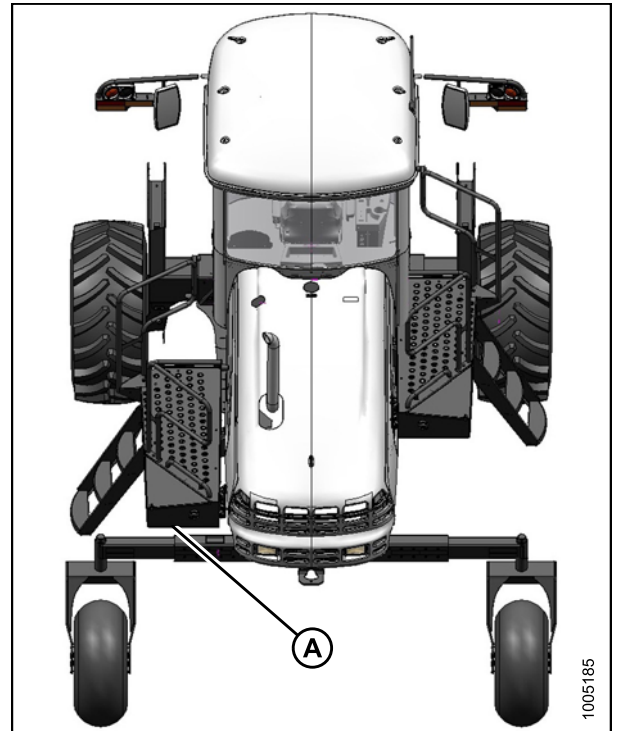


Figure 3.76: Windrower LH Platform

OPERATION

4. Disconnect the electrical harness at connector (A).

NOTE:

Valve block hidden to show the electrical connector.

5. If couplers and coupler lock are installed on lines, proceed as follows. Otherwise, proceed to Step 13., [page 69](#).

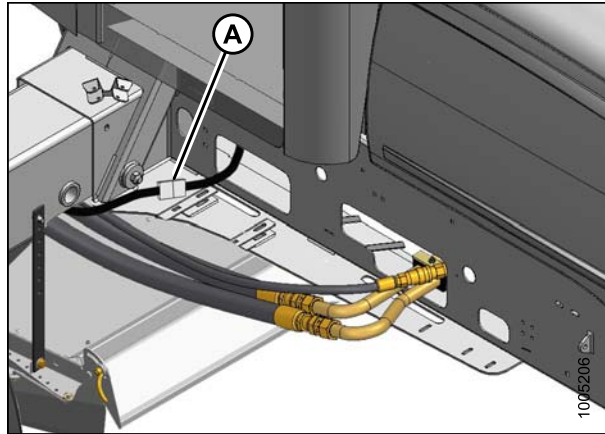


Figure 3.77: Hydraulic Connections

6. Disconnect 12.7 mm (1/2 in.) hose (B) from windrower coupler and remove lynch pin (A).

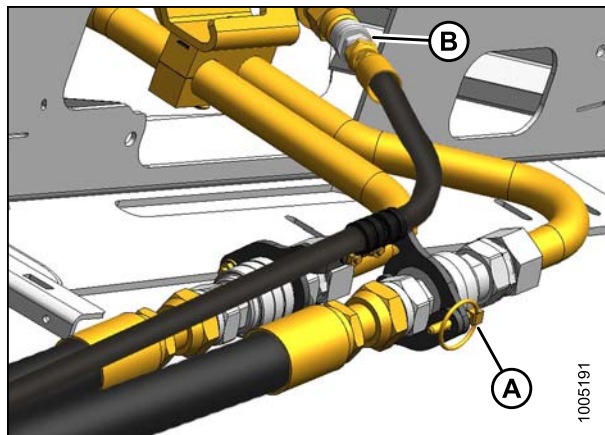


Figure 3.78: Hydraulic Connections

7. Open coupler lock (A).
8. Remove lock from couplers (B).

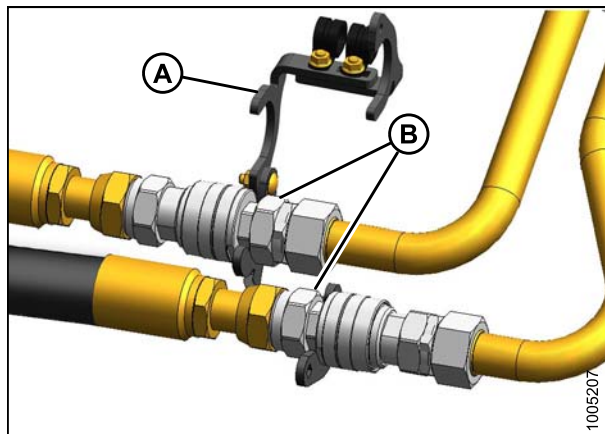


Figure 3.79: Hydraulic Connections

OPERATION

9. Unscrew sleeves (A) on couplers and separate couplers.
10. Install caps and plugs on open lines.

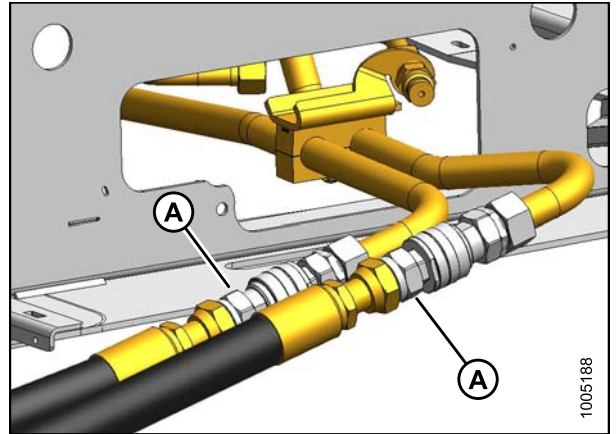


Figure 3.80: Hydraulic Connections

11. Attach coupler lock (B) to hoses and secure with lynch pin (A).
12. Proceed to Step [14.](#), [page 70.](#)

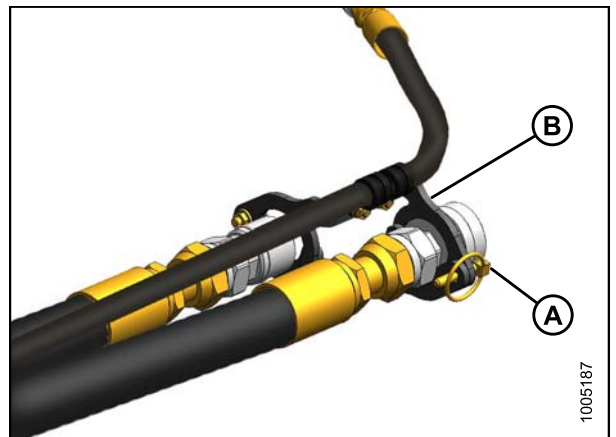


Figure 3.81: Hydraulic Connections

13. Disconnect hoses from lines (A), (B), and (C) on windrower. Install caps and plugs on open lines.

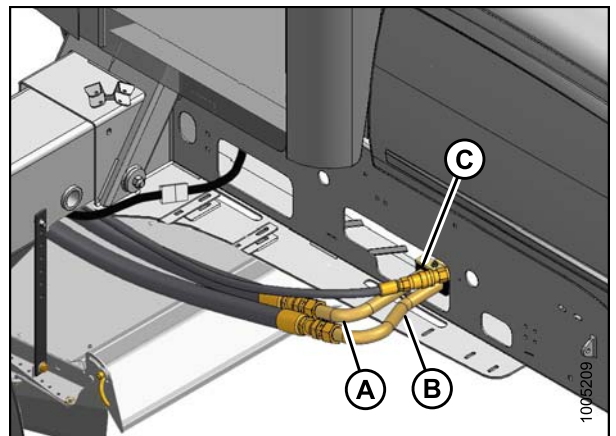


Figure 3.82: Hydraulic Connections

OPERATION

14. Remove hose support (A) from the windrower frame.
15. Route hoses (B) and electrical harness onto the header.

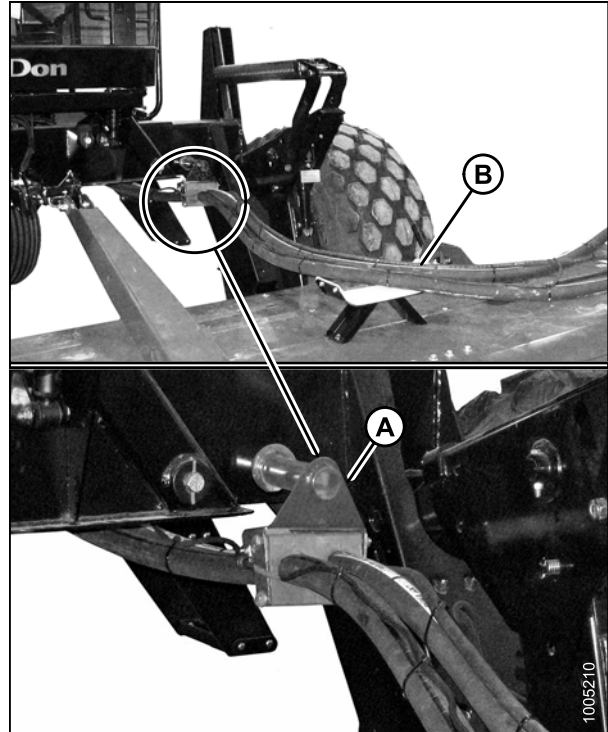


Figure 3.83: Hose Bundle

16. Move maintenance platform (A) to the CLOSED position. For instructions, refer to the windrower operator's manual.
17. Refer to the windrower operator's manual to mechanically detach the header from the windrower.

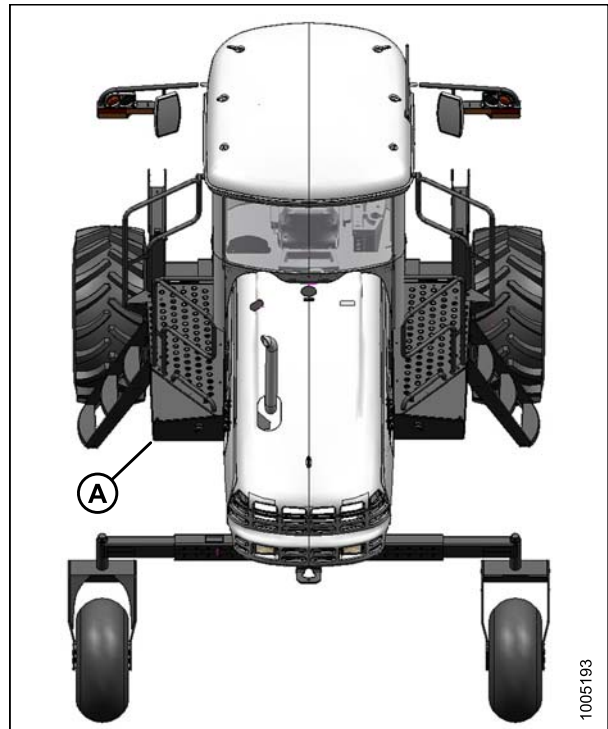


Figure 3.84: Windrower LH Platform

3.8.2 Detaching the Header: M200 Windrowers

Refer to your windrower operator's manual for procedure to mechanically detach the header from a windrower. Refer to the following procedure to disconnect electrical and hydraulic systems:

DANGER

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

1. Lower the header to ground. If ground is soft, place blocks under header.
2. Stop the engine and remove the key.
3. Move the left side (cab-forward) platform (A) to the open position. For instructions, refer to the windrower operator's manual.

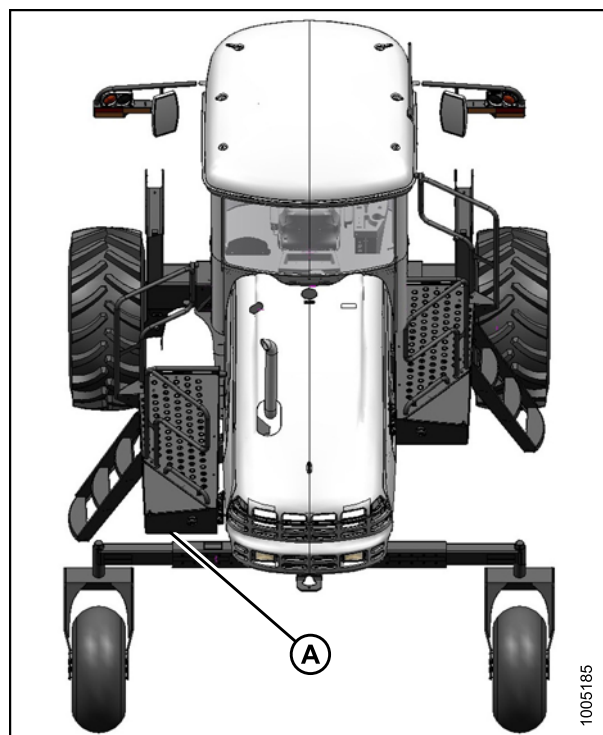


Figure 3.85: Windrower LH Platform

4. Disconnect the pressure hose (A) from port (M2) on the header drive valve block.
5. Disconnect the return hose (B) from port (R2) on the header drive valve block.
6. Install plugs and caps on open windrower lines and header hoses.

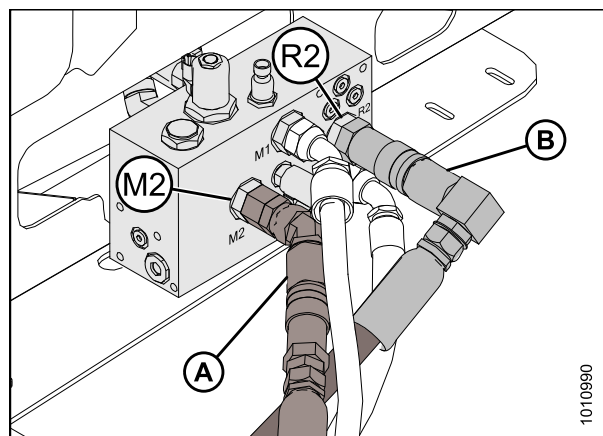


Figure 3.86: Hydraulic Connections

OPERATION

7. Raise and unlock lever (A) and undo the three cinch straps (B).
8. Move hose bundle to store on header.

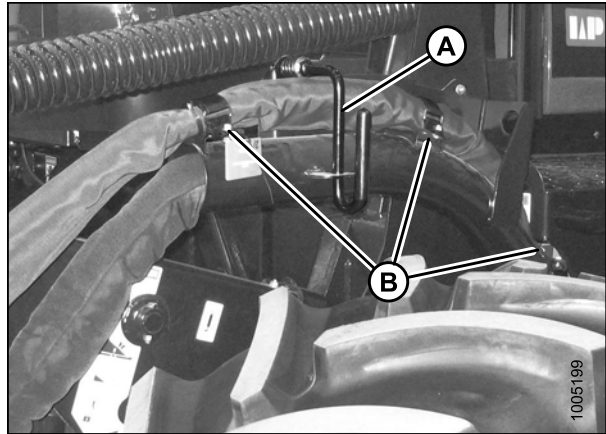


Figure 3.87: Hose Bundle

9. Disconnect the electrical connector (A) at the header by turning the collar counterclockwise and pulling the connector to disengage.

NOTE:

Hydraulic lines and hoses hidden on illustration to show the electrical connection.

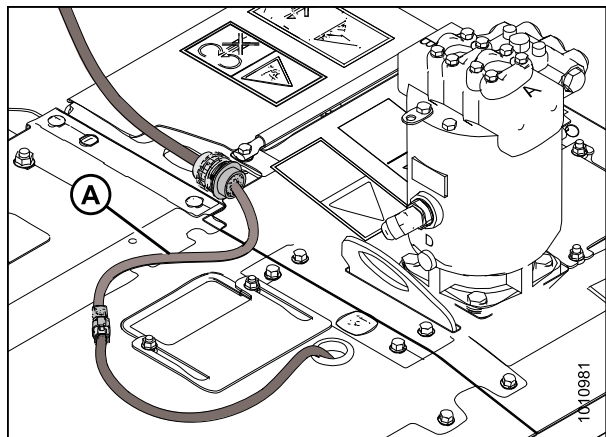


Figure 3.88: Electrical Connection

10. At the header, disconnect electrical connector (D) by turning collar counterclockwise and pulling connector to disengage.
11. Disconnect the pressure (A), return (B), and case drain (C) hoses.

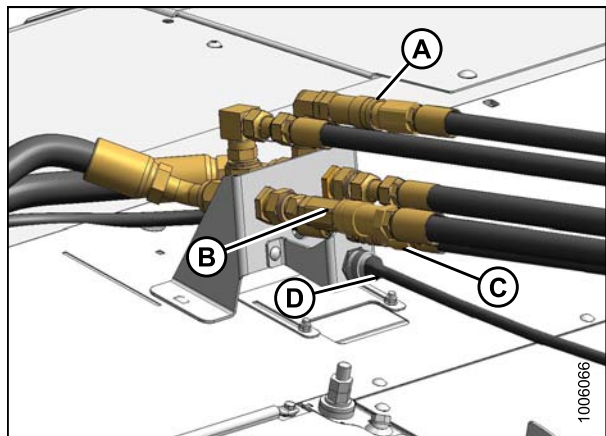


Figure 3.89: Hydraulic Connections

OPERATION

12. Move the hose bundle from header to the left-side (cab-forward) hose support (B).
13. Rotate lever (A) clockwise and push to engage bracket.
14. Route the electrical harness through the hose support (B) and attach cap to electrical connector (C).

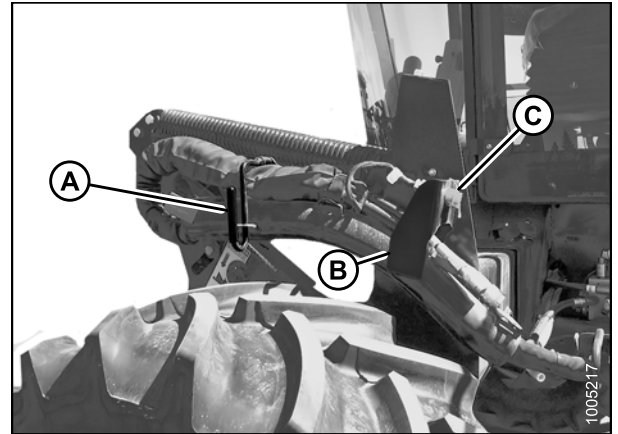


Figure 3.90: Hose Bundle

15. Move the windrower platform (A) back to the CLOSED position. For instructions, refer to the windrower operator's manual.
16. Refer to the windrower operator's manual to mechanically detach header from the windrower.

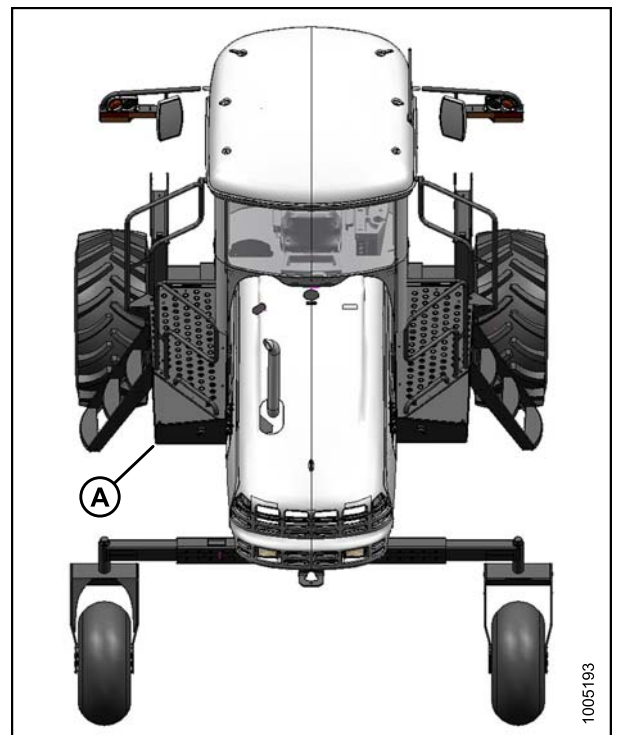


Figure 3.91: Windrower LH Platform

3.8.3 Detaching the Header: M1240 Windrowers

DANGER

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

OPERATION

CAUTION

Check to be sure all bystanders have cleared the area.

1. Start the windrower and press switch (A) to raise the header to the maximum height.
2. Stop engine and remove key from ignition.



Figure 3.92: Ground Speed Lever

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

IMPORTANT:

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

4. Open left side platform. For instructions, refer to the windrower operator's manual.

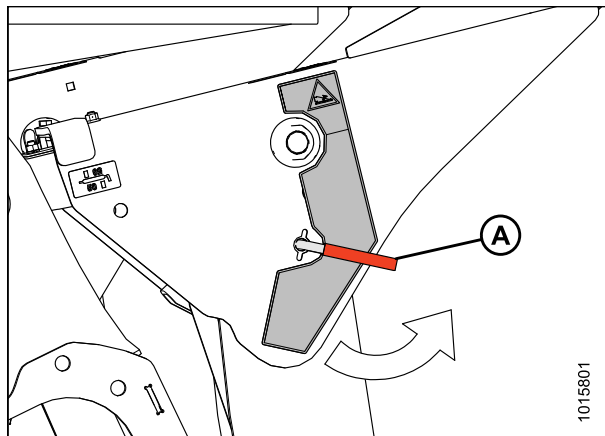


Figure 3.93: Engaging Cylinder Safety Prop

5. Disconnect the following electrical harness and hydraulic hoses from the windrower:
 - a. Disconnect the disc pressure hose from receptacle (A)
 - b. Disconnect the disc return hose from receptacle (B)
 - c. Disconnect the case drain hose from receptacle (C)
 - d. Disconnect the electrical harness from receptacle (D)

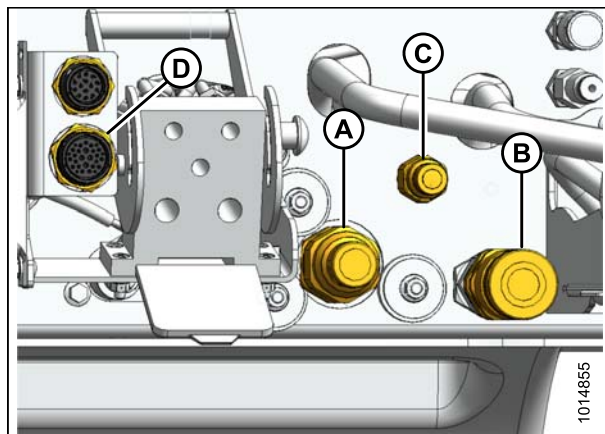


Figure 3.94: Header Drive Hydraulics

OPERATION

6. Remove hairpin from clevis pin (A) and remove clevis pin from header boot (B) on both sides of header.

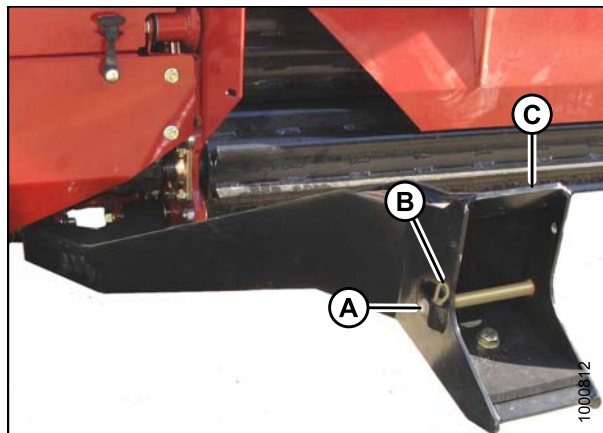


Figure 3.95: Header Boots

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

IMPORTANT:

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

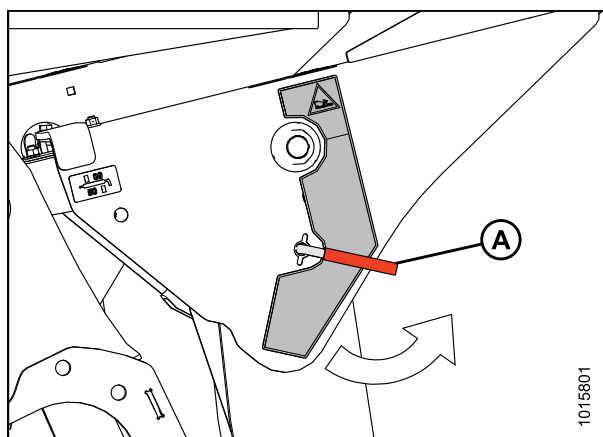


Figure 3.96: Engaging Cylinder Safety Prop

Windrowers with center-link self-alignment kit only:

8. Release the center-link latch (A) before returning to the cab.

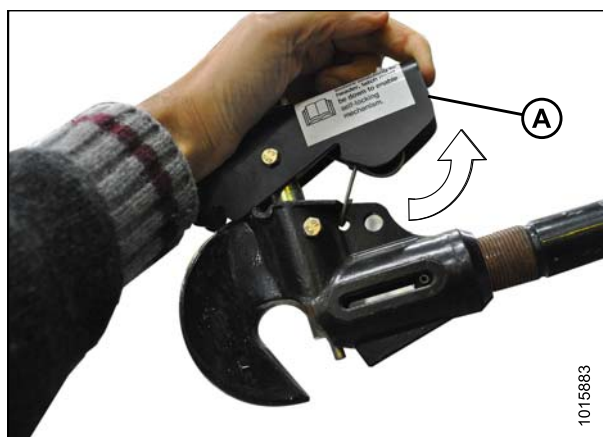


Figure 3.97: Center-Link

OPERATION

9. Disengage safety prop by turning lever (A) downwards until lever locks into the vertical position.
10. Repeat for the opposite side.

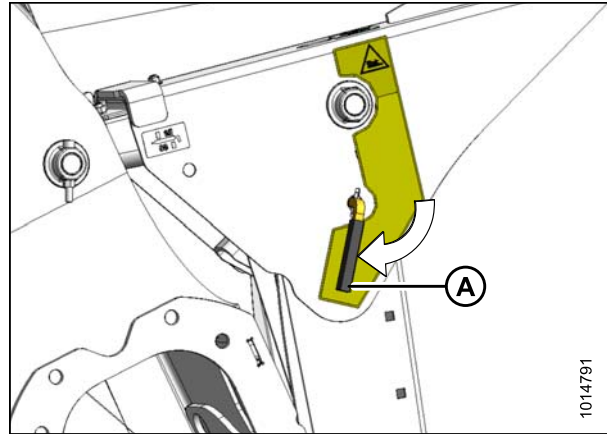


Figure 3.98: Safety Props

CAUTION

Check to be sure all bystanders have cleared the area.

11. Start engine and remove header float when prompted by the Harvest Performance Tracker (HPT).

NOTE:

If not prompted by the HPT to remove float, remove float manually. Refer to [4.1.3 Removing and Restoring Float for M1240 Self-Propelled Windrowers](#), page 84.

12. Lower the header to the ground

OPERATION

Windrowers with center-link self-alignment kit only:

13. Activate the HEADER TILT cylinder switches (A) on the GSL to release load on center-link cylinder and unlatch the center-link.
14. Operate the link lift cylinder with the REEL UP switch (B) to disengage the center-link from the header.



Figure 3.99: GSL

Windrowers WITHOUT the optional center-link self-alignment kit:

15. Shut off the engine and remove the key.
16. Lift hook release (C) and lift hook (B) off header pin.

CAUTION

Check to be sure all bystanders have cleared the area.

17. Start the engine.

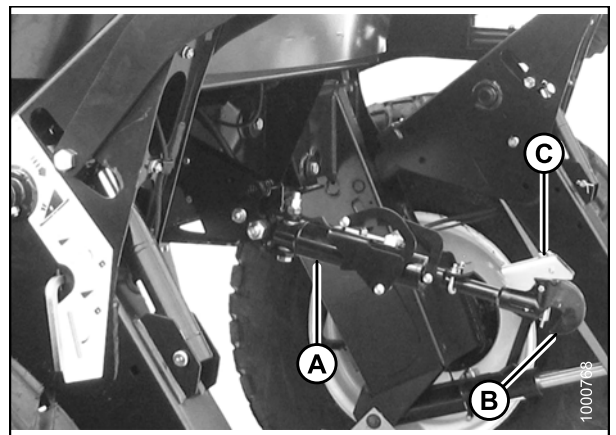


Figure 3.100: Hydraulic Center-Link

OPERATION

18. Back the windrower slowly away from header.
19. Reinstall clevis pin (A) through boot (C) and secure with hairpin (B). Repeat for opposite side.

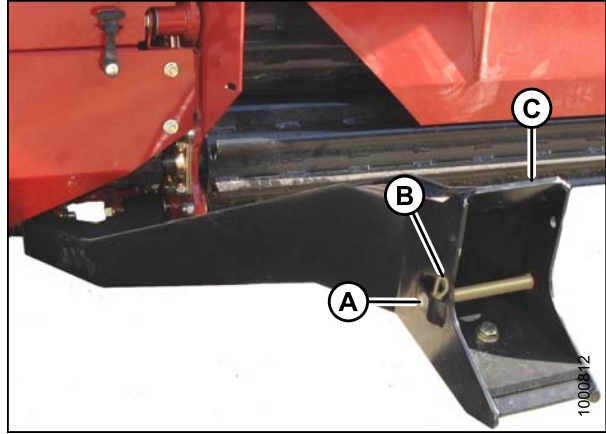


Figure 3.101: Header Boot

3.9 Break-In Period

After attaching the header to the windrower for the first time, operate the machine slowly for five minutes, watching and listening from the windrower seat for binding or interfering parts.

NOTE:

Until you become familiar with the sound and feel of your new header, be extra alert and attentive.

 **CAUTION**

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

NOTE:

Perform the items specified in [5.3.1 Maintenance Schedule/Record, page 121](#).

3.10 Shutting down the Windrower

CAUTION

Before leaving the windrower seat for any reason:

1. Park on level ground (if possible).
2. Lower the header fully.
3. Place ground speed control in N-DETENT.
4. Stop the engine and remove the key.
5. Wait for all movement to stop.

OPERATION

3.11 Transporting the Header

For information on transporting the header when attached to the windrower, refer to your windrower operator's manual.

IMPORTANT:

For cab-forward road travel the windrower must have the lighting and marking bundle installed (MD #B5412).

IMPORTANT:

Lights are factory assembled to meet road travel lighting requirements with windrower in ENGINE-FORWARD transport mode. If transporting header with header forward, light assemblies **MUST** be reversed.

Ensure the reflector assemblies are properly orientated to suit the mode of transporting the header. The amber deflector **MUST** face the direction of travel.

For procedure on changing the reflector orientation, refer to [3.12 Adjusting the Transport Lights, page 82](#).

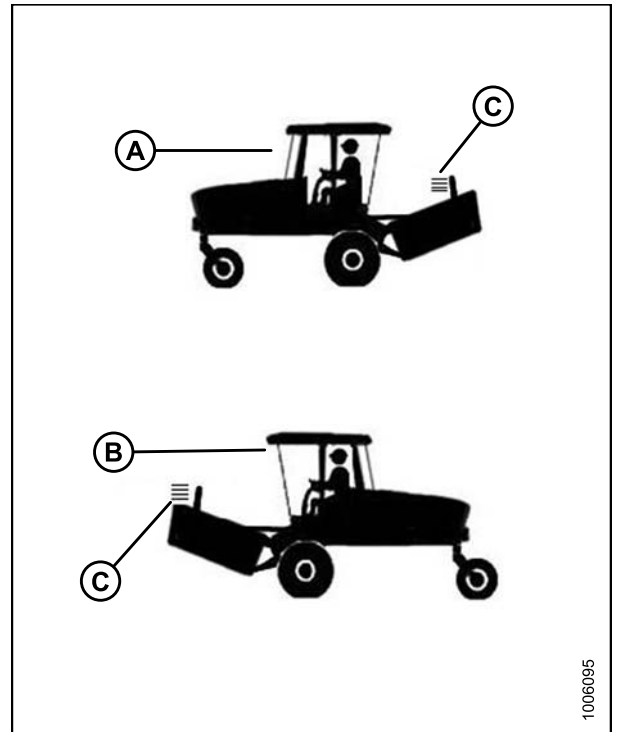


Figure 3.102: Windrower Direction

A - Engine-Forward

B - Cab-Forward

C - Amber Light

3.12 Adjusting the Transport Lights

The transport lights, which are mounted on both ends of the header, are activated by switches in the M-Series and M1-Series windrower cab. Refer to your windrower operator's manual on when to use them. The reflectors can be reversed, depending on the direction of travel. The amber deflector must face the direction of travel.

⚠ DANGER

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

Change the amber reflector (A) orientation as follows:

NOTE:

Arrow indicates direction of travel (B).

1. Disconnect wiring harness (C) at light.
2. Remove four bolts (D) and then remove light assembly (E).

NOTE:

Only two bolts shown in illustration.

3. Repeat for opposite light assembly.
4. Swap locations of light assemblies (E).
5. Reinstall light assemblies (E) so that amber reflector faces in opposite direction from original installation.
6. Reinstall bolts (D) and connect light to wiring harness (C).

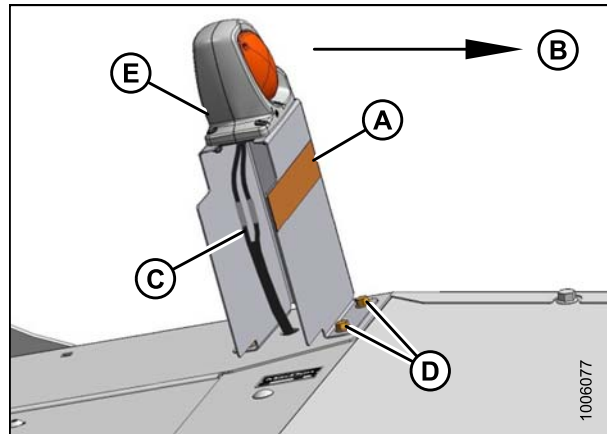


Figure 3.103: Transport Light Assembly

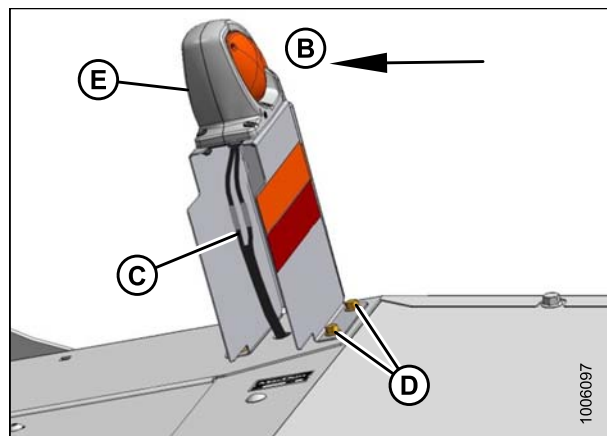


Figure 3.104: Transport Light Assembly

4 Operating the Header

Your header will provide the best performance when it is properly adjusted to suit the crop and conditions.

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

The variables listed below and detailed on the following pages will affect the performance of the header. You will quickly become familiar with adjusting the machine to give you the desired results. Most of the adjustments have been set at the factory, but if desired, the settings can be changed to suit crop conditions.

Table 4.1 Header Adjustment Procedures

Variable	Refer to
Header float	4.1 Header Float, page 83
Roll gap	4.2 Roll Gap, page 86
Roll tension	4.3 Roll Tension, page 89
Roll timing	4.4 Roll Timing, page 90
Forming shields	4.5 Forming Shields, page 92
Header angle	4.6 Header Angle, page 96
Cutting height	4.7 Cutting Height, page 97
Disc speed	4.8 Disc Speed, page 99
Ground speed	4.9 Ground Speed, page 100

4.1 Header Float

Header float springs are normally set so 43–48 kg (95–105 lb) is required to lift the header at either end.

In rough or stony conditions, it may be desirable to maintain a lighter setting to protect cutting components.

