

R1 Series Rotary Disc Header

Operator's Manual 215622 Revision A

Original Instruction

The Harvesting Specialists.

R113 Rotary Disc Header



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Noise Levels

The A-weighted sound pressure level inside the operator's station of a typical self-propelled vehicle (e.g., MacDon M1170 Windrower), when operated in conjunction with this R1 Series Rotary Disc Header, **is 70 dBA**. This measurement was taken in accordance with ISO 5131. The sound pressure level depends upon the rotary disc speed, crop conditions, and the exact type of self-propelled vehicle used to power the R1 Series Rotary Disc Header.

Declaration of Conformity

CE	EC Declaration	of Conformity	
		[4] As per Shipping Document	
	MacDon Industries Ltd. 680 Moray Street, Winnipeg, Manitoba, Canada R3J 3S3	[5] June 11, 2021	
	[2] Rotary Disc Header	[6]Adrienne Tankeu	
	[3] MacDon RI Series	Product Integrity	
	1	,	
EN	BG	CZ	DA
We, [1]	Ние, [1]	My, [1]	Vi, [1]
Declare, that the product:	декларираме, че следният продукт:	Prohlašujeme, že produkt:	erklærer, at prduktet:
Machine Type: [2]	Тип машина: [2]	Typ zařízení: [2]	Maskintype [2]
Name & Model: [3]	Наименование и модел: [3]	Název a model: [3]	Navn og model: [3]
Serial Number(s): [4]	Сериен номер(а) [4]	Sériové(á) číslo)a): [4]	Serienummer (-numre): [4]
fulfils all the relevant provisions of the Directive 2006/42/EC.	отговаря на всички приложими разпоредби на директива 2006/42/ЕО.	splňuje všechna relevantní ustanovení směrnice 2006/42/EC.	Opfylder alle bestemmelser i direktiv 2006/42/EF.
Harmonized standards used, as reterred to in Article 7(2): FN ISO 4254-1:2013	Използвани са следните хармонизирани стандарти според чл. 7(2):	Byly použity harmonizované standardy, jak je uve- deno v článku 7(2):	Anvendte harmoniserede standarder, som henvist til i paragraf 7(2):
EN ISO 4254-7:2009	EN ISO 4254-1:2013	EN ISO 4254-1:2013	EN ISO 4254-1:2013
Place and date of declaration: [5]	EN ISO 4254-7:2009 Място и дата на декларацията: [5]	EN ISO 4254-7:2009 Místo a datum prohlášení: [5]	EN ISO 4254-7:2009 Sted og dato for erklæringen: [5]
Identity and signature of the person empowered to draw up the declaration: [6]	Име и подпис на лицето, упълномощено да изготви декларацията: [6]	Identita a podpis osoby oprávněné k vydání prohlášení: [6]	Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6]
Name and address of the person authorized to compile the technical file:	Име и адрес на лицето, упълномощено да състави техническия файл:	Jméno a adresa osoby oprávněné k vyplnění techni- ckého souboru:	Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil:
Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germany) bvonriedesel@macdon.com	Бенедикт фон Рийдезел Управител, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Германия) bvonriedesel@macdon.com	Benedikt von Riedesel generální ředitel, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Německo) bvonriedesel@macdon.com	Benedikt von Riedesel Direktør, MacDon Europe GmbH Hagenauer Straße 59 D-65203 Wiesbaden (Tyskland) bvonriedesel@macdon.com
DE	ES	ET	FR
Wir, [1]	Nosotros [1]	Meie, [1]	Nous soussignés, [1]
Erklären hiermit, dass das Produkt:	declaramos que el producto:	deklareerime, et toode	Déclarons que le produit :
Maschinentyp: [2]	Tipo de máquina: [2]	Seadme tüüp: [2]	Type de machine : [2]
Name & Modell' [3]	Nombre v modelo: [3]	Nimi ia mudel: [3]	Nom et modèle : [3]
Sorionnummor (n): [4]	Números de serie: [4]	Seerianumbrid: [4]	Numéro(s) de série : [4]
alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt.	cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC.	vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele.	Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC.
Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2):	Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2):	Kasutatud on järgnevaid harmoniseeritud stand- ardeid, millele on viidatud ka punktis 7(2):	Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2):
EN ISO 4254-1:2013	EN ISO 4254-1:2013	EN ISO 4254-1:2013	EN ISO 4254-1:2013
EN ISO 4254-7:2009	EN ISO 4254-7:2009 Lugar y fecha de la declaración: [5]	EN ISO 4254-7:2009 Deklaratsiooni koht ja kuunäev: [5]	EN ISO 4254-7:2009 Lieu et date de la déclaration : [5]
Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6]	Identidad y firma de la persona facultada para draw redactar la declaración: [6]	Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6]	Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6]
Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen:	Nombre y dirección de la persona autorizada para elaborar el expediente técnico:	Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress:	Nom et adresse de la personne autorisée à consti- tuer le dossier technique :
Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden Jourgiedeselfmanden com	Benedikt von Riedesel Gerente general - MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Alemania) bvonriedesel@mardon.com	Benedikt von Riedesel Peadirektor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Saksamaa) bvonriedesel@macdon.com	Benedikt von Riedesel Directeur général, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Allemagne) bvonriedesel@macdon.com
Stanieucsci@macdon.com			
The Harvesting Specialists			MacDon

EC Declaration of Conformity

п	Ш	IT	11/
"	nu	LI	LV
Noi, [1]	Mi, [1]	Mes, [1]	Mēs, [1]
Dichiariamo che il prodotto:	Ezennel kijelentjük, hogy a következő termék:	Pareiškiame, kad šis produktas:	Deklarējam, ka produkts:
Tipo di macchina: [2]	Gép típusa: [2]	Mašinos tinas: [2]	Mašīnas tips: [2]
Nome e modello: [3]	Név és modell: [3]	Provide la construction (2)	Nessulume up medalis. [2]
Nonce e modello. [6]	Szériaszám(ok): [4]	Pavadinimas ir modelis: [3]	Nosaukums un modelis. [3]
Numero(i) di serie: [4]		Serijos numeris (-iai): [4]	Sērijas numurs(-i): [4]
soddisfa tutte le disposizioni rilevanti della direttiva	teljesiti a kovetkezo iranyelv osszes vonatkozo	atitinka taikomus reikalavimus pagal Direktyvą	Atbilst visām būtiskajām Direktīvas 2006/42/EK
2006/42/CE.	elon asait. 2000/42/EK.	2006/42/EB.	prasībām.
Utilizzo degli standard armonizzati, come indicato nell'Articolo 7(2):	Az alábbi harmonizált szabványok kerültek alkalmazásra a 7(2) cikkely szerint:	Naudojami harmonizuoti standartai, kai nurodoma straipsnyje 7(2):	Piemēroti šādi saskaņotie standarti , kā minēts 7. panta 2. punktā:
	EN ISO 4254 1-2012		
EN ISO 4254-1:2013	EN ISU 4254-1:2013	EN ISO 4254-1:2013	EN ISO 4254-1:2013
EN ISO 4254-7:2009	EN ISO 4254-7:2009	EN ISO 4254-7:2009	EN ISO 4254-7:2009
Luogo e data della dichiarazione: [5]	A nyilatkozattétel ideje és helye: [5]	Deklaracijos vieta ir data: [5]	Deklarācijas parakstīšanas vieta un datums: [5]
Nome e firma della persona autorizzata a redigere la	Azon személy kiléte és aláírása, aki jogosult a	Armone tanatuhás duomonye ir naračas armone	Tās personas vārds uzvārds un paraksts kas ir
dichiarazione: [6]	nyilatkozat elkészítésére: [6]	igalioto sudarvti šia deklaracija: [6]	pilovarota, sagatavot šo deklarāciju: [6]
Nome e persona autorizzata a compilare il file	Azon személy neve és aláírása, aki felhatalmazott a	Verdes is neverale somens luvis isolistes sudenti Xi	Tās porconas vārds uzvārds up adroso kas ir
tecnico:	műszaki dokumentáció összeállítására:	vardas ir pavarde asmens, kuris įgailotas sudaryti sį technini faila:	nilovarota, sastādīt tebnisko dokumentāciju:
Ronadikt von Riederal	Benedikt von Riedesel		pinival ota sastadit termisko dokumentaciju.
General Manager, MacDon Europe GmbH	Vezérigazgató, MacDon Europe GmbH	Benedikt von Riedesel Generalinis direktorius, MacDon Europe GmbH	Benedikts fon Kidizels
Hagenauer Straße 59	Hagenauer Straße 59	Hagenauer Straße 59	Generaturektors, MacDon Europe Gribh
65203 Wiesbaden (Germania)	65203 Wiesbaden (Németország)	65203 Wiesbaden (Vokietija)	65203 Wiesbaden (Vācija)
bvonriedesel@macdon.com	bvonriedesel@macdon.com	bvonriedesel@macdon.com	hyonriedesel@macdon.com
_			Stormaaselemaaaneon
	 \		
NL	PO	PT	RO
Wij, [1]	My niżej podpisani, [1]	Nós, [1]	Noi, [1]
Verklaren dat het product:	Oświadczamy, że produkt:	Declaramos, que o produto:	Declarăm, că următorul produs:
Machinetype: [2]	Typ urządzenia: [2]	Tipo de máguina: [2]	Tipul mașinii: [2]
Naam on model: [2]	Nazwa i model: [3]	Nerve e Mardalas [2]	Denumirea și modelul: [3]
waan en mouer. [5]	Numer continu/numeri continu [4]	Nome e Middelo: [3]	Numěr (numera) saria: [4]
Serienummer(s): [4]	Numer seryjny/numery seryjne: [4]	Número(s) de Série: [4]	Numar (numere) serie. [4]
voldoet aan alle relevante bepalingen van de Richtlijn 2006/42/EC.	spełnia wszystkie odpowiednie przepisy dyrektywy 2006/42/WE.	cumpre todas as disposições relevantes da Directiva 2006/42/CE.	corespunde tuturor dispozițiilor esențiale ale directivei 2006/42/EC.
Geharmoniseerde normen toegepast, zoals vermeld in Artikel 7(2):	Zastosowaliśmy następujące (zharmonizowane) normy zgodnie z artykułem 7(2):	Normas harmonizadas aplicadas, conforme referido no Artigo 7(2):	Au fost aplicate următoarele standarde armonizate conform articolului 7(2):
EN ISO 4254-1-2013	EN ISO 4254-1:2013	EN ISO 4254 1-2012	EN ISO 4254-1:2013
EN ISO 4254 7:2000	EN ISO 4254-7:2009	EN 130 4234-1.2013	EN ISO 4254-7-2009
EN ISO 4254-7:2009	EN 130 423477.2005	EN ISO 4254-7:2009	EN 130 423477.2003
Plaats en datum van verklaring: [5]	Data i miejsce oświadczenia: [5]	Local e data da declaração: [5]	Data și locul declarației: [5]
Naam en handtekening van de bevoegde persoon om	Imię i nazwisko oraz podpis osoby upoważnionej do	Identidade e assinatura da pessoa autorizada a	Identitatea și semnătura persoanei împuternicite
de verklaring op te stellen: [6]	przygotowania deklaracji: [6]	elaborar a declaração: [6]	pentru întocmirea declarației: [6]
Naam en adres van de geautoriseerde persoon om het technisch dossier samen te stellen:	Imię i nazwisko oraz adres osoby upoważnionej do przygotowania dokumentacji technicznej:	Nome e endereço da pessoa autorizada a compilar o ficheiro técnico:	Numele și semnătura persoanei autorizate pentru întocmirea cărții tehnice:
Benedikt von Riedesel	Benedikt von Riedesel	Benedikt von Riedesel	Benedikt von Riedesel
Algemeen directeur, MacDon Europe GmbH	Dyrektor generalny, MacDon Europe GmbH	Gerente Geral, MacDon Europa Ltda.	Manager General, MacDon Europe GmbH
Hagenauer Straße 59	Hagenauer Straße 59	Hagenauer Straße 59	Hagenauer Straße 59
65203 Wiesbaden (Duitsland)	65203 Wiesbaden (Niemcy)	65203 Wiesbaden (Alemanha)	65203 Wiesbaden (Germania)
bvonriedesel@macdon.com	bvonriedesel@macdon.com	bvonriedesel@macdon.com	bvonriedesel@macdon.com
SR	SV	SL	SK
	Vi. [1]	Mi. [1]	My. [1]
MI, [1]		teteriteren de tedelete	Marke market and an a Market and a lar
Izjavljujemo da proizvod	intygar att produkten:	izjavijamo, da izdelek:	tymto preniasujeme, ze tento vyrobok:
Tip mašine: [2]	Maskintyp: [2]	Vrsta stroja: [2]	Typ zariadenia: [2]
Naziv i model: [3]	Namn och modell: [3]	Ime in model: [3]	Názov a model: [3]
Serijski broj(evi): [4]	Serienummer: [4]	Serijska/-e številka/-e: [4]	Výrobné číslo: [4]
Ispunjava sve relevantne odredbe direktive 2006/42/EC.	uppfyller alla relevanta villkor i direktivet 2006/42/EG.	ustreza vsem zadevnim določbam Direktive 2006/42/ES.	spĺňa príslušné ustanovenia a základné požiadavky smernice č. 2006/42/ES.
Korišæeni su usklađeni standardi kao što je navedeno u èlanu 7(2):			
	Harmonierade standarder används, såsom anges i artikel 7(2):	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2):	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2):
	Harmonierade standarder används, såsom anges i artikel 7(2):	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2):	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 42541:2013
EN ISO 4254-1:2013	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 FN ISO 4254-7:2009	Uporabijeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 FN ISO 4254-7:2009	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009
EN ISO 4254-1:2013 EN ISO 4254-7:2009	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Plate och datum för inburget: [5]	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Kral in datum izlave: [5]	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Mierto a dřtum prehlácenja: [5]
EN ISO 4254-1:2013 EN ISO 4254-7:2009 Datum i mesto izdavanja deklaracije: [5]	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Plats och datum för intyget: [5]	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Kraj in datum izjave: [5]	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Miesto a dátum prehlásenia: [5]
EN ISO 4254-1:2013 EN ISO 4254-7:2009 Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašæenog za sastavljanje deklaracije: [6]	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Plats och datum för intyget: [5] Identitet och signatur för person med befogenhet att upprätta intyget: [6]	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Kraj in datum izjave: [5] Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6]	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6]
EN ISO 4254-1:2013 EN ISO 4254-7:2009 Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašæenog za sastavljanje deklaracije: [6] Ime i adresa osobe ovlašæene za sastavljanje teh- nièke datoteke:	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 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:	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Kraj in datum izjave: [5] Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6] Ime in naslov osebe, pooblaščene za pripravo tehnične datoteke:	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6] Meno a adresa osoby oprávnenej zostaviť technický súbor:
EN ISO 4254-1:2013 EN ISO 4254-7:2009 Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašæenog za sastavljanje deklaracije: [6] Ime i adresa osobe ovlašæene za sastavljanje teh- ničke datoteke:	Harmonierade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 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: Benedikt von Bioderci	Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Kraj in datum izjave: [5] Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6] Ime in naslov osebe, pooblaščene za pripravo tehnične datoteke: Benedikt von Riedesel	Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6] Meno a adresa osoby oprávnenej zostaviť technický súbor: Bopdilst una Biodecel
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Introduction