When float setting is light, it may be necessary to use a slower ground speed to avoid excessive bouncing resulting in a ragged cut. Faster ground speeds may require additional ground pressure.

Up to three user-defined float positions can be stored in the windrower's control system. For information on setting float, refer to the Float Options topic in the windrower operator's manual.

4.1.1 Checking Float

DANGER

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

Set the float fine adjustment to **MID-RANGE** with the windrower float adjustment system in the cab (refer to your windrower operator's manual).

1. Lower the header until lift cylinders are fully retracted.
2. Stop the engine and remove the key.
3. Grasp the front corner of the header and lift. The force to lift should be 426–471 N (95–105 lbf) and should be approximately the same at both ends. If adjustment is required, refer to [4.1.2 Adjusting Float for M200 and M205 Self-Propelled Windrowers, page 84](#) or refer to [4.1.3 Removing and Restoring Float for M1240 Self-Propelled Windrowers, page 84](#).

4.1.2 Adjusting Float for M200 and M205 Self-Propelled Windrowers

DANGER

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

Set the float fine adjustment to **MID-RANGE** with the windrower float adjustment system in the cab (refer to your windrower operator's manual).

Check the float by grasping the front corner of the header and lifting. The weight should feel like 43–48 kg (95–105 lb) and should be approximately the same at both ends.

If adjustment is required, follow these steps:

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Turn drawbolt (A):
 - a. Clockwise to **INCREASE** float (makes header lighter).
 - b. Counterclockwise to **DECREASE** float (makes header heavier).
4. Recheck the float.



Figure 4.1: Windrower Lift Linkage

4.1.3 Removing and Restoring Float for M1240 Self-Propelled Windrowers

Follow these steps to remove and restore the header float settings:

1. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QuickMenu options.
2. Rotate scroll knob (A) to highlight header float adjust (B) and press scroll knob to select.

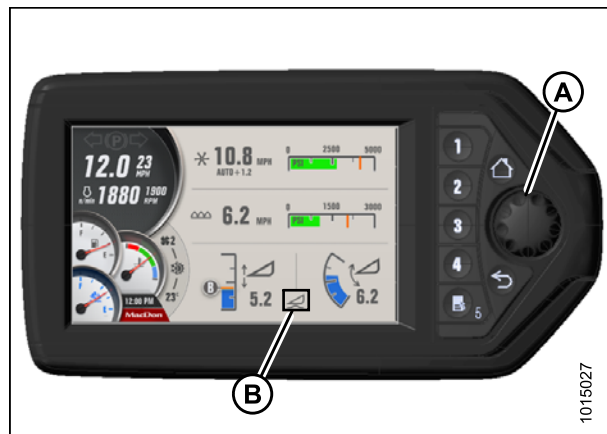


Figure 4.2: Run Screen – HPT Display

OPERATING THE HEADER

3. Press soft key 3 (A) to remove or restore the header float.

NOTE:

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



Figure 4.3: Adjusting Float – HPT Display

4.2 Roll Gap

Steel rolls condition the crop by crimping and crushing the stem in several places. This allows moisture to release for quicker drying. The degree to which the crop is conditioned as it passes through the rolls is controlled by roll gap. The roll gap is factory-set at 25.4 mm (1.0 in.), but it can be adjusted.

Correct conditioning of alfalfa, clover, and other legumes is usually indicated when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set enough roll gap to achieve this result.

A larger gap may be desirable in thick stemmed cane-type crops. However, too large a gap may cause feeding problems. Grass-type crops may require a smaller gap for proper feeding and conditioning.

IMPORTANT:

It's recommended that operators visually check the size of the gap if they are using settings below the factory setting.\

4.2.1 Checking Roll Gap

DANGER

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

1. Lower the header fully.
2. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).
3. Remove bolts (A) that secure conditioner shield (B).
4. Remove the shield (B).

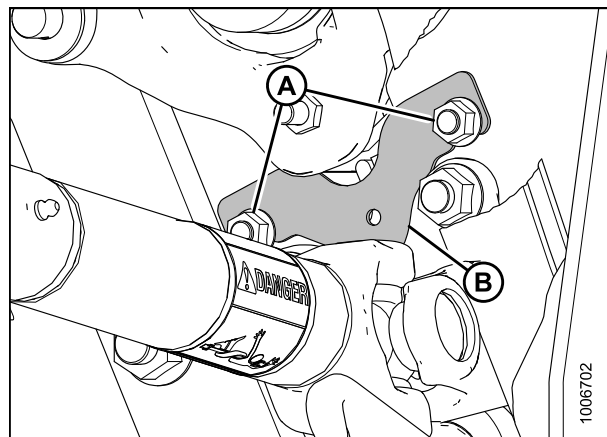


Figure 4.4: Conditioner Shield

OPERATING THE HEADER

5. Inspect roll gap at both ends of the rolls. At factory setting, the roll gap (B) should be 25.4 mm (1 in.).

IMPORTANT:

Roll timing is critical when the roll gap is decreased because the bars may contact each other if the timing is wrong.

6. Check roll timing. Refer to [4.4 Roll Timing, page 90](#).

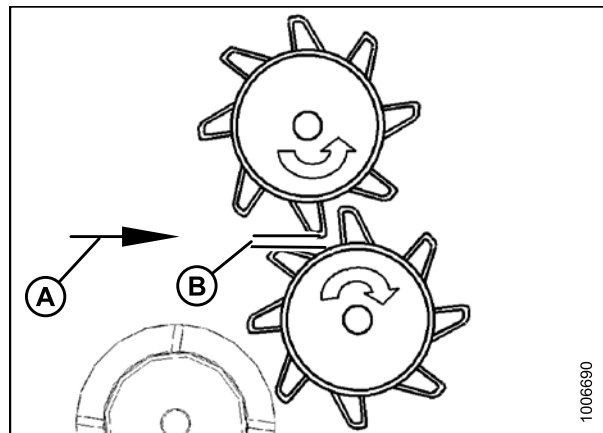


Figure 4.5: Conditioner Roll Gap

A - Crop Direction

B - Roll Gap

7. Reinstall the conditioner shield (B) and secure it with nuts (A).
8. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

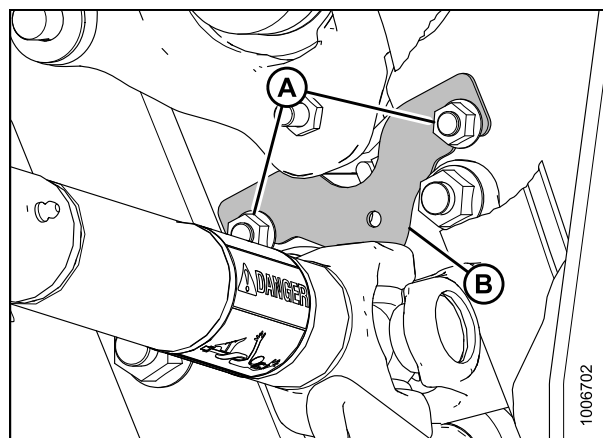


Figure 4.6: Conditioner Shield

4.2.2 Adjusting Roll Gap

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

OPERATING THE HEADER

- Loosen upper jam nut (B) on both sides of conditioner adjustment bolts.
- To increase roll gap, turn lower nut (A) clockwise.
- To decrease roll gap, turn lower nut (A) counterclockwise.
- Measurement at (C) should be 35 mm (1.4 in.). This equates to 25.4 mm (1 in.) of roll gap.
- Once adjustment is complete, hold nut (A) and torque jam nut (B) to 102 N·m (75 ft·lbf).

NOTE:

When adjusting roll gap, be sure that the thread protruding at the adjustment is the same on both ends of the conditioner rolls. This will achieve consistent intermesh across the rolls.

- Check roll gap. Refer to [4.2.1 Checking Roll Gap, page 86](#).

IMPORTANT:

Roll timing is critical when the roll gap is decreased because the bars may contact each other if the timing is wrong.

- Refer to [4.4 Roll Timing, page 90](#) for instructions on checking the timing.
- Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

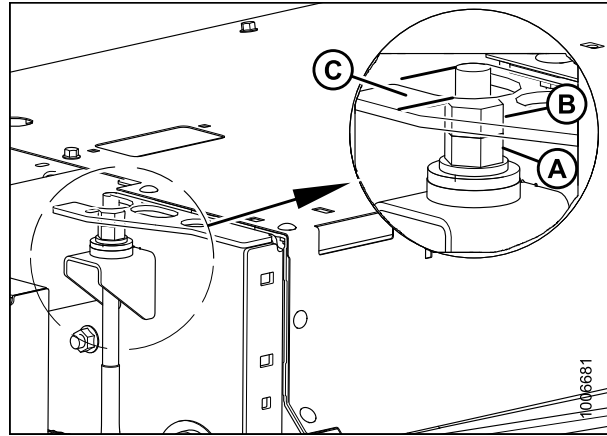


Figure 4.7: Roll Gap Adjustment Bolt

4.3 Roll Tension

Roll tension (the force holding the rolls together) is factory set with a spring-type adjustable linkage.

The roll tension factory setting is the spring fully tensioned.

Heavy crops or tough forage tend to separate the rolls and require more tension to ensure material is sufficiently crimped. Light alfalfa and short grasses require less tension to minimize over-conditioning.

4.3.1 Adjusting Roll Tension

DANGER

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

Before changing the factory adjusted roll tension, refer to [4.2.2 Adjusting Roll Gap, page 87](#) to ensure the roll gap setting is ideal for your crop type.

1. Lower the header fully.
2. Stop the engine and the remove the key.
3. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).
4. To decrease the roll tension, turn the spring drawbolts counterclockwise to loosen the springs. Set dimension (C) to 45–55 mm (1.77–2.16 in.).
5. To increase the roll tension, loosen jam nut (A) and turn the spring drawbolt (B) clockwise to tighten the spring at each end of the roll. Set dimension (C) to 45–55 mm (1.77–2.16 in.).

IMPORTANT:

Turn each bolt equal amounts. Each turn of the bolt changes the roll tension by approximately 44.5 N (10 lbf).

6. Tighten jam nut (A) against casting after adjusting tension.
7. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

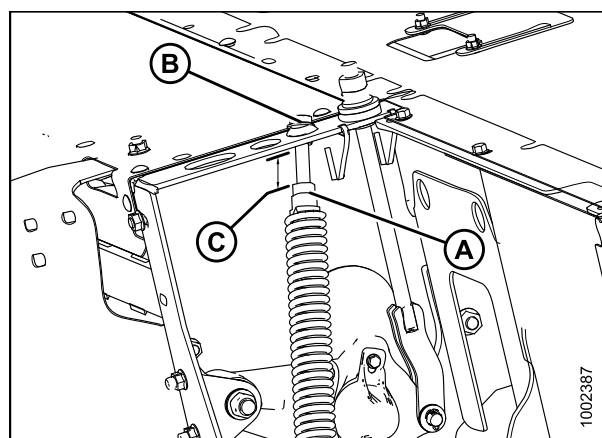


Figure 4.8: Roll Tension Spring (RH Side)

4.4 Roll Timing

For proper conditioning, the rolls must be properly timed. Each steel bar on one of the rolls should be centered between two bars of the other roll. The factory setting should be suitable for most crop conditions.

IMPORTANT:

Roll timing is especially critical when roll gap is decreased because the bars can contact each other if the timing is wrong.

4.4.1 Checking Roll Timing

DANGER

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

1. Lower the header fully.
2. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).
3. Loosen nuts (A) and slide conditioner shield (B) up to remove it.

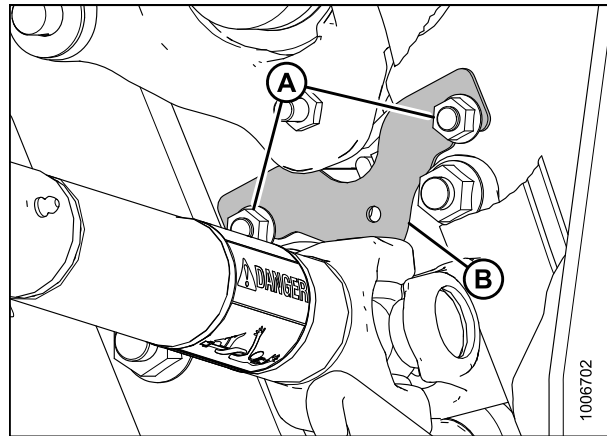


Figure 4.9: Conditioner Shield (LH Side)

4. Measure the clearance (B) between the flats of the conditioner roll bars at both end of the conditioner rolls. Dimension (B) should be set to 9–13 mm (0.35–0.51 in.). If adjustment is required, refer to [4.4.2 Adjusting Roll Timing, page 91](#).

NOTE:

There should be less than 2 mm (0.08 in.) difference between the two ends of the conditioner roll.

NOTE:

Roll spacing not to scale in illustration.

5. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

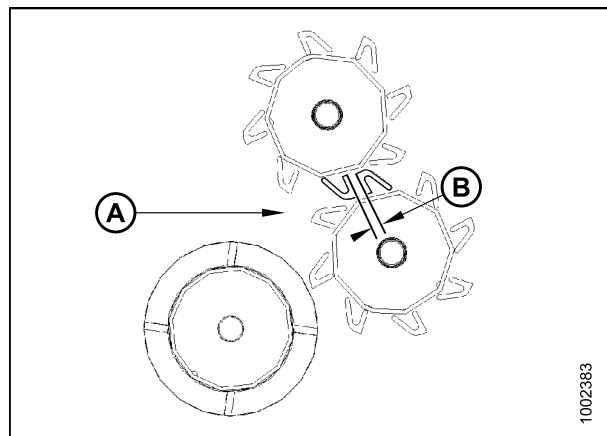


Figure 4.10: Roll Timing

A - Crop Flow

B - Roll Timing Distance 9–13 mm (0.35–0.51 in.)

4.4.2 Adjusting Roll Timing

Follow these steps to adjust the roll timing (if necessary):

1. Loosen four bolts (A) in slots of yoke plate (B) on upper roll universal shaft.

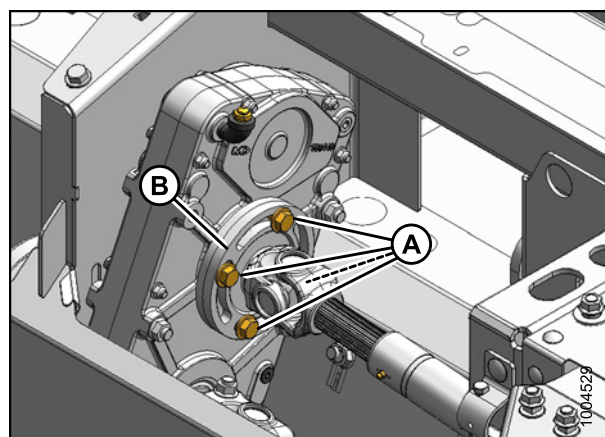


Figure 4.11: Conditioner Gearbox

2. Locate roll timing gauge (MD #150572) (B) on frame member under the flange. Remove nut (A) to remove gauge.

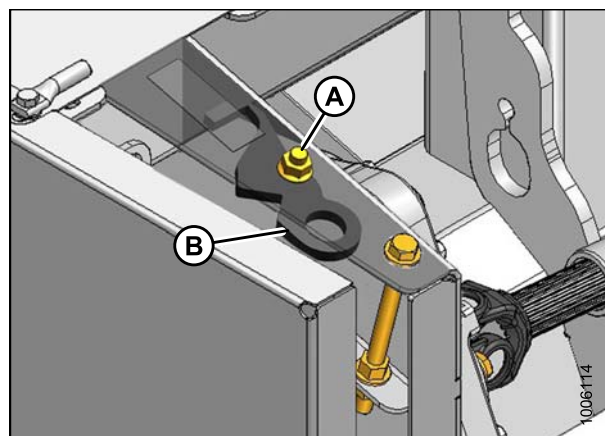


Figure 4.12: Roll Timing Gauge

3. Position gauge (MD #150572) (A) at left end of rolls, and manually turn the rolls to engage. The rolls will automatically adjust to the correct timing. This will provide for a roll gap of 11 mm (7/16 in.) and a roll timing setting of 4 mm (3/16 in.).
4. Using the roll gap adjustment bolt, reduce the roll gap until the roll sits lightly on the gauge.
5. Repeat procedure for right end of the conditioner.
6. Tighten bolts in slots of yoke plate to secure the upper conditioner roll position.
7. Turn the rolls manually to release gauge.

CAUTION

To ensure gauge is not forcibly ejected from rolls when machine is started, ensure gauge is securely reattached to frame.

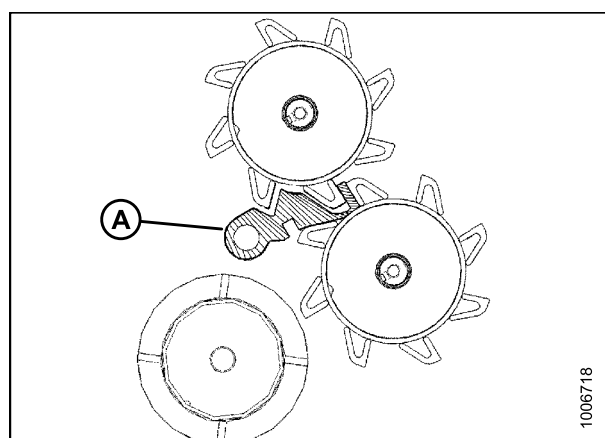


Figure 4.13: Roll Timing Gauge

4.5 Forming Shields

⚠ WARNING

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

The position of the forming shields controls the width and placement of the windrow. The decision on forming shield position should be based on the following factors:

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

A wider windrow will generally dry faster and more evenly resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. For more information, refer to [4.15 Haying, page 116](#).

A narrower windrow may be preferred for ease of pickup and when drying is not critical (for example, when cutting for silage or green-feed).

4.5.1 Adjusting the Side Deflectors

The position of the side deflectors controls the width and placement of the windrow.

⚠ DANGER

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

1. Set forming shield side deflectors (A) to desired width by repositioning adjuster bars (B) in holes in forming shield cover. To ensure windrow placement is centered, adjust both side deflectors to the same position.

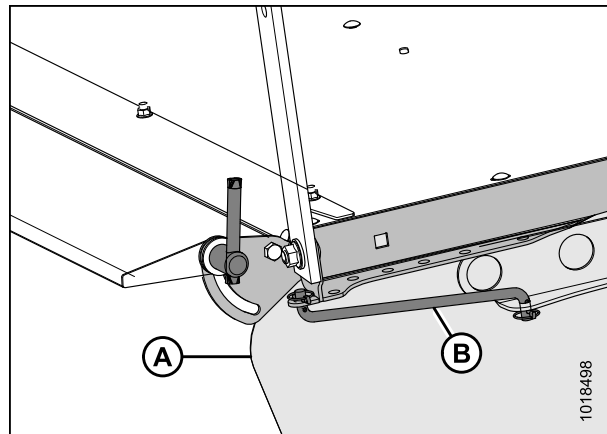


Figure 4.14: Forming Shield

OPERATING THE HEADER

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

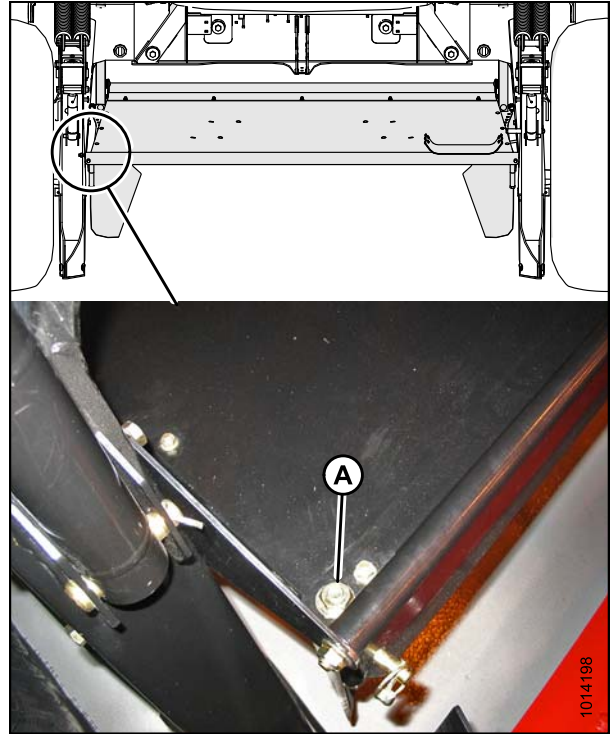


Figure 4.15: Forming Shield

4.5.2 Adjusting the Rear Deflector (Fluffer Shield)

DANGER

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

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

1. For more crop control in light material, lower the deflector (A) by pushing down on one side of the deflector and then on the other side.

NOTE:

Locking handles (B) are located at both ends of the deflector and may be loosened slightly.

2. For heavier crops, raise the deflector by pulling up on one side and then on the other side.

NOTE:

For even windrow formation, be sure the deflector (A) is not twisted.

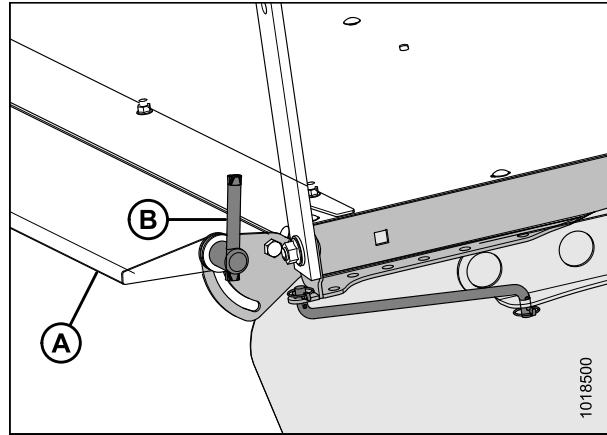


Figure 4.16: Forming Shield

3. Tighten handles (B) to secure deflector position.

4.5.3 Adjusting the Swath Baffle

The swath baffle determines the width and height of the windrow.

DANGER

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

OPERATING THE HEADER

The swath baffle (A) is located immediately behind and above the conditioning rolls and can be positioned to:

- Direct the crop flow into the forming shield for narrow and moderate width windrows
 - Direct crop downward to form a wide swath
1. Remove lynch pin from pin (B) and remove pin from lever (C).
 2. Move lever to middle hole in bracket and reinstall pin (B) through lever and bracket.
 3. Secure with lynch pin.

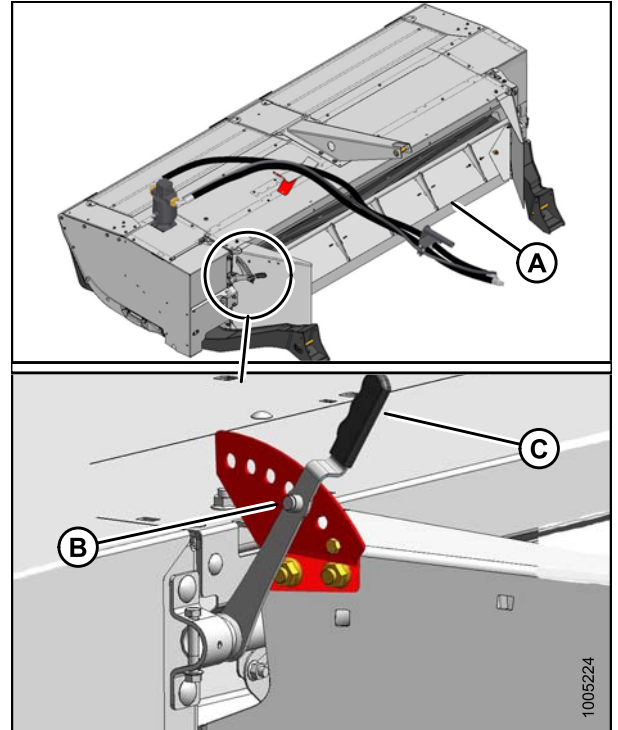


Figure 4.17: Swath Baffle Lever

NOTE:

Swath baffle position may need to be adjusted for proper pin engagement. Loosen bolts (A) and adjust bracket (B) and baffle as required. Tighten bolts (A).

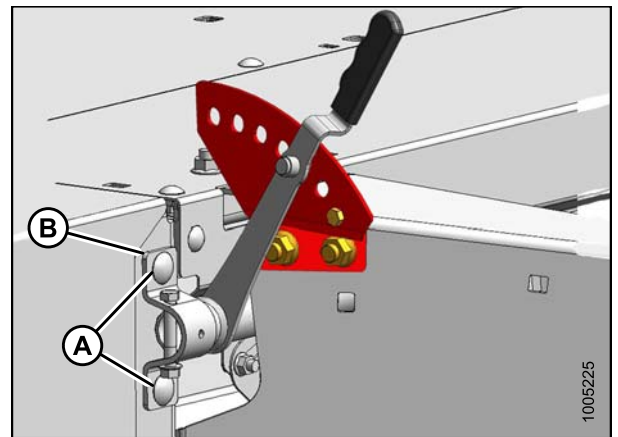


Figure 4.18: Swath Baffle Lever

4.6 Header Angle

Header (or cutterbar) angle can be varied from 0–8° below horizontal. Choose an angle that maximizes performance for your crop and field conditions. A flatter angle provides better clearance in stony conditions while a steeper angle provides better lifting action in down crops.

The header angle may be hydraulically adjusted from the windrower cab using the hydraulic cylinder (A) without shutting down the windrower.

Refer to your windrower operator's manual.

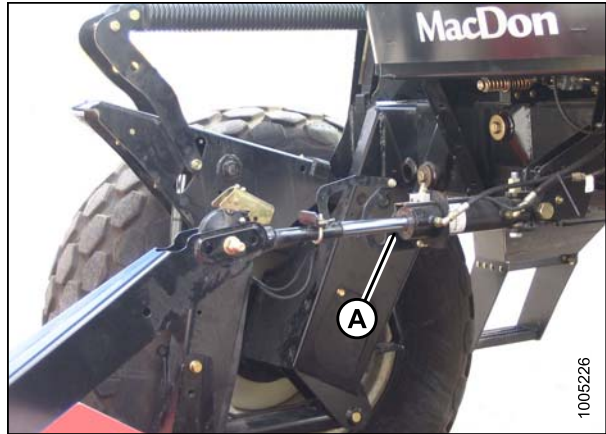


Figure 4.19: Hydraulic Center-Link

4.7 Cutting Height

Cutting height is determined by a combination of the angle of the cutterbar/header and the optional gauge roller or skid shoe settings if installed. Cutting height should be adjusted for optimum cutting performance without excessive mud build-up inside the header that can lead to poor crop flow and increased wear on cutting components. Choose an angle that maximizes performance for your crop and field conditions. Refer to [4.6 Header Angle, page 96](#).

Optional adjustable gauge rollers or skid shoes are also available to provide different cutting heights. Refer to:

- [6.1 Options and Attachments: Kits, page 175](#)
- [4.7.1 Adjusting Gauge Roller Height, page 97](#)
- [4.7.2 Adjusting the Skid Shoe Height, page 97](#)

Lowering the skid shoes/gauge rollers or decreasing header angle increases the cutting height. This may reduce damage to cutting components in stony conditions. Also, a longer stubble length helps material dry faster.

Raising the skid shoes/gauge rollers and increasing header angle allows the crop to be cut lower.

To minimize damage to cutterbar components, scooping soil, or soil build-up at the cutterbar in damp conditions, set header float as light as possible without excessive bouncing.

A light float setting may require reduced ground speeds to avoid excess bouncing and a ragged cut.

4.7.1 Adjusting Gauge Roller Height

DANGER

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

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Remove lynch pin and remove adjuster pin (A) from one side of the roller.
5. Hold roller and remove lynch pin and adjuster pin (A) from other side. Position roller at desired position and reinstall adjuster pins (A). Secure with lynch pins.
6. Repeat for roller at opposite end of header.
7. Adjust mud bar (B) by loosening nuts (C).
8. Retighten nuts (C) while maintaining a minimum clearance between mud bar and roller.

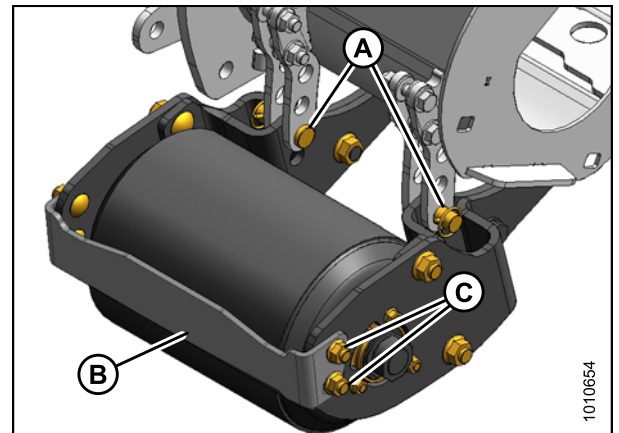


Figure 4.20: Gauge Roller

4.7.2 Adjusting the Skid Shoe Height

DANGER

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

OPERATING THE HEADER

1. Raise header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Remove lynch pin and remove adjuster pin (A) from one side of skid shoe (B).
5. Hold skid shoe and remove lynch pin and adjuster pin (A) from other side. Position shoe at desired position, and reinstall adjuster pins (A). Secure with lynch pins.
6. Repeat for skid shoe at opposite end of header.
7. Check header float as described in [4.1 Header Float, page 83](#).
8. Adjust header angle to desired working position using the machine's header angle controls. If angle is not critical, set it to mid-position. Refer to [4.6 Header Angle, page 96](#).

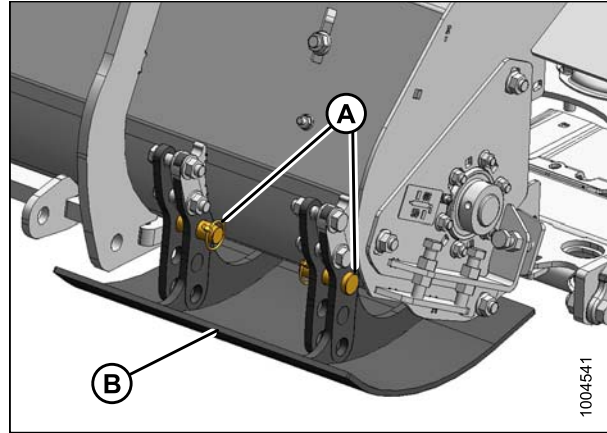


Figure 4.21: Skid Shoe

4.8 Disc Speed

The disc header can be used to cut a variety of crops.

For the best cutting results, a range of disc speeds is recommended for each type of crop and condition. Refer to table below.

Table 4.2 Disc Speed Recommendations

Crop	Condition	Disc rpm
Alfalfa	Heavy	2300–2500
	Light	1600–2000
Sudan, Sorghum, Haygrazer, Timothy	Tall and stemmy	2300–2500
Short grass	Dense	2500
	Thin	1800–2000

Disc speeds are set and adjusted from the cab using system controls, without shutting down the windrower. For instructions for setting and adjusting disc speeds, refer to your windrower operator's manual.

4.9 Ground Speed

CAUTION

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

Choose a ground speed that allows the cutterbar and conditioner to cut the crop smoothly and evenly. Try different combinations of header speed and ground speed to suit your specific crop.

In tough cutting conditions, such as native grasses, the disc speed will need to be increased.

In light crops, the header speed can be reduced while maintaining ground speed.

Refer to your windrower operator's manual for changing ground speed.

NOTE:

Operating the header at the minimum disc speed will extend the wear life of cutting components.

The chart below indicates the relationship between ground speed and area cut.

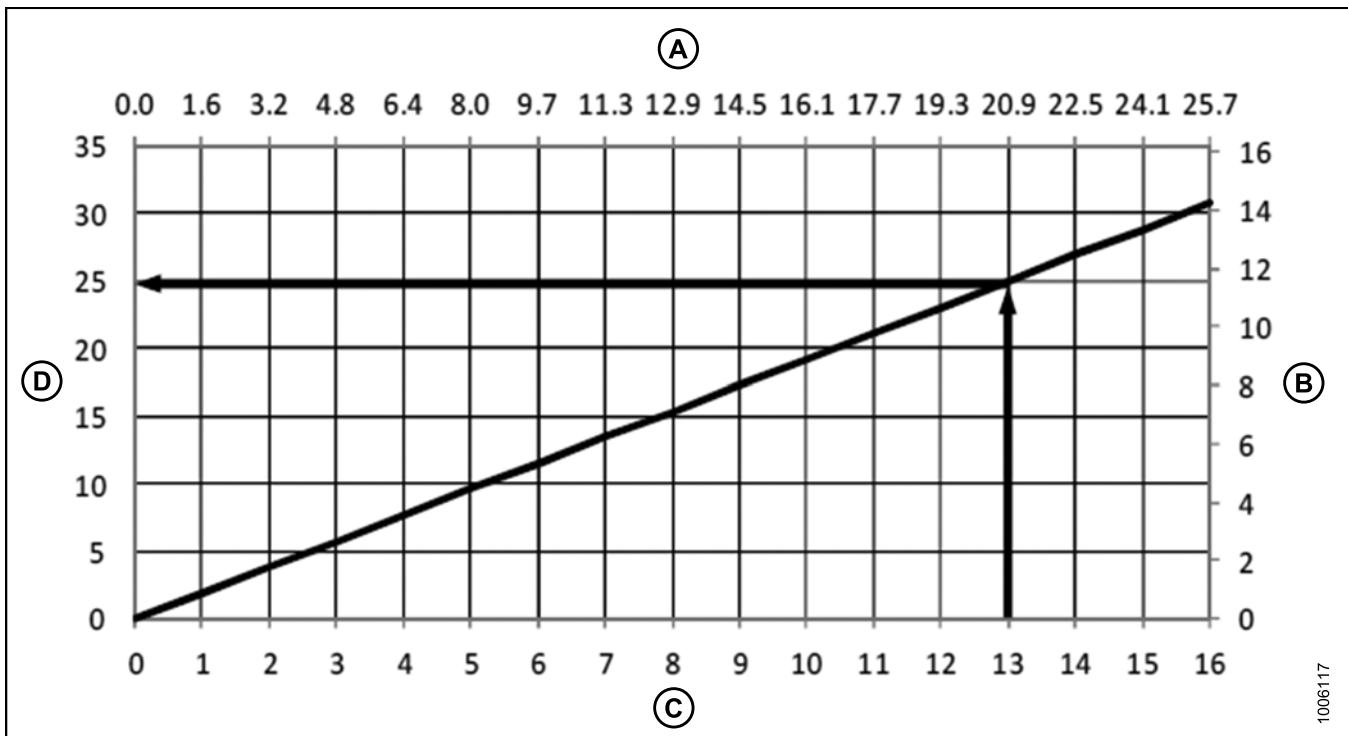


Figure 4.22: Ground Speed Chart

A - Kilometers/Hour

B - Hectares/Hour

C - Miles/Hour

D - Acres/Hour

Example: At ground speed of 21 km/h (13 mph) the area cut would be approximately 25 acres (12 hectares) per hour.

4.10 Double Windrowing

If your windrower is equipped with the Double Windrow Attachment (DWA [A]), refer to the MacDon DWA Manual for operating and maintenance instructions.

The manual is shipped with the DWA Kit.

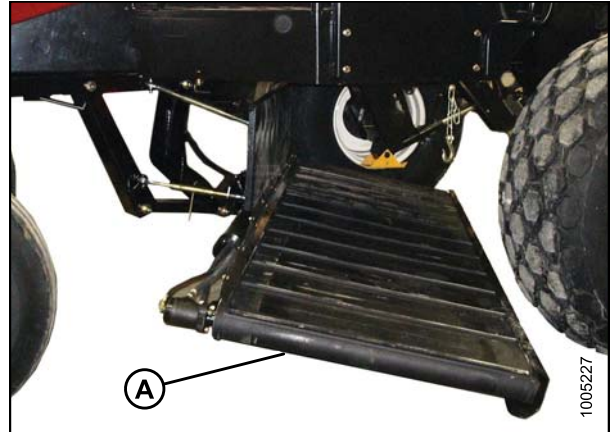


Figure 4.23: DWA

4.11 Tall Crop Feed Plates

The tall crop feed plates (A) assist in feeding tall crops into the conditioner by aiding material flow from behind the cage deflectors (B).