This instructional manual contains safety, operating, and maintenance procedures for the MacDon R113 and R116 Rotary Disc Headers. The rotary disc header, when attached to a MacDon Windrower, is designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows. The following is a list of windrowers which are compatible with the rotary disc header:

Rotary Disc Header Model	Compatible Windrower Model
R113 SP	M155 Self-Propelled Windrower
	M155 <i>E4</i> Self-Propelled Windrower
	M205 Self-Propelled Windrower
	M1170 Windrower
	M1240 Windrower
R116 SP	M155 Self-Propelled Windrower
	M155 <i>E4</i> Self-Propelled Windrower
	M1170 Windrower

Carefully read all the material provided before attempting to unload, assemble, or use the machine.

Use this manual as your first source of information about the machine. If you follow the instructions provided in this manual, and use MacDon parts when repair is necessary, the rotary disc header will work well for many years. If you require more detailed service information, contact your MacDon Dealer.

Use the Table of Contents and the Index to guide you to specific topics. Study the Table of Contents to familiarize yourself with how the material is organized. Keep this manual handy for frequent reference. If the machine is sold or transferred, be sure to pass this manual on to the new Operators or Owners. Call your Dealer if you need any additional assistance, information, or additional copies of this manual.

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 the functionality of the machine, reduce its service life, and may result in a hazardous situation for the Operator or bystanders.

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

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

Conventions

The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the rotary disc header faces the crop.
- Unless otherwise noted, use the standard torque values provided in this manual.

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

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

This document is currently available in Chinese, English, and Russian.



Manual Storage Case

Summary of Changes

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.

Section	Summary of Change	Internal Use Only
1.9 Understanding Safety Signs, page 11	Updated text of signs MD #184371, 184385, 194466, and 246956	Product Safety
3.4.1 Attaching Header to M1 Series Windrower, page 26	Added step. Added updated illustrations. Revised headings.	Technical Publications
3.4.2 Attaching Header to M155, M155E4, or M205 Windrower – Hydraulic Center-Link with Optional Self-Alignment, page 32	Added step and illustration.	Technical Publications
3.4.3 Attaching Header to M155, M155E4, M205 Windrower – Hydraulic Center-Link without Optional Self- Alignment, page 37	Added step and illustration.	Technical Publications
Connecting Header Hydraulics and Electrical Components – M1 Series Windrowers, page 43	Added steps and illustrations.	Technical Publications
Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers, page 57	Added step and illustration.	Technical Publications
Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers, page 59	Added step and illustration.	Technical Publications
3.6.1 Opening Driveshields, page 80	Added safety step.	Technical Publications
3.8 Header Settings, page 87	Reordered table.	Technical Publications
3.11.1 Removing Cutterbar Deflectors – R113, page 105	Added topic.	Technical Publications
3.11.2 Installing Cutterbar Deflectors – R113, page 106	Added topic.	Technical Publications
4.4 Lubrication, page 119	Added "Every 25 Hours" entries to the maintenance schedule.	Product Support
Every 25 Hours, page 121	Added "Every 25 Hours" greasing procedure.	Product Support

Model and Serial Number

Record the model number, serial number, and model year of the header on the lines below.



The serial number plate (A) is located near the base of the right side hazard/signal light on the right edge of the rotary disc header.



Figure 1: Right Side of Header – R113 SP Shown, R116 SP Similar

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Chapter 1: Safety

Understanding and consistently following these safety procedures will help to ensure the safety of those operating the machine and of bystanders.

1.1 Safety Alert Symbols

The 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. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information.

Signal words are selected using the following guidelines:

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

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.

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

IMPORTANT:

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

NOTE:

Provides additional information or advice.

1.3 General Safety

Protect yourself when assembling, operating, and servicing machinery.

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

Wear all 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

In addition, take the following precautions:

• Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.



Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

Figure 1.4: Safety Equipment

• Provide a first aid kit in case of emergencies.

- Keep a properly maintained fire extinguisher on the machine. Familiarize yourself with its use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operators are fatigued or in a hurry. Take time to consider the safest way to accomplish a task. **NEVER** ignore the signs of fatigue.

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as scarves or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Ensure that the driveline guards can rotate independently of their shaft, and that they can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Parts from other manufacturers may not meet the correct strength, design, or safety requirements.
- Keep hands, feet, clothing, and hair away from moving parts. **NEVER** attempt to clear obstructions or objects from a machine while the engine is running.
- Do **NOT** modify the machine. Unauthorized modifications may impair the functionality and/or safety of the machine. It may also shorten the machine's service life.
- To avoid injury or death from the 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.
- Keep the machine service area clean and dry. Wet and/or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Ensure that all electrical outlets and tools are properly grounded.
- Keep the work area well-lit.
- Keep machinery clean. Straw and chaff on a hot engine are fire hazards. Do **NOT** allow oil or grease to accumulate on service platforms, ladders, or controls. Clean machines before they are stored.
- **NEVER** use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.
- When storing machinery, cover any sharp or extending components to prevent injury from accidental contact.



Figure 1.5: Safety around Equipment



Figure 1.6: Safety around Equipment



Figure 1.7: Safety around Equipment

1.4 Maintenance Safety

Protect yourself when servicing machinery.

To ensure your safety while maintaining the machine:

- Review the operator's manual and all safety items before the operation and/or maintenance of the machine.
- Place all controls in Neutral, stop the engine, set the parking brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, and/or repairing the machine.
- Follow good shop practices:
 - Keep service areas clean and dry
 - Ensure that electrical outlets and tools are properly grounded
 - Keep the work area well lit
- Relieve pressure from hydraulic circuits before servicing and/or disconnecting the machine.
- Ensure that 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 the 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 lubricant fitting) will cause drive components in other areas (belts, pulleys, and knives) to move. Stay clear of driven components at all times.
- Wear protective gear when working on the machine.
- Wear heavy gloves when working on knife components.



Figure 1.8: Safety around Equipment



Figure 1.9: Equipment is NOT Safe for Children



Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

Protect yourself when assembling, operating, and servicing hydraulic components.

- Always place all hydraulic controls in Neutral before leaving the operator's seat.
- 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 hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs can fail suddenly and create hazardous conditions.
- Wear proper hand and eye protection when searching for high-pressure hydraulic fluid leaks. Use a piece of cardboard as a backstop instead of your 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 1.11: Testing for Hydraulic Leaks



Figure 1.12: Hydraulic Pressure Hazard



Figure 1.13: Safety around Equipment

1.6 Welding Precaution

To prevent damage to sensitive electronics, welding should never be attempted on the rotary disc header while it is connected to a windrower.

Severe damage to sensitive, expensive electronics can result from welding on the header while it is connected to the windrower. It can be impossible to know what effect high current could have with regard to future malfunctions or shorter lifespan. It is very important that welding on the header is not attempted while the header is connected to the windrower.

If it is unfeasible to disconnect the rotary disc header from the windrower before welding, contact your MacDon Dealer for welding precautions detailing all electrical components that must be disconnected first for safe welding.

1.7 Safety Signs

Safety signs are decals placed on the machine where there is a risk of personal injury, or where the Operator should take extra precautions before operating the controls. They are usually yellow.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or illegible.
- If the original part on which a safety sign was installed is replaced, ensure that the repair part displays the current safety sign.
- Replacement safety signs are available from your MacDon Dealer Parts Department.



Figure 1.14: Operator's Manual Decal

1.7.1 Installing Safety Decals

If a safety decal is damaged it should be replaced.

- 1. Decide exactly where you are going to place the decal.
- 2. Clean and dry the installation area.
- 3. Remove the smaller portion of the split backing paper.
- 4. Place the decal in position and slowly peel back the remaining paper, smoothing the decal as it is applied.
- 5. Prick small air pockets with a pin and smooth them out.

SAFETY

1.8 Safety Sign Locations

Safety signs are installed in several locations on the header. Replace any missing or damaged decals on the machine with identical parts.



Figure 1.16: Safety Sign Decals



Figure 1.17: Safety Sign Decal Locations Roll Conditioner

A - MD #190546 D - MD #246959 B - MD #184385 E - MD #246956 C - MD #184371 F - NO STEP Symbol (Imprinted on Shield)

1.9 Understanding Safety Signs

Understanding these safety signs will allow you to understand the various hazards that your equipment may present.

NOTE:

This is a general list of safety sign definitions and the decals listed may not necessarily be applicable to your machine.

MD #113482

General hazard pertaining to machine operation and servicing.

CAUTION

- Read the operator's manual, and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do **NOT** allow untrained persons to operate the machine.
- Review safety instructions with all Operators annually.
- Ensure that all safety signs are installed and legible.
- Ensure that bystanders are clear of the machine before starting the engine, and while it is being operated.
- Do not allow people to ride on the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage the rotary disc header drive, put the transmission in Neutral, and wait for all movement to stop before leaving the operator's position.
- Shut off the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Engage the locks to prevent the lowering of the rotary disc header before servicing it in the raised position.
- Use the slow moving vehicle emblem and flashing warning lights when operating the machine on roadways, unless these actions are prohibited by law.

MD #166466

Hydraulic pressure oil hazard

WARNING

- High pressure oil can easily puncture skin, resulting in serious injury, gangrene, or death.
- If you are injured, seek emergency medical help immediately.
- Do **NOT** use any part of your body to check for hydraulic fluid leaks.
- Relieve the hydraulic pressure before loosening any fittings.



Figure 1.19: MD #166466

Figure 1.18: MD #113482

1000917

MD #184371

Hand entanglement hazard

WARNING

MD #184385

shield.

DANGER

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Entanglement hazard

To prevent injury:

- Stop the engine and remove the key before opening the shield.
- Do not operate the machine without the shields in place.

To prevent injury from entanglement with the conditioner:

Stop the engine and remove the key before opening the

Do **NOT** operate the machine without the shield in place.

Stand clear of the machine while it is running.



Figure 1.20: MD #184371



Figure 1.21: MD #184385



Slippery surface

WARNING - DO NOT STEP ON SURFACE

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



Figure 1.22: MD #190546

MD #194465

Rotating cutters

WARNING - STAND CLEAR

- Contact with the cutter blades, or objects thrown by the rotating blades, can result in serious injury or death.
- Do **NOT** stand on or near the machine when it is in operation.
- Do **NOT** operate the machine with the covers or curtains open or removed.
- Shut the engine off, and remove the key before opening any covers.



Figure 1.23: MD #194465

MD #194466

Thrown objects hazard. Crop materials exiting at high speed.

WARNING

To prevent injury or death from thrown objects:

- Stand clear of the machine while it is running.
- Stop the machine and wait for all movement to cease before approaching.