The feed plates are designed for installation under the two cage deflectors. They are stored inside the compartment at the right end of the header.

Tall crop feed plates should only be installed when cutting tall, heavier crops; they can degrade cutterbar performance if used in medium to light alfalfa.

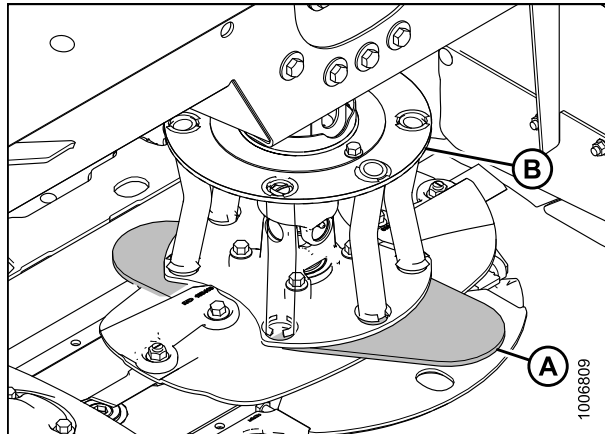


Figure 4.24: Cage Deflector

4.11.1 Removing the Tall Crop Feed Plates from Storage

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the right-hand end drive cover. Refer to [3.4.5 Removing Right Endshield, page 32](#).
4. Remove the four nuts (A), securing nut shields (B) and feed plates (C) to side of compartment, and remove deflectors and plates. Reinstall nuts (A).
5. Install right-hand endshield. Refer to [3.4.6 Installing Right Endshield, page 32](#).

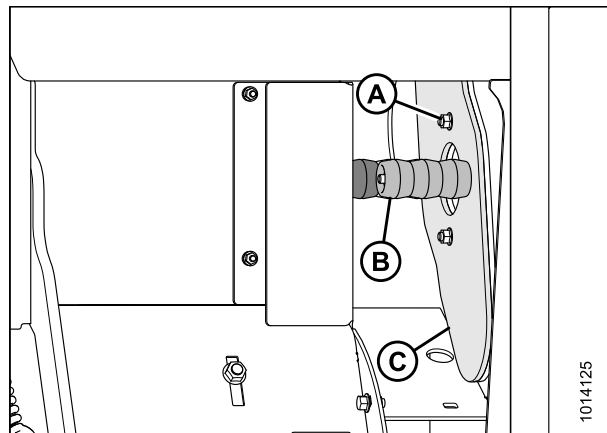


Figure 4.25: Nut Shield and Feed Plate Storage

OPERATING THE HEADER

Installing Tall Crop Feed Plates under Driven Deflector

1. Lower header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Remove driven deflector. Refer to [Removing the Driven Deflector, page 149](#).
5. Remove the tall crop feed plates from storage. Refer to [4.11.1 Removing the Tall Crop Feed Plates from Storage, page 102](#).
6. Position feed plate (A) on the disc, ensuring that hole in feed plate registers on disc. Position plate approximately as shown and align holes.

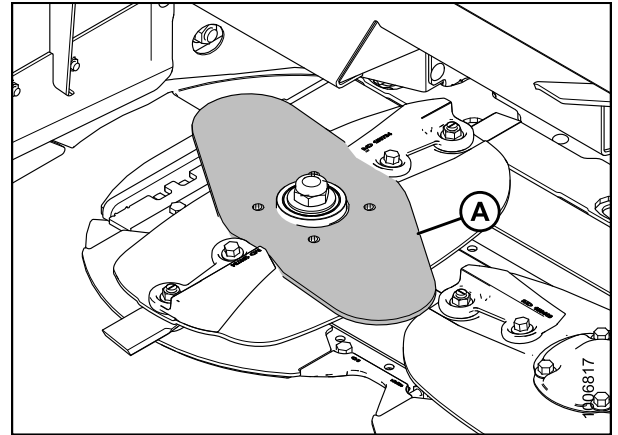


Figure 4.26: Right End Shown

IMPORTANT:

Depending on disc (B) rotation, the feed plate (A) should be positioned so that when holes are aligned, the leading edge of the feed plate is farther from the accelerator (B) than the trailing edge.

7. Install the deflector. Refer to [Installing the Driven Deflector, page 150](#).
8. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

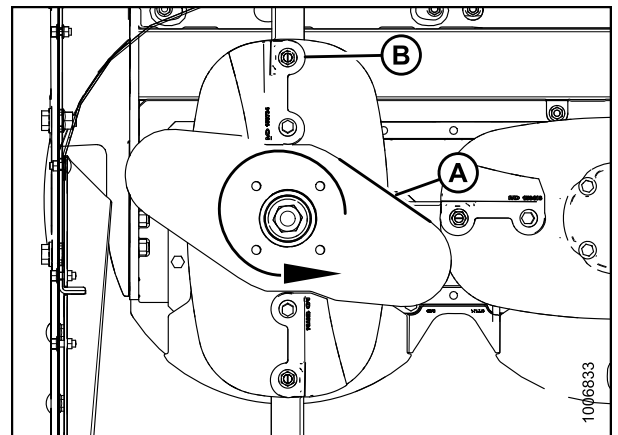


Figure 4.27: Right End Top View

Installing Tall Crop Feed Plates under Driveline Deflector

⚠ DANGER

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

OPERATING THE HEADER

1. Locate the feed plates. Refer to [4.11.1 Removing the Tall Crop Feed Plates from Storage, page 102](#).
2. Lower the header fully.
3. Stop the engine and remove the key.
4. Open the cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).
5. Install feed plate (A) on the disc.

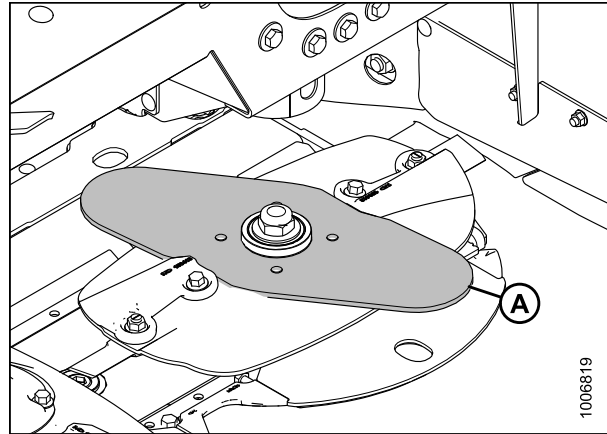


Figure 4.28: Left End Shown

IMPORTANT:

Depending on disc (B) rotation, the feed plate (A) should be located so that when holes are aligned, the leading edge of the feed plate is farther from the accelerator (B) than the trailing edge.

6. Install the deflector. Refer to [Installing the Driveline Deflector, page 151](#).

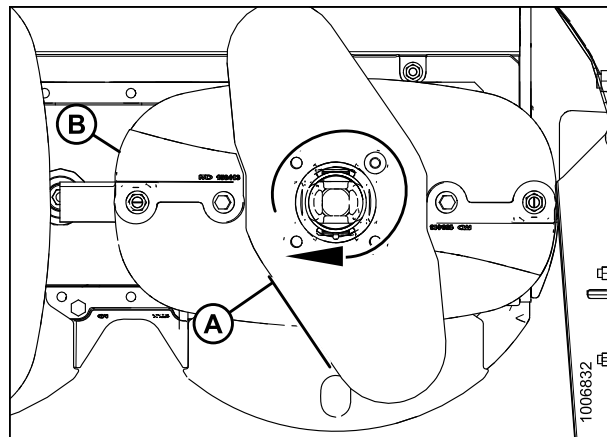


Figure 4.29: Left End Top View Shown

4.11.2 Removing Tall Crop Feed Plates

Follow these steps to remove the tall crop feed plates:

DANGER

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

OPERATING THE HEADER

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

4. Place a block of wood between discs to prevent deflector from turning.

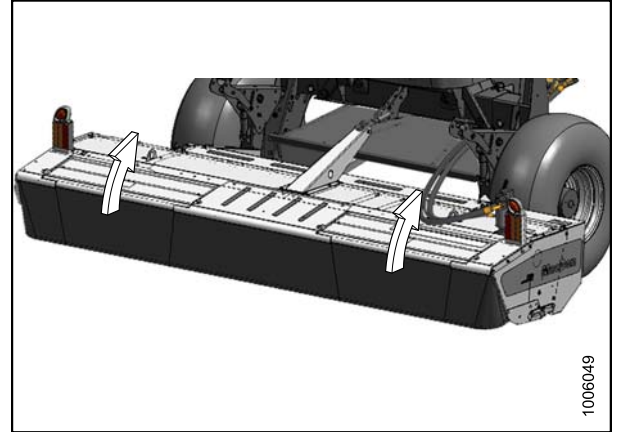


Figure 4.30: Cutterbar Doors

Removing Tall Crop Feed Plates from under Driven Deflector

1. Remove the deflector. Refer to [Removing the Driven Deflector, page 149](#).
2. Remove feed plate (A).
3. Return the tall crop feed plates to the storage location. Refer to [4.11.3 Returning Tall Crop Feed Plates to Storage, page 106](#).
4. Install the deflector. Refer to [Installing the Driven Deflector, page 150](#).
5. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

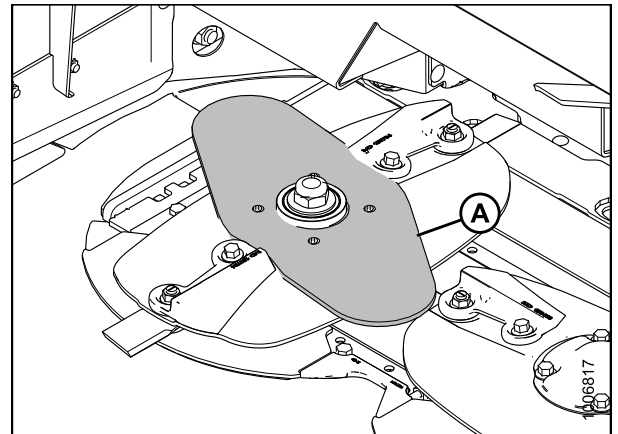


Figure 4.31: Right End Shown

Removing Tall Crop Feed Plates from under Driveline Deflector

1. Open cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
2. Remove the deflector. Refer to [Removing the Driveline Deflector, page 150](#).

OPERATING THE HEADER

3. Remove feed plate (A).
4. Return feed plates to storage. Refer to [4.11.3 Returning Tall Crop Feed Plates to Storage](#), page 106.
5. Install the deflector. Refer to [Installing the Driveline Deflector](#), page 151.
6. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors](#), page 33.

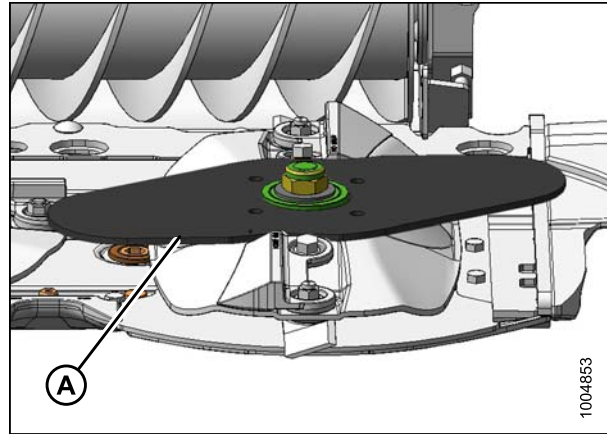


Figure 4.32: Tall Crop Feed Plate

4.11.3 Returning Tall Crop Feed Plates to Storage

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the right-hand end driveshield. Refer to [3.4.5 Removing Right Endshield](#), page 32.
4. Remove the four nuts (A) and secure the nut shields (B) and feed plates (C) to side of compartment. Reinstall nuts (A).

NOTE:

Nut shields will not be in storage location if they are installed on the cutterbar.

5. Install right-hand shield. Refer to [3.4.6 Installing Right Endshield](#), page 32.

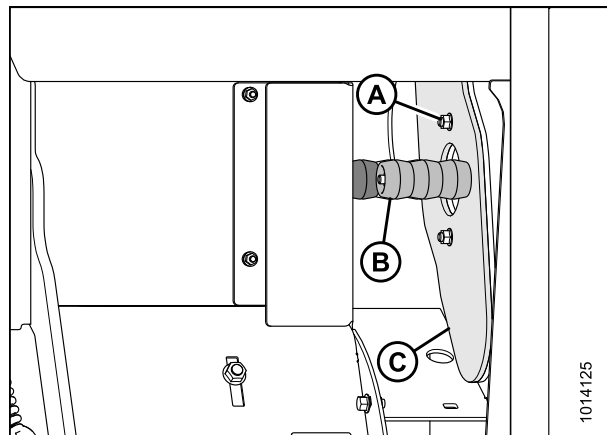


Figure 4.33: Nut Deflector and Feed Plate Storage

4.12 Tall Crop Divider Option

Tall crop dividers (one on each end of the header) assist in clean crop dividing and cutterbar entry in tall crops. Tall crop dividers are not adjustable, but they are removable.

4.12.1 Installing Tall Crop Divider

To install the tall crop divider kit (MD #B5509), follow these steps:

DANGER

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

1. Lower header fully.
2. Stop the engine, and remove the key.
3. Unpack kit.
4. Open cutterbar doors. Refer to [3.5 Cutterbar Doors](#), page 33.

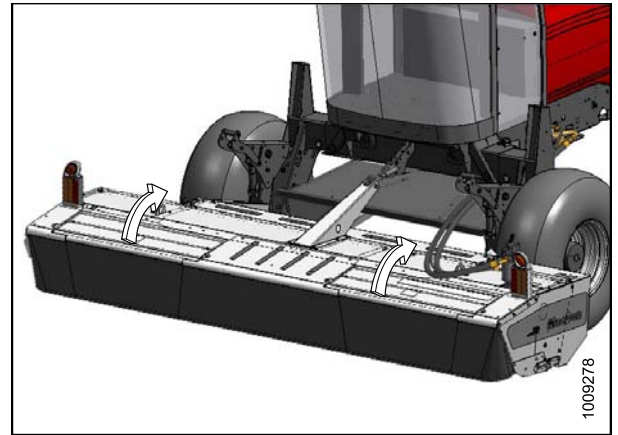


Figure 4.34: Cutterbar Doors

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

NOTE:

Mounting holes in header should be vacant.
Remove fasteners, if necessary.

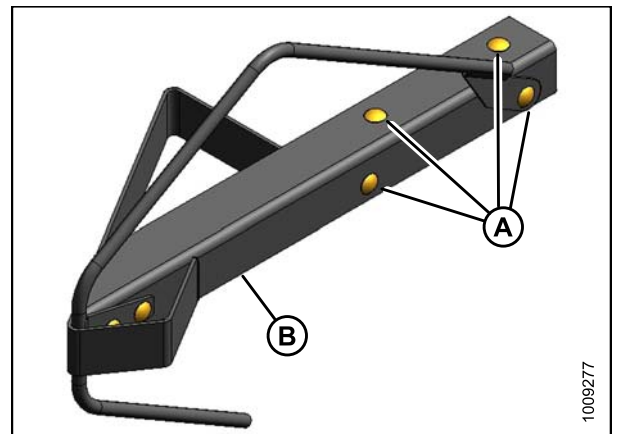


Figure 4.35: Tall Crop Divider Kit (LH Shown, RH Opposite)

OPERATING THE HEADER

6. Position left-hand divider (B) on header left front corner, and install with four bolts (A) and nuts in existing holes. Tighten hardware.
7. Repeat for right-hand side.
8. Lower cutterbar doors.

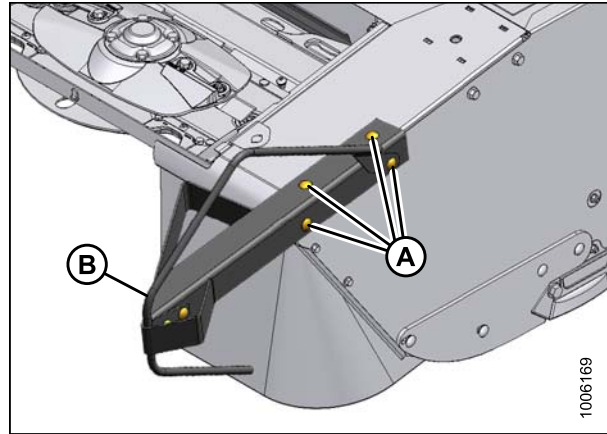


Figure 4.36: Tall Crop Divider Installed

4.12.2 Removing Tall Crop Divider

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Remove the four bolts (A) and nuts. Remove the deflector (B).

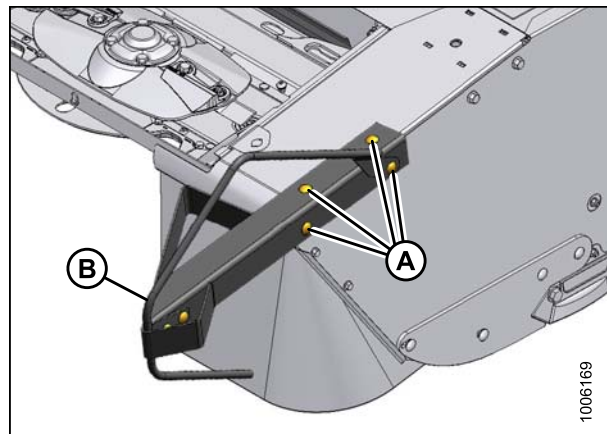


Figure 4.37: LH Crop Divider

OPERATING THE HEADER

5. Reinstall two bolts and nuts at location shown (A).
6. Repeat Steps [4., page 108](#) and [5., page 109](#) at the other end of the header.
7. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

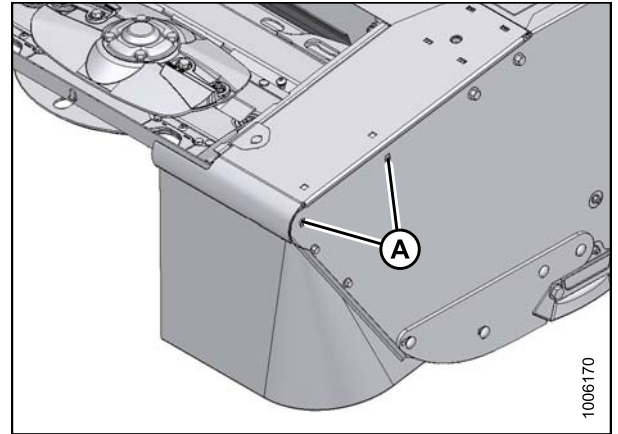


Figure 4.38: Crop Divider Mounting Holes

4.13 Overshot Auger

The overshot auger is designed to feed the cut crop from the cutterbar into the conditioner rolls.

The auger position has been factory set and should not normally require adjustment. However, if adjustment is required the vertical and fore-aft positions of the auger can be adjusted for crop conditions. The ideal setting allows optimal movement of crop, minimizes wrapping, and keeps the cutterbar clear.

For fine stemmed crop, the auger performs best when set as close as possible to the pan and stripper bars without rubbing. This is especially important in grass and other crops which have a tendency to wrap.

IMPORTANT:

The auger flighting should **NEVER** contact the pan or stripper bars.

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

4.13.1 Adjusting the Overshot Auger

If necessary, adjust the auger position as follows:

DANGER

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

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props](#), page 28.
4. Remove/loosen four bolts (A) and remove cover (B).

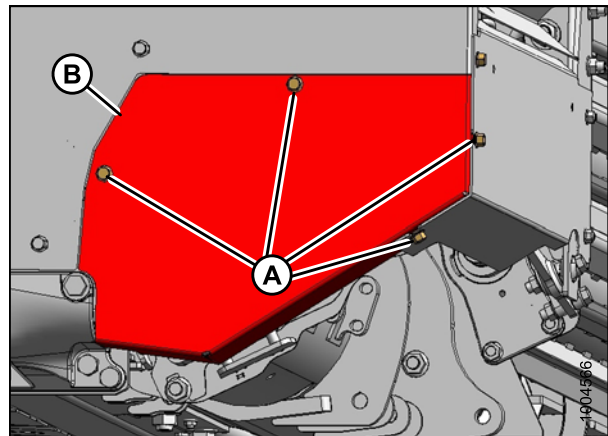


Figure 4.39: Drive Belt Cover

OPERATING THE HEADER

5. Loosen jam nuts (A) to relieve tension on auger drive belts (B).
6. Loosen three jam nuts (C).
7. To adjust vertical position, loosen upper nuts on adjuster bolts (D). Hold lower nut and turn adjuster bolts (D) to set auger vertical position from bottom of pan.
8. To adjust fore-aft position, loosen aft nut on adjuster bolt (E). Hold forward nut and turn adjuster bolt (E) to set auger so that it clears the back of the pan.
9. Tighten the three nuts (C) and then the jam nuts on adjuster bolts (D) and (E).
10. Replace cover (B) and tighten bolts (A).
11. Repeat Steps [6.](#), [page 111](#) to [9.](#), [page 111](#) at opposite end of auger.

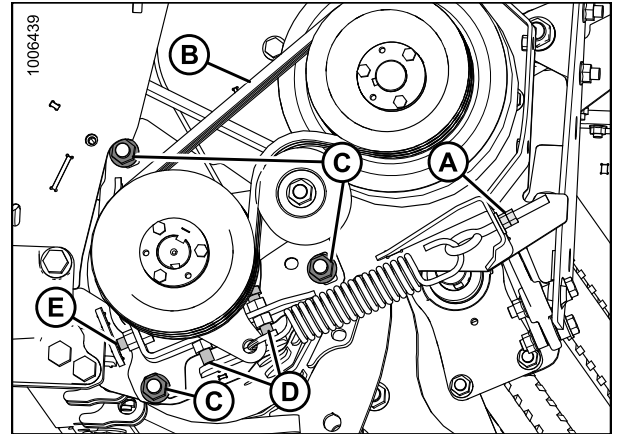


Figure 4.40: Drive Belts

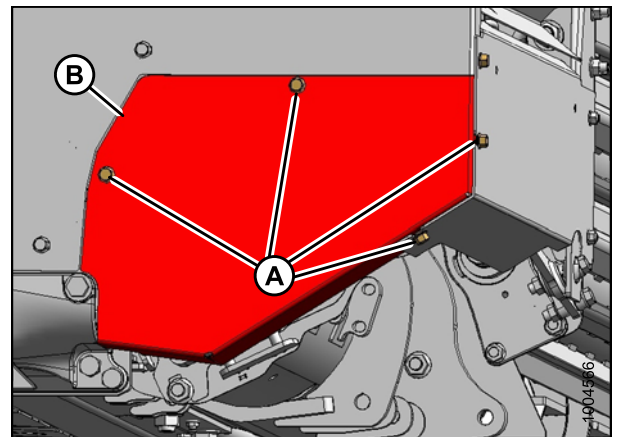


Figure 4.41: Drive Belt Cover

12. To adjust the center support, loosen bolts (A). Adjust auger support (B) fore or aft and vertical position as required. Tighten bolts (A).
13. Check clearance to stripper bars. Refer to [4.14 Stripper Bars](#), [page 113](#).

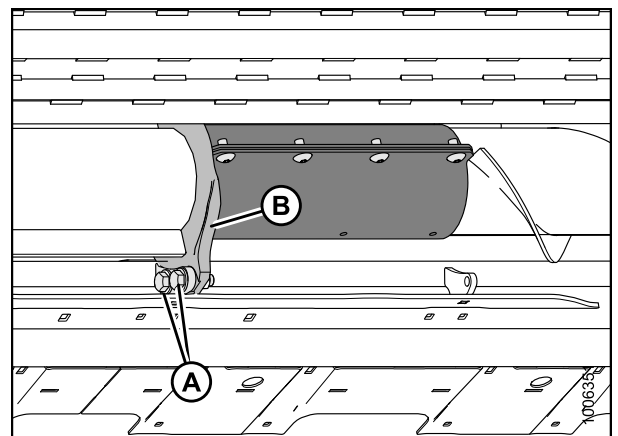


Figure 4.42: Auger Support

OPERATING THE HEADER

14. To tighten auger drive belts (C), adjust eye bolt (A) and secure with jam nut (B). Refer to [Inspecting and Adjusting the Auger Drive Belts](#), page 165.

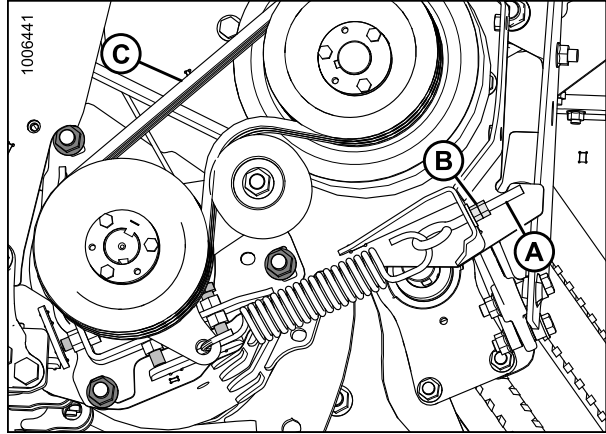


Figure 4.43: Drive Belts

4.14 Stripper Bars

There are two adjustable stripper bars installed on the pan at both ends of the auger that minimize wrapping of material around the auger. The factory position should be satisfactory for most crops, but bars can be adjusted for specific conditions.

For fine stemmed crop, the auger performs best when the stripper bars are positioned as close as possible to the auger without rubbing.

Component wear and cutting in bumpy terrain where the auger can contact the stripper bar may cause clearances to become excessive resulting in feeding problems and uneven windrows.

If material starts to accumulate between the auger flighting and the strippers, the gap will need to be adjusted.

NOTE:

The stripper bars will likely require adjustment if the auger position is changed.

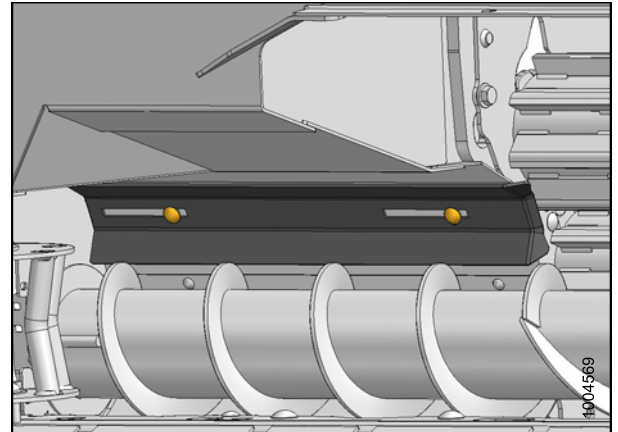


Figure 4.44: RH Stripper Bar

4.14.1 Adjusting the Stripper Bar

If necessary, adjust the stripper bar as follows:

 DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).
4. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

OPERATING THE HEADER

5. Loosen nuts (A) on the two bolts securing stripper bar to the pan sufficiently so that stripper bar can be moved.

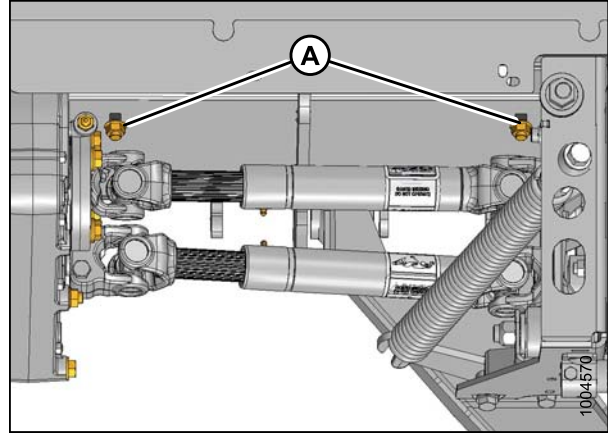


Figure 4.45: Left End Drives

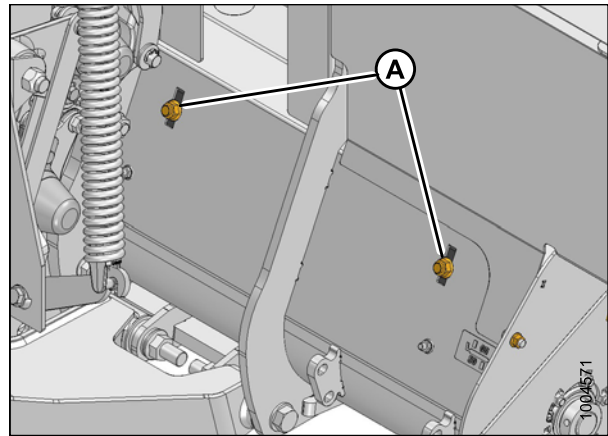


Figure 4.46: Right End

6. Position stripper bar (A) as close as possible to auger flighting without contacting it.
7. Repeat Steps 5., page 114 and 6., page 114 for opposite side.
8. Manually rotate auger to check that auger does **NOT** contact stripper bars. Readjust as required.

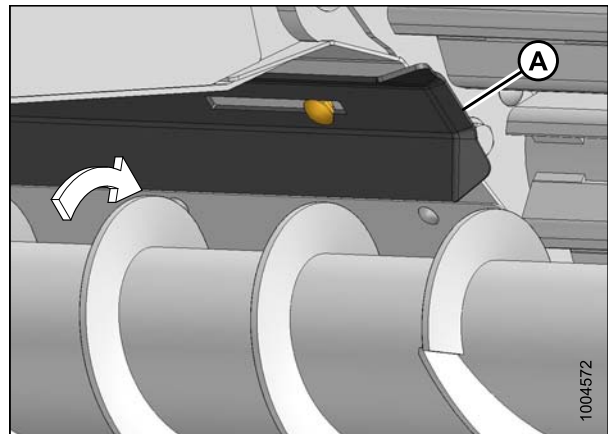


Figure 4.47: Stripper Bar

OPERATING THE HEADER

9. Tighten nuts (A).

NOTE:

Right side and left side stripper bars are interchangeable. Each stripper bar can be flipped when one bar wears out or becomes damaged.

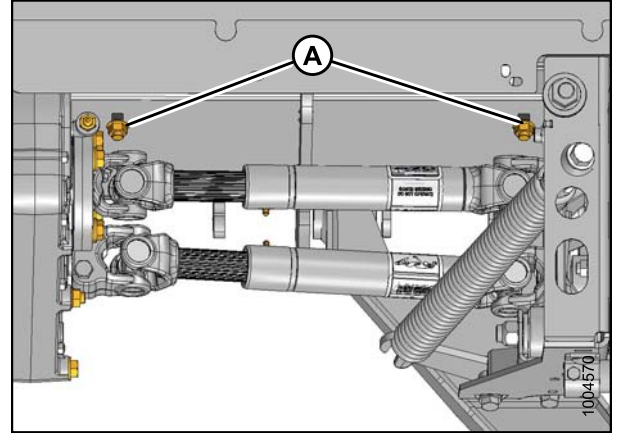


Figure 4.48: Left End

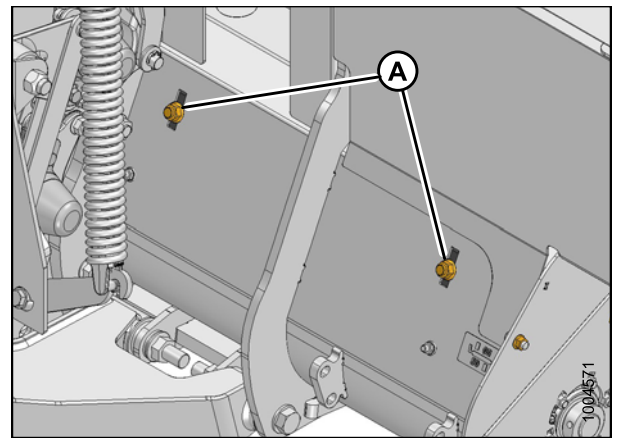


Figure 4.49: Right End

4.15 Haying

4.15.1 Curing

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

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

4.15.2 Topsoil Moisture

Table 4.3 Topsoil Moisture Levels

Level	% Moisture	Condition
Wet	Over 45%	Soil is muddy
Damp	25–45%	Shows footprints
Dry	Under 25%	Surface is dusty

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

4.15.3 Weather and Topography

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

4.15.4 Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the greatest results. Refer to [4 Operating the Header, page 83](#) for instructions on adjusting the header.

OPERATING THE HEADER

Table 4.4 Recommended Windrow Characteristics

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

4.15.5 Driving on Windrow

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

NOTE:

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

4.15.6 Raking and Tedding

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

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

4.15.7 Using Chemical Drying Agents

4.16 Unplugging the Header

Follow these steps to remove plugged material from the header:

DANGER

To avoid bodily injury or death from unexpected startup of machine, always stop the engine and remove the key before removing plugged material from header.

1. Stop forward movement of the windrower and disengage the header.
2. Run the header backwards with the header reverse controls in the windrower cab to clear the plug. If plug does not clear, proceed to the next steps.
3. Raise the header fully.
4. Stop the engine and remove the key.
5. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props](#), page 28.

WARNING

Wear heavy gloves when working around cutterbar.

6. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors](#), page 33.
7. Clean off the cutterbar or rolls by hand.

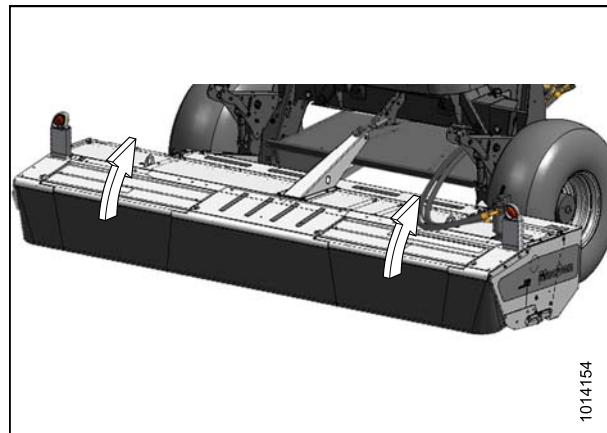


Figure 4.50: Cutterbar Doors

5 Maintenance and Servicing

Use the following instructions as your first source of information for servicing the header. A parts catalog is located in a plastic case at the right end of the header. If more detailed maintenance and service information is required, contact your Dealer.

Log the hours of operation and use the Maintenance Schedule/Record provided to keep a record of scheduled maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

5.1 Preparation for Servicing

CAUTION

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Engage park brake.
4. Wait for all moving parts to stop.

5.2 Recommended Fluids and Lubricants

Your machine can operate at top efficiency only if clean lubricants are used.

- Use clean containers to handle all lubricants.
- Store in an area protected from dust, moisture, and other contaminants.

Table 5.1 Fluids and Capacities

Lubricant	Location	Description	Capacities
Grease	As required unless otherwise specified	SAE Multi-Purpose, High temperature extreme pressure (EP) performance with 0–1% max. Molybdenum Disulphide (NLGI Grade 2) Lithium complex base	—
	Driveline slip-joints	High temperature extreme pressure (EP) performance with 10% max. Molybdenum Disulphide (NLGI Grade 2) Lithium base	—
Gear Lubricant	Cutterbar	80W-90 gear lubricant with high thermal and oxidation stability conforming to API gear lubricant service GL-5 minimum (SAE J2360 preferred) specifications such as Traxon 80W-90 gear oil	4.25 L (4.4 US quarts)
	Conditioner gearbox	75W-90 synthetic gear lubricant with high thermal and oxidation stability conforming to API GL-5 minimum (SAE J2360 preferred) specifications such as Traxon E Synthetic 75W-90 gear oil	750 ml (0.79 US quarts)
	Bevel gearbox		2.1 L (2.2 US quarts)

5.3 Maintenance Requirements

In this manual, periodic maintenance requirements are organized by service intervals. For detailed instructions, refer to the specific headings in this section.

Regular maintenance is the best insurance against early wear and breakdowns. Use the following schedule and recommendations to increase machine life.

- Use fluids and lubricants specified in [5.2 Recommended Fluids and Lubricants, page 120](#).
- Make copies of the [5.3.1 Maintenance Schedule/Record, page 121](#) and log the hours of operation.

Where a service interval is given with more than one timeframe, e.g., 100 hours or Annually, service the machine at whichever interval is reached first.

IMPORTANT:

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



Carefully follow safety messages given in [1 Safety, page 1](#).

5.3.1 Maintenance Schedule/Record

Action		✓ Check				⚡ Lubricate				▲ Change			
	Hour meter reading												
	Service date												
	Serviced by												
Preseason or Annual. Refer to 5.3.2 Preseason/Annual Service, page 124 .													
End of season. Refer to 5.3.3 End-of-Season Service, page 124 .													
First 5 hours													
✓	Check for loose hardware. Refer to 8.1 Torque Specifications, page 185 .												
✓	Check drive belt tension. Refer to Inspecting the Conditioner Drive Belt, page 158 and Inspecting and Adjusting the Auger Drive Belts, page 165 .												
First 10 hours then daily													
✓	Check hydraulic hoses and lines. Refer to 5.6.2 Hydraulic Hoses and Lines, page 172 .												
✓	Check cutterblades, deflectors, and discs. Refer to 5.4.2 Inspecting the Cutterbar Discs, page 137 .												

MAINTENANCE AND SERVICING

Action	✓ Check	☼ Lubricate	▲ Change										
First 25 hours													
✓	Check drive belt tension. Refer to <i>Inspecting the Conditioner Drive Belt, page 158</i> and <i>Inspecting and Adjusting the Auger Drive Belts, page 165</i> .												
Every 25 hours													
☼	Lube roll universal joints. Refer to <i>5.3.4 Lubrication and Servicing, page 125</i> .												
☼	Lube cutterbar driveline bearings. Refer to <i>5.3.4 Lubrication and Servicing, page 125</i> .												
First 50 hours													
✓	Check drive belt tension. Refer to <i>Inspecting the Conditioner Drive Belt, page 158</i> and <i>Inspecting and Adjusting the Auger Drive Belts, page 165</i> .												
▲	Change cutterbar lubricant. Refer to <i>5.3.7 Lubricating the Cutterbar, page 131</i> ¹ .												
▲	Change bevel gearbox lubricant. Refer to <i>5.5.1 Bevel Gearbox, page 157</i> .												
▲	Change conditioner gearbox lubricant. Refer to <i>5.5.1 Bevel Gearbox, page 157</i> .												
Every 50 hours													
☼	Lube drive belt tensioner. Refer to <i>5.3.4 Lubrication and Servicing, page 125</i> .												
☼	Lube roll shaft bearings. Refer to <i>5.3.4 Lubrication and Servicing, page 125</i> .												
☼	Lube gauge roller bearings. ²												
Every 100 hours or annually													
✓	Check conditioner drive belt. Refer to <i>Inspecting the Conditioner Drive Belt, page 158</i> .												

1. Use only the specified amount. DO NOT overfill
2. Optional

MAINTENANCE AND SERVICING

	Action	✓ Check	✦ Lubricate	▲ Change									
✓	Check auger drive belt. Refer to <i>Inspecting and Adjusting the Auger Drive Belts, page 165.</i>												
✓	Check conditioner gearbox lubricant. Refer to <i>5.5.3 Conditioner Gearbox, page 161.</i>												
✓	Check bevel gearbox lubricant. Refer to <i>5.5.1 Bevel Gearbox, page 157.</i>												
First 150 hours													
▲	Change cutterbar lubricant. Refer to <i>5.3.7 Lubricating the Cutterbar, page 131¹.</i>												
▲	Change bevel gearbox lubricant. Refer to <i>5.5.1 Bevel Gearbox, page 157.</i>												
▲	Change conditioner gearbox lubricant. Refer to <i>5.5.3 Conditioner Gearbox, page 161.</i>												
Every 250 hours³													
▲	Change cutterbar lubricant. Refer to <i>5.3.7 Lubricating the Cutterbar, page 131¹.</i>												
▲	Change bevel gearbox lubricant. Refer to <i>5.5.1 Bevel Gearbox, page 157.</i>												
▲	Change conditioner gearbox lubricant. Refer to <i>5.5.3 Conditioner Gearbox, page 161.</i>												

3. Begins after the first 150 hour service

5.3.2 Preseason/Annual Service

CAUTION

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

Perform the following at the beginning of each operating season:

- Lubricate machine completely. Refer to [5.3.4 Lubrication and Servicing, page 125](#).
- Perform all annual maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

5.3.3 End-of-Season Service

CAUTION

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

Do the following at the end of each operating season:

- Clean the header thoroughly.
- Store in a dry, protected place if possible. If stored outside, always cover the header with a waterproof canvas or other protective material.
- Raise the header and engage header safety props.
- If possible, block up the header to take weight off tires.
- Repaint all worn or chipped painted surfaces to prevent rust.
- Loosen drive belt.
- Lubricate the header thoroughly, leaving excess grease on fittings to keep moisture out of bearings.
- Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
- Oil cutterbar components to prevent rust.
- Check for worn components and repair as necessary.
- Check for broken components and order replacements from your Dealer. Attention to these items right away will save time and effort at beginning of next season.
- Replace or tighten any missing or loose hardware. Refer to [8.1 Torque Specifications, page 185](#).
- Remove divider rods (if equipped) to reduce space required for inside storage.

5.3.4 Lubrication and Servicing

WARNING

To avoid personal injury, before servicing the header or opening drive covers, follow procedures in [5.1 Preparation for Servicing, page 119](#).

Log hours of operation and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

To access the drive systems, open the driveshield and cutterbar doors. Refer to:

- [3.4 Driveshields, page 30](#)
- [3.5 Cutterbar Doors, page 33](#)

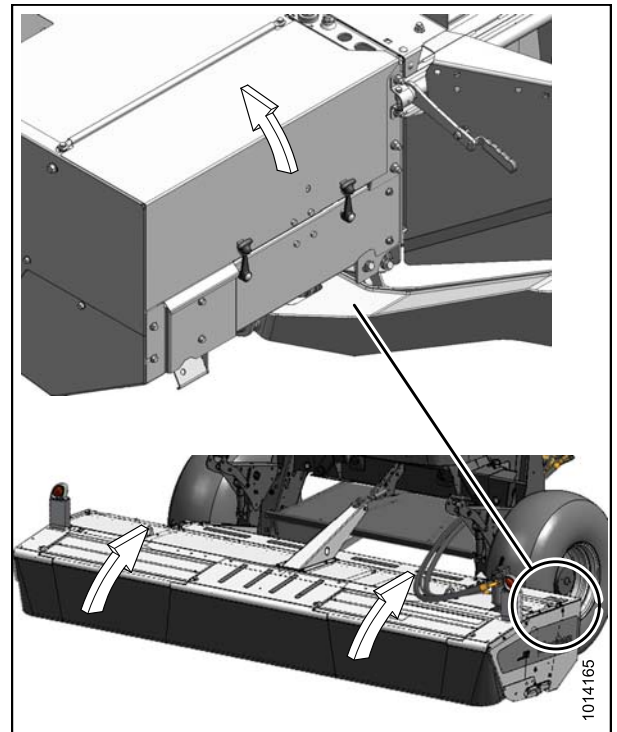


Figure 5.1: Driveshield

5.3.5 Greasing Procedure

DANGER

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

MAINTENANCE AND SERVICING

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

Use the recommended lubricants specified in this manual. Refer to [5.2 Recommended Fluids and Lubricants, page 120](#).

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

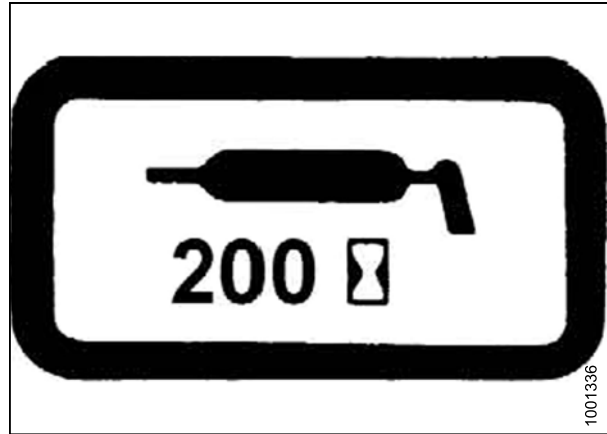


Figure 5.2: Grease Interval Decal

5.3.6 Lubrication and Servicing Intervals

To identify the various locations that require lubrication and servicing, refer to the following illustrations (organized by the frequency of service that is required).

Every 25 Hours

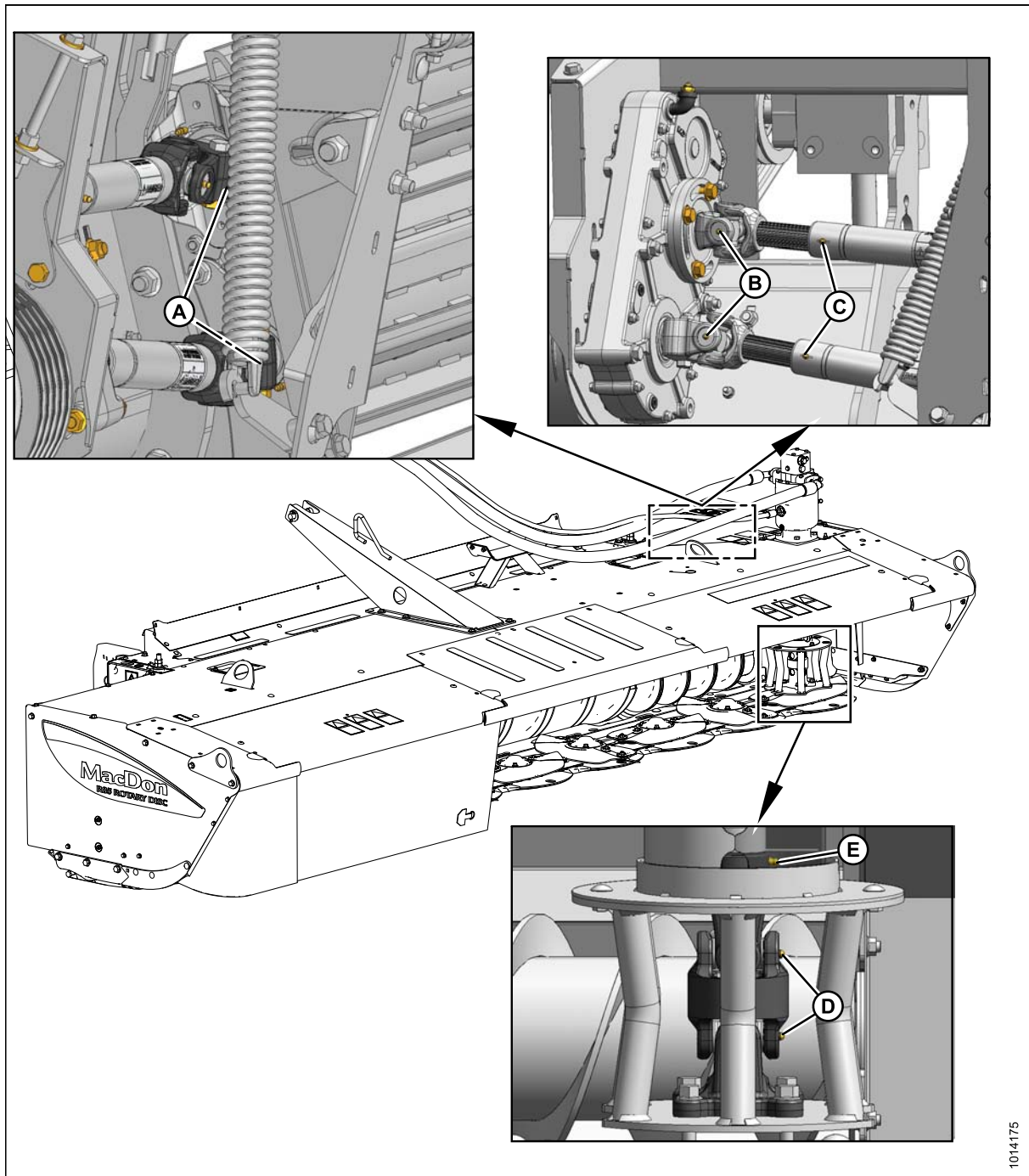


Figure 5.3

- A - Driveline Universals (2 Places)
- C - Driveline Shaft⁴ (2 Places)
- E - Driveline Shaft⁴

- B - Driveline Universals (2 Places)
- D - Driveline Universals (2 Places)

NOTE:

Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI grade 2) lithium base except where noted.

MAINTENANCE AND SERVICING

Every 50 Hours

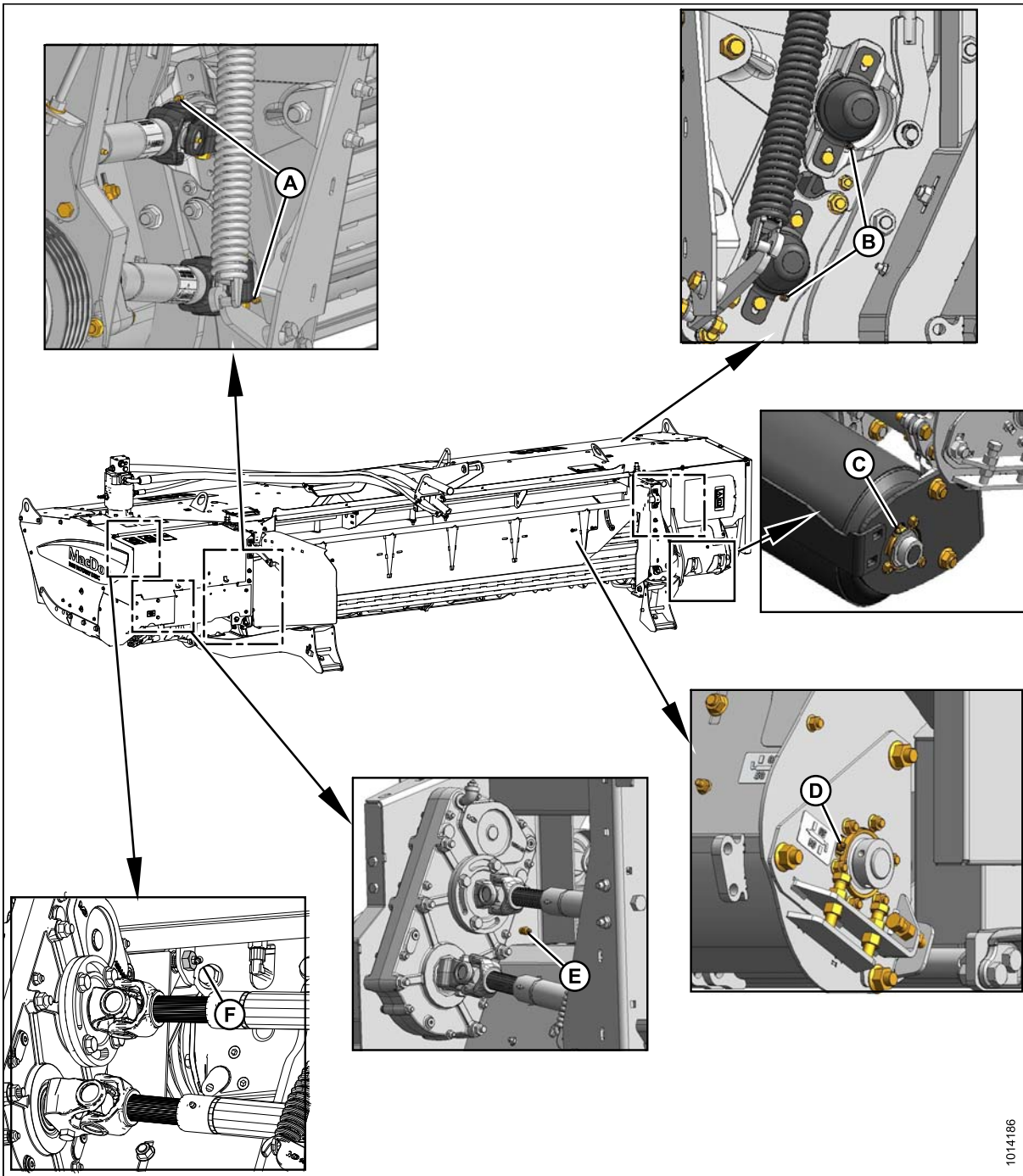


Figure 5.4

A - Roll Shaft Bearings (2 Places)

B - Roll Shaft Bearings (2 Places)

C - Optional Gauge Roll Bearings(2 Places Each)

D - Auger Bearing (1 Place)

E - Auger Bearing (1 Place)

F - Belt Tensioner Pivot (1 Place)

NOTE:

Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI grade 2) lithium base except where noted.

MAINTENANCE AND SERVICING

Every 100 Hours or Annually

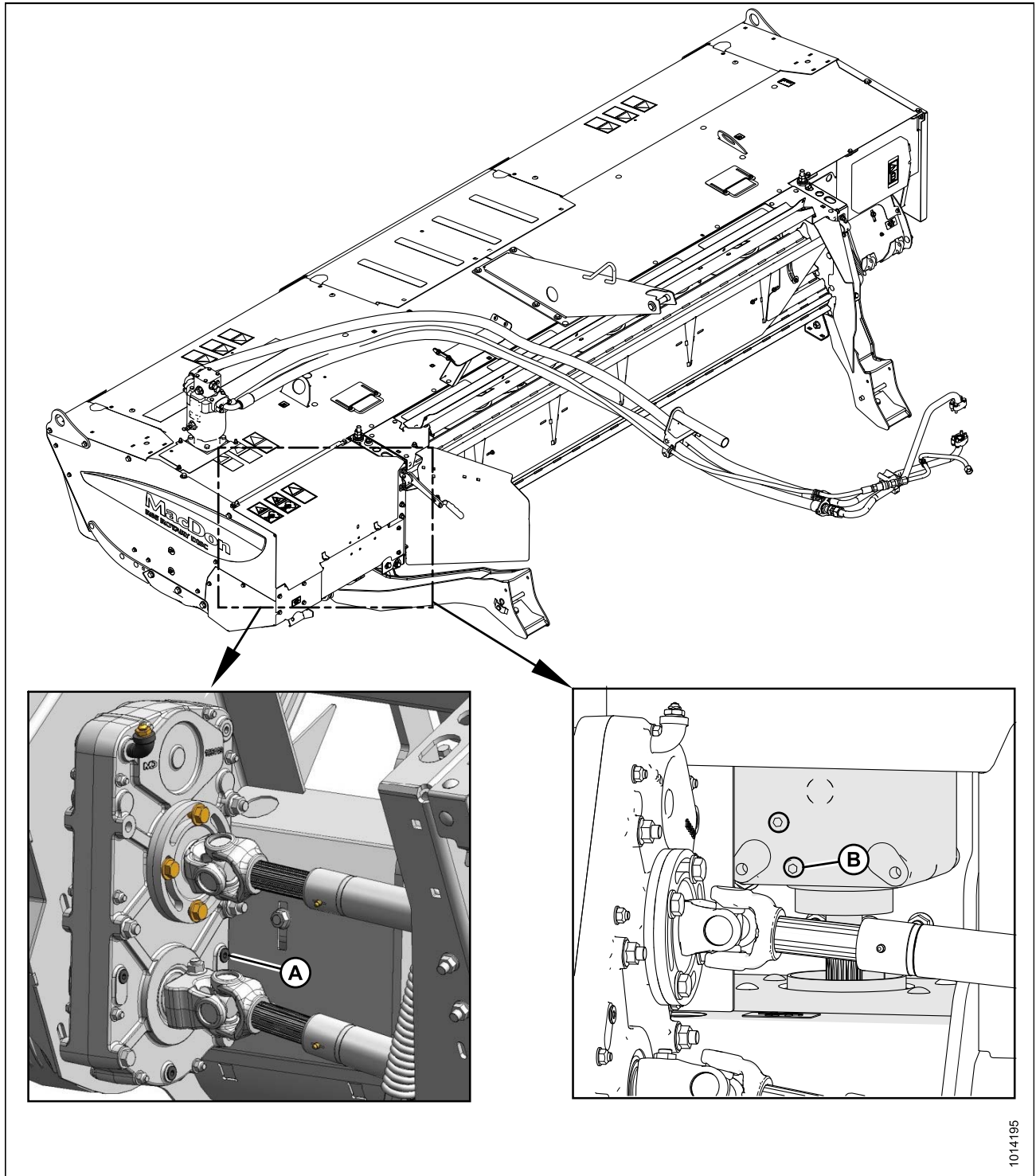


Figure 5.5

A - Conditioner Gearbox Oil Level (Check with Top of Header Horizontal) B - Bevel Gearbox Oil Level (Check with Top of Header Horizontal)

4. 10% moly grease is recommended for driveline shaft slip joint only

MAINTENANCE AND SERVICING

Every 250 Hours

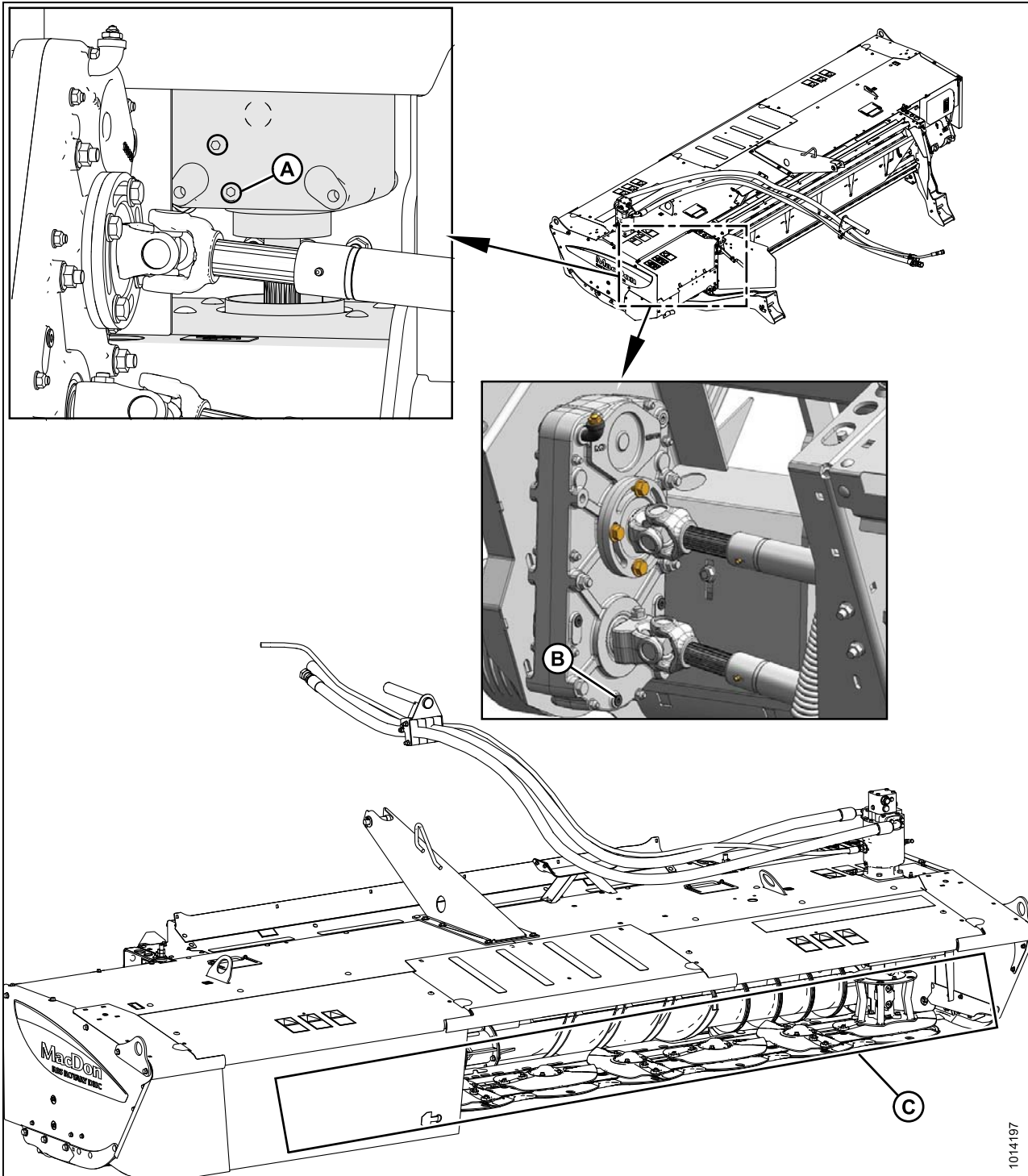


Figure 5.6

A - Drain and Refill Bevel Gearbox Lube⁵

B - Drain and Refill Conditioner Gearbox Lube⁵

C - Drain and Refill Cutterbar Lube⁶

5. Refer to [Changing the Bevel Gearbox Lubricant](#), page 157.

6. Refer to [5.3.7 Lubricating the Cutterbar](#), page 131.

5.3.7 Lubricating the Cutterbar

The lubricant level in the cutterbar **CANNOT** be checked. If the cutterbar lubricant quantity is in doubt, do **NOT** add lubricant. Drain the cutterbar and refill with new clean lubricant.

Draining the Cutterbar Lubricant

IMPORTANT:

Drain the cutterbar when the lubricant is warm. If the lubricant is cold, idle the machine for about 10 minutes prior to draining.

⚠ DANGER

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

⚠ CAUTION

Be careful when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

⚠ DANGER

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

1. Place blocks under each end of the header (A) making sure the left end is higher than the right end.
2. Disengage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
3. Start the windrower and lower header onto blocks.
4. Stop the engine and remove the key.
5. Open cutterbar doors (B). Refer to [3.5 Cutterbar Doors, page 33](#).

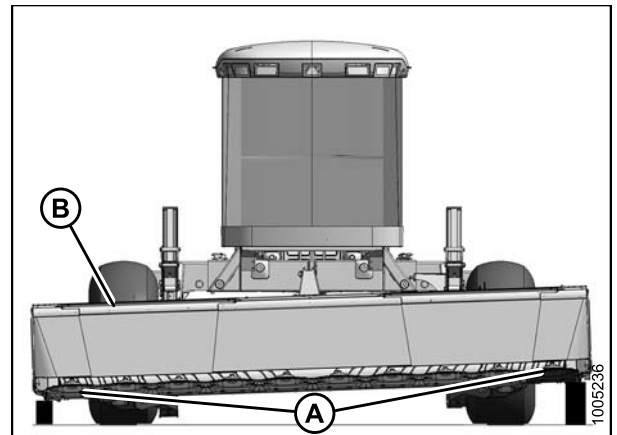


Figure 5.7: Header Raised Left Side

MAINTENANCE AND SERVICING

6. Locate one of the three filler plugs along the top of the cutterbar. Refer to [5.8: 16 ft.: Cutterbar Filler Plug Locations](#), page 132.

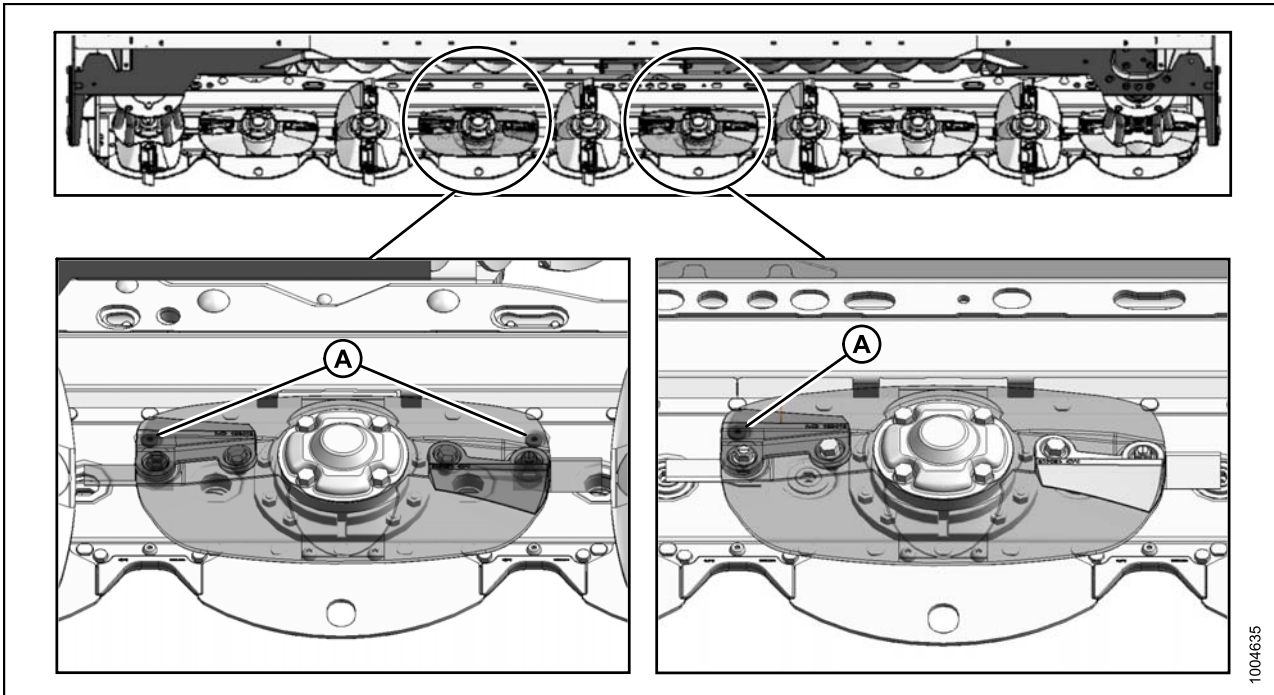


Figure 5.8: Cutterbar Filler Plug Locations

7. Clean around either filler plug (A) and remove one plug with an 8 mm hex key.

NOTE:

Rotate disc to expose filler plug if necessary.

8. Place a suitably sized container under the cutterbar drain hole (A). Refer to [5.2 Recommended Fluids and Lubricants](#), page 120 for cutterbar lubricant capacity.
9. Remove plug (A) with an 8 mm hex key and allow sufficient time for lubricant to drain.

IMPORTANT:

Do NOT flush the cutterbar.

10. Replace drain plug (A) and tighten.
11. Safely dispose of lubricant.
12. Add lubricant. Refer to [Filling the Cutterbar Lubricant](#), page 133.

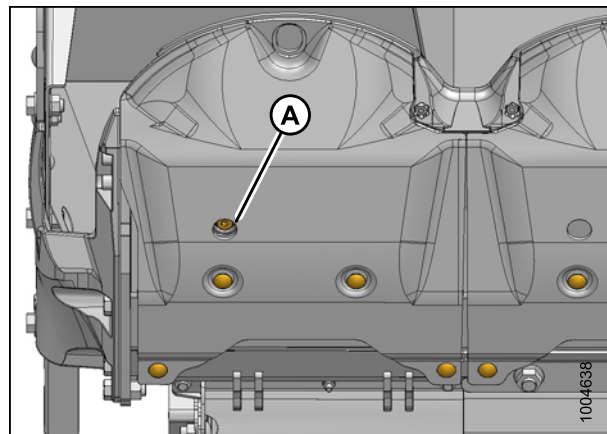


Figure 5.9: Cutterbar Lubricant Drain

Filling the Cutterbar Lubricant

⚠ DANGER

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

1. Park the machine on level ground.
2. Raise the header fully.
3. Stop the engine and remove the key.
4. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
5. Move higher block to right end of header.

NOTE:

Having the fill end higher allows for quicker filling of cutterbar.

6. Disengage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).

⚠ CAUTION

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

7. Start windrower and lower header onto blocks (A).
8. Stop the engine and remove the key.
9. Verify that drain plug (A) has been installed before adding new lubricant.

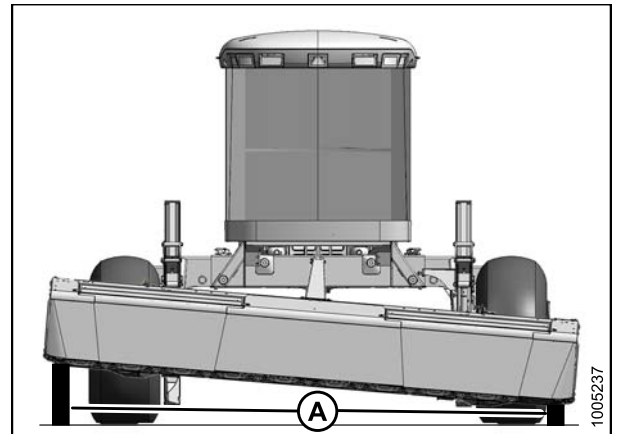


Figure 5.10: Header Raised Right Side

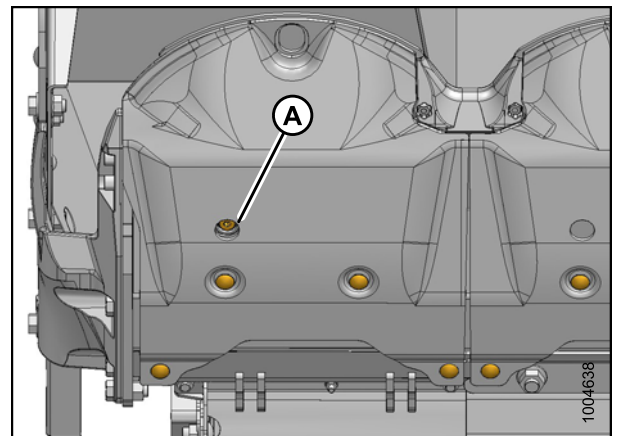


Figure 5.11: Cutterbar Drain Plug

MAINTENANCE AND SERVICING

10. Locate the filler plugs (A) and (B) along the top of the cutterbar. Refer to [Figure 5.12: Cutterbar Filler Plug Locations, page 134](#).

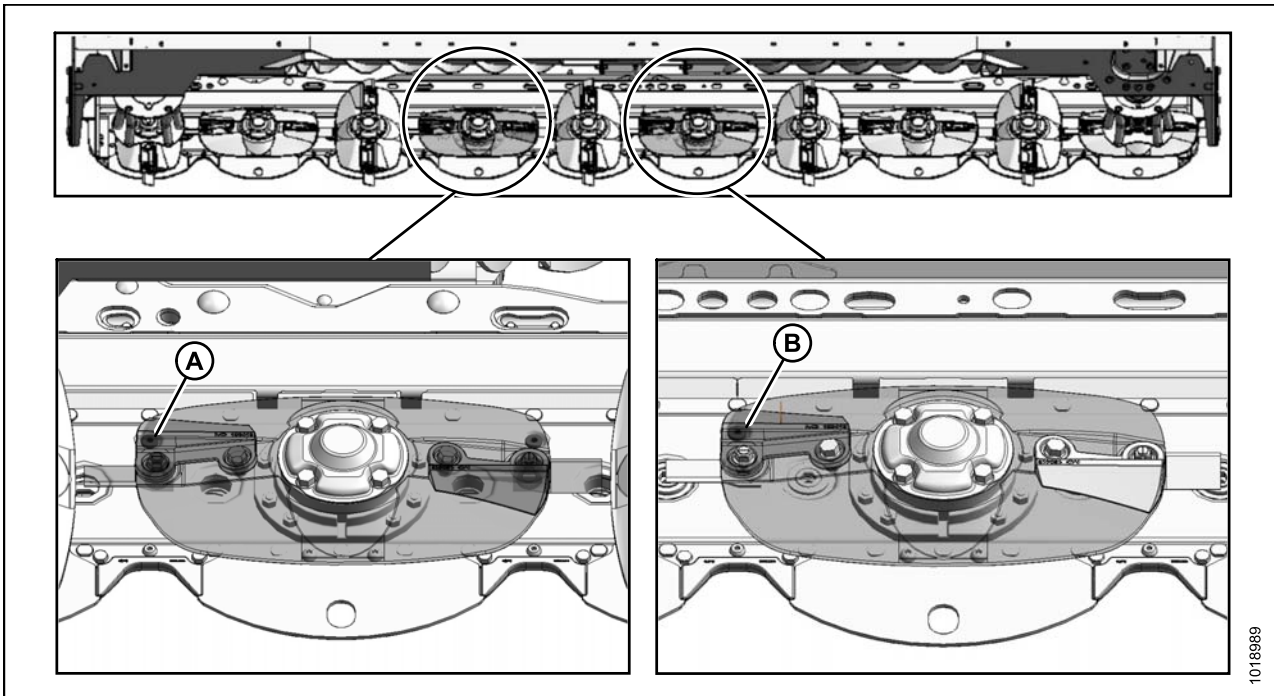


Figure 5.12: Cutterbar Filler Plug Locations

11. Clean around and remove filler plugs (A) and (B) with an 8 mm hex key.

NOTE:

Opening two fill plugs allows air to escape while adding oil to the cutterbar and prevents oil from blowing back through the fill hole.