Figure 1.24: MD #194466

MD #246956

Entanglement hazard

DANGER

To prevent injury from entanglement with the conditioner:

- Stand clear of the machine while it is running.
- Stop the engine and remove the key before opening the shield.
- Do **NOT** operate the machine without the shield in place.



Figure 1.25: MD #246956

MD #246959

Pinch hazard

MD #247167

WARNING

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Rotating blades

the cover.

WARNING - KEEP AWAY

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

Disengage the power take-off, shut off the engine, and

Ensure that the blades have stopped rotating before lifting

The cutters may continue to rotate after the power is shut off

remove the key before opening the covers.

due to inertia. Wait for them to stop moving.



Figure 1.26: MD #246959



Figure 1.27: MD #247167



Header crushing hazard

WARNING

To prevent injury or death from a raised machine falling:

- Do **NOT** lift the header at the marked locations.
- Only use the marked locations to lower the header from the vertical to the horizontal position.



Figure 1.28: MD #304865

Chapter 2: Product Overview

Refer to this section to learn about the dimensions, weights, and equipment specifications for your machine and its systems.

2.1 Specifications

Consult this section to learn about the physical characteristics of and equipment specifications for your machine.

NOTE:

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

	R113 SP	R116 SP
Frame and Structure		
Width (transport)	4063 mm (160 in.)	5027 mm (198 in.)
Weight: base machine and adapter frame	1364 kg (3007 lb.)	1495 kg (3297 lb.)
Weight: base machine, adapter frame, and steel conditioner	1850 kg (4079 lb.)	1982 kg (4369 lb.)
Weight: base machine, adapter frame, and polyurethane conditioner	1868 kg (4118 lb.)	1999 kg (4408 lb.)
Compatible windrowers	MacDon M155, M155 <i>E4</i> , M205, M1170, or M1240 Windrower	MacDon M155, M155 <i>E4</i> , or M1170 Windrower
Lighting	Left and righ	nt turn signals
Manual storage	Plastic case on hea	der right driveshield
Cutterbar		
Number of cutting discs	Eight	Ten
Blades per disc Two 18° bevel down		oevel down
Disc speed (full engine speed)	2500 rpm	
Blade max tip speed	80.5 m/s (180 mph)	
Effective cutting width	3978 mm (13 ft.)	4942 mm (16 ft. 2 in.)
Minimum cutting height	27 mm (1	1 1/16 in.)
Cutting angle range	g angle range 0–8° below horizontal	
Adjustable shoes	Standard	
Gear train protection	Shearpin (safecut)	
Converging Drums	Two-drum type	Four-drum type
Drives		•
Hydraulic motor	Piston type in	to 90° gearbox
Cutterbar	Direct drive throu univer	gh 90° gearbox and sal shaft
Conditioner drive	Belt drive (4HB) from 90)° gearbox to conditioner
Conditioner roll timing	Timing	gearbox

PRODUCT OVERVIEW

	R113 SP	R116 SP
Hay Conditioner Options		
Steel rolls	Optional	
Roll type	Steel on steel chevron conditioner rolls	
Roll length	3275 mm (129 in.)	
Roll diameter	229 mm (9.0 in.) / 179 mm (7.0 in.) OD tube	
Roll speed	1009 rpm	
Polyurethane rolls	Optional	
Roll type	Polyurethane intermeshing conditioner rolls	
Roll length	3275 mm (129 in.)	
Roll diameter	254 mm (10.0 in.) / 203 mm (8.0 in.) OD tube	
Roll speed	1009 rpm	
Swath width ¹	915–2540 mm (36–102 in.)	
Forming shields	Full width adjustable baffle on conditioner wit adjustable side deflectors on support frame	
No conditioner	Optional (includes rear curtain)	

^{1.} Actual swath width may vary based upon conditioner type, crop type, and crop volume.

2.2 Component Identification

Operating and maintaining the header requires understanding the names of its parts and their locations.



Figure 2.1: R1 SP Series – R113 SP Shown, R116 SP Similar

- A Front Curtains
- B C
- D Hose Support²
- G Center-Link Tube
- K Conditioner Rolls

- B Cutterbar Doors
- E Hydraulic Motor³
- H Hazard/Brake Lights
- L 8-Disc Cutterbar

- C Drive Shield (Left)
- F Hose Support
- J Disc Drum (Right)

^{2.} M155/M155E4 SP Windrower only

^{3.} M155/M155*E4* SP Windrower motor shown





A - Header Supports D - Rear Crop Baffle

B - Side Deflectors E - Adapter Frame C - Side Deflector Adjuster Handles F - Drive Shield

2.3 Definitions

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
Center-link	A hydraulic cylinder link between the header and machine used to change header angle
CGVW	Combined gross vehicle weight
Export header	Header configuration typical outside North America
FFFT	Flats from finger tight
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
GVW	Gross vehicle weight
Hard joint	A joint made with 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 windrower
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms
hp	Horsepower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
M Series Windrowers	MacDon M100, M105, M150, M155, M155 <i>E4</i> , M200, and M205 Windrowers
M1 Series Windrowers	MacDon M1170 and M1240 Windrowers
n/a	Not applicable
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
Nut	An internally threaded fastener that is designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings 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
R1 SP Series	MacDon R113 and R116 Rotary Disc Headers for windrowers
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
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 (Nm) or foot-pounds (lbf·ft)

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

PRODUCT OVERVIEW

Term	Definition
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees to achieve its final position
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 locking mechanism
Windrower	Power unit for a header

Chapter 3: Operation

Safely operating your machine requires familiarizing yourself with its capabilities.

3.1 Break-In Period

A brand-new machine must be operated gently when it is run for the first time.

After attaching the header to the windrower for the first time, operate the machine slowly for five minutes, watching and listening from the operator's 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.

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

NOTE:

Perform the items specified in 4.3.2 Break-In Inspections, page 117.

3.2 Daily Start-Up Check

Perform this procedure before operating the machine.

- Ensure that the windrower and the header are properly attached, all controls are in neutral, and the windrower brakes are engaged.
- Clear the area of bystanders, pets, etc. Keep children away from the machinery. Walk around the header confirm that no one is under, on, or close to it.
- Wear close-fitting clothing and protective shoes with slip-resistant soles. Have at hand any protective clothing and personal safety devices that MIGHT be necessary throughout the day. Don't take chances when it comes to safety.
- Remove any foreign objects from the machine. Clear any obstacles that might interfere with the operation of the machine.
- 1. Check the machine for leaks or any parts that are missing, broken, or not working correctly.

NOTE:

Use the proper procedure when searching for pressurized fluid leaks. For instructions, refer to 4.12.1 Checking Hydraulic Hoses and Lines, page 234.

- 2. Clean all lights and reflective surfaces on the machine, and check the lights to ensure that they are operating correctly.
- 3. Perform all daily maintenance procedures. For instructions, refer to 4.3.1 Maintenance Schedule/Record, page 114.
3.3 Engaging and Disengaging Header Safety Props

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

Refer to the relevant procedure for your windrower:

- For M1 Series Windrowers, refer to 3.3.1 Engaging and Disengaging Header Safety Props M1 Series Windrower, page 23
- For M Series Self-Propelled Windrowers, refer to 3.3.2 Engaging and Disengaging Header Safety Props M155, M155E4, or M205 Self-Propelled Windrower, page 24

3.3.1 Engaging and Disengaging Header Safety Props – M1 Series Windrower

Safety props are located on both header lift cylinders on the windrower. Engage the props any time you are going to work on or around a raised header. When engaged, safety props prevent a header from dropping suddenly if the lift system hydraulics lose pressure.

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

- 1. Start the engine.
- 2. Press HEADER UP switch (A) on the ground speed lever (GSL) to raise the header to its maximum height.

NOTE:

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

- a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
- b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.
- 3. Shut down the engine, and remove the key from the ignition.
- 4. Engage the safety props on both lift cylinders as follows:
 - a. Pull lever (A) toward you to release it, and then rotate it toward the header to lower the safety prop onto the cylinder.
 - b. Repeat the previous step for the opposite lift cylinder.

IMPORTANT:

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



Figure 3.1: Ground Speed Lever



Figure 3.2: Safety Prop Lever

- 5. Disengage the safety props on both lift cylinders as follows:
 - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
 - b. Repeat the previous step for the opposite cylinder.

NOTE:

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

Check to be sure all bystanders have cleared the area.

- 6. Start the engine.
- 7. Lower the header fully.
- 8. Shut down the engine, and remove the key from the ignition.



Figure 3.3: Safety Prop Lever

3.3.2 Engaging and Disengaging Header Safety Props – M155, M155*E4*, or M205 Self-Propelled Windrower

Safety props are located on both header lift cylinders on the windrower. Engage the props any time you are going to work on or around the header when it is raised. When engaged, safety props prevent a header from dropping suddenly if the lift system hydraulics lose pressure.

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.

- 1. Start the engine.
- 2. Press HEADER UP switch (A) on the ground speed lever (GSL) to raise the header to its maximum height.

NOTE:

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

- a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
- b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.



Figure 3.4: Ground Speed Lever

- 3. Engage the safety props on both lift cylinders as follows:
 - a. Pull lever (A) and rotate it toward the header to lower safety prop (B) onto the cylinder.
 - b. Repeat the previous step for the opposite lift cylinder.



Figure 3.5: Safety Prop

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. Disengage the safety props on both lift cylinders as follows:
 - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into vertical position.
 - b. Repeat the previous step for the opposite cylinder.
- 2. Start the engine.
- 3. Lower the header fully.
- 4. Shut down the engine, and remove the key from the ignition.



Figure 3.6: Safety Prop

3.4 Attaching Rotary Disc Header to Windrower

The procedure for attaching a rotary disc header to a windrower varies depending on the windrower model and how that windrower is equipped.

Proceed to the header attaching procedure that is suitable for your windrower:

- 3.4.1 Attaching Header to M1 Series Windrower, page 26
- 3.4.2 Attaching Header to M155, M155E4, or M205 Windrower Hydraulic Center-Link with Optional Self-Alignment, page 32
- 3.4.3 Attaching Header to M155, M155E4, M205 Windrower Hydraulic Center-Link without Optional Self-Alignment, page 37

3.4.1 Attaching Header to M1 Series Windrower

The procedure for attaching the header to an M1 Series Windrower varies depending on whether or not the self-aligning center-link is installed.

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. Shut down the engine, and remove the key from the ignition.
- 2. Locate hydraulic center-link (A).



Figure 3.7: Hydraulic Center-Link Location

3. **Hydraulic center-link without self-alignment:** Remove pin (A) and raise center-link (B) until the hook is above the attachment pin on the header. Replace pin (A) to hold the center-link in place.

IMPORTANT:

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



Figure 3.8: Hydraulic Center-Link and Pin

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

Check to be sure all bystanders have cleared the area.

5. Start the windrower engine. For instructions, refer to the windrower operator's manual.



Figure 3.9: Header Support

6. Lowering the header lift legs with a header or weight box attached: proceed to Step *10, page 28*.

Lowering the header lift legs without a header or weight box attached: fully release the tension in header float springs (A):

- If you are prompted by the Harvest Performance Tracker (HPT) to remove the float, then remove the float and proceed to Step *7, page 27*.
- If you are not prompted by the HPT to remove the float, then remove the float manually. For instructions, refer to the windrower operator's manual. Once the float is removed, proceed to Step *10, page 28*.

IMPORTANT:

When you are lowering the header lift legs without a header or a weight box attached to the windrower, ensure that the tension on the float springs is fully released in order to prevent damage to the header lift linkages.

- 7. Press rotary scroll knob (A) on the to highlight the QuickMenu options.
- Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B), and press the scroll knob to select it. The Float Adjust page appears.



Figure 3.10: Header Float Springs



Figure 3.11: HPT Display

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

NOTE:

If the header float is active, the icon at soft key 3 will display Remove Float; if the header float has been removed, then the icon will display Resume Float.

- 10. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract the header lift cylinders.
- 11. **Self-aligning hydraulic center-link:** Press REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

IMPORTANT:

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



Figure 3.12: HPT Display



Figure 3.13: GSL A - Reel Down C - Header Tilt Down E - Header Down

B - Reel Up D - Header Tilt Up

F - Header Up



Figure 3.14: Header Support

supports (B). Continue to drive slowly forward until the feet engage the supports and the header nudges forward.

13. Ensure feet (A) are properly engaged in supports (B).

12. Drive the windrower slowly forward until feet (A) enter

- 14. Windrowers equipped with the self-aligning center-link kit:
 - a. Adjust the position of center-link cylinder (A) with the switches on the GSL until hook (B) is above the header attachment pin.

IMPORTANT:

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

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

15. Windrowers without the self-aligning center-link kit:

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

IMPORTANT:

The hook release must be down to enable the selflocking mechanism. If the hook release is open i.e. is in the up position, manually push it down after the hook engages the pin.

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

DANGER

Check to be sure all bystanders have cleared the area.

e. Start the engine.