NOTE:

Rotate disc to expose filler plug if necessary.

12. Add lubricant to cutterbar through filler hole (A). Refer to [5.2 Recommended Fluids and Lubricants, page 120](#) for recommended lubricant type and volume.

IMPORTANT:

DO NOT overfill the cutterbar. Overfilling can cause overheating and damage to or failure of the cutterbar. To avoid overfilling, completely drain the oil from the cutterbar before adding the recommended volume of oil. Refer to [Draining the Cutterbar Lubricant, page 131](#).

13. Install the filler plugs that were removed.
14. Close the cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).
15. Start engine and raise header off blocks.
16. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
17. Remove blocks and lower the header fully.
18. Stop the engine and remove the key.
19. Disengage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).

20. Start engine and lower the header fully.

5.3.8 Rock Guards

The machine is equipped with rock guards at each cutting disc location. Rock guards prevent the cutterbar from digging into the ground and protect the disc from coming in contact with stones and other debris.

Inspecting the Rock Guards

Check rock guards periodically for severe damage or wear as follows:

DANGER

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

DANGER

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

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Inspect rock guards (A) for severe damage, wear, and distortion. The guards should be replaced if severely damaged or worn.
5. Check for loose or missing fasteners and tighten or replace fastener if missing.
6. Contact your MacDon Dealer for replacement procedures.

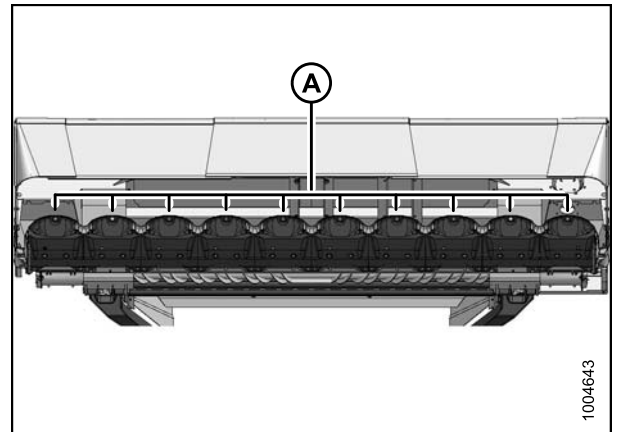


Figure 5.13: Rock Guards

5.4 Cutterbar Disc Maintenance

Perform daily inspections to ensure that cutterbar discs have not suffered damage from rocks, or experienced excessive wear from abrasive working conditions.

Cutterbar discs are interchangeable and can be moved to a spindle that rotates in the opposite direction as long as it is in usable condition and the blades are oriented to cut in the correct direction.

The cutterbar discs are **NOT** repairable and must be replaced if severely damaged or worn.

IMPORTANT:

If holes appear in a cutterbar disc, replace the disc immediately. Do **NOT** attempt to repair the cutterbar discs. Always use factory replacement parts.

5.4.1 Direction of Spindle Rotation

When installing cutterblades or disc accelerators, the direction of rotation determines proper crop positioning. Refer to Figure 5.14: *Spindle Rotation*, page 136 to determine the direction of spindle rotation.

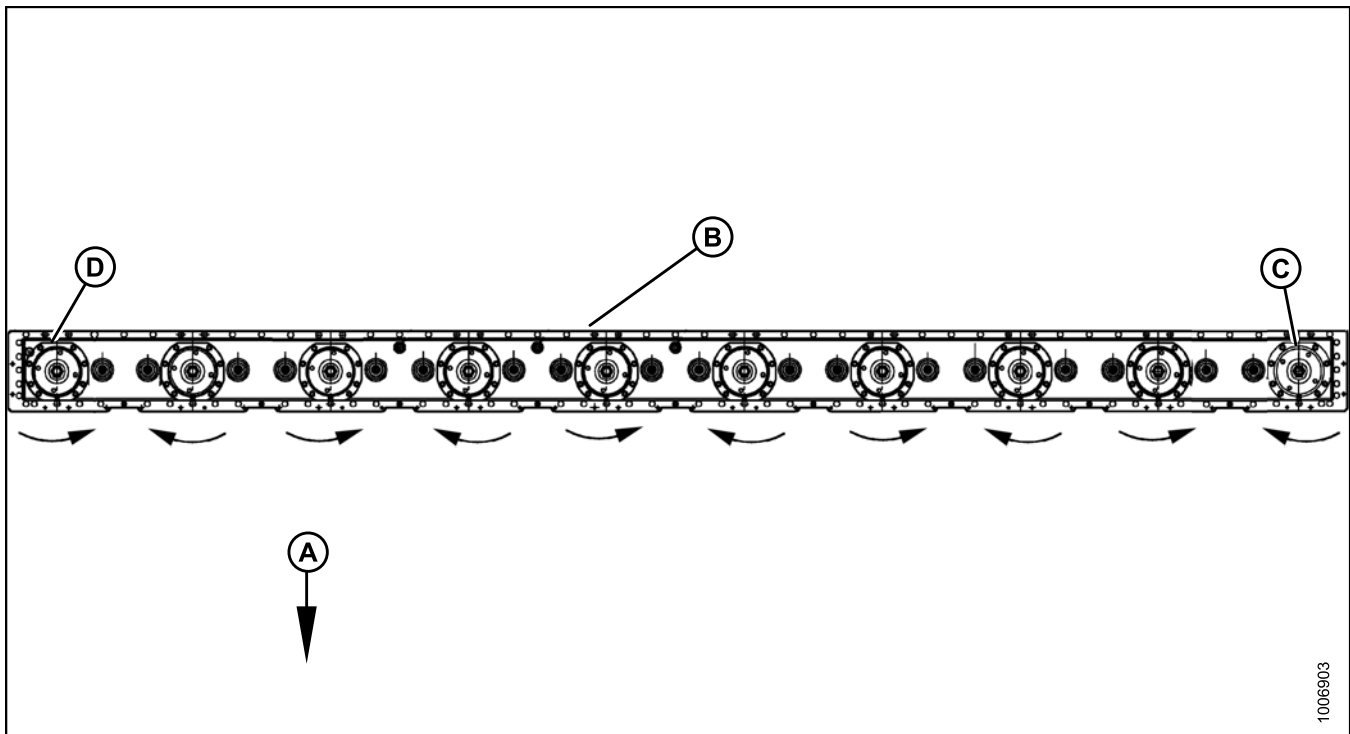


Figure 5.14: Spindle Rotation

A - Front of Header

B - 16-Footer Cutterbar

C - Disc 1⁷

D - Disc 8⁸

- 7. Driveline deflector installed here.
- 8. Driven deflector installed here.

5.4.2 Inspecting the Cutterbar Discs

Perform the following cutterbar disc inspection daily:

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Check discs (A) for damage or loose fasteners.
5. Replace damaged discs. Refer to:
 - [5.4.3 Removing a Cutterbar Disc, page 137](#)
 - [5.4.4 Installing a Cutterbar Disc, page 138](#)
6. Replace damaged fasteners. Tighten loose fasteners.
7. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

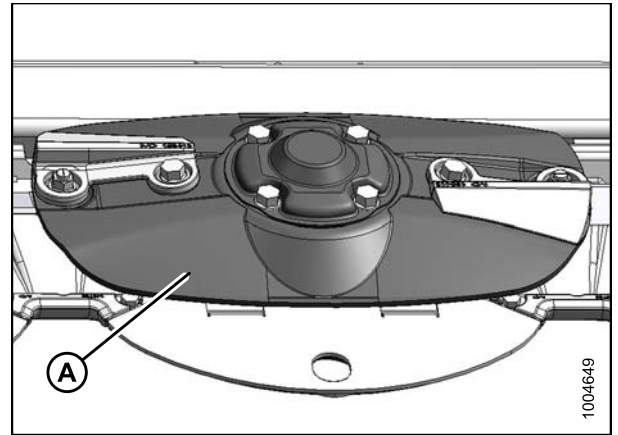


Figure 5.15: Cutterbar Disc

5.4.3 Removing a Cutterbar Disc

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Open cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).
2. Identify which disc needs to be replaced.
3. Place a block of wood between two discs to prevent disc rotation while loosening bolts.
4. If the disc has a deflector installed on it, remove the rotary deflector. Refer to:
 - [Removing the Driveline Deflector, page 150](#)
 - [Removing the Driven Deflector, page 149](#)

MAINTENANCE AND SERVICING

- Remove four bolts (A) on disc cover (B) and remove cover and disc (C).

NOTE:

If removing multiple discs, mark the position of each disc to assist in reinstallation. The blades on each disc are direction-specific. Refer to [5.4.1 Direction of Spindle Rotation, page 136](#).

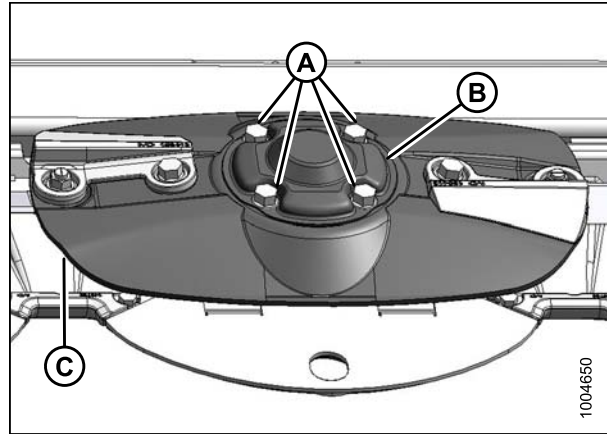


Figure 5.16: Cutterbar Disc

5.4.4 Installing a Cutterbar Disc

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

- Install the new disc on spindle positioned at a 90° angle to the adjacent discs.

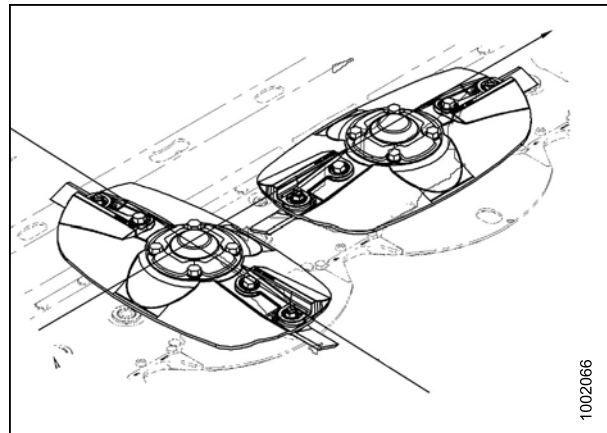


Figure 5.17: Cutterbar Discs

- Install cover (B) and secure with four bolts (A). Tighten bolts.
- Reinstall previously removed rotary deflector (if applicable). Refer to:
 - [Installing the Driveline Deflector, page 151](#)
 - [Installing the Driven Deflector, page 150](#)
- Close the cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).

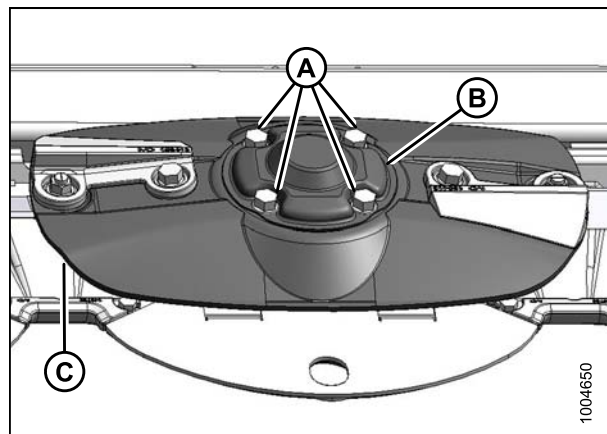


Figure 5.18: Cutterbar Disc

5.4.5 Cutterblades

Each disc has two cutterblades (A) attached at each end with a specially designed shoulder bolt that allows the blades to swivel horizontally.

Since each blade has two cutting edges, they can be flipped over to extend the life of the blades.

The blades are NOT repairable and must be replaced if damaged or worn.

IMPORTANT:

Always use MacDon factory replacement parts.

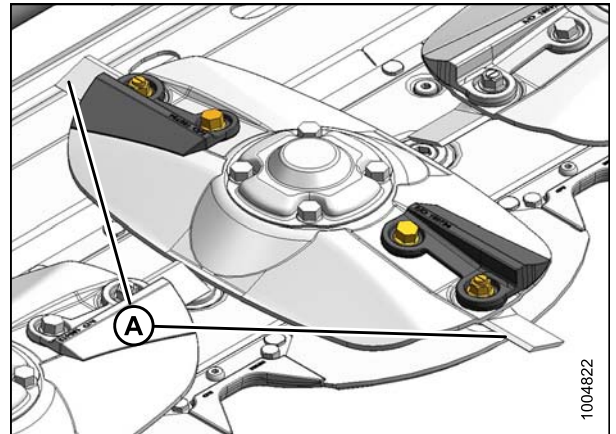


Figure 5.19: Cutterblades

Inspecting Cutterblades

⚠ 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

Cutterblades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

⚠ CAUTION

Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades at earliest possible opportunity.

⚠ CAUTION

Damaged or loose cutterblades or blade attachment hardware can be ejected during machine operation and may cause personal injury or machine damage.

MAINTENANCE AND SERVICING

1. Check daily that the cutterblades are securely attached to the disc.
2. Inspect blades for cracks, wear beyond safe operating limits (C), and distortion.
3. Replace blades immediately if any problems occur.

IMPORTANT:

Blades should be replaced in pairs, or the disc may become unbalanced and cause damage to the cutterbar.

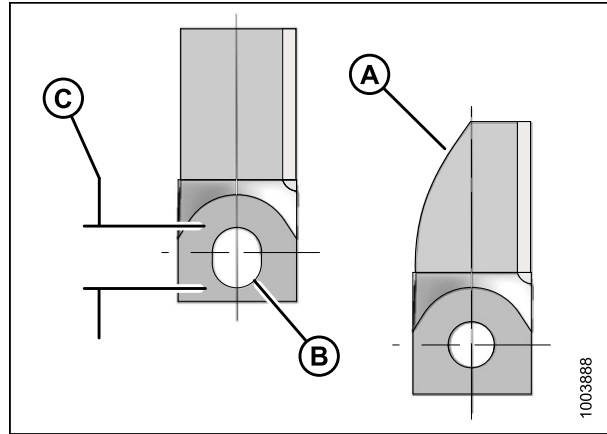


Figure 5.20: Cutterblades

A - Blade Wear to Center Line

B - Elongated Hole

C - Maximum Elongation 21 mm (13/16 in.)

IMPORTANT:

The cutterblades have cutting edges on both sides so the blades can be turned over and reused. The twist in each blade determines the cutting direction. If you are unsure which direction the spindles rotate, refer to [5.4.1 Direction of Spindle Rotation, page 136](#).

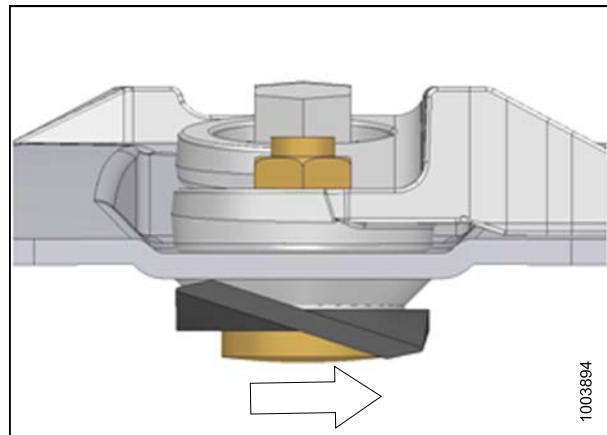


Figure 5.21: Counterclockwise Disc Rotation Direction

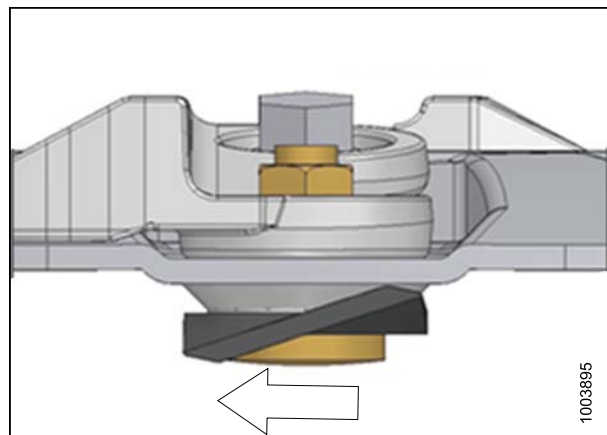


Figure 5.22: Clockwise Disc Rotation Direction

MAINTENANCE AND SERVICING

Inspecting Cutterblade Hardware

CAUTION

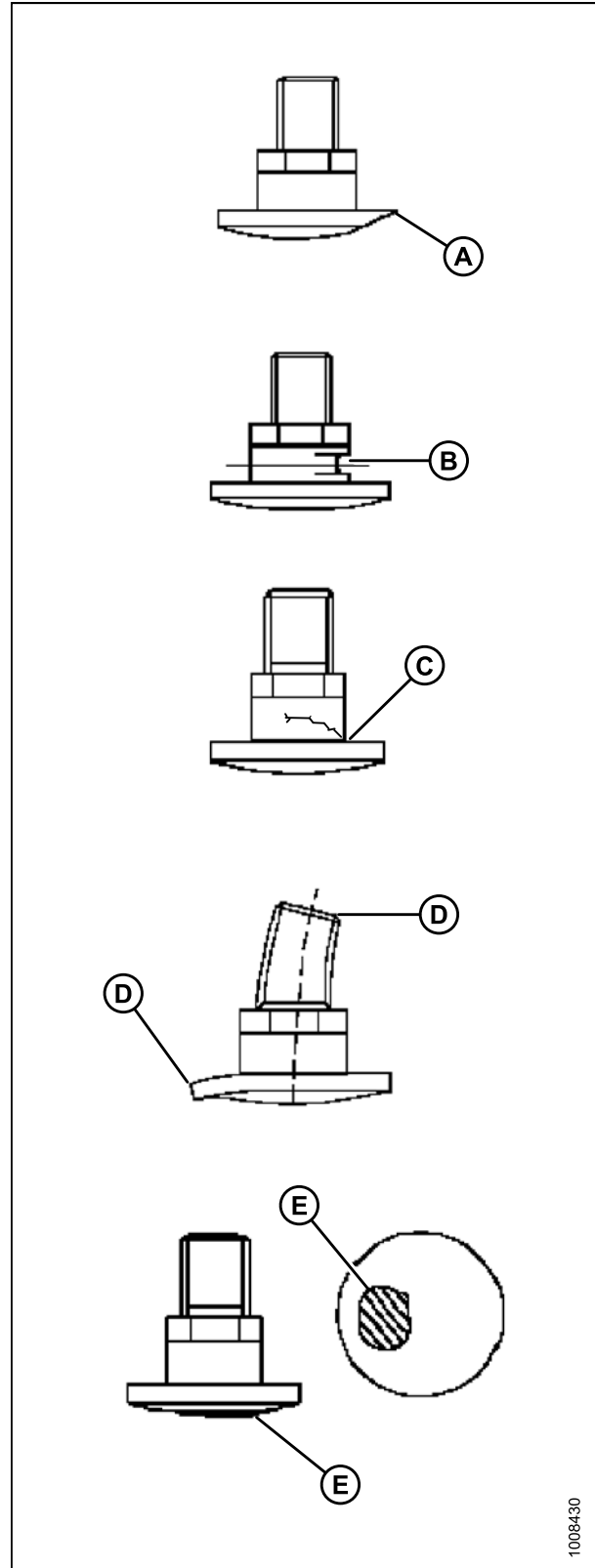
Damaged or loose cutterblades or blade attachment hardware can be ejected during machine operation and may cause personal injury or machine damage.

MAINTENANCE AND SERVICING

Check blade attachment hardware each time blades are changed. Refer to [Replacing the Cutterblades, page 143](#) for hardware replacement procedure.

Check bolts and replace bolt if:

- Bolt has been removed and installed five times
- Head (A) is worn flush with bearing surface of blade
- Diameter of bolt neck is worn (B) 3 mm (1/8 in.)
- Bolt is cracked (C)
- Bolt is visibly distorted (D)
- There is evidence of interference (E) with adjacent parts



MAINTENANCE AND SERVICING

Check nuts and replace nut if:

- Nut has been removed and installed five times
- Worn height (A) is less than half original height (B)
- Nut is cracked

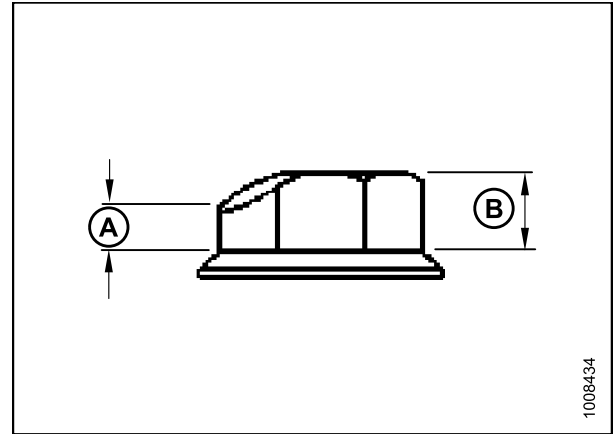


Figure 5.24: Cutterblade Nut

Replacing the Cutterblades

Follow these steps to replace the cutterblades:

DANGER

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

CAUTION

Cutterblades have two cutting edges. Be careful when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Open the cutterbar door(s). Refer to [3.5 Cutterbar Doors, page 33](#).
5. Rotate disc (A) so that blade (B) faces forward and lines up with hole (C) in rock guard.
6. Place a block of wood between two discs to prevent disc rotation while loosening blade bolts.
7. Clean debris from blade attachment area.

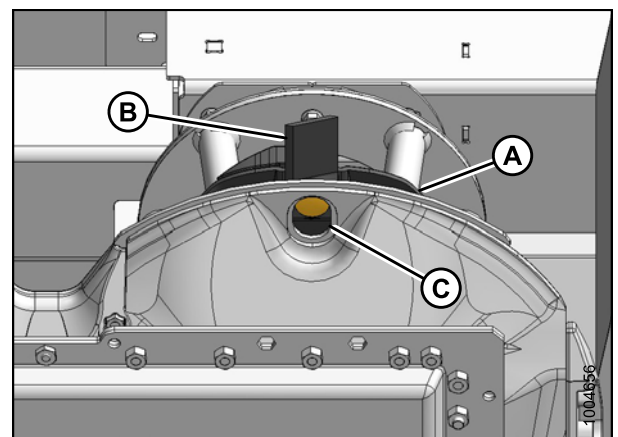


Figure 5.25: Cutterblades

MAINTENANCE AND SERVICING

- Remove nut (A).
- Remove shoulder bolt (B) and blade (C).
- Install new or reversed blade (C) with shoulder bolt (B) onto disc.

NOTE:

Ensure shoulder bolt is fully engaged into blade before tightening nut.

NOTE:

Ensure blade is installed correctly to suit rotation of disc. Refer to:

- [5.21: Counterclockwise Disc Rotation Direction, page 140](#)
- [5.22: Clockwise Disc Rotation Direction, page 140](#)

If you are unsure which direction the spindle rotates, Refer to [5.4.1 Direction of Spindle Rotation, page 136](#).

- Install nut (A). Tighten nut to 135 N·m (100 ft·lbf).
- Remove block of wood (if used).

WARNING

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

- Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

5.4.6 Accelerators

Two accelerators (A) are mounted on each outboard disc. They are designed to quickly move the cut material off the disc and into the auger and conditioner.

Accelerators are replaceable and should be inspected periodically for damage and loose or missing fasteners.

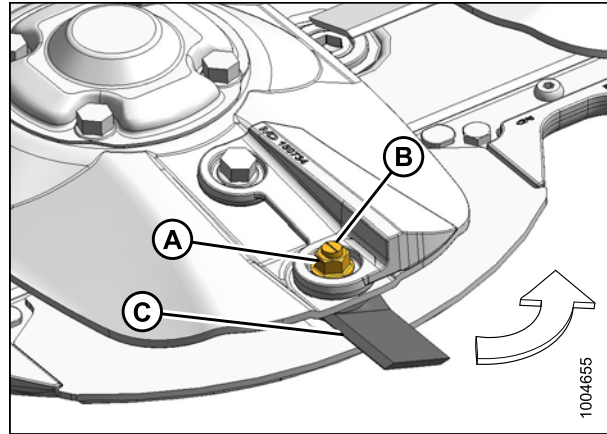


Figure 5.26: Cutterblades

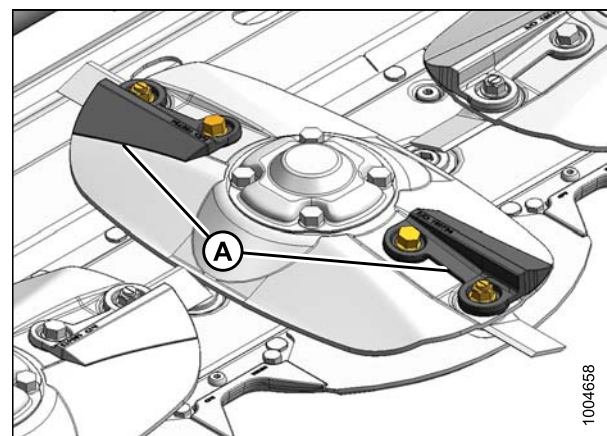


Figure 5.27: Outboard Disc

Inspecting Accelerators

Follow these steps to inspect accelerators:

DANGER

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

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props](#), page 28.
4. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors](#), page 33.

CAUTION

Cutterblades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

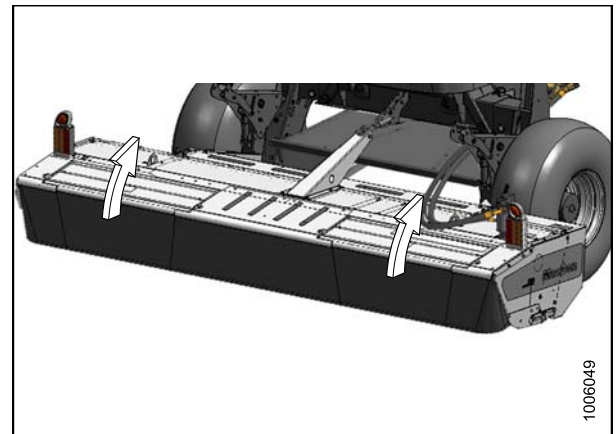


Figure 5.28: Cutterbar Doors

5. Inspect accelerators (A) and replace if severely damaged or worn.
6. Check for loose or missing fasteners and tighten or replace fastener if missing.

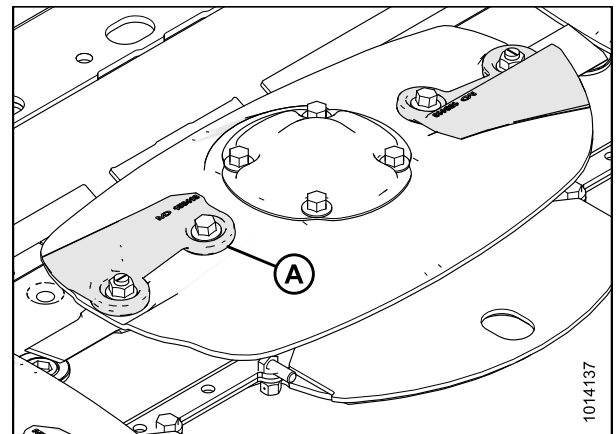


Figure 5.29: Inspecting Accelerators

Replacing Accelerators

Follow these steps to replace the accelerators:

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props](#), page 28.

MAINTENANCE AND SERVICING

4. Remove disc (D). Refer to [5.4.3 Removing a Cutterbar Disc](#), page 137.
5. Remove bolt and nut (A) and nut (B).
6. Remove accelerator (C) from disc (D).

IMPORTANT:

Do NOT remove cutterblade bolt unless it or the blade is being replaced. Repeat for other accelerator.

7. Install a new accelerator on disc onto existing cutterblade bolt. Install nut (B).

NOTE:

Accelerators are handed for clockwise or counterclockwise operation. Verify the direction of disc before installing accelerators.

8. Install hex bolt (A) and nut at inboard hole. Bolt head faces up.
9. Tighten both nuts to 135 N·m (100 ft·lbf).
10. Repeat for other accelerator.
11. Reinstall disc (D) on spindle. Refer to [5.4.4 Installing a Cutterbar Disc](#), page 138.
12. Remove block of wood (if used).



WARNING

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

13. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors](#), page 33.

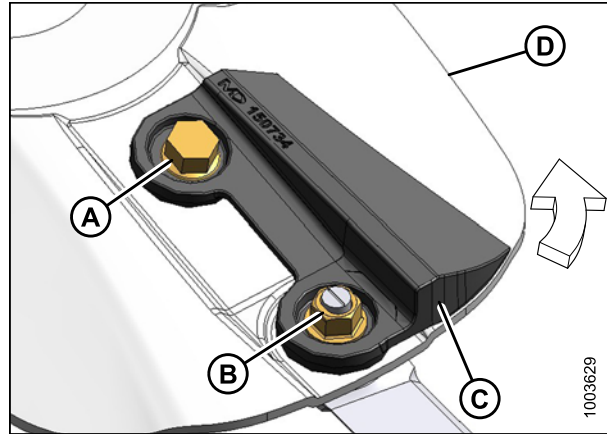


Figure 5.30: Disc Accelerator

5.4.7 Nut Shield

If accelerators are not used, nut shields will be required to protect the cutterblade nuts.

Nut shields are mounted on each outboard disc.

Nut shields are replaceable and should be inspected periodically for damage and loose or missing fasteners.

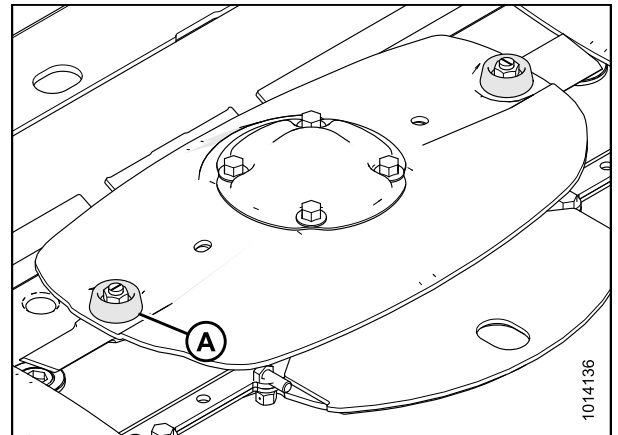


Figure 5.31: Inspecting Nut Shield

Inspecting Nut Shield

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
5. Inspect nut shields (A) and replace if severely damaged or worn.
6. Check for loose or missing fasteners and tighten or replace fastener if missing. If replacement is required, refer to [Replacing Nut Shield, page 148](#).
7. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

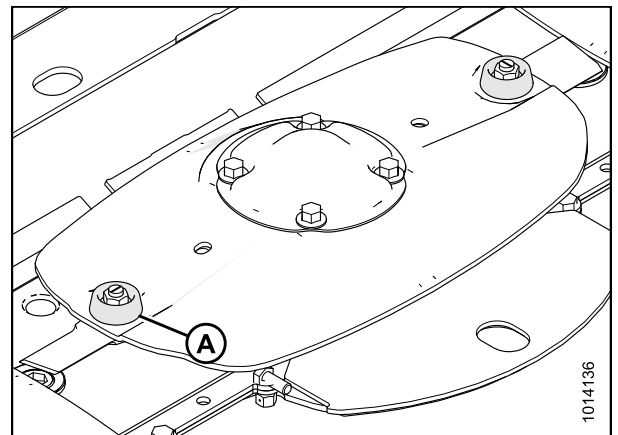


Figure 5.32: Inspecting Nut Shield

Replacing Nut Shield

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
4. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
5. Remove disc (C). Refer to [5.4.3 Removing a Cutterbar Disc, page 137](#).
6. Remove nut shield by loosening nut (A) and removing nut shield (B) from disc (C).

IMPORTANT:

Do NOT remove cutterblade bolt unless it or the blade is being replaced.

7. Locate new nut shield (B) on disc (C) and align with existing cutterblade bolt. Install nut (A).
8. Tighten nut. Torque to 135 N·m (100 ft·lbf).
9. Reinstall disc (D) on spindle. Refer to [5.4.4 Installing a Cutterbar Disc, page 138](#).
10. Remove block of wood (if used).

WARNING

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

11. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

5.4.8 Rotary Deflectors

The rotary cage deflectors are designed to deliver the cut material from the ends of the cutterbar into the auger and to assist in maintaining an even flow of crop into the conditioner.

Rotary deflectors should be checked daily for damage or wear.

Inspecting Rotary Deflectors

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.

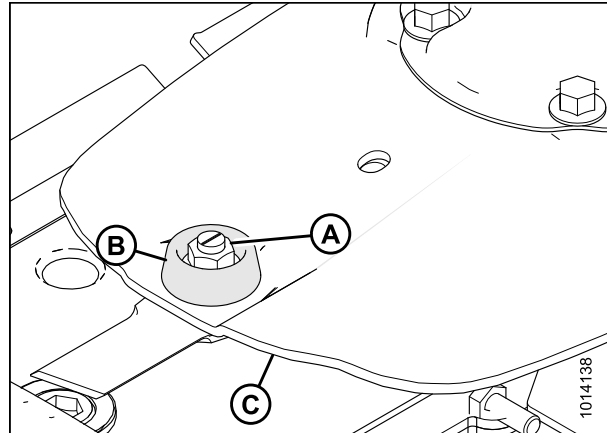


Figure 5.33: Nut Shield

MAINTENANCE AND SERVICING

3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Check that deflectors (A) are not damaged or bent, also check for loose hardware.
5. Replace deflectors (A) if they are severely damaged or worn. Do **NOT** repair. Refer to:
 - [Removing the Driven Deflector, page 149](#)
 - [Installing the Driven Deflector, page 150](#)
 - [Removing the Driveline Deflector, page 150](#)
 - [Installing the Driveline Deflector, page 151](#)
6. Tighten loose fasteners.

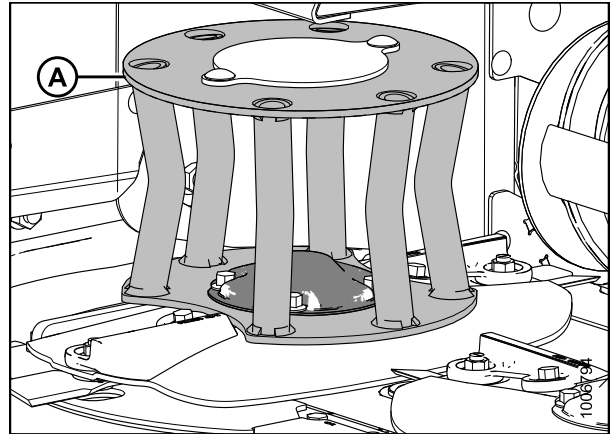


Figure 5.34: Rotary Deflector

WARNING

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

7. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

Removing the Driven Deflector

Follow these steps to replace the driven rotary deflector:

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Remove four bolts (A).
5. Remove cover (B) and deflector (C).