Figure 3.15: Hydraulic Center-Link



Figure 3.16: Hydraulic Center-Link

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

NOTE:

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

- a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
- b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.
- 17. Shut down the engine, and remove the key from the ignition.
- 18. Engage the safety props on both lift cylinders as follows:
 - a. Pull lever (A) toward you to release it, and then rotate it toward the header to lower the safety prop onto the cylinder.
 - b. Repeat the previous step for the opposite lift cylinder.

IMPORTANT:

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

19. Install clevis pin (A) through the support and the windrower lift arm and secure it with hairpin (B). Repeat this step for the opposite side of the header.

IMPORTANT:

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



Figure 3.17: GSL



Figure 3.18: Safety Prop Lever



Figure 3.19: Header Support

- 20. Disengage the safety props on both lift cylinders as follows:
 - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
 - b. Repeat the previous step for the opposite cylinder.

NOTE:

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



Figure 3.20: Safety Prop Lever

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

NOTE:

If you are not prompted by the HPT display to restore the float, restore the float manually.

22. Shut down the engine, and remove the key from the ignition.



Figure 3.21: GSL

3.4.2 Attaching Header to M155, M155*E*4, or M205 Windrower – Hydraulic Center-Link with Optional Self-Alignment

The procedure for attaching the header to an M Series Windrower varies depending on whether or not the self-aligning center-link is installed.

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. Shut down the engine, and remove the key from the ignition.
- 2. Locate header supports (A) on the rear of the header.



Figure 3.22: Header Supports – R113 SP



Figure 3.23: Header Support

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

 Remove the float engagement pin from hole (A) to disengage the float springs, and insert the float engagement pin into storage hole (B). Secure the pin with the lynch pin. Repeat this step for the opposite linkage.

IMPORTANT:

DANGER

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

Check to be sure all bystanders have cleared the area.

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



Figure 3.24: Float Linkage



Figure 3.25: Ground Speed Lever

6. Press REEL UP switch (A) 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 3.26: Ground Speed Lever

cylinders.

7. Slowly drive the windrower forward until windrower feet (A) enter header supports (B). Continue driving slowly forward until the feet engage the supports and the header is nudged forward.



Figure 3.27: Header Support



Figure 3.28: Ground Speed Lever



Figure 3.29: Hydraulic Center-Link

- 8. Use the following GSL functions to position the center-link hook above the header attachment pin:
 - REEL UP (A) to raise the center-link
 - REEL DOWN (B) to lower the center-link
 - HEADER TILT UP (C) to retract the center-link
 - HEADER TILT DOWN (D) to extend the center-link

IMPORTANT:

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

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

IMPORTANT:

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

- Lower center-link (A) onto the header with the REEL DOWN switch until the center-link locks into position and hook release (B) is down.
- 11. Check that the center-link is locked onto the header by pressing the REEL UP switch on the GSL.

Check to be sure all bystanders have cleared the area.

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

NOTE:

It may be necessary to repeat this procedure if there is air in the system.

- 14. Engage the safety props on both lift cylinders:
 - a. Shut down the engine, and remove the key from the ignition.
 - b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.
 - c. Repeat the previous steps for the opposite lift cylinder.



Figure 3.30: Ground Speed Lever



Figure 3.31: Safety Prop

15. Install clevis pin (A) through the support and the windrower lift member, and secure it with hairpin (B). Repeat this step for the opposite side of the machine.

IMPORTANT:

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

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

- 17. Disengage the safety prop by turning lever (A) downwards until the lever locks into vertical position.
- 18. Repeat the previous step for the opposite safety prop.



Figure 3.32: Header Support



Figure 3.33: Header Float Linkage



Figure 3.34: Safety Prop Lever

Check to be sure all bystanders have cleared the area.

- 19. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
- 20. Stop the engine, and remove the key from the ignition.



Figure 3.35: Ground Speed Lever

3.4.3 Attaching Header to M155, M155*E*4, M205 Windrower – Hydraulic Center-Link without Optional Self-Alignment

Attaching the header to an M155, M155*E*4, or M205 Windrower without a non-self-aligning center link requires manual adjustment of the center-link.

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. Shut down the engine, and remove the key from the ignition.
- 2. Locate header supports (A) on the rear of the header.



Figure 3.36: Header Supports - R113 SP

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

4. To disengage the float springs, move the float engagement pin from engaged position (A) and insert the pin into storage hole (B). Secure the float engagement pin with a lynch pin. Repeat this step for the opposite linkage.

IMPORTANT:

To avoid damaging the lift system when lowering the header lift linkages without a header or a weight box attached, ensure that the float engagement pin is installed in storage position (B) and **NOT** in engaged position (A).



Figure 3.37: Header Support



Figure 3.38: Header Float Linkage

Check to be sure all bystanders have cleared the area.

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



Figure 3.39: Ground Speed Lever

6. Remove pin (A) from the frame linkage and raise centerlink (B) until the hook is above the attachment pin on the header. Replace pin (A) to hold the center-link in place.

IMPORTANT:

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

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

- 8. Use the following GSL functions to position the center-link hook above the header attachment pin:
 - HEADER TILT UP (A) to retract the center-link
 - HEADER TILT DOWN (B) to extend the center-link
- 9. Stop the engine, and remove the key from the ignition.



Figure 3.40: Hydraulic Center-Link



Figure 3.41: Header Support



Figure 3.42: Ground Speed Lever

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

IMPORTANT:

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

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



Figure 3.43: Hydraulic Center-Link



Figure 3.44: Ground Speed Lever



Check to be sure all bystanders have cleared the area.

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

NOTE:

It may be necessary to repeat this procedure if there is air in the system.

- 15. Engage the safety props on both lift cylinders:
 - a. Shut down the engine, and remove the key from the ignition.
 - b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.
 - c. Repeat the previous steps for the opposite lift cylinder.



Figure 3.45: Safety Prop

16. Install clevis pin (A) through the support and the windrower lift member, and secure it with hairpin (B). Repeat this step for the opposite side of the machine.

IMPORTANT:

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



Figure 3.46: Header Support

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



19. Repeat the previous step for the opposite safety prop.



Figure 3.47: Header Float Linkage



Figure 3.48: Safety Prop Lever

DANGER

Check to be sure all bystanders have cleared the area.

- 20. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
- 21. Stop the engine, and remove the key from the ignition.



Figure 3.49: Ground Speed Lever

3.4.4 Attaching Hydraulic and Electrical Components

The procedure for attaching the header hydraulic and electrical components depends on the windrower model.

NOTE:

Headers are factory-configured for either M Series or M1 Series windrowers. M1-configured headers have a bent-axis motor while M-configured headers are fitted with an in-line motor.

NOTE:

Hydraulic conversion kits are needed to convert a header configured for operating with an M1 Series Windrower so that it can work with an M Series windrower, and vice versa. Contact your MacDon Dealer for more information.

Refer to the relevant hydraulic and electrical attachment procedure:

- Connecting Header Hydraulics and Electrical Components M1 Series Windrowers, page 43
- Connecting Header Hydraulic and Electrical Components M155 or M155E4 Windrower, page 48
- Connecting Header Hydraulics and Electrical Components M205 Self-Propelled Windrower, page 55

Connecting Header Hydraulics and Electrical Components – M1 Series Windrowers

Ensure that the hydraulic hoses and electrical harness are routed so that they do not interfere with any moving parts, and so that they are not damaged by rubbing.

NOTE:

A hydraulic drive kit (MD #B6845) is required for an R1 header configured for use with an M155 or M155*E4* Windrower in order for it to operate correctly with an M1 Series Windrower. To order this kit, contact your MacDon Dealer.



Figure 3.50: Hydraulic Drive Kit (MD #B6845)



Figure 3.51: Low Pressure Case Drain Kit (MD #B6698)

NOTE:

When connecting the R113 SP to an M1240 windrower, Low Pressure Case Drain kit (A) (MD #B6698) must be installed onto the M1240. This kit contains an alternative case drain line which is routed directly to the hydraulic reservoir via a special set of 1/2 in. hydraulic couplers.

- Move the windrower's left platform to the OPEN position. Refer to your windrower operator's manual for instructions.
- 2. Retrieve the hydraulic hoses from the header.



Figure 3.52: Windrower Left Platform Open – M1240 Shown



Figure 3.53: Hose Support Attachment

3. Attach hose support (A) to the windrower frame near the left leg, and route the hose bundle under the frame.

NOTE:

Route the hydraulic hoses as straight as possible while avoiding rub or wear points that could damage the hoses.

- 4. Rest the hose bundle routed from the windrower on header hose support (A).
- 5. If necessary, use a clean rag to remove any dirt and moisture from the couplers.



Figure 3.54: Hose Support



Figure 3.55: Header Drive Motor Hydraulic Connections

- 6. Connect the header hydraulic hoses and electrical harness as follows:
 - a. Connect the pressure hose to receptacle (A).
 - b. Connect the return hose to receptacle (B).
 - c. Connect the case drain hose to receptacle (C).
 - d. Connect the electrical harness to windrower electrical harness (D).

- 7. **M1170 Windrowers:** Connect the hydraulic hoses and the electrical harness to receptacles on the windrower as follows:
 - a. Connect the pressure hose to receptacle (A).
 - b. Connect the return hose to receptacle (B).
 - c. Connect the case drain hose to receptacle (C).
 - d. Connect the electrical harness to receptacle (D).

NOTE:

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



Figure 3.56: M1170 Hydraulic and Electrical Connections

- 8. **M1240 Windrowers:** Connect the hydraulic hoses and electrical harness to the receptacles on the windrower. Refer to the illustration which describes the configuration of your windrower.
 - a. Connect the pressure hose to receptacle (A).
 - b. Connect the return hose to receptacle (B).
 - c. Connect the case drain hose non-flat face coupler to receptacle (C).

NOTE:

The R113 SP, when attached to an M1240 Windrower, requires a different set of low-pressure case drain couplers; these have a different hose connection to the hydraulic fluid reservoir.

d. Connect the electrical harness to receptacle (D).

NOTE:

The hydraulic hoses should have enough slack to pass by multicoupler (E) in Figure 3.57, page 47 without coming into contact with it. This will protect the hoses from rubbing against the multicoupler and becoming damaged. You can increase the slack in the hoses by loosening and adjusting the hose holder on the front windrower leg and pulling the hoses backward toward the windrower.

NOTE:

The 1/2 in. flat-faced coupler for case drain (E) in Figure 3.58, page 47 is **NOT** suitable for the R113/R116 SP.

9. Close the windrower's left side platform. For instructions, refer to the windrower operator's manual.



Figure 3.57: M1240 Hydraulic and Electrical Connections – Draper Ready Configuration



Figure 3.58: M1240 Hydraulic and Electrical Connections – Disc Ready Configuration

Connecting Header Hydraulic and Electrical Components – M155 or M155E4 Windrower

Ensure that the hydraulic hoses and electrical harness are routed so that they do not interfere with any moving parts, and so that they are not damaged by rubbing.

NOTE:

Hydraulic drive kit (A) (MD #B6272) is required for an R1 Series Rotary Disc Header to operate correctly on M155 and M155*E4* Self-Propelled Windrowers. To order this kit, contact your MacDon Dealer.



Figure 3.59: Hydraulic Drive Kit (MD #B6272)

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



Figure 3.60: Hose Bundle

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



Figure 3.61: Hose Bundle



Figure 3.62: Hose Support

4. Position the hose support so that lower bolt (A) is in the forward hole as shown. Loosen both bolts and adjust them as required.

5. Move the windrower's left platform (A) to the OPEN position. Refer to your windrower operator's manual for instructions.



Figure 3.63: Windrower Left Platform in Open Position



Figure 3.64: Hose Bundle

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

NOTE:

Keep the hoses as straight as possible. Do not allow the hoses to rub against other parts.

7. Route pressure hose (C) from the header through support (B) to the windrower.

8. Connect pressure hose (A) routed from the header to the hydraulic coupler at port M2 (B) on the windrower's auxiliary disc drive manifold (the middle valve block).



Figure 3.65: Hydraulic Connections



Figure 3.66: Hydraulic Connections

- 9. Remove the caps and plugs from the hoses on the windrower and from the lines on the header.
- 10. Connect pressure hose (B) from port M1 (C) on the windrower's drive manifold to the female coupler at the steel line attached to port (A) on the header motor.

 Connect return hose (A) from port R1 (C) on the windrower's drive manifold to the coupler on steel line (B) attached to the aft port on the header motor.



Figure 3.67: Hydraulic Connections



Figure 3.68: Windrower Hose Connections with Reverser

NOTE:

If the windrower is equipped with reverser manifold (A) for an auger header, route return hose (B) from port R1 (D) on the windrower's reverser manifold to steel line (C) attached to the aft port on the header motor. Connect case drain hose (A) from lift manifold port T3 (C) to the 1/2 in. female coupler at the bulkhead, which is attached to motor port (B).



Figure 3.69: Hydraulic Connections



Figure 3.70: Electrical Connection

13. Connect electrical harness (A) from the windrower to electrical connector (B) on the header.

- 14. Lower and lock lever (A).
- 15. Secure hose (B) with three adjustable straps (C).