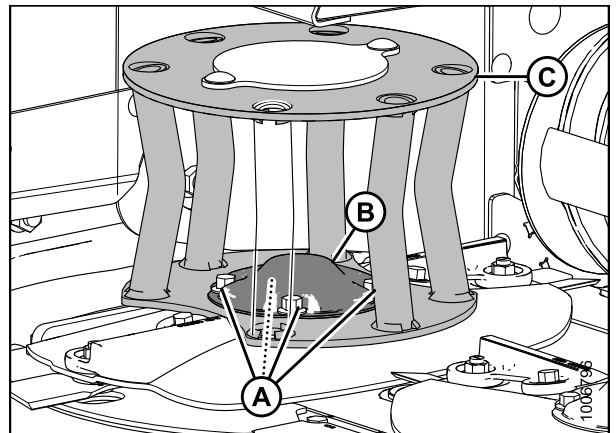


Figure 5.35: Driven Deflector

Installing the Driven Deflector

Follow these steps to replace the driven rotary deflector:

1. Position new deflector (C) on spindle so that it clears accelerators (D).
2. Install cover (B) and secure with four bolts (A).
3. Tighten bolts.
4. Remove block of wood (if used).

⚠ WARNING

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

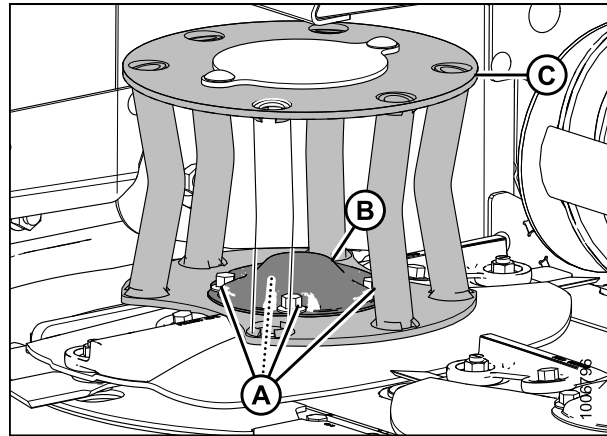


Figure 5.36: Driven Deflector

Removing the Driveline Deflector

Follow these steps to replace the driveline deflector:

⚠ DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).
4. Locate the deflector (C) with the driveline in the center of it.
5. Remove the four bolts (A) that secure the driveline (B) and disc to the spindle.
6. Rotate the deflector (C) as required so the large opening in deflector faces you.
7. Remove the driveline (B) through the larger opening in the deflector.

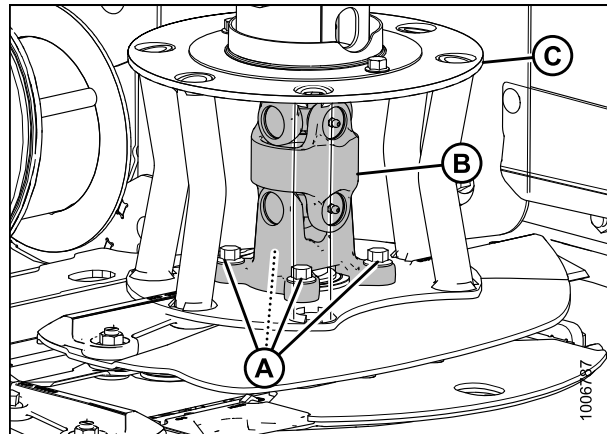


Figure 5.37: Driveline Deflector

MAINTENANCE AND SERVICING

- Loosen the four bolts (A) in the two plates (B) that hold the upper driveline shield (C) in place.
- Move the plates (B) so that shield (C) can be lowered into deflector (D).
- Remove the deflector (D).

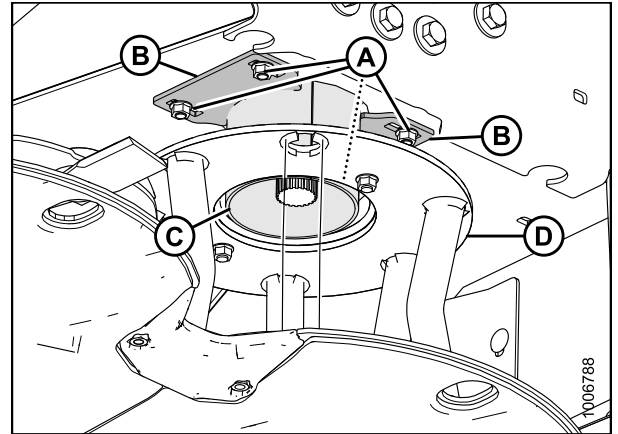


Figure 5.38: Driveline Deflector

Installing the Driveline Deflector

Follow these steps to replace the driveline deflector:

- Position the deflector (D) and upper driveline shield (C) onto spindle.
- Raise the upper driveline shield (C) into position and slide plates (B) into slots in shield. Do not tighten bolts.

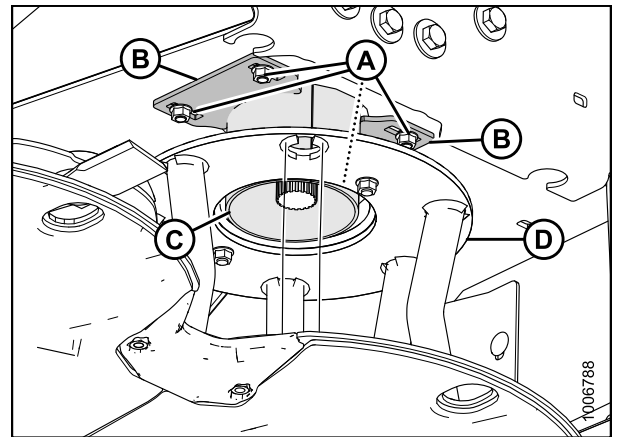


Figure 5.39: Driveline Deflector

- Insert driveline (B) into deflector (C) and install onto shaft. Ensure that driveline (B) grease zerks will be accessible through large opening in deflector.
- Align mounting holes in deflector (C), spindle, and driveline (B) and reinstall four bolts (A). Tighten bolts.
- Adjust the upper driveline shield to achieve consistent gap around deflector shield (C).

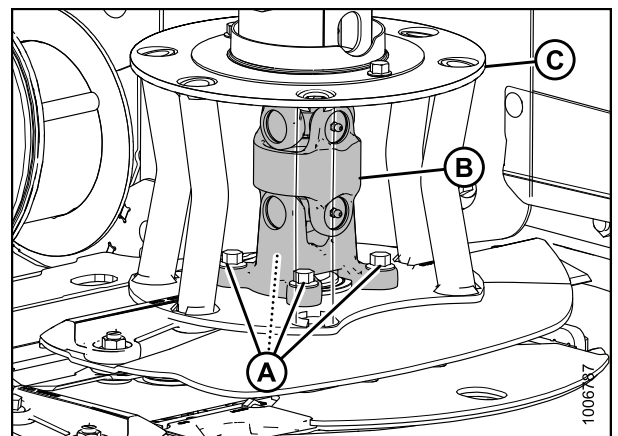


Figure 5.40: Driveline Deflector

6. Tighten bolts (A) on shield plates (B).
7. Remove block of wood (if used).
8. Manually rotate discs to check for interference of adjacent parts.
9. Close the cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

WARNING

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

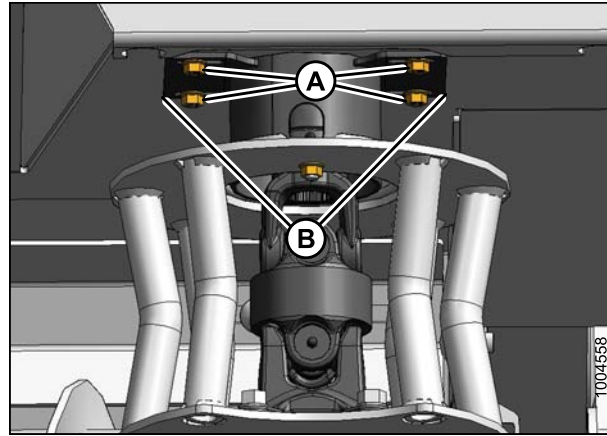


Figure 5.41: Driveline Deflector

5.4.9 Disc Spindles

To avoid damaging the cutterbar and its drive systems, each disc is attached to a spindle which incorporates a key that shears if the disc contacts a large stone, a stump, or other large object. In the event of a sheared key, the disc stops rotating, but remains attached to the spindle.

Replacing a Spindle Key

Follow these steps to replace a spindle key:

DANGER

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

NOTE:

Short spindle assembly shown in this procedure. The procedure for replacing a tall spindle is identical.

1. Lower the header fully.
2. Stop the engine and remove key.
3. Open cutterbar doors. Refer to [3.5 Cutterbar Doors, page 33](#).

CAUTION

Cutterblades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

4. Remove cutter disc (A) from failed spindle. Refer to [5.4.3 Removing a Cutterbar Disc, page 137](#).

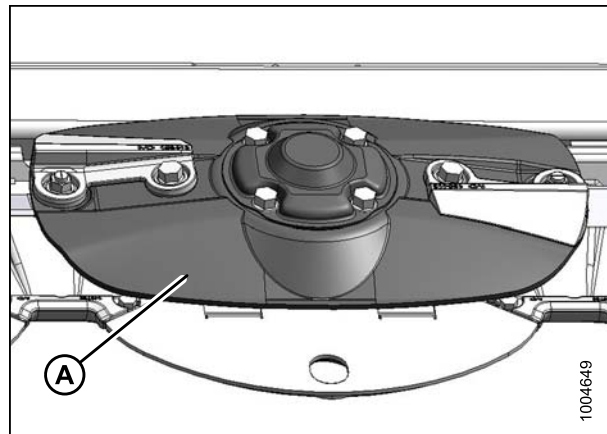


Figure 5.42: Cutter Disc

MAINTENANCE AND SERVICING

- Using a 34 mm socket wrench, remove nut (A) and washer (B) from spindle.

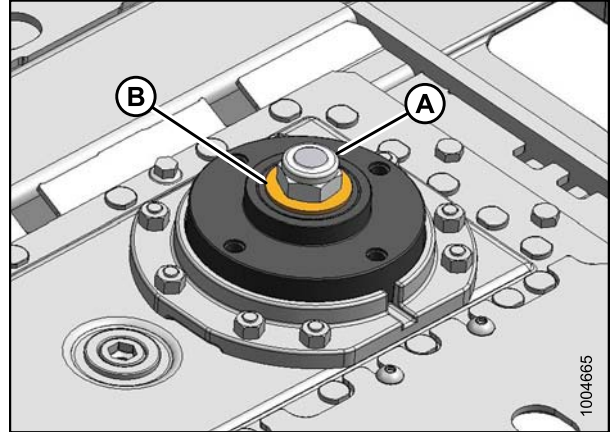


Figure 5.43: Cutterbar Spindle Assembly (Short Spindle Shown)

- Install four M12 mm x 60 mm long bolts (A) into holes in disc (B).
- Use bolts (A) as jacking screws to remove flange (B) from gear. Remove bolts from flange.

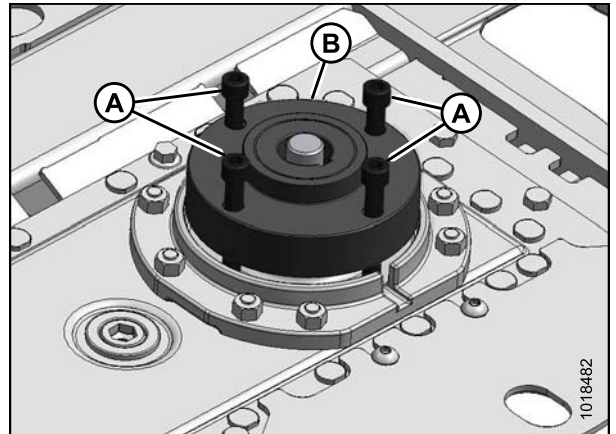


Figure 5.44: Cutterbar Spindle Flange and Securing Bolts

- Pry out failed key (A) from spindle keyway (B).
- Thoroughly clean metal debris from disassembled components and cutterbar.

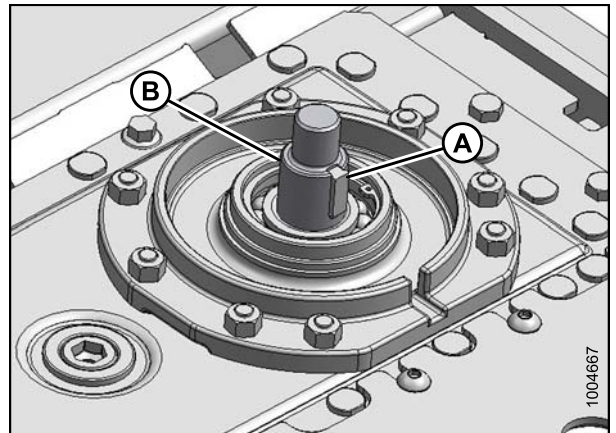


Figure 5.45: Cutterbar Spindle Keyway and Key

MAINTENANCE AND SERVICING

10. Inspect flange (C) and spindle shaft (E) for damage. If seriously damaged, replace entire spindle assembly. Contact your MacDon Dealer.
11. Install new key (D) into gear (E) keyway as shown.
12. Align keyway in disc (C) with key in gear (E) and install disc (C) onto gear until sufficient threads are exposed to install washer (B) and nut (A).

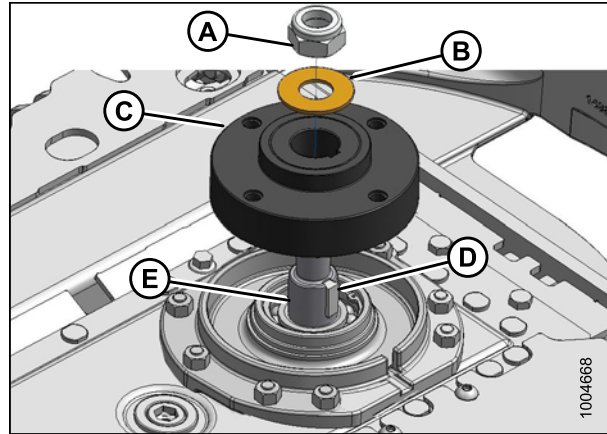


Figure 5.46: Cutterbar Spindle Assembly

13. Tighten nut (A) until flange is in final position. Torque nut to 440 N·m (325 ft·lbf).
14. Reinstall disc. Refer to [5.4.4 Installing a Cutterbar Disc, page 138](#).

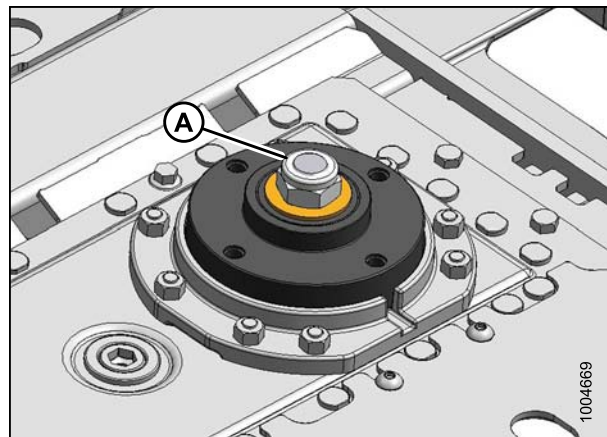


Figure 5.47: Cutterbar Spindle Assembly

5.4.10 Cutterbar Doors

Inspecting Curtains

Replace the curtains if they should become worn or damaged. Contact your Dealer for replacement instructions.

Inspecting Door Latches: North American Header

The cutterbar door latches should operate smoothly and remain engaged when the doors are open. The door latch should pivot on its hinge bolt and should engage the securing pin when the cutterbar doors are opened. Adjustment of these door latches is not usually required.

Inspecting Door Latches: Export Header

The cutterbar door latches should operate smoothly and remain engaged when the doors are down. Tighten latch hardware if loose. If the rubber bushing is damaged or does not allow the latch to operate properly, the latch should be replaced.

Adjusting Door Latches: Export Header

Follow these steps to adjust the door latches:

DANGER

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

1. Turn off the windrower's engine and remove key from the ignition.
2. Unlatch and lift curtain.
3. Loosen bolts (A) and move latch assembly to position as shown so that latch (B) engages pin.
4. Tighten bolts (A).
5. If necessary, loosen nut (C) and rotate latch (B) to position as shown.
6. Tighten nut (C).

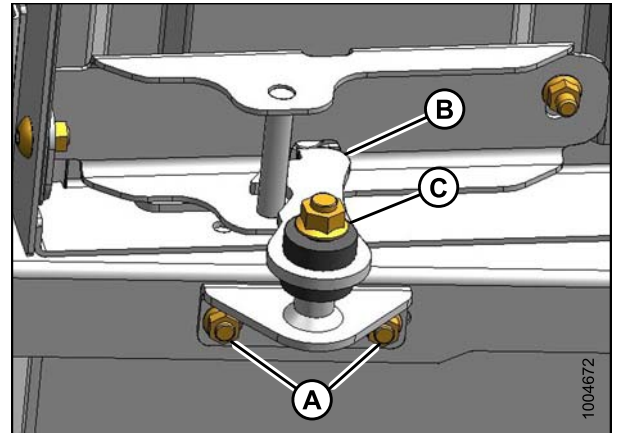


Figure 5.48: Cutterbar Door Latch

Replacing Door Latches: Export Header

To replace cutterbar door latches, follow these steps:

DANGER

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

1. Turn off the windrower's engine and remove key from ignition.
2. Unlatch and lift curtain.

MAINTENANCE AND SERVICING

3. Remove bolts (A) and remove latch assembly from frame.
4. Locate new latch assembly on frame and reinstall bolts (A).
5. Adjust to position shown and tighten bolts (A).

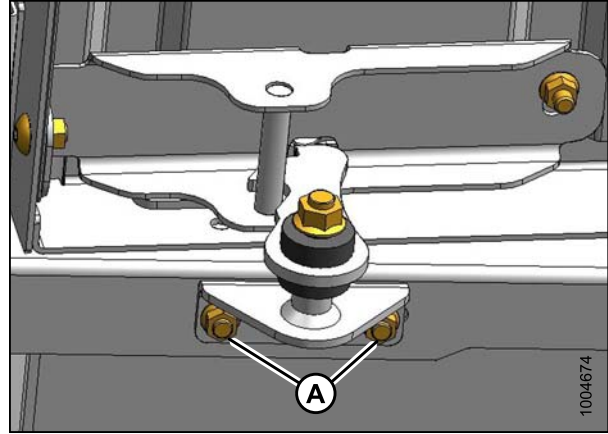


Figure 5.49: Cutterbar Door Latch

Replacing Door Latch Brackets: Export Header

To replace the cutterbar door latch brackets, follow these steps:

⚠ DANGER

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

1. Turn off the windrower's engine and remove key from ignition.
2. Open cutterbar door.
3. Remove bolts (A), washers, and nuts, and remove latch bracket (B) from door.
4. Locate new latch bracket (B) on door and reinstall bolts (A), washers, and nuts. Use three washers on aft bolt as spacers between bracket (B) and door.
5. Close door and check alignment with latch. Adjust as necessary and tighten bolts (A).

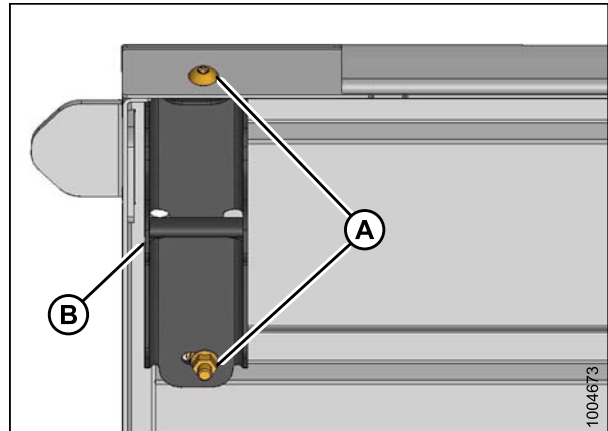


Figure 5.50: Latch Bracket

5.5 Drive Systems

5.5.1 Bevel Gearbox

The bevel gearbox (A), which transfers power from the hydraulic motor to the header drives, is located inside the drive compartment at the left end of the header.

If repairs are required, the gearbox should be removed and serviced at your Dealer.

The only regular servicing required is maintaining the lubricant level and changing the lubricant according to the intervals specified in this manual. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

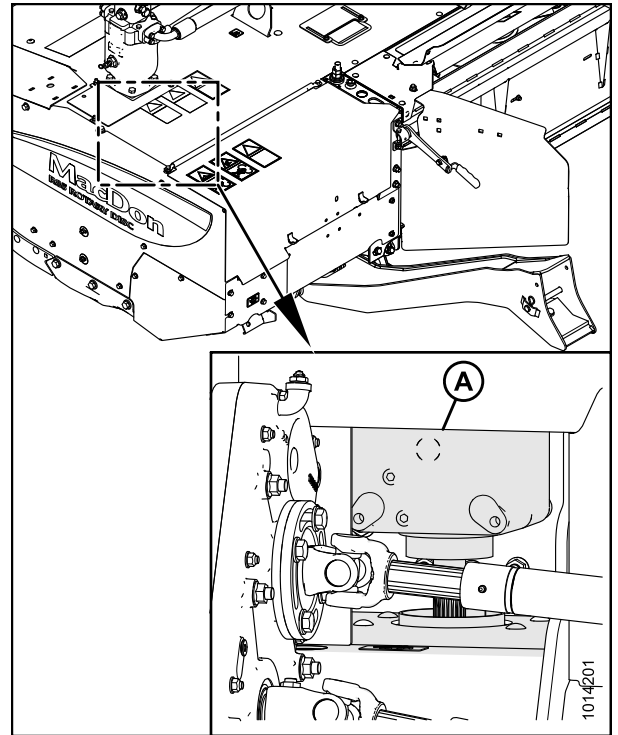


Figure 5.51: Bevel Gearbox

Changing the Bevel Gearbox Lubricant

Follow these steps to change the bevel gearbox lubricant:

⚠ DANGER

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

1. If the lubricant is cold, idle the machine for about 10 minutes to warm the lubricant.
2. Raise the header fully.
3. Stop the engine and remove the key.
4. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
5. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

MAINTENANCE AND SERVICING

- Place a suitably sized container under drain plug (B). Refer to [5.2 Recommended Fluids and Lubricants, page 120](#) for gearbox capacity.
- Remove plugs (A) and (B).
- Allow sufficient time for lubricant to drain.
- Disengage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).
- Start the engine, and lower the header until the gearbox is level with the ground.
- Stop the engine and remove the key.
- Install plug (B).
- Remove breather from filler elbow (C).
- Add gear lubricant to gearbox through port (A). Lubricant should slightly run out of port (A) when at the proper level. Refer to [5.2 Recommended Fluids and Lubricants, page 120](#) for quantity and specification.
- Install plug (A) and breather (C), and tighten.
- Properly dispose of used lubricant and clean up any spilled lubricant.
- Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

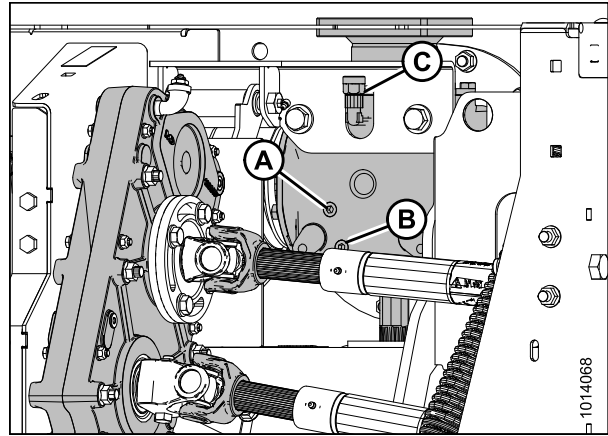


Figure 5.52: Bevel Gearbox

5.5.2 Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield. The tension is factory-set and should not require adjustment.

Inspecting the Conditioner Drive Belt

Check the belt tension and inspect for damage or wear every 100 hours or annually (preferably before the start of the cutting season).

⚠ DANGER

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

- Lower the header fully.
- Stop the engine and remove the key.
- Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

MAINTENANCE AND SERVICING

4. Inspect the condition of belt (A). Replace if damaged or showing signs of cracking or separation.
5. Check that adjuster nut (B) is tight.
6. Check that end of slots (C) are aligned with plate (D).
7. If necessary, adjust tension as follows:
 - a. Loosen jam nut (E).
 - b. Turn adjuster nut (B) until end of slots (C) are aligned with plate (D).
 - c. Tighten jam nut (E).
8. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

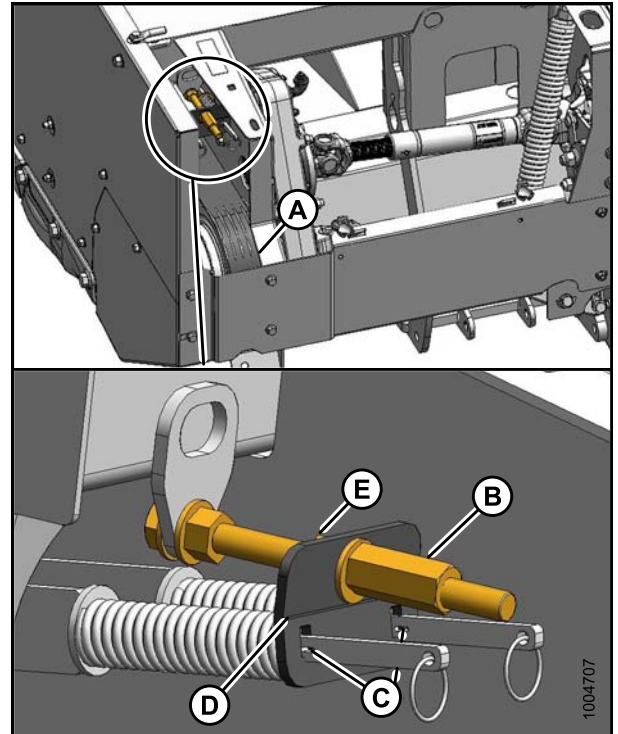


Figure 5.53: Conditioner Drive Belt Adjuster

Replacing the Conditioner Drive Belt

DANGER

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

1. Lower the header fully.
2. Stop the engine and remove the key.
3. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

MAINTENANCE AND SERVICING

4. Remove the auger drive belts (A). Refer to [Replacing the Auger Drive Belts, page 166](#).

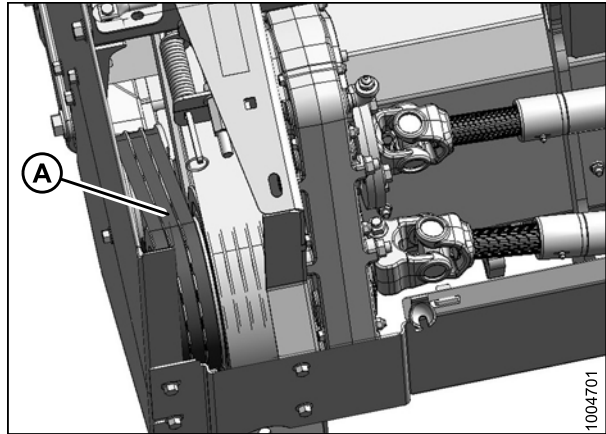


Figure 5.54: Drive Belts (Left Side)

5. Turn adjuster nut (A) counterclockwise until springs are loose and there is no tension on belt (B).

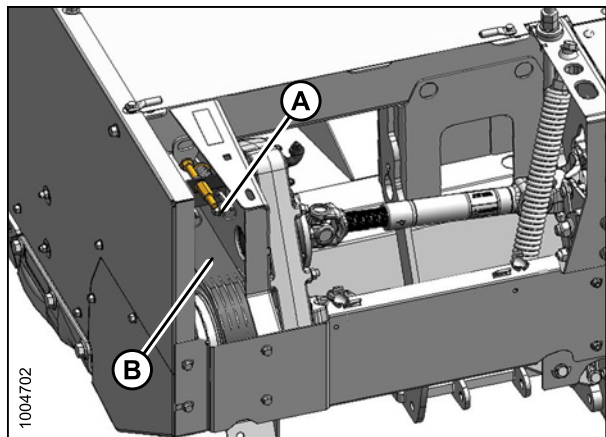


Figure 5.55: Drive Belts (Left Side)

6. Remove conditioner drive belt (A).
7. Install new conditioner drive belt (A) onto pulleys ensuring it is in the pulley grooves.
8. Tension conditioner drive belt (A). Refer to [Inspecting the Conditioner Drive Belt, page 158](#).
9. Install and tension auger drive belts. Refer to [Replacing the Auger Drive Belts, page 166](#).
10. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

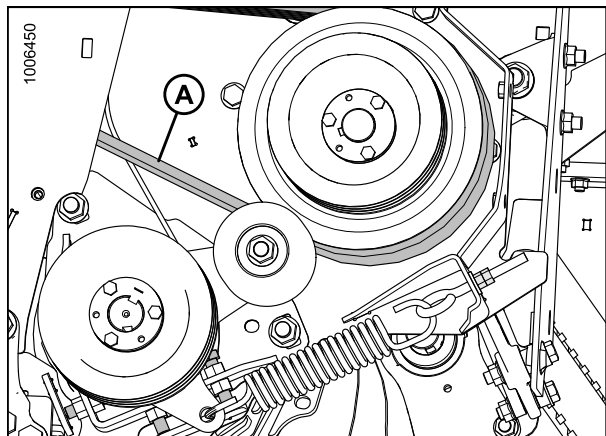


Figure 5.56: Drive Belts (Left Side)

5.5.3 Conditioner Gearbox

The conditioner gearbox (A), which transfers power from the bevel gearbox to the conditioner rolls and to the overshot auger, is located inside the drive compartment at the left end of the header.

If repairs are required, the conditioner gearbox should be removed and serviced at your MacDon Dealer.

The only regular servicing required is maintaining the lubricant level and changing the lubricant according to the intervals specified in this manual. Refer to [5.3.1 Maintenance Schedule/Record, page 121](#).

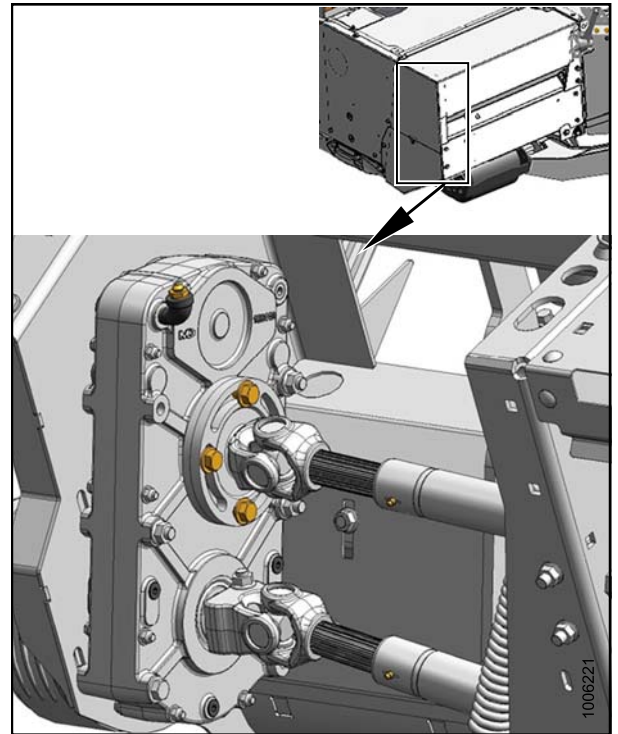


Figure 5.57: Conditioner Gearbox

Changing the Conditioner Gearbox Lubricant

Follow these steps to change the conditioner gearbox lubricant:

⚠ DANGER

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

1. If the lubricant is cold, idle the machine for about 10 minutes to warm the lubricant.
2. Angle the header until the gearbox (A) is level to the ground (B). Refer to [4.6 Header Angle, page 96](#) for the adjustment procedure.
3. Stop the engine and remove the key.
4. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).

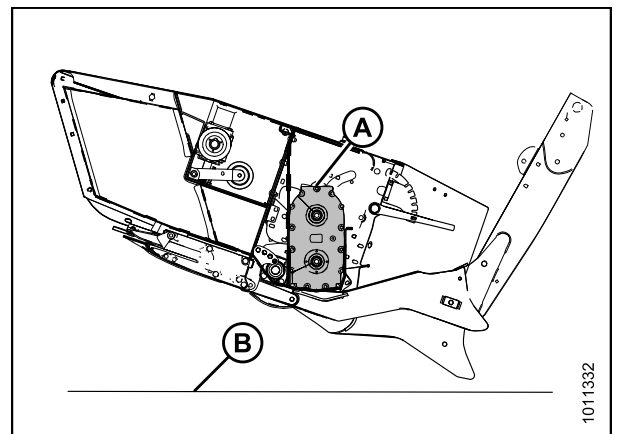


Figure 5.58: Conditioner Gearbox Orientation

MAINTENANCE AND SERVICING

5. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

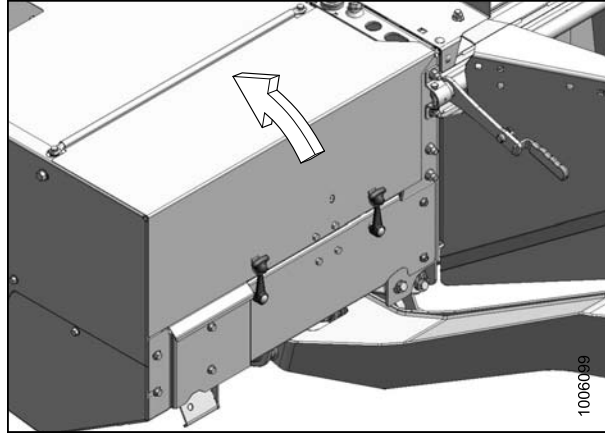


Figure 5.59: Driveshield

6. Place a suitable container under drain plug (A). Refer to [5.2 Recommended Fluids and Lubricants, page 120](#) for conditioner gearbox lubricant capacity.
7. Remove plugs (A) and (B).
8. Allow sufficient time for lubricant to drain.
9. Replace plug (A) and tighten.

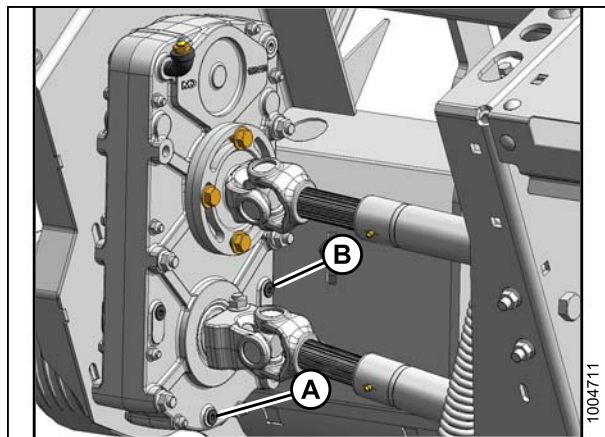


Figure 5.60: Conditioner Gearbox

10. Remove breather and bushing (A) at filler pipe (B).
11. Add gear lubricant to gearbox through filler pipe (B). Refer to [5.2 Recommended Fluids and Lubricants, page 120](#) for specification.

NOTE:

To check the lubricant level, tilt the header so the top of the gearbox is level with the ground. Lubricant should run out of port (C) slightly when at the proper level.