16. Move platform (A) to the CLOSED position.



Figure 3.71: Hose Bundle



Figure 3.72: Top View of Windrower

Connecting Header Hydraulics and Electrical Components – M205 Self-Propelled Windrower

Ensure that the hydraulic hoses and electrical harness are routed so that they do not interfere with any moving parts, and so that they are not damaged by rubbing.

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

IMPORTANT:

The M205 Self-Propelled Windrower requires a compatibility kit (MD #257188) to connect to the R113 Rotary Disc Header. The R113 SP must be reconfigured before the kit is installed.

- If the header does not have a hydraulic motor, install the Hydraulic Drive kit (MD #B6845) before proceeding.
- If the header is configured to operate with an M155E4 windrower, remove the hydraulic motor from the rotary disc header and install the M1170 Compatibility kit (MD #B6845). However, do NOT reposition the conditioner drive speed sensor on the rotary disc header as described in the M1170 Compatibility kit instructions.



Figure 3.73: M205 Compatibility Kit (MD #257188)



Figure 3.74: Hose Routing from Header to Windrower

1. Route header hose bundle (A) from the header over support (B) and under the windrower frame. Insert the pin on hose support (C) into hole (D) in the windrower frame near the left leg.

IMPORTANT:

Route the hydraulic hoses as straight as possible while avoiding wear points that could damage the hoses.

OPERATION

NOTE:

The pressure hose crosses on top of the return hose once it is routed past support (B).

- 2. Proceed according to the type of hydraulic couplers or fittings used on the M205:
- If the M205 is equipped with quick couplers (A) to connect to the header, proceed to *Connecting R113 Rotary Disc Header Hydraulics M205 Self-Propelled Windrower with Quick Couplers, page 57*



Figure 3.75: Pressure and Return Steel Lines with Quick Couplers – Left Side of Windrower



Figure 3.76: Pressure and Return Steel Lines with Union Fittings – Left Side of Windrower



Figure 3.77: Pressure and Return Steel Lines with Plugs – Left Side of Windrower

• If the M205 uses union fittings (A) instead of quick couplers to connect to the header, remove union fittings (A) from the steel lines, and proceed to *Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers, page 59*

 If the M205 has plugs (A) installed in the steel lines, then proceed to Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers, page 59

Connecting R113 Rotary Disc Header Hydraulics - M205 Self-Propelled Windrower with Quick Couplers

Ensure that the couplers are fully mated when connecting the R113 Rotary Disc Header to an M205 Self-Propelled Windrower with hydraulic quick couplers.

1. Locate pressure and return hydraulic hoses (A) on the left side of the header.

2. Install female coupler (A) onto header pressure hose (B).

3. Install male coupler (C) onto header return hose (D).



Figure 3.78: Pressure and Return Hoses – R113 SP



Figure 3.79: M205 equipped with Quick Couplers

4. Connect pressure coupler (A) to inboard steel line coupler (B).

NOTE:

For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.

5. Connect return coupler (D) to outboard steel line coupler (E).

NOTE:

For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.

6. Close coupler lock assembly (G) over the couplers and secure it with pin (H).



Figure 3.80: Header Pressure and Return Connections



Figure 3.81: Quick Couplers – View from Top

7. Confirm that the quick couplers are connected properly.

IMPORTANT:

The couplers will restrict the flow of oil if they are not fully mated (O-ring [A] will be visible). Restricting the flow of oil causes excessive heat build up, which can damage the drive components and the couplers themselves. Couplers (B) are fully mated, and couplers (C) at right are not fully mated.
- 8. Connect case drain hose (A) to 1/2 in. male flat face fitting (B).
- 9. Secure the case drain hose to the coupler lock assembly with two clamps (C).
- 10. Open the left driveshield. For instructions, refer to 3.6.1 *Opening Driveshields, page 80*.



Figure 3.82: Case Drain Connection



Figure 3.83: Speed Sensor

Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers

The hydraulic hoses on the header will need union fittings installed before they can be connected to an M205 Self-Propelled Windrower.

1. Locate pressure and return hydraulic hoses (A) on the left side of the header.



Figure 3.84: Pressure and Return Hoses – R113 SP

- 11. Ensure that the speed sensor is installed correctly for the windrower; use top hole (A) for the M205 Windrower.
- 12. Close the left endshield. For instructions, refer to *3.6.2 Closing Driveshields, page 81.*

- 2. Install union fitting (A) onto header pressure hose (B).
- 3. Install union fitting (C) onto header return hose (D).



NOTE:

For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.

5. Connect the **RETURN** hose with union fitting (D) to outboard steel line (E).

NOTE:

For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.

- 6. Connect case drain hose (G) to 1/2 in. male flat face fitting (H).
- 7. Open the left driveshield. For instructions, refer to *3.6.1 Opening Driveshields, page 80*.



Figure 3.85: Header Hoses and Union Fittings



Figure 3.86: Header Hydraulic Connections – Left Side of Windrower

- 8. Ensure that the speed sensor is installed correctly for the windrower; use top hole (A) for the M205 Windrower.
- 9. Close the left endshield. For instructions, refer to *3.6.2 Closing Driveshields, page 81.*



Figure 3.87: Speed Sensor

Connecting R113 Rotary Disc Header Electrical Components – M205 Self-Propelled Windrower

The adapter harness and the power limiter harness on the R113 must be connected to the M205's electrical system.

1. If your windrower is equipped with a draper/auger header drive, disconnect the hose bundle connectors (not shown) from the chassis harness connectors labeled HC-2 (A) and HC-1 (B).

NOTE:

If the windrower was connected to an R80 or R85 rotary disc header, the header will have been disconnected from the chassis harness when the header was detached from the windrower.

- 2. Connect the adapter harness as follows:
 - Connect 8-pin female connector (C) to chassis harness connector HC-2 (A).
 - Route the harness between the frame channel and protrusion (D) (shown partly cutoff), and on top of the front axle.
 - Connect 29-pin round male connector (E) to R113 header connector (F).



Figure 3.88: Adapter Harness Installation

3. Disconnect 4-pin female piston pump connector (A) from header pump relay harness (B).



Figure 3.89: Piston Pump

OPERATION



Figure 3.90: Power Limiter Harness Installation

- 4. Connect the power limiter harness (MD #256651) as follows:
 - Connect 4-pin male connector (A) to piston pump (B).
 - Connect 4-pin female connector (C) to header pump relay harness (D).
 - Route the power wire with terminal (F) through frame channel hole (E) and connect it to bus bar stud (G) beside the battery. Tighten the terminal nut to 11 Nm (100 lbf·in).
 - Secure the harness to chassis harness (H) using cable ties (J)

NOTE:

The locations of module (K) and fuse (L) are approximate.

- 5. Confirm that the power limiter harness is functional by checking the red LED light on module (A):
 - If the light is solid, then the harness is functioning correctly.
 - If the light is flashing, then the connection is incorrect. These are the possible causes of an incomplete connection:
 - The power supply might be reversed.
 - The polarity of the 4-pin connections to the header pump relay harness or to the piston pump might be reversed.
- 6. Confirm that the adapter harness is functional:
 - Depending on the cab display module (CDM) software version, the header ID might appear as "Disc" when the engine is started, or else binary code "0001" might appear in the upper right portion of the HEADER CUT WIDTH screen. Both of these header IDs are correct.
 - Confirm that the four-way hazard lights and turn signals operate correctly.



Figure 3.91: Power Limiter Harness Module

3.5 Detaching Header from Windrower

Detach the header when replacing the header with a different one or when storing the header.

3.5.1 Detaching Header from M1 Series Windrower

Detaching an R1 Series header from an M1 Series windrower requires removing the electrical and hydraulic connections, detaching the header supports, and releasing the center link.

DANGER

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

Check to be sure all bystanders have cleared the area.

- 1. Start the engine.
- 2. Press switch (A) to raise the header to its maximum height.
- 3. Shut down the engine, and remove the key from the ignition.



Figure 3.92: GSL

- 4. Engage the safety props on both lift cylinders as follows:
 - a. Pull lever (A) toward you to release it, and then rotate it toward the header to lower the safety prop onto the cylinder.
 - b. Repeat the previous step for the opposite lift cylinder.

IMPORTANT:

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



Figure 3.93: Safety Prop Lever

OPERATION

5. Open the left platform on the windrower. For instructions, refer to the windrower operator's manual.



Figure 3.94: Left Platform Open – M1240 Windrower



Figure 3.95: Header Drive Hydraulics

6. Disconnect electrical harness (A) and hydraulic hoses (B), (C), and (D) from the windrower.

7. Remove hose support (A) and the hose bundle from the windrower frame.



Figure 3.96: Hoses on Windrower



Figure 3.97: Hose Storage Position

8. Slide support (A) into center-link support (B) and secure it with hardware (C).

9. Store hoses (A) and electrical harness (B) disconnected from the windrower in Step *6, page 66* into storage plate (C).

NOTE:

Install caps and plugs on open lines to prevent the buildup of dirt and debris while the header is in storage.

NOTE:

Some parts have been removed from the illustration for the sake of clarity.

Figure 3.98: Hydraulic Storage Plate



Figure 3.99: Header Supports

10. Remove hairpin (B) from clevis pin (A). Remove the clevis pin from header support (C) on each side of the header.

11. Windrowers WITH center-link self-alignment kit: Release center-link latch (A).



Figure 3.100: Center-Link



Figure 3.101: Safety Prop Lever

- 12. Disengage the safety props on both lift cylinders as follows:
 - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
 - b. Repeat the previous step for the opposite cylinder.

NOTE:

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

13. Repeat for the opposite side.

DANGER

Check to be sure all bystanders have cleared the area.

- 14. Start the engine.
- 15. Remove the header float when prompted by the Harvest Performance Tracker (HPT).

NOTE:

If you are not prompted by the HPT to remove the float, remove the float manually.

- 16. Lower the header fully.
- 17. Use HEADER TILT cylinder switches (A) on the GSL to release the load on the center-link cylinder.
- 18. Windrowers WITH center-link self-alignment kit: Operate the link lift cylinder with REEL UP switch (B) to disengage the center-link from the header. Proceed to step 22, page 70.



Figure 3.102: GSL

- 19. Windrowers WITHOUT center-link self-alignment kit: Shut down the engine, and remove the key from the ignition.
- 20. Windrowers WITHOUT center-link self-alignment kit: Lift hook release (A) and lift hook (B) off of the header pin.

Check to be sure all bystanders have cleared the area.

22. Back the windrower slowly away from the header.

23. Reinstall clevis pin (A) through support (C) and secure it with hairpin (B). Repeat this step for opposite side.

21. Windrowers WITHOUT center-link self-alignment kit: Start the engine. For instructions, refer to the windrower operator's manual.



Figure 3.103: Hydraulic Center-Link



Figure 3.104: Header Support

3.5.2 Detaching Header from M155 or M155E4 Self-Propelled Windrower

Detaching an R1 Series Rotary Disc Header from an M155 or M155*E4* Self-Propelled Windrower involves removing the electrical and hydraulic connections and then following the detaching procedure in the windrower operator's manual.

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 the ground. If the ground is soft, place blocks under the header.
- 2. Stop the engine, and remove the key from the ignition.

3. Move left platform (A) to the open position.



Figure 3.105: Windrower Left Side Platform

4. Disconnect hose (A) from port M2 on the disc drive valve.



Figure 3.106: Hydraulic Connections

- 5. Raise lever (A) and undo three cinch straps (C).
- 6. Move hose (B) so that it can be stored on the header.



Figure 3.107: Hose Bundle

- 7. Disconnect the following hoses from the hydraulic motor:
 - Pressure hose (A)
 - Return hose (B)
 - Case drain hose (C)
- 8. Install caps on the connectors and on the hose ends to prevent the buildup of dirt and debris.



Figure 3.108: Hose Bundle

9. Disconnect electrical connector (A) by turning the collar counterclockwise and pulling on the connector.

NOTE:

The hydraulic lines and hoses in the illustration have been hidden in order to show the electrical connection.



Figure 3.109: Electrical Connection

- 10. Move the hose bundle from the header to left hose support (B).
- 11. Rotate lever (A) clockwise and push it forward so that it engages with the bracket.
- 12. Route the electrical harness through hose support (B) and attach a cap to electrical connector (C).



Figure 3.110: Hose Bundle

- 13. Move windrower platform (A) to the CLOSED position.
- 14. Refer to the windrower operator's manual for instructions on how to mechanically detach the header from the windrower.



Figure 3.111: M155 Windrower

3.5.3 Detaching Header from M205 Windrower

The procedure for detaching your R113 SP Rotary Disc Header from an M205 Windrower will depend on whether or not the windrower is equipped with hydraulic quick couplers.

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 the ground. If the ground is soft, place blocks under the header.
- 2. Stop the engine, and remove the key from the ignition.