12. Reinstall plug (C) and tighten.
13. Reinstall bushing and breather (A) in filler pipe (B) and tighten.
14. Properly dispose of used lubricant and clean up any spilled lubricant.
15. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

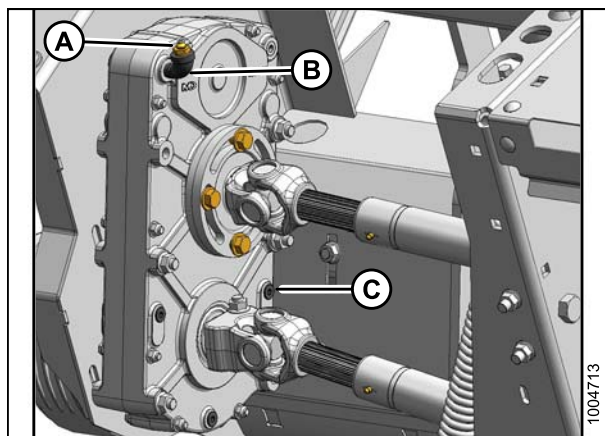


Figure 5.61: Conditioner Gearbox

5.5.4 Header Drive Speed Sensor

The header drive speed sensor monitors the rotational speed of the bevel gearbox pulley and sends a signal to the system monitor in the windrower cab to display disc speed.

The sensor does not require regular maintenance; if it malfunctions or is damaged, it can be easily adjusted or replaced.

Adjusting the Header Drive Speed Sensor

DANGER

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

1. Lower header to ground, turn off engine, and remove key.
2. Loosen bolts (A) and slide cover (B) off opening.

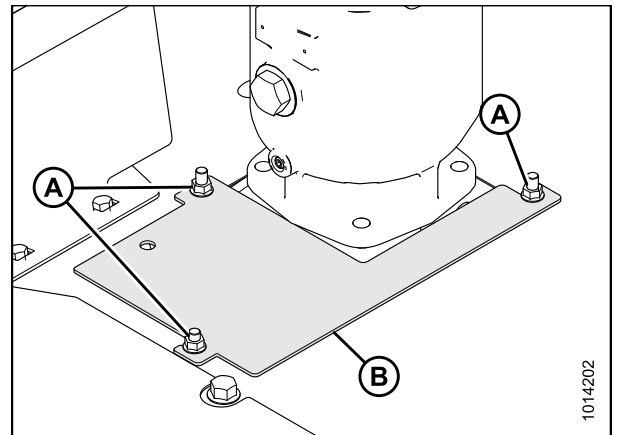


Figure 5.62: Header Drive

3. Check gap (B) between sensor (A) and pulley. If required, adjust gap by loosening bolts (D) and moving bracket (C) to achieve 2–3 mm (0.08–0.12 in.) gap (B). When correct gap is achieved, tighten bolts (D).
4. Check position of sensor (A). If required, adjust position by loosening bolt (E) and moving sensor to align it with rim of pulley.

NOTE:

Top panel removed for clarity.

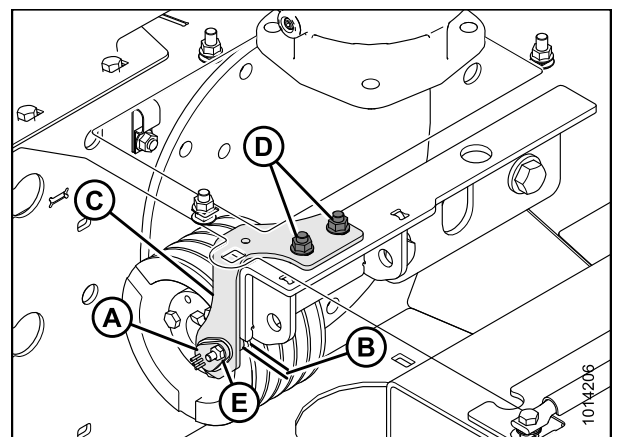


Figure 5.63: Header Drive Speed Sensor

MAINTENANCE AND SERVICING

Replacing the Header Drive Speed Sensor

1. Loosen bolts (A) and remove the cover (B).

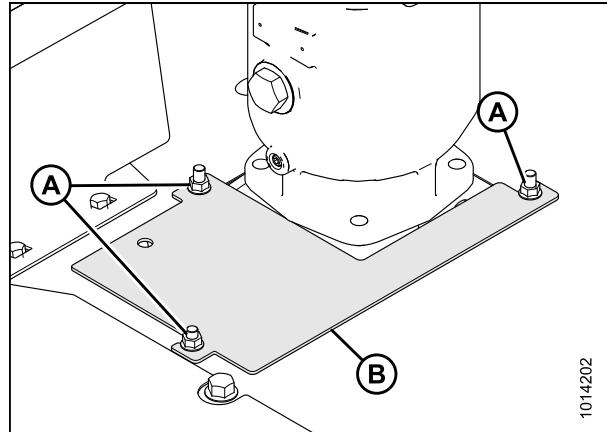


Figure 5.64: Header Drive Cover

2. Cut and remove cable tie securing harness to bracket (C).
3. Unplug sensor wire from connector (A).
4. Remove nut and bolt (E) securing sensor (A) to bracket (C) and remove the sensor (A).
5. Install the new sensor (A) onto the bracket (C) with bolt and nut (E). Ensure sensor is aligned with the pulley rim.
6. Check that gap (B) between sensor and pulley is 0.08 in. (2 mm). Adjust as required.
7. Connect sensor wire to connector (A).
8. Secure harness to bracket with plastic tie.

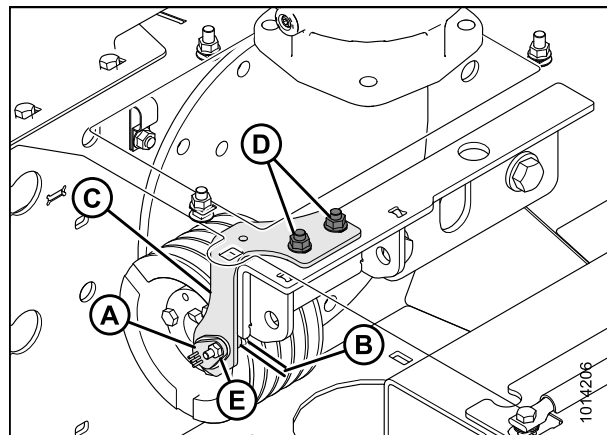


Figure 5.65: Header Drive Speed Sensor

NOTE:

Top panel removed for clarity.

9. Reinstall cover (B) and secure with bolts (A).

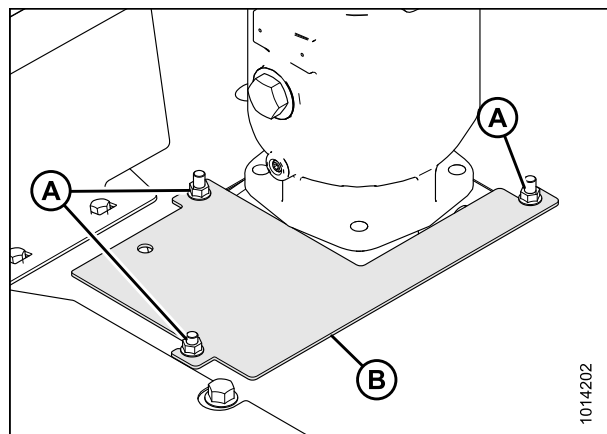


Figure 5.66: Header Drive Cover

5.5.5 Auger Drive Belt

The auger drive belts are located inside the drive compartment at the lower left end of the header.

Check the belt tension and inspect for damage or wear every 100 hours or annually, preferably before the start of the cutting season.

Inspecting and Adjusting the Auger Drive Belts

DANGER

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

1. Lower header to ground, stop the engine and remove the key.
2. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).

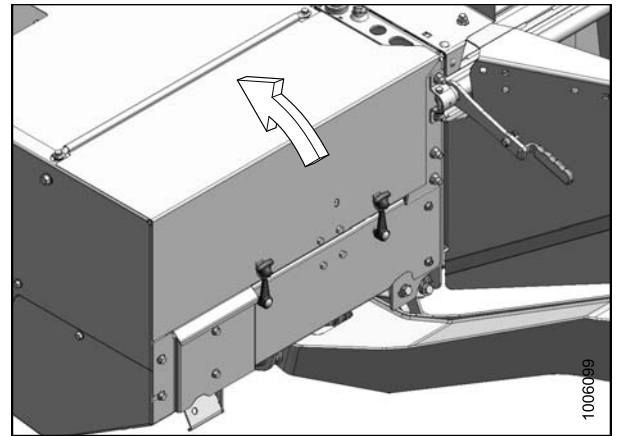


Figure 5.67: Driveshield

3. Check condition of auger drive belts (A). If severely worn or damaged, replace them. Refer to [Replacing the Auger Drive Belts, page 166](#).
4. Raise the header fully.
5. Stop the engine and remove the key.
6. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).

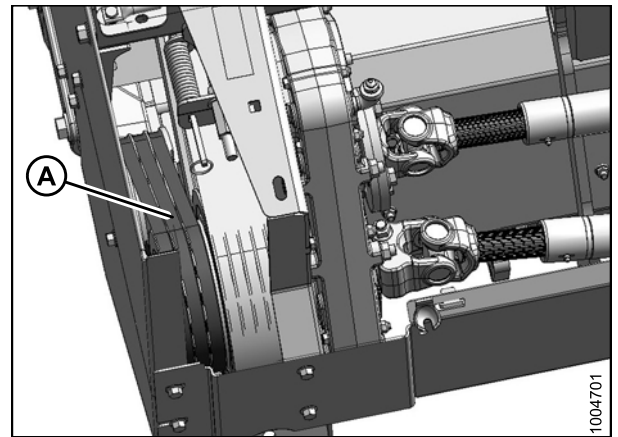


Figure 5.68: Auger Drive Belts

MAINTENANCE AND SERVICING

Belt Tension Spring (Eye Bolt Style)

7. To check the belt tension, spring (A) length should measure 262 mm (10.3 in.) (B). If necessary, adjust belt tension as follows:
 - a. Loosen jam nut (C).
 - b. Adjust eye bolt with adjuster bolt (D) until spring length (B) is achieved.
 - c. Tighten jam nut (C).

NOTE:

Edge of eye bolt to jam nut (E) should measure 41 mm (1.6 in.).

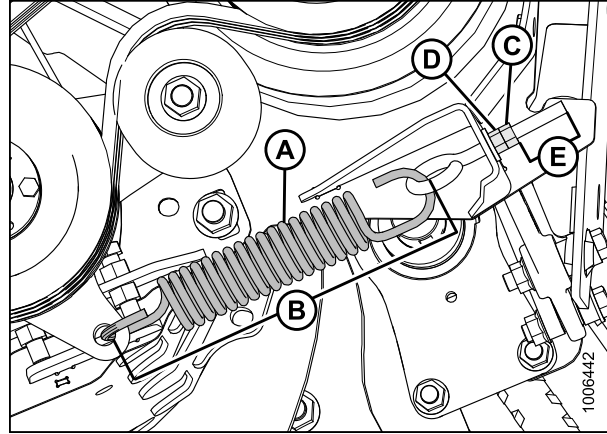


Figure 5.69: Belt Tension Spring

8. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).

Replacing the Auger Drive Belts

Follow these steps to replace the auger drive belts:

⚠ DANGER

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

1. Raise the header fully.
2. Stop the engine and remove the key.
3. Engage header safety props. Refer to [3.3 Engaging and Disengaging the Header Safety Props, page 28](#).

MAINTENANCE AND SERVICING

4. Open the driveshield. Refer to [3.4 Driveshields, page 30](#).
5. Remove/loosen four bolts (A) and remove cover (B).

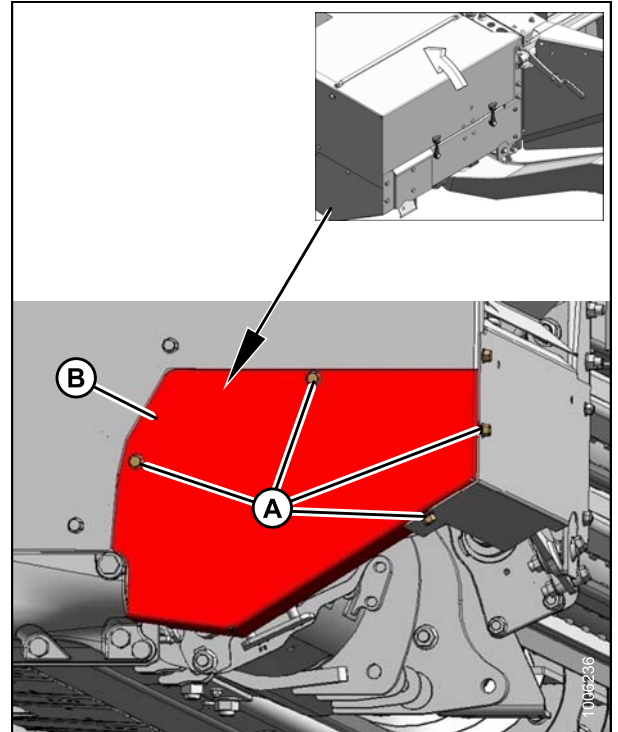


Figure 5.70: Drive Cover – SP

6. Loosen jam nut (A) to release tension on auger drive belts (B).
7. Remove all three belts.

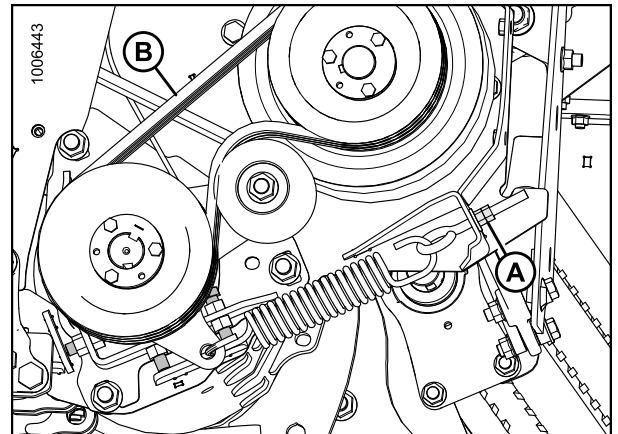


Figure 5.71: Auger Drive Belts

MAINTENANCE AND SERVICING

8. Install belts (A) on the pulleys. Ensure they are seated the pulley grooves.
9. Check alignment of belts on pulleys. Belts must not overhang the edge of idler pulley (B). Contact your MacDon Dealer if pulleys need realigning.

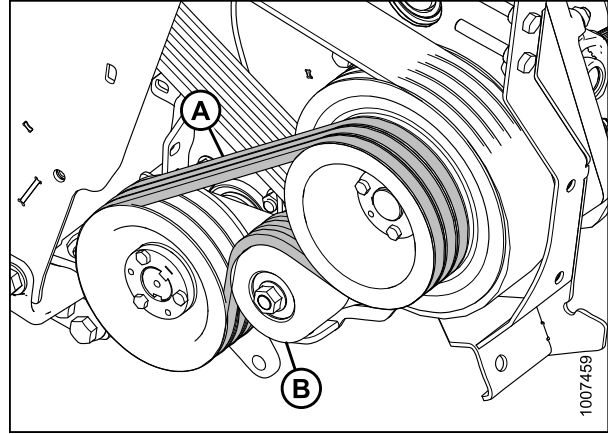


Figure 5.72: Auger Drive Belts

10. Tension the belts with adjuster nuts (A). Refer to [Inspecting and Adjusting the Auger Drive Belts, page 165](#).

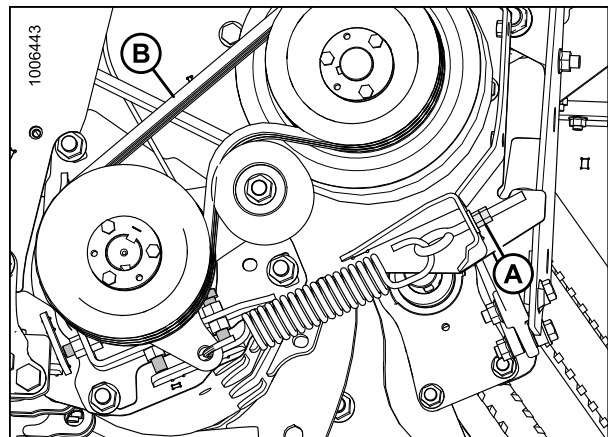


Figure 5.73: Auger Drive Belts

MAINTENANCE AND SERVICING

11. Reinstall cover (B) with bolts (A).
12. Close the driveshield. Refer to [3.4 Driveshields, page 30](#).
13. Adjust the tension of new belts after a short break-in period (about 5 hours).

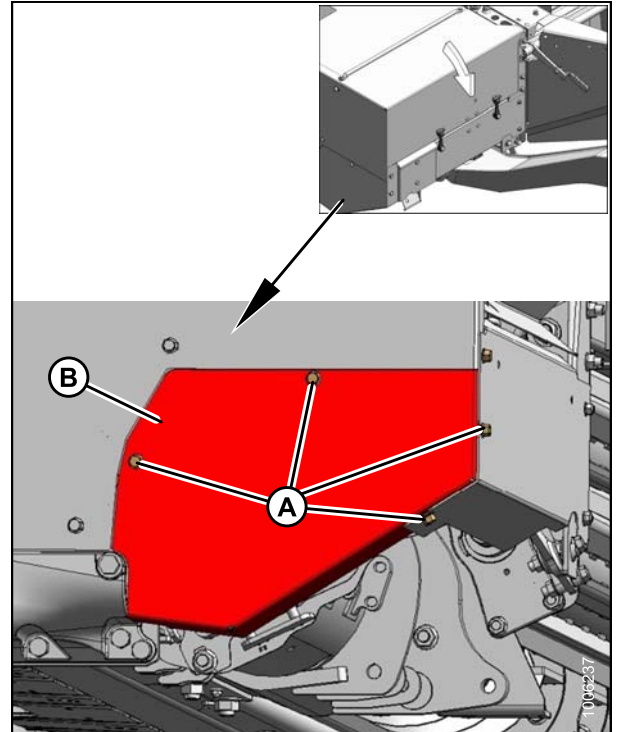


Figure 5.74: Drive Cover – SP

5.5.6 Installing Sealed Bearings

Follow these steps to install sealed bearings:

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

NOTE:

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

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

NOTE:

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

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

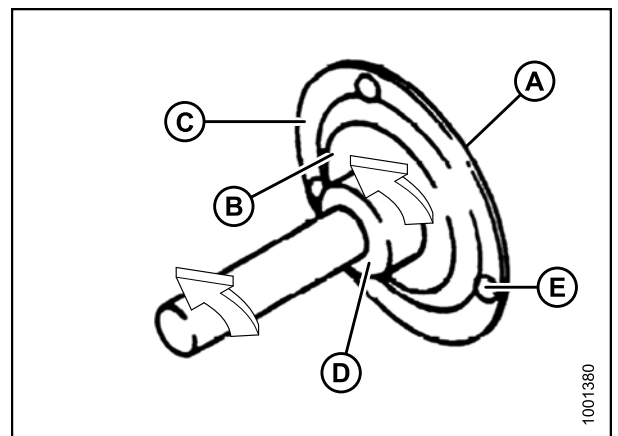


Figure 5.75: Sealed Bearing

5.6 Hydraulics

Refer to your windrower operator's manual for hydraulic system maintenance procedures.

5.6.1 Hydraulic Motor

The hydraulic motor does not require regular maintenance or servicing. If repairs are required, it should be serviced by your Dealer.

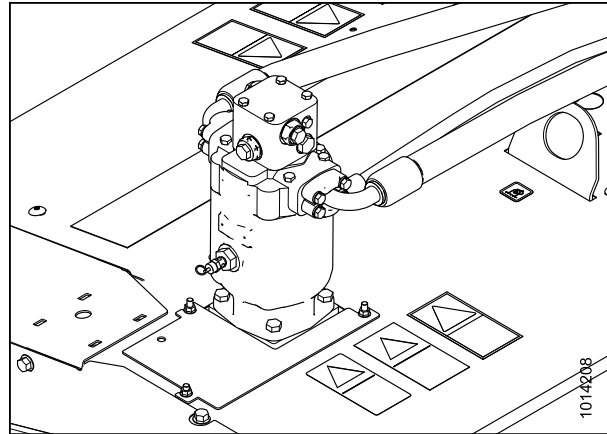


Figure 5.76: Hydraulic Motor

Removing the Hydraulic Motor

Follow these steps to remove the hydraulic motor:

⚠ DANGER

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

1. If the machine is connected to the windrower, lower header to ground.
2. Stop the engine and remove the key.
3. Disconnect case drain hose (A) from motor (B).
4. Disconnect pressure and return hoses at fittings (C).

IMPORTANT:

To protect the motor from contamination and prevent spillage of excess fluid, install caps and plugs on open fittings and hoses.

5. Remove four bolts (D).
6. Use a sling and a lifting device to remove the motor.

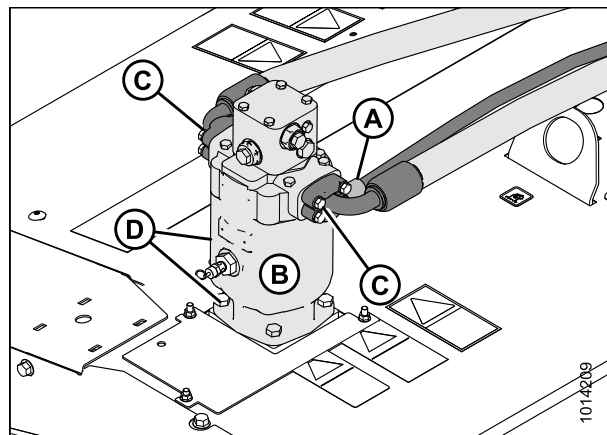


Figure 5.77: Hydraulic Motor

MAINTENANCE AND SERVICING

7. Cover gearbox opening (A) with a rag or plastic.

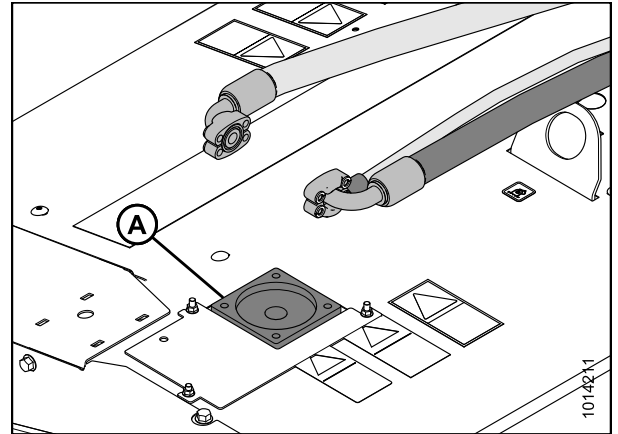


Figure 5.78: Hydraulic Motor Removed

Installing the Hydraulic Motor

Follow these steps to install the hydraulic motor:

1. Remove covering from gearbox opening (A).
2. Attach a sling to the motor with the opposite end to a lifting device.

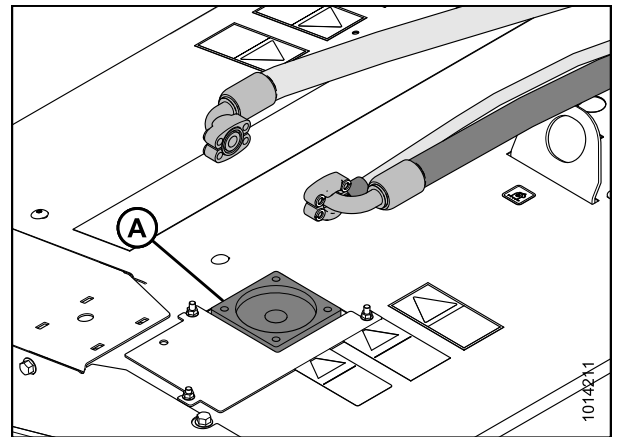


Figure 5.79: Hydraulic Motor Removed

3. Lower the motor (B) on gearbox opening.
4. Install four bolts (D) and torque to 140 N·m (103 ft·lbf).
5. Remove caps from motor ports and hoses.
6. Connect case drain hose (A) to motor.
7. Connect hoses (C) to motor (B) with split flanges (E) and torque to 64–77 N·m (47–57 ft·lbf).

NOTE:

Hydraulic connections vary depending on the windrower. Refer to the specific instruction supplied with your hydraulic drive kit.

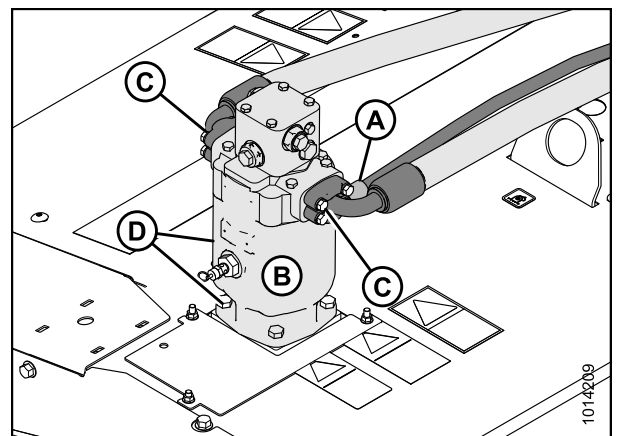


Figure 5.80: Hydraulic Motor: 16-foot

5.6.2 Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

WARNING

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

IMPORTANT:

Keep hydraulic coupler tips and connectors clean. Allowing dust, dirt, 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.



Figure 5.81: Hydraulic Pressure Hazard

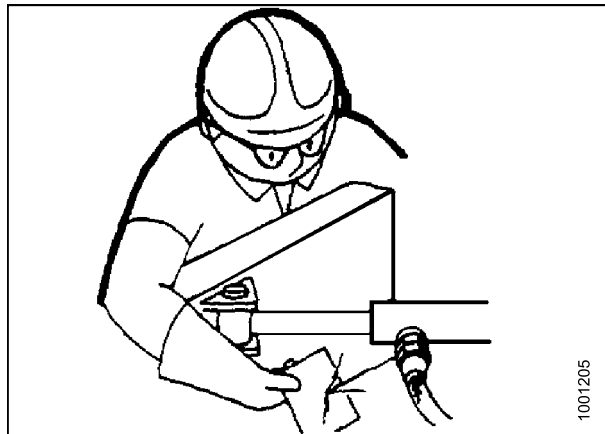


Figure 5.82: Testing for Hydraulic Leaks

5.7 Electrical System

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

Keep lights clean and replace defective bulbs.

5.7.1 Hazard Lights

Hazard Lights: Replacing Bulbs and Lenses

Follow these steps to replace a hazard light bulb or lens:

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

NOTE:

Refer to header parts catalog for bulb part number.

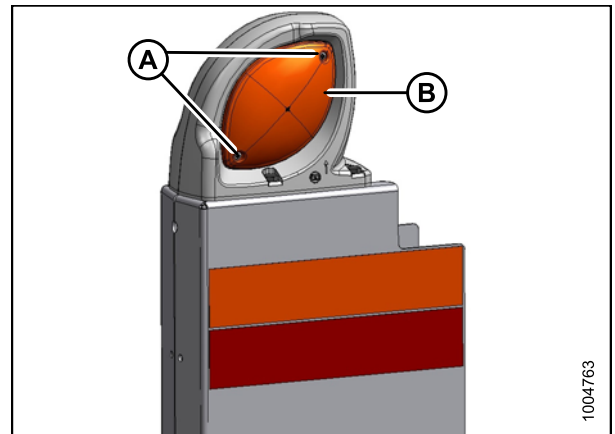


Figure 5.83: Hazard Lights

Hazard Lights: Replacing the Lamp Assembly

Follow these steps to replace the lamp assembly:

1. Remove four bolts (A) and nuts, and remove lamp assembly (B) from lamp bracket (C).
2. Disconnect lamp wires from wiring harness at connectors (D).
3. Connect new lamp wires to wiring harness (D).
4. Place lamp assembly (B) on lamp bracket (C) and secure with four bolts (A) and nuts.

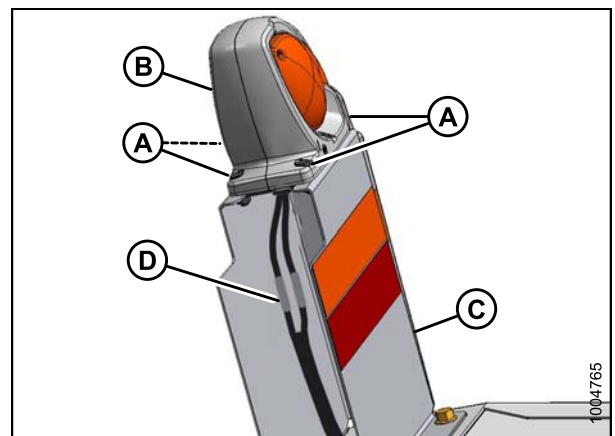


Figure 5.84: Hazard Lights

MAINTENANCE AND SERVICING

Hazard Lights: Replacing the Lamp Bracket

Follow these steps to replace the lamp bracket:

1. Disconnect lamp wires from wiring harness at connectors (A).
2. Remove four bolts (B) and remove lamp assembly (C) from header.
3. Place new lamp assembly (C) on header and secure with four bolts (B).

NOTE:

Ensure amber reflector (D) faces the front of the machine.

4. Connect lamp wires to wiring harness (A).

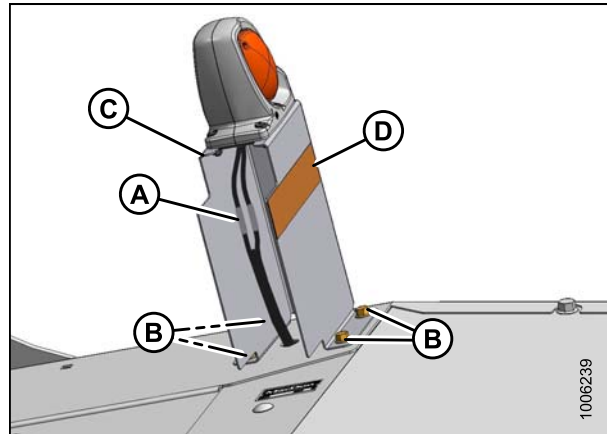


Figure 5.85: Hazard Lights

6 Options and Attachments

6.1 Options and Attachments: Kits

The following kits are available through your MacDon Dealer. The Dealer will require the “B” number for pricing and availability.

6.1.1 Adjustable Skid Shoe Kit

The skid shoe kit installs at either end of the cutterbar. The shoes can be adjusted for varying cutting height. The kit includes two skid shoe assemblies, attachment hardware, and installation instructions.

MD #B5660

Instruction part number: MD #169972

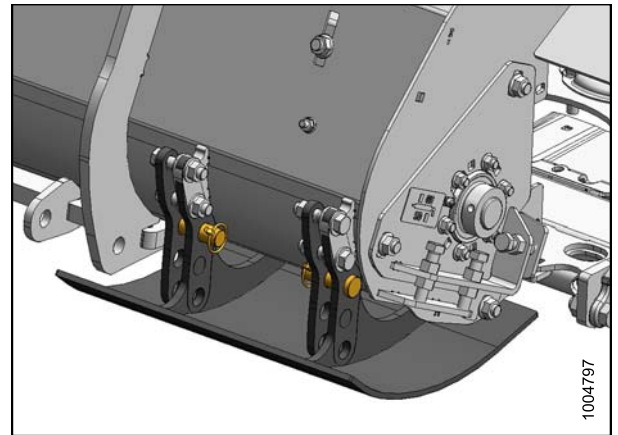


Figure 6.1: MD #B5660

6.1.2 Cutterbar Repair Tool Kit

The cutterbar repair tool kit contains the tools required to replace the cutterbar idler gears.

MD #B4905

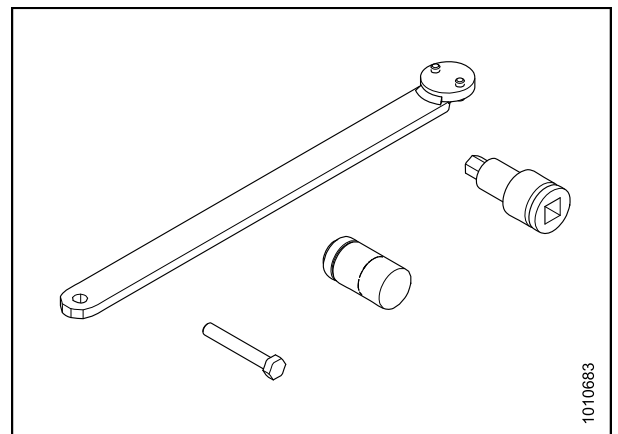


Figure 6.2: MD #B4905

6.1.3 Double Windrow Attachment (DWA) Double Windrow Attachment - Self Propelled

6.1.4 Gauge Roller

MD #B5650

Instruction Part Number: MD #169467

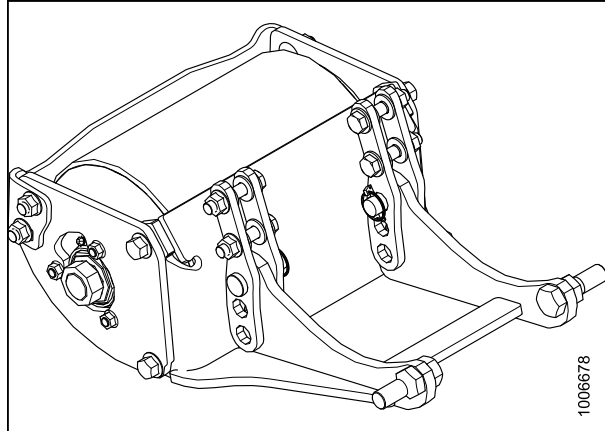


Figure 6.3: MD #B5650

6.1.5 Hydraulic Drive: 16-Foot for M200 Self-Propelled

MD #B5455

Instruction Part Number: MD #169483

6.1.6 Tall Crop Divider Kit

The tall crop dividers attach to the ends of the header for clean crop dividing and cutterbar entry in tall crops. The kit includes left and right dividers and attachment hardware.

MD #B5509

Instruction part number: MD #169485

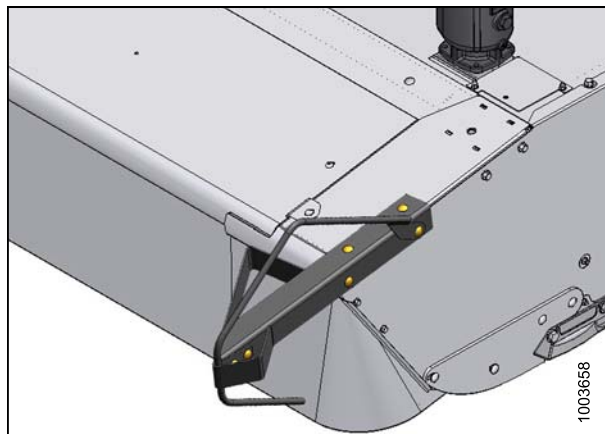


Figure 6.4: MD #B5509

6.1.7 Tall Crop Feed Plate Kit

The tall crop feed plates (A) assist the feeding of tall crops into the conditioner by encouraging material flow from behind the cage deflectors (B).

MD #B4903

NOTE:

One set is supplied standard.