- 3. Move left platform (A) to the open position.
- 4. To disconnect an R113 SP from an M205 Windrower equipped with quick couplers, refer to *Disconnecting Header Hydraulics M205 Self-Propelled Windrower with Quick Couplers, page 75.*
- 5. To disconnect an R113 SP from an M205 Windrower not equipped with quick couplers, refer to *Disconnecting Header Hydraulics M205 Self-Propelled Windrower without Quick Couplers, page 76.*



Figure 3.112: Windrower Left Side Platform

Disconnecting Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers

Quick couplers allow for Operators to disconnect the header's hydraulic lines from the windrower without tools.

- 1. Disconnect case drain hose (A) from 1/2 in. male flat face fitting (B).
- 2. Remove two clamps (C) securing the case drain hose to the coupler lock assembly.



Figure 3.113: Case Drain Connection

- 3. Disconnect **PRESSURE** coupler (A) from inboard steel line coupler (B).
- 4. Disconnect **RETURN** coupler (C) from outboard steel line coupler (D).
- 5. Remove pin (E) and open coupler lock assembly (F) over the couplers.
- Disconnect the electrical connectors. For instructions, refer to Disconnecting Header Electrical System – M205 Self-Propelled Windrower, page 77.



Figure 3.114: Header Pressure and Return Connections

Disconnecting Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers

Disconnecting the header's hydraulic hoses from a windrower not fitted with quick couplers will require the use of wrenches.

1. Disconnect the **PRESSURE** hose with union fitting (A) from inboard steel line (B).

NOTE:

For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.

2. Disconnect the **RETURN** hose with union fitting (D) from outboard steel line (E).

NOTE:

For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.

- 3. Disconnect case drain hose (G) from 1/2 in. male flat face fitting (H).
- 4. Disconnect the electrical connectors. For instructions, refer to Disconnecting Header Electrical System – M205 Self-Propelled Windrower, page 77.



Figure 3.115: Header Hydraulic Connections

Disconnecting Header Electrical System – M205 Self-Propelled Windrower

The procedure for disconnecting an R113 Rotary Disc Header from an M205 Self-Propelled Windrower differs depending on whether or not you are simply swapping the header or storing it long-term.

IMPORTANT:

Ensure that module (E) is disconnected at header pump relay harness (D) when operating with any other header.

Disconnect the following when switching headers:

- 1. Disconnect the power limiter harness:
 - Disconnect 4-pin male connector (A) from piston pump (B).
 - Disconnect 4-pin female connector (C) from header pump relay harness (D).



Figure 3.116: Power Limiter Harness Removal

2. Disconnect 4-pin female piston pump connector (A) from header pump relay harness (B).



Figure 3.117: Piston Pump

- 3. Disconnect the adapter harness:
 - Disconnect 8-pin female connector (B) from chassis harness connector HC-2 (A).
 - Disconnect 29-pin round male connector (C) from R113 SP header connector (D).
- 4. Proceed to Step 6, page 79.



Figure 3.118: M205 Adapter Harness



Figure 3.119: M205 Adapter Harness

 Disconnect the following when storing or servicing headers: Disconnect 29-pin round male connector (A) from R113 SP header connector (B).



Figure 3.120: Detaching Header Hose from Windrower

- 6. Remove hose support pin (B) from hole (C) in the windrower frame.
- 7. Place header hose bundle (A) on top of the rotary disc header.

3.6 Driveshields

Driveshields protect people from rotating belts and drives. The header has two driveshields: one on the left side, and one on the right side.

3.6.1 Opening Driveshields

The driveshields protect sensitive components from damage. Open them only when you intend to service the header.

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure apply to the left driveshield; the right driveshield is similar.



Figure 3.121: Left Driveshield

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Remove lynch pin (A) and tool (B) from pin (C).



Figure 3.122: Left Driveshield

3. Insert the flat end of tool (A) into latch (B) and turn it counterclockwise to unlock the driveshield.

4. Pull the top of driveshield (A) away from the header

For improved access, lift the driveshield off of the pins at the base of the shield, and lay the shield on the header.



Figure 3.123: Driveshield Latch



Figure 3.124: Left Driveshield

3.6.2 Closing Driveshields

Close the driveshields when your maintenance or repair tasks are complete.

to open it.

NOTE:

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure apply to the left driveshield; the right driveshield is similar.

- 1. Position the driveshield the onto pins, if necessary.
- 2. Push driveshield (A) to engage latch (B).
- 3. Ensure that the driveshield is properly secured.



Figure 3.125: Left Driveshield



Figure 3.126: Left Driveshield

4. Replace tool (B) and lynch pin (A) onto pin (C).

3.7 Cutterbar Doors

Two doors with rubber curtains provide access to the cutterbar area.

To reduce the risk of personal injury and machine damage, do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition. Objects in the path of the blades can be ejected with considerable force when the machine is started.

Rotary disc headers sold outside of North America have latches on cutterbar doors (A).

Curtains (B) and (C) are attached to each front corner and at the center respectively. Always keep the curtains lowered when operating the rotary disc header.

IMPORTANT:

Replace the curtains if they become worn or damaged. For instructions, refer to *4.9 Maintaining Curtains, page 200*.



Figure 3.127: Cutterbar Doors and Curtains – R113 SP Shown, R116 SP Similar

3.7.1 Opening Cutterbar Doors – North America

Opening the cutterbar doors on North American models is a simple procedure; ensure that the machine is shut down before you attempt it.

If the machine was sold outside of North America, it will have export-style latches. For instructions, refer to 3.7.2 Opening Cutterbar Doors – Export Latches, page 84.

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. Shut down the engine, and remove the key from the ignition.

2. Lift up doors (A) at the front of the machine.



Figure 3.128: Cutterbar Doors and Curtains – R113 SP Shown, R116 SP Similar

3.7.2 Opening Cutterbar Doors – Export Latches

Machines sold outside North America have a tool-operated latch on the cutterbar doors.

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. Shut down the engine, and remove the key from the ignition.
- 2. Locate latch access holes (A) for each door.



Figure 3.129: Cutterbar Door Latch Access Hole – Export Only

3. Use a rod or screwdriver to press down on latch (A) to release the cutterbar door.



Figure 3.130: Cutterbar Door Latch – Cutaway View



Figure 3.131: R113 SP Cutterbar Doors Shown, R116 SP Similar

4. Lift up on doors (A) while pressing down on the latch.

3.7.3 Closing Cutterbar Doors

Do not operate the machine without closing the cutterbar doors.

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

- 1. Pull down on door (A) from the top to close.
- 2. Ensure that the curtains hang properly and completely enclose the cutterbar area.



Figure 3.132: Cutterbar Doors and Curtains

3.8 Header Settings

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

Correct operation of the machine reduces crop loss and increases productivity. Proper adjustments and timely maintenance extend the service life of the machine.

The variables listed in the following table and detailed in this manual affect the performance of the rotary disc header. Most of these variables have been set at the factory, but these variables can be changed to suit the cutting conditions.

Table 3.1 Header Operating Variables

Variable	Refer to
Cutting height	3.8.1 Cutting Height, page 87
Cutterbar angle	3.8.2 Cutterbar Angle, page 89
Float	3.8.3 Header Float, page 90
Ground speed	3.8.4 Ground Speed, page 90
Crop stream configuration	3.9 Reconfiguring Cutterbar Crop Stream, page 92
Conditioner settings	3.10 Conditioner, page 95
Cutterbar deflectors	3.11 Cutterbar Deflectors, page 105

3.8.1 Cutting Height

Cutting height is determined by a combination of the cutterbar angle and skid shoe settings. Adjust the cutting height for optimum cutting performance while preventing excessive build-up of mud and soil inside the rotary disc header, which can lead to poor crop flow and increased wear on cutting components.

Lowering the skid shoes and decreasing the cutterbar angle increases the cutting height, resulting in higher stubble that helps material dry faster. This may be desirable in stony conditions to help reduce damage to cutting components.

Raising the skid shoes and increasing the cutterbar angle decreases the cutting height, resulting in a shorter stubble. For instructions, refer to *Adjusting Cutting Height, page 88*.

To choose a cutterbar angle that maximizes performance for your crop and field conditions, refer to 3.8.2 Cutterbar Angle, page 89.

To minimize cutterbar damage, scooping soil, and soil build-up at the cutterbar in damp conditions, the float should be set as light as possible without causing excessive bouncing. For instructions, refer to 3.8.3 Header Float, page 90.

Adjusting Cutting Height

Lowering the skid shoes and decreasing the cutterbar angle increases the cutting height, resulting in taller stubble that helps material dry faster. Raising the skid shoes and increasing the cutterbar angle decreases the cutting height, resulting in shorter stubble.

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

NOTE:

There are two skid shoes on the R113 SP, and four on the R116 SP.

- 1. Raise the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Loosen bolts (C).
- 5. Remove bolts, nuts, and washers (D).
- 6. Raise or lower the skid shoe.

NOTE:

Skid shoes have two adjustment settings: fully raised (A) and fully lowered (B).

- 7. Install bolts, nuts, and washers (D).
- 8. Tighten bolts (C).
- 9. Adjust the cutterbar angle to the desired working position. If the angle is not critical, set it to the mid-position. For instructions, refer to *3.8.2 Cutterbar Angle, page 89*.
- 10. Check the header float. For instructions, refer to the windrower operator's manual.



Figure 3.133: Skid Shoes – R113 SP



Figure 3.134: Skid Shoes - R116 SP

3.8.2 Cutterbar Angle

Cutterbar angle (sometimes called header angle) is the angle at which the cutterbar approaches the crop relative to the ground. It is one of the variables which impact cutting height and quality.

The cutterbar angle (A) adjustment ranges from 0° to 8° below the horizontal plane. Choose an angle that maximizes the performance of the machine for your crop and field conditions. A flatter angle provides better clearance in stony conditions, while a steeper angle is required in lodged crops for better lifting action.

Check the float after significantly adjusting the cutterbar angle. Adjusting the cutterbar angle affects the header float, because the header's center of gravity shifts when the cutterbar angle is changed. Refer to your windrower operator's manual for instructions.



Figure 3.135: Cutterbar Angle

OPERATION

3.8.3 Header Float

The header float feature allows the header to closely follow the contours of the ground and respond quickly to changes in elevation or obstacles. The ideal float setting is the one where the cutterbar is on the ground and is able to cut with minimal header bouncing, and without scooping or pushing soil.

The M1 Series, M155, M155*E4*, and M205 Windrowers have different float adjustments. Although they all have float springs, the M1 Series are completely adjustable from the cab through the Harvest Performance Tracker (HPT). By contrast, for the M155, M155*E4*, and M205 windrowers, operators can make coarse adjustments to the float at the spring drawbolt, and can make fine adjustments through the Cab Display Module (CDM) in the windrower cab.

IMPORTANT:

- Set the header float to as light a setting as possible, though not so light that the header bounces frequently. This will reduce the chances of damage to knife components, and will prevent the header from scooping soil when cutting. It will also reduce the occurrence of soil build-up at the cutterbar in wet conditions.
- Avoid excessive bouncing, which will result in ragged cutting. You can do this by operating the header at a slower ground speed when the float setting is light.
- Install applicable header options such as crop dividers before setting the header float.
- Adjust the float when adding or removing optional attachments that change the weight of the header.
- Changing the angle of the header affects the float setting. Check the float setting after making changes to the header angle.

For instructions on setting and adjusting the header float, refer to your windrower operator's manual.

3.8.4 Ground Speed

Choose a ground speed that allows the cutterbar to cut the crop smoothly and evenly. Try different combinations of disc speed and ground speed to suit your specific crop. Refer to your windrower operator's manual for instructions on changing ground speed.

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

In tough cutting conditions, such as when cutting native grasses, set the disc speed to MAXIMUM.

In light crops, reduce the disc speed while maintaining the same ground speed.

NOTE:

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

The example shown in Figure 3.136, page 91 illustrates the relationship between ground speed and cut area for an R113 and an R116 Rotary Disc Headers. The chart demonstrates that a ground speed of 21 km/h (13 mph) would produce a cut area of approximately 8 hectares (20 acres) per hour.

OPERATION



A - Acres/Hour E - R116 SP

C - Kilometers/Hour

D - Miles/Hour

3.9 Reconfiguring Cutterbar Crop Stream

Discs are factory-installed to produce three crop streams. However, the disc rotation pattern can be changed by changing the spindle and its disc to suit crop conditions. Each spindle and disc pair is designed to rotate in one direction, and must be changed as a set when the crop flow is altered.

Reducing or increasing the number of crop streams will produce the following results:

- Reducing the number of crop streams will result in narrower windrows.
- Increasing the number of crop streams will result in smoother, wider windrows.

NOTE:

Increasing the number of crop streams will also increase the number of diverging disc pairs. This may negatively affect the quality of the cutting.



Figure 3.137: R113 and R116 SP Cutterbars

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and are identified by a smooth top on spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and are identified by machined grooves on spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation).
- Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.
- The shear pin will not perform properly if the spindles used are in the wrong orientation.



Figure 3.138: Cutterbar Spindles

3.9.1 Changing Header Cutterbar Crop Stream Configuration

Two crop stream settings are possible: one stream and three streams.





A - One Crop Stream

B - Three Crop Streams

To change R113 SP (8 disc) spindle rotation from three crop streams (B) to one crop stream (A):

• Swap disc/spindle (3) with disc/spindle (6)

To change R113 SP (8 disc) spindle rotation from one crop stream (A) to three crop streams (B):

• Swap disc/spindle (6) with disc/spindle (3)

For instructions, refer to Removing Cutterbar Spindles, page 136 and Installing Cutterbar Spindles, page 138.

3.9.2 Changing Header Cutterbar Crop Stream Configuration

Two crop stream settings are possible: one stream and three streams.



 Figure 3.140: R116 SP (10 Disc) Spindle Rotation Pattern and Crop Streams

 A - One Crop Stream
 B - Three Crop Streams

To change R116 SP (10 disc) spindle rotation from one crop stream (A) to three crop streams (B):

• Swap disc/spindle (7) with disc/spindle (4).

To change R116 SP (10 disc) spindle rotation from three crop streams (B) to one crop stream (A):

• Swap disc/spindle (4) with disc/spindle (7).

For instructions, refer to Removing Cutterbar Spindles, page 136 and Installing Cutterbar Spindles, page 138.
3.10 Conditioner

Conditioner rolls condition the crop by crimping and crushing the stem in several places, which allows the release of moisture, resulting in faster crop drying times. Both steel and polyurethane conditioner rolls are available.

Refer to 5 Options and Attachments, page 235 for information on ordering conditioner rolls.

3.10.1 Roll Gap

The roll gap is the distance between the two conditioner rolls. The roll gap controls the degree to which crop is conditioned as it passes through the rolls. The roll gap is factory-set at approximately 3 mm (1/8 in.) for polyurethane rolls, and at 6 mm (1/4 in.) for steel rolls.

Polyurethane rolls are better suited for crushing stems while providing reduced crimping and are recommended for alfalfa, clover, legumes, and similar crops. Correct crop conditioning is achieved when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set the roll gap appropriately to achieve these results.

Steel rolls can be operated over a larger range of roll gap settings, since they are able to intermesh, and are therefore suited to a wider range of crops, from (alfalfa to thicker-stemmed cane-type crops. They are capable of a roll gap of up to 25 mm (1 in.); however, too large a gap may cause crop feeding problems.

Grass-type crops may require a smaller gap for the proper feeding and conditioning of cut crop.

IMPORTANT:

If the roll gap you've selected is smaller than the factory setting, it is recommended to visually inspect the roll gap.

Checking Roll Gap

To prevent equipment damage, check the roll gap when you are using a roll gap setting smaller than that set at the factory.



To avoid injury or death from unexpected start-up 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. Shut down the engine, and remove the key from the ignition.

3. **Polyurethane rolls:** Insert a feeler gauge through the inspection hole in the conditioner endsheet to check the roll gap on polyurethane roll conditioners. The factory setting is 3 mm (1/8 in.).

4. **Steel rolls:** The length of thread (A) extending above the jam nut on the adjustment rods can be used as an approximation of the roll gap. However, this method does

factory setting for steel rolls is 6 mm (1/4 in.). If

Steel Rolls, page 97 for adjustment instructions.

NOT provide consistent roll gap measurements. The roll gap

adjustments are required, refer to Adjusting Roll Gap -



Figure 3.141: Polyurethane Roll Conditioner

Figure 3.142: Roll Gap Adjustment

Adjusting Roll Gap – Polyurethane Rolls

Because polyurethane rolls operate at smaller gaps and the conditioning is less aggressive, the roll gap setting is more sensitive than on steel rolls.

DANGER

To avoid injury or death from unexpected start-up 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. Shut down the engine, and remove the key from the ignition.

- 3. Loosen upper jam nut (A) on both sides of the conditioner attachment.
- 4. Turn lower nut (B) counterclockwise until the upper roll rests on the lower roll.
- 5. Turn lower nut (B) one full turn clockwise to raise the upper roll and achieve a 3 mm (1/8 in.) roll gap.
- 6. Hold nut (B) and tighten jam nut (A) on both sides of the conditioner attachment.

IMPORTANT:

Make sure the roll gap adjustment nuts are adjusted equally on both sides to achieve a consistent gap across the rolls.



Figure 3.143: Roll Gap Adjustment

 Rotate the rolls manually and use a feeler gauge at the ends of the rolls to check that the actual gap is no less than 2 mm (5/64 in.) and no more than 4 mm (5/32 in.).

Adjusting Roll Gap - Steel Rolls

The length of thread extending above the jam nut on the adjustment rods can be used as an approximation of roll gap but does **NOT** provide consistent roll gap measurements.

DANGER

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

To ensure the roll gap is at the factory setting, follow the procedure below:

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Loosen jam nut (A) on both sides of the conditioner.
- 4. Turn lower nut (B) counterclockwise until the upper roll rests on the lower roll. Ensure the rolls intermesh.
- 5. Turn lower nut (B) two and a half full turns clockwise to raise the upper roll and achieve a 6 mm (1/4 in.) roll gap.
- 6. Hold nut (B) and tighten jam nut (A) on both sides of the conditioner.

IMPORTANT:

Make sure the roll gap adjustment nuts are adjusted equally on both sides to achieve a consistent gap across the rolls.

- 7. If further adjustment to roll gap is required:
 - Turn lower nut (B) clockwise to increase the roll gap.
 - Turn lower nut (B) counterclockwise to decrease the roll gap.



Figure 3.144: Roll Gap Adjustment

NOTE:

Make further adjustments to the roll gap based on cutting performance and crop conditions.

3.10.2 Roll Tension

Roll tension refers to the tension holding the rolls together. It is factory-set to maximum and should rarely require adjustment. Heavy crops or tough forage can, however, cause the rolls to separate. In such conditions, maximum roll tension is required to ensure that the cut crop is crimped sufficiently.

Adjusting Roll Tension

The amount of pressure that is applied to the crop as it passes through the roll conditioner is adjusted by changing the roll tension setting. Generally, maximum roll tension is desirable.

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.

To adjust the roll tension back to factory setting, follow these steps:

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Loosen jam nut (A) on both sides of the conditioner.
- 4. Turn spring drawbolt (B) clockwise to tighten spring (C) and increase the roll tension.
- 5. Turn spring drawbolt (B) counterclockwise to loosen spring (C) and decrease the roll tension.
- Measure the amount of exposed thread on spring drawbolt (B) at each end of the conditioner. Measurement (D) should be 12–15 mm (1/2–9/16 in.) for both the polyurethane and steel roll conditioners.

IMPORTANT:

Turn each bolt equally. Each turn of the bolt changes the roll tension by approximately 32 N (7.2 lbf).

7. Tighten jam nuts (A) on each end of the conditioner.



Figure 3.145: Adjusting Roll Tension

3.10.3 Roll Timing

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

IMPORTANT:

Roll timing is critical when the roll gap is decreased because conditioning is affected and the bars may contact each other.



Figure 3.146: Properly Timed Rolls

Checking Roll Timing

Check the roll timing if excessive noise is coming from the conditioner rolls.

The roll timing is factory-set and should not require adjustment. However, if there is excessive noise coming from the conditioner rolls, the timing will need to be adjusted. For instructions, refer to *Adjusting Roll Timing, page 99*.

Adjusting Roll Timing

The roll timing is factory-set and should not require adjustment. However, if there is excessive noise coming from the conditioner rolls, the timing will need to be adjusted.

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

- 1. Shut down the engine, and remove the key from the ignition.
- 2. On the upper roll, loosen four bolts (A) securing yoke plate (B).

NOTE:

Only three of the four bolts are shown in the illustration.



Figure 3.147: Conditioner Drive

- 3. Secure bottom roll (A).
- 4. Manually rotate upper roll (B) in a counterclockwise direction until it stops.
- 5. Make a mark (C) across yoke (D) and gearbox flange (E).



Figure 3.148: Conditioner Drive

- 6. Secure bottom roll (A).
- 7. Manually rotate upper roll (B) in a clockwise direction until it stops.
- 8. Make a mark (C) across yoke (D) and gearbox flange (E).



Figure 3.149: Conditioner Drive

- 9. Determine center point (A) between the two marks on the yoke plate, and place a third mark.
- 10. Rotate upper roll (B) counterclockwise until the mark on the gearbox flange lines up with the third (center) mark.



Figure 3.150: Conditioner Drive

11. Ensure that the threads on four bolts (A) are clean and free of lubricant.

NOTE:

Only three of the four bolts are shown in the illustration.

12. Apply medium-strength threadlocker (Loctite[®] 242 or equivalent), and tighten bolts (A). Torque to 95 Nm (70 lbf·ft).



Figure 3.151: Conditioner Drive

3.10.4 Forming Shields – Roll Conditioner

The forming shield position controls the width and placement of the windrow.

Consider the following factors when setting the forming shield position:

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

OPERATION

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

Positioning Forming Shield Side Deflectors – Roll Conditioner

The position of the side deflectors controls the width and placement of the windrow. To ensure that windrow placement is centered between the carrier wheels, adjust the left and right deflectors to the same position.

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. Shut down the engine, and remove the key from the ignition.
- 2. Loosen locking handle (A).
- 3. Slide adjuster bar (B) along adjuster plate (C) to the desired deflector position and engage bar (B) into a notch in the adjuster plate.
- 4. Tighten locking handle (A).
- 5. Repeat Steps *2, page 102* to *4, page 102* for the other side.



Figure 3.152: Forming Shield Side Deflector and Adjuster Bar

Positioning Rear Baffle – Roll Conditioner

The rear baffle is used in conjunction with the forming shield side deflectors to determine the height and width of the windrow.

The rear baffle is located immediately behind and above the conditioner rolls and can be positioned to do the following:

- Raise the baffle and direct crop flow into the forming shields for a fluffier, narrower windrow.
- Lower the baffle and direct crop downward to form a flatter, wider windrow.
- Provide even material distribution across the windrow with the adjustable fins under the rear baffle. For instructions, refer to *Positioning Rear Baffle Deflector Fins, page 103*.

To position the rear baffle, follow these steps:

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

1. Shut down the engine, and remove the key from the ignition.

- 2. Remove lynch pin (A), securing rear baffle adjustment lever (B) to bracket (C).
- 3. Pull rear baffle adjustment lever (B) inboard to disengage it from bracket (C).
- 4. Position rear baffle adjustment lever (B) as follows:
 - Move the lever forward to raise the baffle
 - Move the lever backward to lower the baffle
- 5. Release rear baffle adjustment lever (B) so that the tab engages the middle notch in bracket (C).
- 6. Secure baffle adjustment lever (B) with lynch pin (A).



Figure 3.153: Right End of Conditioner

Positioning Rear Baffle Deflector Fins

The additional rear baffle deflector fins are stored on top of the baffle, but can be moved under the baffle when a narrower windrow is desired.

To install the fins:

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

1. Remove two deflector fins (A) from rear baffle (B).



Figure 3.154: Deflector Fins in Storage Position

- Position deflector fin (A) under the baffle and secure it with existing bolt and nut (B). Install the bolt so that the bolt head faces down. Adjust the fin to an angle of approximately 60° as shown, and torque the nut to 69 Nm (51 lbf·ft).
- 3. Repeat Step 2, page 104 for the opposite deflector fin.

NOTE:

Adjusting the angle of the fins can be useful to spread crop within the windrow width.



Figure 3.155: Left Deflector Fins in Field Position under Baffle

3.11 Cutterbar Deflectors

A two-piece cutterbar deflector is attached to the cutterbar just below the conditioner rolls. Deflectors provide improved feeding into the conditioner rolls and prevent long-stemmed crop from feeding under the rolls.

Cutterbar deflectors may not be well-suited for some types of crops and certain field conditions. Refer to the following table:

Table 3.2 Conditions for Using Cutterbar Deflectors

Crop/Field Condition	Use Deflector
Average crop/normal field conditions	Νο
Long-stemmed and heavy/normal field conditions	Yes
Long-stemmed and heavy/sandy soil	No
Long-stemmed and heavy/gopher mounds or rocks ⁴	No

3.11.1 Removing Cutterbar Deflectors – R113

When cutting a short-stemmed crop in normal field conditions with an R113, the cutterbar deflectors may not be necessary and can be removed.

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

- 1. Raise the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Locate deflector (A) behind the cutterbar.
- 5. Clear any debris from the deflector area.
- 6. Remove bolt (C) shared with the rock guard on the outboard end of the deflector. Retain the hardware.
- 7. Remove and retain three bolts and nuts (C) securing deflector (A) to the cutterbar. Remove deflector (A).
- 8. Repeat Steps *6, page 105* and *7, page 105* on the opposite side of the machine.
- If the conditioner is going to be completely removed, reinstall bolt (B) through the rock guard and secure it with an M12 washer and locking nut. Torque the hardware to 68 Nm (50 lbf·ft).



Figure 3.156: Left Deflector – Behind the Cutterbar

10. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to 3.11.2 Installing Cutterbar Deflectors – R113, page 106.