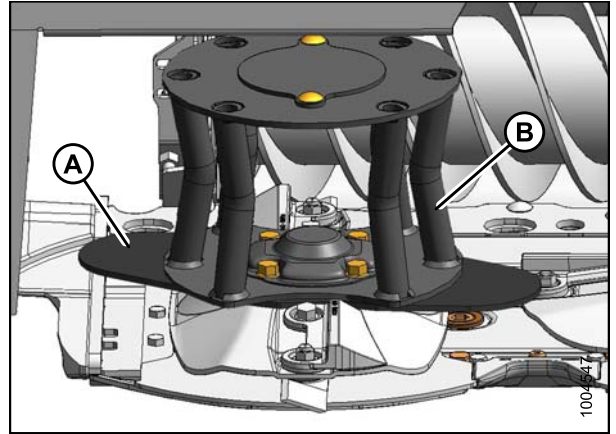


Figure 6.5: MD #B4903

7 Troubleshooting

7.1 Header Performance

Symptom	Problem	Solution	Refer to
Cutterbar plugging	Dull, bent, or badly worn blades	Replace blades.	Replacing the Cutterblades, page 143
	Auger drive belt slipping	Adjust tension or change belts.	5.5.5 Auger Drive Belt, page 165 and 5.5.2 Conditioner Drive Belt, page 158
	Conditioner drive belt slipping		
	Built-up of dirt between rock guards	Decrease header angle and increase float. In some conditions, it may be necessary to carry header slightly with header lift cylinders.	4.6 Header Angle, page 96 and 4.1 Header Float, page 83
Decrease header angle and increase float.			
Strips of uncut crop left on field	Bent cutter blades	Replace blades.	Replacing the Cutterblades, page 143
	Excessive header speed	Reduce header disc speed.	4.8 Disc Speed, page 99
	Foreign object on cutterbar	Disengage header and stop the engine. When all moving parts are completely stopped, remove foreign object.	4.16 Unplugging the Header, page 118
	Ground speed too slow	Increase ground speed.	4.9 Ground Speed, page 100
	Header float too light causing bouncing	Adjust to heavier float setting.	4.1 Header Float, page 83
Cutting height varies from one side to the other	Float not properly balanced	Adjust header float.	4.1 Header Float, page 83
	Excessive ground speed	Reduce ground speed.	4.9 Ground Speed, page 100
	Header angle too flat for guards to pick up down crop	Increase header angle.	4.6 Header Angle, page 96
	Downed crop	Adjust header angle to cut closer to ground.	
Ragged or uneven cutting of crop	Header angle too flat for guards to pick up down crop	Increase header angle.	4.6 Header Angle, page 96
	Downed crop	Adjust header angle to cut closer to ground.	

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Conditioner rolls plugging	Ground speed too fast	Reduce ground speed.	4.9 Ground Speed, page 100
	Roll gap too large for proper feeding	Decrease roll gap.	4.2.2 Adjusting Roll Gap, page 87
	Roll gap too small in thick stemmed cane-type crops	Increase roll gap.	
	Baffle set too low	Raise baffle.	4.5.3 Adjusting the Swath Baffle, page 94
	Roll speed too low	Increase disc speed.	4.8 Disc Speed, page 99
	Foreign object between rolls	Disengage header and stop the engine. When all moving parts are completely stopped, remove foreign object.	–
	Conditioner belt slipping	Adjust belt tension.	5.5.2 Conditioner Drive Belt, page 158
	Auger belt slipping		5.5.5 Auger Drive Belt, page 165
	Cutting height too low	Decrease header angle to raise cutting height.	4.6 Header Angle, page 96
	Rolls improperly timed	Adjust roll timing.	4.4 Roll Timing, page 90
Uneven formation and bunching of windrow	Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control.	4.5.2 Adjusting the Rear Deflector (Fluffer Shield), page 94
	Forming shields improperly adjusted	Adjust forming shield.	4.5 Forming Shields, page 92
	Roll gap too large	Adjust roll gap.	4.2.2 Adjusting Roll Gap, page 87
	Auger belts slipping	Replace belts.	5.5.5 Auger Drive Belt, page 165
	Conditioner rolls running too slow	Maintain rated header speed.	Refer to windrower operator's manual
Uneven windrow formation in light crop	Uneven feeding	Reduce header speed.	
Plugging behind end cage deflectors	No cutting full header width	Cut full header width.	–
	Ground speed too slow	Increase ground speed.	4.9 Ground Speed, page 100
Not cutting short enough in down crop	Ground speed too fast	Reduce ground speed.	Replacing the Cutterblades, page 143
	Broken, bent, or dull blades	Replace blades or turn blades over.	
	Cutting height too high	Adjust header angle to lower cutting height if field conditions allow.	4.6 Header Angle, page 96

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Material being pulled out by roots when cutting tall crop leaning into machine	Crop in conditioner rolls before crop is cut	Increase roll gap.	4.2.2 Adjusting Roll Gap, page 87
Damaged leaves and broken stems	Insufficient roll gap		
	Roll timing off	Check roll timing and adjust if necessary.	4.4 Roll Timing, page 90
Slow crop drying	Crop is bunched in windrow	Adjust forming shields/baffle.	4.5 Forming Shields, page 92
	Rolls not crimping crop sufficiently	Decrease roll gap.	4.2.2 Adjusting Roll Gap, page 87
Excessive drying or bleaching of crop	Excessive crimping	Increase roll gap.	
	Crop is spread too wide in windrow		
Poorly formed or bunched windrows	Forming shields not properly adjusted	Adjust forming shields.	4.5 Forming Shields, page 92

TROUBLESHOOTING

7.2 Mechanical Problems

Symptom	Problem	Solution	Refer to
Excessive noise	Bent cutterblade	Replace blade.	Replacing the Cutterblades, page 143
	Conditioner roll timing off	Check roll timing and adjust if necessary.	4.4 Roll Timing, page 90
	Conditioner roll gap too small	Check gap and adjust if necessary.	4.2.2 Adjusting Roll Gap, page 87
Excessive vibration or noise in header	Conditioner rolls contacting each other	Increase roll gap.	4.4 Roll Timing, page 90
		Check roll timing.	
	Auger center support loose	Tighten bolts on support.	4.13.1 Adjusting the Overshot Auger, page 110
Mud deposits on conditioner rolls	Clean rolls.	–	
Excessive heat in cutterbar	Too much lubricant in cutterbar	Drain lubricant and refill with specified amount.	5.3.7 Lubricating the Cutterbar, page 131
Frequent blade damage	Mud on cutterbar	Remove mud from cutterbar: do not allow mud to dry on cutterbar.	–
	Spindle bearing failure	Replace spindle bearing.	See MacDon Dealer
	Material wrapped around spindle	Remove disc and remove material.	5.4 Cutterbar Disc Maintenance, page 136
	Cutting too low in rocky field conditions	Decrease header angle: increase float.	4.6 Header Angle, page 96 and 4.1 Header Float, page 83
	Ground speed too high in rocky field conditions. At High ground speed, header tends to dig rocks from ground instead of floating over them	Reduce ground speed.	4.9 Ground Speed, page 100
	Blade incorrectly mounted	Check all blade mounting hardware ensuring blades are free to move.	Inspecting Cutterblades, page 139
Header float set too heavy	Increase float.		
Machine pulling to one side	Header dragging to one end and pulling to that side	Adjust header float on both ends.	4.1 Header Float, page 83

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Excessive wear of cutting components	Header angle too steep	Reduce header angle.	4.6 Header Angle, page 96
	Crop residue and dirt deposits on cutterbar	Clean cutterbar.	—
	Mud on cutterbar	Remove mud from cutterbar: do not allow mud to dry on cutterbar.	
Breakage of conditioner drive belt	Improper belt tension	Adjust conditioner drive belt tension.	5.5.2 Conditioner Drive Belt, page 158
	Belt not in proper groove in pulley	Move belt to proper groove.	
	Foreign object between rolls	Disengage header and stop the engine. When all moving parts are completely stopped, remove foreign object.	—
	Belt pulleys and idlers misaligned	Align pulleys and idler.	See MacDon Dealer
Discs don't turn when engaging header	Mud on cutterbar	Remove mud from cutterbar: do not allow mud to dry on cutterbar.	—
	Faulty drive belt	Check belt on pulleys.	5.5.2 Conditioner Drive Belt, page 158
	Hoses not connected	Connect hoses.	3.7 Attaching the Header, page 41
Header slows when going uphill	Hydraulic oil level in windrower is low	Add oil to windrower reservoir.	Refer to windrower operator's manual
Header runs while unloaded but slows or stops when starting to cut	Defective hydraulic motor	Repair/replace hydraulic motor.	See MacDon Dealer
	Defective hydraulic pump in windrower	Repair/replace pump.	
	Defective relief valve in windrower	Repair/replace relief valve.	
	Cold oil in hydraulic drive system	Reduce ground speed until oil reaches operating temperature.	4.9 Ground Speed, page 100

8 Reference

8.1 Torque Specifications

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

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

8.1.1 SAE Bolt Torque Specifications

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

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

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	11.9	13.2	*106	*117
5/16-18	24.6	27.1	*218	*241
3/8-16	44	48	32	36
7/16-14	70	77	52	57
1/2-13	106	118	79	87
9/16-12	153	170	114	126
5/8-11	212	234	157	173
3/4-10	380	420	281	311
7/8-9	606	669	449	496
1-8	825	912	611	676

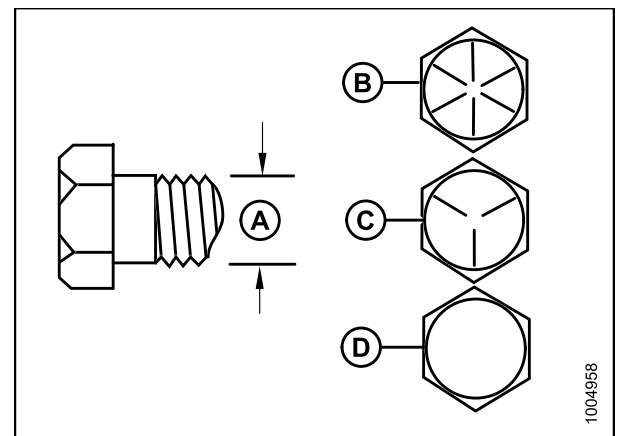


Figure 8.1: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

REFERENCE

Table 8.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	8.1	9	*72	*80
5/16-18	16.7	18.5	*149	*164
3/8-16	30	33	22	24
7/16-14	48	53	35	39
1/2-13	73	80	54	59
9/16-12	105	116	77	86
5/8-11	144	160	107	118
3/4-10	259	286	192	212
7/8-9	413	456	306	338
1-8	619	684	459	507

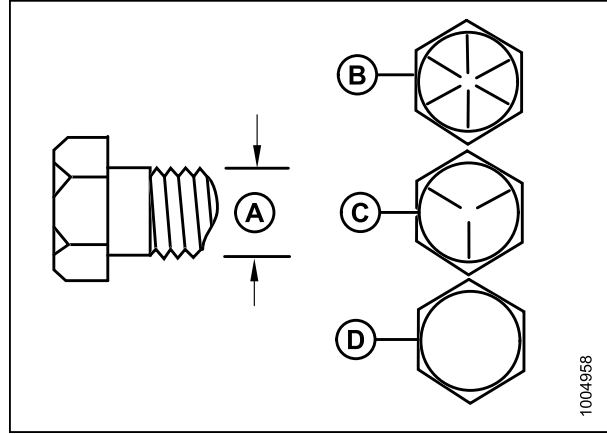


Figure 8.2: Bolt Grades

A - Nominal Size
 B - SAE-8
 C - SAE-5
 D - SAE-2

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

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	16.8	18.6	*150	*165
5/16-18	24	26	18	19
3/8-16	42	46	31	34
7/16-14	67	74	50	55
1/2-13	102	113	76	84
9/16-12	148	163	109	121
5/8-11	204	225	151	167
3/4-10	362	400	268	296
7/8-9	583	644	432	477
1-8	874	966	647	716

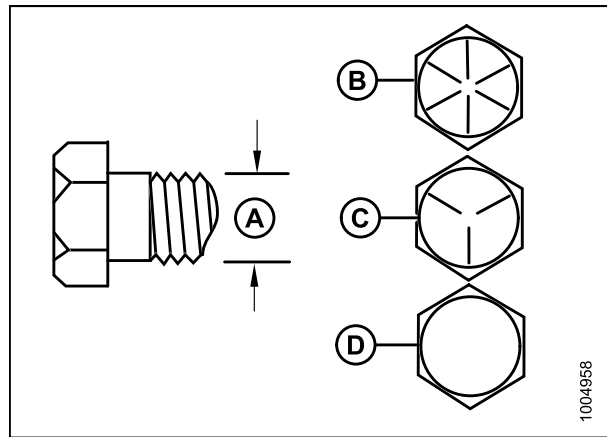


Figure 8.3: Bolt Grades

A - Nominal Size
 B - SAE-8
 C - SAE-5
 D - SAE-2

REFERENCE

Table 8.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	16.8	18.6	*150	*165
5/16-18	35	38	26	28
3/8-16	61	68	46	50
7/16-14	98	109	73	81
1/2-13	150	166	111	123
9/16-12	217	239	160	177
5/8-11	299	330	221	345
3/4-10	531	587	393	435
7/8-9	855	945	633	700
1-8	1165	1288	863	954

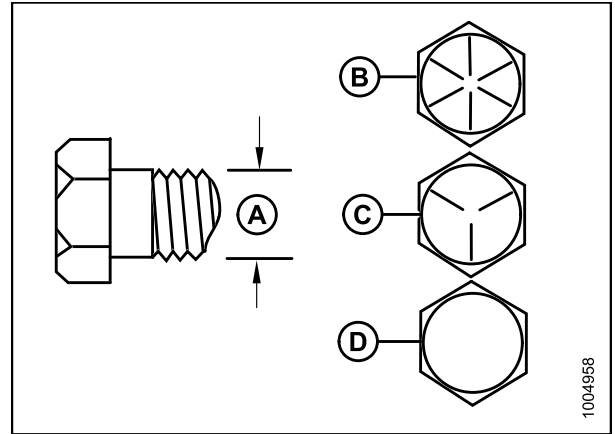


Figure 8.4: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

8.1.2 Metric Bolt Specifications

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

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.4	1.6	*13	*14
3.5-0.6	2.2	2.5	*20	*22
4-0.7	3.3	3.7	*29	*32
5-0.8	6.7	7.4	*59	*66
6-1.0	11.4	12.6	*101	*112
8-1.25	28	30	20	23
10-1.5	55	60	40	45
12-1.75	95	105	70	78
14-2.0	152	168	113	124
16-2.0	236	261	175	193
20-2.5	460	509	341	377
24-3.0	796	879	589	651

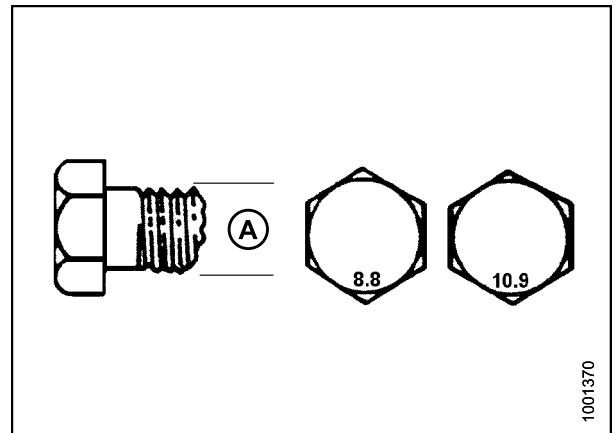


Figure 8.5: Bolt Grades

REFERENCE

Table 8.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5	314	347	233	257
24-3.0	543	600	402	444

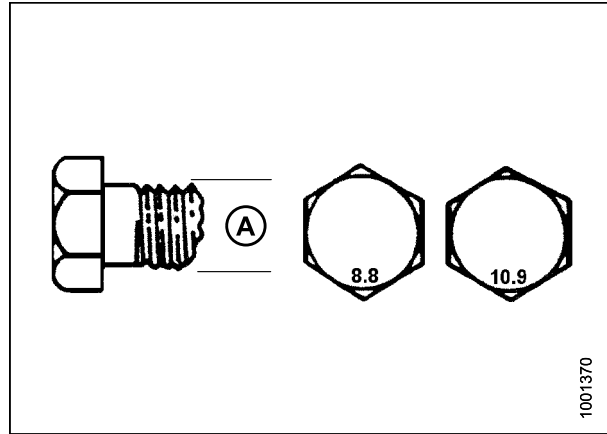


Figure 8.6: Bolt Grades

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

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.8	2	*18	*19
3.5-0.6	2.8	3.1	*27	*30
4-0.7	4.2	4.6	*41	*45
5-0.8	8.4	9.3	*82	*91
6-1.0	14.3	15.8	*140	*154
8-1.25	38	42	28	31
10-1.5	75	83	56	62
12-1.75	132	145	97	108
14-2.0	210	232	156	172
16-2.0	326	360	242	267
20-2.5	637	704	472	521
24-3.0	1101	1217	815	901

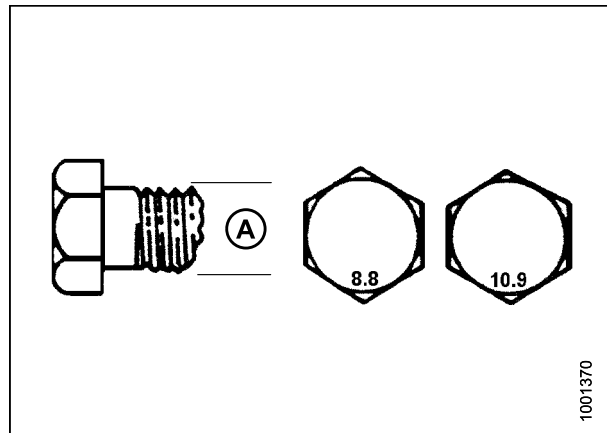


Figure 8.7: Bolt Grades

REFERENCE

Table 8.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.3	1.5	*12	*13
3.5-0.6	2.1	2.3	*19	*21
4-0.7	3.1	3.4	*28	*31
5-0.8	6.3	7	*56	*62
6-1.0	10.7	11.8	*95	*105
8-1.25	26	29	19	21
10-1.5	51	57	38	42
12-1.75	90	99	66	73
14-2.0	143	158	106	117
16-2.0	222	246	165	182
20-2.5	434	480	322	356
24-3.0	750	829	556	614

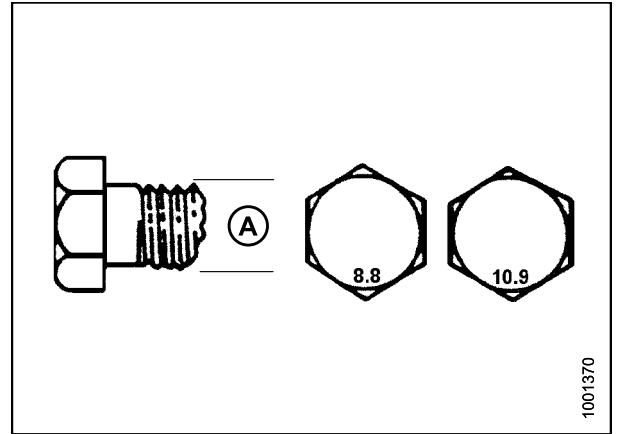


Figure 8.8: Bolt Grades

8.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.9 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	N·m	ft·lbf	N·m	ft·lbf
M3	–	–	–	1
M4	–	–	4	2.6
M5	–	–	8	5.5
M6	9	6	12	9
M8	20	14	28	20
M10	40	28	55	40
M12	70	52	100	73
M14	–	–	–	–
M16	–	–	–	–

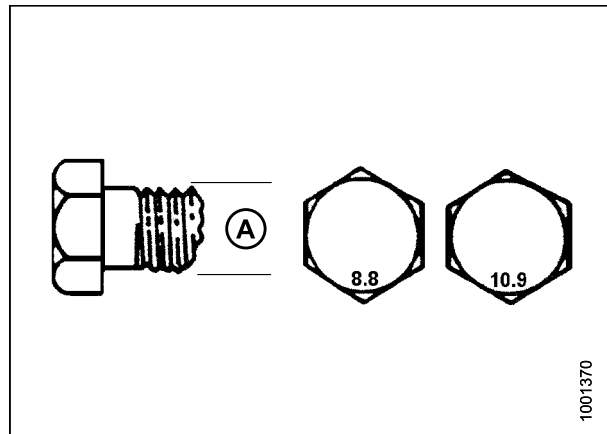


Figure 8.9: Bolt Grades

8.1.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in [Table 8.10 Flare-Type Hydraulic Tube Fittings, page 191](#).
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.

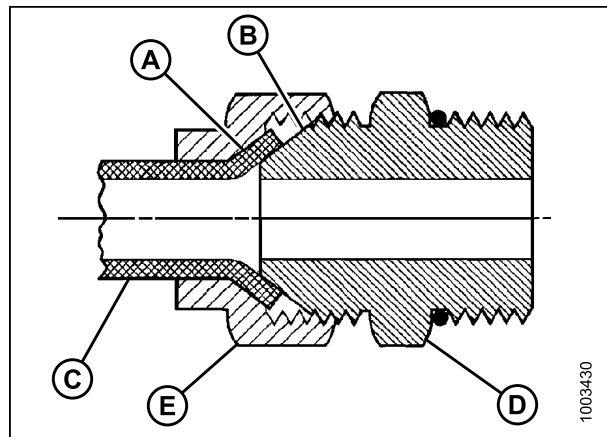


Figure 8.10: Hydraulic Fitting

REFERENCE

Table 8.10 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value ⁹		Flats from Finger Tight (FFFT)	
		N·m	ft·lbf	Tube	Swivel Nut or Hose
-2	5/16-24	4-5	3-4	—	—
-3	3/8-24	7-8	5-6	—	—
-4	7/16-20	18-19	13-14	2-1/2	2
-5	1/2-20	19-21	14-15	2	2
-6	9/16-18	30-33	22-24	2	1-1/2
-8	3/4-16	57-63	42-46	2	1-1/2
-10	7/8-14	81-89	60-66	1-1/2	1-1/2
-12	1-1/16-12	113-124	83-91	1-1/2	1-1/4
-14	1-3/16-12	136-149	100-110	1-1/2	1-1/4
-16	1-5/16-12	160-176	118-130	1-1/2	1
-20	1-5/8-12	228-250	168-184	1	1
-24	1-7/8-12	264-291	195-215	1	1
-32	2-1/2-12	359-395	265-291	1	1
-40	3-12	—	—	1	1

9. Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

8.1.5 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
4. Apply hydraulic system oil to O-ring (A).

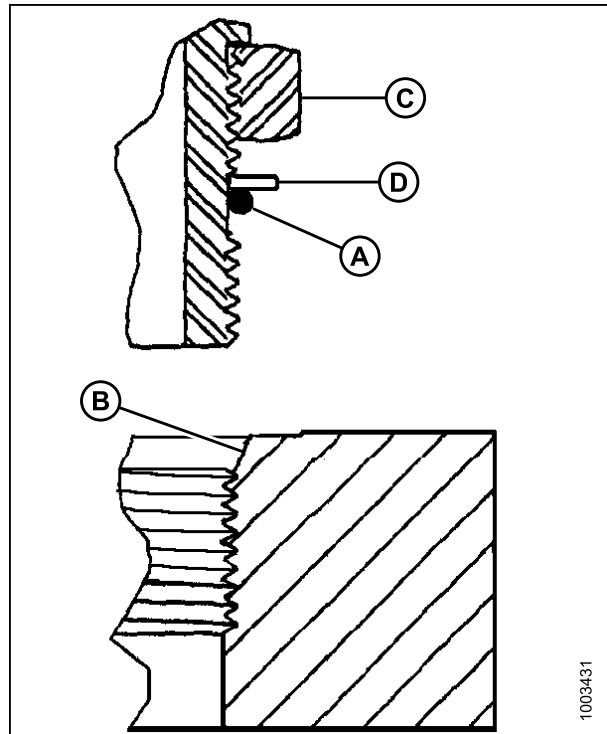


Figure 8.11: Hydraulic Fitting

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.

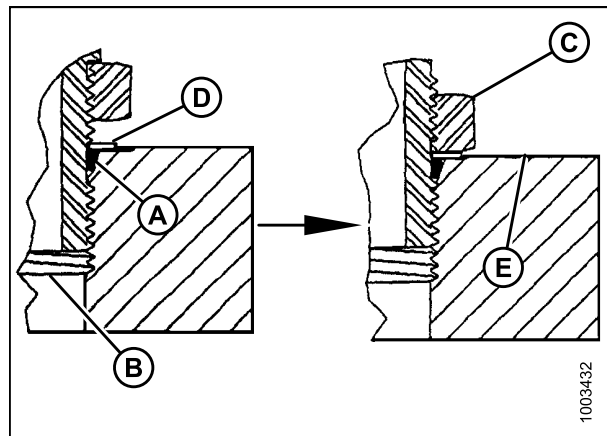


Figure 8.12: Hydraulic Fitting

REFERENCE

Table 8.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁰	
		N·m	ft·lbf (*in·lbf)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1-1/16–12	120–132	88–97
-14	1-3/8–12	153–168	113–124
-16	1-5/16–12	176–193	130–142
-20	1-5/8–12	221–243	163–179
-24	1-7/8–12	270–298	199–220
-32	2-1/2–12	332–365	245–269

10. Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

8.1.6 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to values in Table 8.12 *O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)*, page 194.
6. Check final condition of fitting.

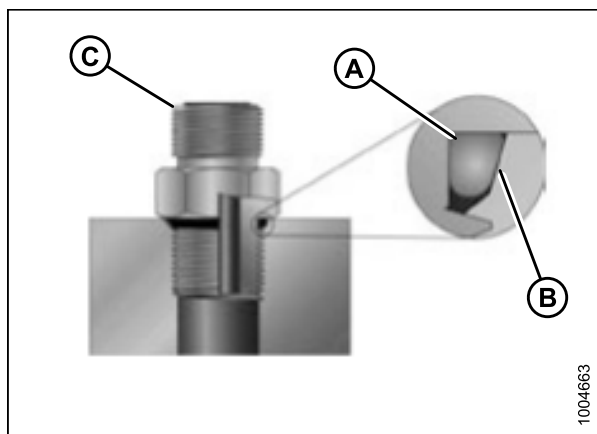


Figure 8.13: Hydraulic Fitting

Table 8.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ¹¹	
		N·m	ft·lbf (*in·lbf)
-2	5/16-24	6-7	*53-62
-3	3/8-24	12-13	*106-115
-4	7/16-20	19-21	14-15
-5	1/2-20	21-33	15-24
-6	9/16-18	26-29	19-21
-8	3/4-16	46-50	34-37
-10	7/8-14	75-82	55-60
-12	1-1/16-12	120-132	88-97
-14	1-3/8-12	153-168	113-124
-16	1-5/16-12	176-193	130-142
-20	1-5/8-12	221-243	163-179
-24	1-7/8-12	270-298	199-220
-32	2-1/2-12	332-365	245-269

11. Torque values shown are based on lubricated connections as in reassembly.

8.1.7 O-Ring Face Seal (ORFS) Hydraulic Fittings

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



Figure 8.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table 8.13 *O-Ring Face Seal (ORFS) Hydraulic Fittings*, page 196.

NOTE:

If applicable, hold hex on fitting body (E) to prevent rotation of fitting body and hose when tightening fitting nut (D).

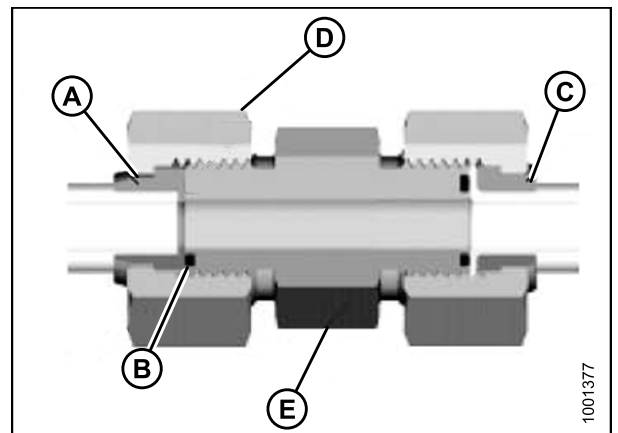


Figure 8.15: Hydraulic Fitting

6. Use three wrenches when assembling unions or joining two hoses together.
7. Check final condition of fitting.

REFERENCE

Table 8.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value ¹²	
			N·m	ft·lbf
-3	Note ¹³	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note ¹³	5/16	–	–
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1-3/16	3/4	115–127	85–94
-14	Note ¹³	7/8	–	–
-16	1-7/16	1	150–165	111–122
-20	1-11/16	1-1/4	205–226	151–167
-24	1–2	1-1/2	315–347	232–256
-32	2-1/2	2	510–561	376–414

12. Torque values and angles shown are based on lubricated connection as in reassembly.

13. O-ring face seal type end not defined for this tube size.

REFERENCE

8.1.8 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The Turns From Finger Tight (TFFT) values are shown in Table [8.14 Hydraulic Fitting Pipe Thread, page 197](#). Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

NOTE:

Over-torque failure of fittings may not be evident until fittings are disassembled.

Table 8.14 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended T.F.F.T	Recommended F.F.F.T
1/8-27	2-3	12-18
1/4-18	2-3	12-18
3/8-18	2-3	12-18
1/2-14	2-3	12-18
3/4-14	1.5-2.5	12-18
1-11 1/2	1.5-2.5	9-15
1 1/4-11 1/2	1.5-2.5	9-15
1 1/2-11 1/2	1.5-2.5	9-15
2-11 1/2	1.5-2.5	9-15

REFERENCE

8.2 Conversion Chart

Table 8.15 Conversion Chart

Quantity	SI Units (Metric)		Factor	Inch-Pound Units	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectares	ha	$\times 2.4710 =$	acres	acres
Flow	liters per minute	L/min	$\times 0.2642 =$	US gallons per minute	gpm
Force	Newtons	N	$\times 0.2248 =$	pounds force	lbf
Length	millimeters	mm	$\times 0.0394 =$	inch	in.
	meters	m	$\times 3.2808 =$	foot	ft.
Power	kilowatts	kW	$\times 1.341 =$	horsepower	hp
Pressure	kilopascals	kPa	$\times 0.145 =$	pounds per square inch	psi
	megapascals	MPa	$\times 145.038 =$		
	bar (Non-SI)	bar	$\times 14.5038$		
Torque	Newton meters	N·m	$\times 0.7376 =$	pound feet or foot pounds	ft·lbf
	Newton meters	N·m	$\times 8.8507 =$	pound inches or inch pounds	in·lbf
Temperature	Celsius	°C	$(C^{\circ} \times 1.8) + 32 =$	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	$\times 3.2808 =$	feet per minute	ft/min
	meters per second	m/s	$\times 3.2808 =$	feet per second	ft/s
	kilometers per hour	km/h	$\times 0.6214 =$	miles per hour	mph
Volume	liters	L	$\times 0.2642 =$	US gallons	US gal
	milliliters	ml	$\times 0.0338 =$	ounces	oz.
	cubic centimeters	cm ³ or cc	$\times 0.061 =$	cubic inches	in. ³
Weight	kilograms	kg	$\times 2.2046 =$	pounds	lb.

Index

A

accelerators	144
<i>See also</i> cutterbars	
replacing.....	145
API	
definitions	19
ASTM	
definitions	19
attaching	
windrowers	41
augers	110, 165
drive belts	165–166
inspect/adjust.....	165
replacing.....	166
stripper bars	
adjusting	113

B

bearings.....	169
bevel gearbox.....	157
changing lubricant	157
break-in	
period	79

C

center-links	19
<i>See also</i> , hydraulic links	
definitions	19
component identification.....	21
conditioner drive belts	158
inspecting	158
replacing.....	159
conditioner gearbox, <i>See</i> drive systems	
conditioner roll tension, <i>See</i> roll tension	
conditioner roll timing, <i>See</i> roll timing	
conditioner rolls	86
conversion charts	198
curtains	
inspecting	154
cutterbar doors	33, 154
adjusting.....	155
closing	
export headers.....	37
North American headers.....	35
inspecting latches	
export headers.....	154
latch brackets	
replacing	156

latches.....	155
replacing	155
opening	
export headers.....	36
North American headers.....	34
cutterbars	
accelerators	
inspecting	145
replacing	145
cutterblades	139
hardware	141
inspecting	139
replacing	143
discs	
accelerators.....	144
inspecting	137
installing.....	138
nut shield.....	147
removing	137
lubricant	
draining lubricant	131
filling cutterbar with lubricant.....	133
maintaining cutterbar discs.....	136
nut shield	
inspecting	147
replacing	148
repair tool kit.....	175
spindles	
direction of rotation	136
cutting height.....	97
gauge roller height	
adjusting	97
skid shoes	97

D

definition of terms	19
disc maintenance	
cutterbar discs	136
inspecting	137
discs	137
disc speed	99
spindle keys	
replacing	152
spindles	152
doors, <i>See</i> cutterbar doors	
double windrowing	101
drive systems	
auger drive belts.....	165
inspect/adjust	165
replacing	166

INDEX

bevel gearbox	157
changing lubricant	157
conditioner drive belts	158
replacing	159
conditioner gearbox	161
changing lubricant	161
hydraulic motor	
installing	171
removing	170
drivelines	
conditioner drive belts	158
driveshields	30
closing	
export headers	31
North American headers	30
opening	
export headers	31
North American headers	30
right endshield	
installing	32
removing	32

E

export headers	
definitions	19

F

float	84
adjusting	84
checking	83
fluids and lubricants, <i>See</i> lubrication	
forming shields	92
adjusting side deflectors	92
attaching	41
rear deflector/fluffer shield	
adjusting	94
swath baffle	
adjusting	94

G

gauge rollers	176
gearbox speed sensors	163
adjusting	163
replacing	164
glossary	19
greasing	
maintenance schedule/record	121
ground speed	100

H

haying tips	116
curing	116
driving on windrows	117
raking and tedding	117
topsoil moisture	116
weather and topography	116
windrow characteristics	116
headers	
angle	96
attaching hydraulic center-link for M1240	
windrowers	46
attaching hydraulics and electrical components	
M1240 windrowers	50
M200 windrowers	60
M205 windrowers	55
attaching mechanical components to M200	
and M205 windrowers	44
definitions	19
detaching	67
M1240 windrowers	73
M200 windrowers	71
M205 windrowers	67
operating	83
transporting	81
unplugging	118
hydraulic motors, <i>See</i> motors	
hydraulics	
fittings	
flare-type	190
O-ring boss (ORB) adjustable	192
O-ring boss (ORB) non-adjustable	194
O-ring face seal (ORFS)	195, 197
hoses and lines	172
hydraulic safety	6
installing motor	171
maintenance	170
removing motor	170

I

identification	21
inspections	
auger drive belts	165
conditioner drive belts	158
cutterbar discs	137
cutterbar door latches (export)	154
cutterblades	139
maintenance schedule/record	121
nut shield	147
rock guards	135
rotary deflectors	148

INDEX

K

kits	
adjustable skid shoes	175
cutterbar repair tool	175
gauge roller.....	176
hydraulic drive - 16-foot for M200	176
tall crop divider.....	176
tall crop feed plate	177

L

lights.....	173
adjusting the transport lights	82
hazard lights	
replacing bulbs and lenses	173
replacing lamp assembly	173
replacing lamp bracket	174
lubrication	
draining cutterbar lubricant.....	131
filling the cutterbar with lubricant.....	133
fluids and lubricants.....	120
lubrication and servicing.....	125

M

maintenance and servicing.....	119
cutterbar lubrication	131
end of season service.....	124
greasing procedure	125
lubrication and servicing	125
maintaining cutterbar discs.....	136
maintenance records	121
maintenance requirements.....	121
schedule.....	121
service.....	124–125
preseason/annual service.....	124
service intervals.....	126
maintenance safety.....	5
metric bolts	
torque specifications.....	187
moisture.....	116
motors	
hydraulic.....	170

N

North American headers	
closing cutterbar doors	35
closing driveshield	30
definitions	19
opening cutterbar doors	34
opening driveshield	30
nut shields.....	147
inspecting	147

replacing.....	148
----------------	-----

O

operation.....	83
operator responsibilities	25
options and attachments	175
adjustable skid shoes	175
cutterbar repair tool	175
gauge roller.....	176
hydraulic drive - 16-foot for M200	176
tall crop divider.....	176
tall crop feed plate	177
overshot augers	
adjusting.....	110
owner responsibilities.....	25

P

preseason service	124
-------------------------	-----

R

raking	117
recommended fluids and lubricants, <i>See</i>	
lubrication	
revisions list	vi
rock guards	135
inspecting	135
roll gap	
adjusting.....	87
checking.....	86
roll tension	89
adjusting.....	89
roll timing	90
adjusting.....	91
checking.....	90
rotary deflectors.....	148
driveline deflectors	
installing.....	151
removing.....	150
driven deflectors	
installing.....	150
removing.....	149
inspecting deflectors.....	148
rpm	
definitions	19

S

SAE	
bolt torques.....	185
definitions	19
safety.....	1

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