^{4.} Removing the deflector helps feed dirt/rocks through the header and prevents debris buildup, wear and damage from rocks.

3.11.2 Installing Cutterbar Deflectors – R113

When cutting long-stemmed crops in certain field conditions with an R113, installing cutterbar deflectors is recommended.

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

- 1. Raise the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Clean any debris from the ledge and the six mounting holes along the aft edge of the cutterbar.
- Position left deflector (A) on the back edge of the cutterbar. Align the slots in the deflector with the existing fasteners and the cutterbar plug.
- 6. Install bolt (C) shared with the rock guard at the outboard end of the deflector.
- 7. Secure the deflector to the cutterbar with three button socket head M10 bolts and lock nuts (B). Insert the bolts into the cutterbar from the bottom.
- 8. Tighten bolts (B) to 54 Nm (40 lbf·ft).
- 9. Repeat Steps *4, page 106* to *8, page 106* to install the right deflector.



Figure 3.157: Left Cutterbar Deflector Viewed from Underside of Cutterbar

3.11.3 Removing Cutterbar Deflectors – R116

When cutting a short-stemmed crop in normal field conditions, the cutterbar deflectors may not be necessary and can be removed.

DANGER

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

- 1. Raise the rotary disc header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.

- 4. Locate deflector (A) behind the cutterbar.
- 5. Clean debris from the deflector area.
- 6. Remove and retain bolt (B) securing the outboard end of the deflector to the cutterbar.
- 7. On the left side of the cutterbar, remove and retain three bolts (C).
- 8. Repeat Step 7, page 107 on the right side.
- 9. Remove cutterbar deflector (A).



Figure 3.158: Cutterbar Deflector – Left Side

10. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to 3.11.4 Installing Cutterbar Deflectors – R116, page 107.

3.11.4 Installing Cutterbar Deflectors – R116

When cutting long-stemmed crops in certain field conditions, installing cutterbar deflectors is recommended.

DANGER

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

- 1. Raise the rotary disc header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Clean any debris from the ledge and the six mounting holes along the aft edge of the cutterbar.
- Position left deflector (A) on the back edge of the cutterbar, and align the slots in the deflector with the existing fasteners and cutterbar plug.
- Secure the outboard end of the deflector to the cutterbar using M8 x 20 mm hex flange bolt (B). Apply mediumstrength threadlocker (Loctite[®] 243 or equivalent) to the bolt threads.
- 7. To secure the left cutterbar deflector, install three button socket head M10 bolts and lock nuts (C). The bolts are inserted into the cutterbar from the bottom.
- 8. Tighten bolts (C) to 54 Nm (40 lbf·ft).
- 9. Tighten bolt (B) to 29 Nm (21 lbf·ft).
- 10. Repeat Steps *4, page 107* to *9, page 107* to secure the right cutterbar deflector.



Figure 3.159: Cutterbar Deflector – Left Side

3.12 Haying Tips

Follow the recommendations in this section to ensure the highest quality hay production.

3.12.1 Curing

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

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

3.12.2 Topsoil Moisture

Topsoil moisture is an important consideration when determining the timing of hay cutting and the type of windrow needed.

Table 3.3 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, do not create a wide and thin windrow. A narrower, thicker 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 the moisture level of the toposil before beginning cutting. Use a soil moisture tester or estimate the level.
- If the ground is wet due to irrigation, wait until the soil moisture level drops below 45%.
- If the ground is wet due to frequent rains, cut the hay when weather allows. Let the hay 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.

3.12.3 Weather and Topography

Time your hay cutting so that the cut hay is able to cure as rapidly as possible.

- Cut as much hay as possible by midday. Drying conditions are best in the afternoon.
- Sun-facing slopes receive up to 100% more exposure to the sun's heat than slopes that do not face the sun. If the hay is to be baled and chopped, consider baling sun-facing slopes and chopping slopes that do not.
- When the relative humidity is high, the evaporation rate is low and so hay dries slowly.
- Humid air is trapped around the windrow in calm conditions. Raking or tedding will expose the hay to fresher and drier air.
- Cut hay perpendicular to the direction of the prevailing winds, if possible.

3.12.4 Windrow Characteristics

The shape and density of the windrow is an important factor with respect to how rapidly the hay cures.

For instructions, refer to *3 Operation, page 21* for instructions on adjusting the header.

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

Table 3.4 Recommended Windrow Characteristics

3.12.5 Driving on Windrow

Driving on previously cut windrows that will not be raked can lengthen drying time by a full day. If practical, set the machine's forming shields to produce a narrower windrow which the machine can straddle. However, driving on the windrow in high-yield crops may be unavoidable if a full width windrow is necessary.

3.12.6 Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces, allowing moisture to escape from cut crop and evaporate faster. However, treated hay lying on wet ground will absorb ground moisture faster, even if a hay drying agent is used.

Before deciding to use a drying agent, carefully compare the costs and benefits of doing so.

3.13 Transporting 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 M155 and M155*E4* windrower must have the lighting and marking bundle installed (MD #B5412).

Chapter 4: Maintenance and Servicing

This section provides information about routine servicing for the header. A parts catalog is located in a plastic case at the right end of the header.

Log the machine's hours of operation and use the maintenance record provided (refer to 4.3.1 Maintenance Schedule/ Record, page 114) to keep track of maintenance procedures as they are performed.

4.1 Preparing Machine for Servicing

Follow these steps to safely prepare your equipment for maintenance or repair.

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

- 1. Lower the header fully. If you need to perform service in the raised position, raise the header fully and then engage the header's safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the parking brake.
- 4. Wait for all moving parts to stop moving.

4.2 **Recommended Safety Procedures**

These procedures will minimize the chances of injury when maintaining or repairing the machine.

- Park on a level surface when possible. Follow all recommendations in your windrower operator's manual. •
- Wear close-fitting clothing and cover any long hair. Never . wear dangling items such as scarves or bracelets.



Figure 4.1: Safety Around Equipment

Figure 4.2: Safety Equipment



Figure 4.3: Safety Around Equipment

Wear protective shoes with slip-resistant soles, a hard hat, protective glasses or goggles, and heavy gloves, as needed.

Be aware that if more than one person is servicing the • machine at the same time, rotating a driveline or other mechanically driven component by hand (for example, to access a lubrication fitting) will cause drive components in other areas (belts, pulleys, and discs) to move. Stay clear of driven components at all times. Communicate regularly with your co-workers.

Revision A

• Be prepared to deal with an accident should it occur. Know where the first aid kits and fire extinguishers are located, and know how to use them.



Figure 4.4: Safety Equipment



Figure 4.5: 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. Ensure that all electrical outlets and tools are properly grounded.

- Use adequate light for the job at hand.
- Replace all shields removed or opened for service.
- Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.
- Keep machinery clean. Never use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

4.3 Maintenance Requirements

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine's service life. Periodic maintenance requirements are organized according to service intervals.

IMPORTANT:

The recommended intervals are based on typical operating conditions. Service the machine more often if the machine is operated regularly under adverse conditions, e.g. severe dust, extra heavy loads, etc.

If more than one interval is specified for a service item, e.g. 100 hours or annually, service the machine at whichever interval is reached first.

When servicing the machine, refer to the specific headings in this section. Use only the fluids and lubricants specified in the inside back cover of this book.

Log the hours of machine operation. Use the maintenance record provided in this manual, and keep extra copies of these maintenance records. Refer to 4.3.1 Maintenance Schedule/Record, page 114.

Carefully follow all safety messages. For more information, refer to 4.2 Recommended Safety Procedures, page 112.

4.3.1 Maintenance Schedule/Record

Keep a record of maintenance as evidence of a properly maintained machine. Daily maintenance records are not required to meet normal warranty conditions.

a no	Hour meter reading													
a no	Service date													
	Serviced by													
First	use	For instructions, r	efer t	o 4.3.2	Brea	k-In In	ispecti	ons, p	age 11	7.				
End	of season	For instructions, r	efer t	o 4.3.4	End-	of-Sea	ison Se	ervicin	g, pag	e 118.				
	Action	✓ Chec	k			۵	Lubric	ate		▲ Change				
At F	irst 10 Hours and then Da	ily												
~	Inspect cutterbar discs. I refer to <i>Inspecting Cutte 130</i> .	For instructions, erbar Discs, page												
~	Inspect disc blades. For to Inspecting Disc Blades	instructions, refer <i>s, page 142</i> .	r											
~	Inspect accelerators. For refer to <i>Inspecting Accel 149</i> .	r instructions, lerators, page												
~	Inspect rock guards. For refer to <i>Inspecting Rock</i> 153.	instructions, Guards, page	Daily maintenance records are not required to meet normal wa conditions.					al war	ranty					
~	Inspect drums. For instru Inspecting Large Drums R116 SP, page 171.	uctions, refer to – <i>R113 or</i>												
~	Check hydraulic hoses and instructions, refer to 4.1 Hydraulic Hoses and Line	nd lines. For 2.1 Checking es, page 234.												

MAINTENANCE AND SERVICING

At F	irst 25 Hours ⁵						
~	Check conditioner drive belt tension. For instructions, refer to <i>Inspecting</i> <i>Conditioner Drive Belt, page 210</i> .						
~	Check roll timing gearbox lubricant level. For instructions, refer to 4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194.						
Ever	y 25 Hours						
~	Check conditioner drive belt tension. For instructions, refer to <i>Inspecting</i> <i>Conditioner Drive Belt, page 210</i>						
٠	Lubricate idler pivot. For instructions, refer to <i>4.4 Lubrication, page 119</i> .						
•	Lubricate upper and lower driveline universal joints. For instructions, refer to <i>4.4 Lubrication, page 119</i> .						
٠	Lubricate roller conditioner bearings. For instructions, refer to <i>4.4 Lubrication, page 119</i> .						
٠	Lubricate conditioner roll driveline slip joints. For instructions, refer to 4.4 Lubrication, page 119.						
At F	irst 50 Hours						
	Change roll timing gearbox lubricant. For instructions, refer to 4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194.						
	Change header drive gearbox oil. For instructions, refer to <i>4.7.1 Changing</i> <i>Header Drive Gearbox Lubricant, page</i> <i>197</i> .						
~	Check cutterbar lubricant. For instructions, refer to <i>4.5.1 Lubricating Cutterbar, page 125</i> .						

^{5.} The driveline inside the driven drum is lubricated for life and does not require any routine lubrication.

MAINTENANCE AND SERVICING

Ever	y 100 Hours or Annually ⁶						
~	Check conditioner drive belt tension. For instructions, refer to <i>Inspecting</i> <i>Conditioner Drive Belt, page 210</i> .						
~	Check roll timing gearbox lubricant. For instructions, refer to 4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194.						
~	Check rotary disc header drive gearbox lubricant. For instructions, refer to 4.7.1 Changing Header Drive Gearbox Lubricant, page 197.						
٠	Lubricate forming shield pivot tube. For instructions, refer to <i>4.4 Lubrication, page 119</i> .						
Ever	y 250 Hours or Annually						
	Change roll timing gearbox lubricant. For instructions, refer to 4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194.						
	Change rotary disc header drive gearbox lubricant. For instructions, refer to 4.7.1 Changing Header Drive Gearbox Lubricant, page 197.						
	Change cutterbar lubricant. For instructions, refer to <i>4.5.1 Lubricating</i> <i>Cutterbar, page 125</i> .						

^{6. 100-}hour check intervals continue after 250 hours.

4.3.2 Break-In Inspections

From the factory the header is ready for normal operation. However, there are several maintenance tasks to complete during the early operating hours of the machine's service life.

Inspection Interval	Item	Refer to
1 Hour	Check for loose hardware and tighten to required torque	7.1 Torque Specifications, page 247
5 Hours	Check for loose hardware and tighten to required torque	7.1 Torque Specifications, page 247
5 Hours	Check conditioner drive belt tension	Inspecting Conditioner Drive Belt, page 210
25 Hours	Check conditioner drive belt tension	Inspecting Conditioner Drive Belt, page 210
50 Hours	Check conditioner drive belt tension	Inspecting Conditioner Drive Belt, page 210
50 Hours	Change conditioner roll timing gearbox lubricant	4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194
50 Hours	Change header drive gearbox lubricant	4.7.1 Changing Header Drive Gearbox Lubricant, page 197
150 Hours	Check conditioner drive belt tension	Inspecting Conditioner Drive Belt, page 210

Table 4.1 Break-In Inspection Schedule

4.3.3 Preseason Servicing

Perform these procedures when taking the machine out of storage.

- Review the operator's manual to refresh your memory on safety and operating recommendations.
- Review all safety signs and other decals on the self-propelled rotary disc header and note any potential hazard areas.
- Ensure that all shields and guards are properly installed and secured. Never alter or remove safety equipment.
- Ensure that 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 procedures at the beginning of each operating season:

- 1. Lubricate the machine completely. For instructions, refer to 4.4 Lubrication, page 119 and 4.5.1 Lubricating Cutterbar, page 125.
- 2. Perform all annual maintenance as listed in 4.3.1 Maintenance Schedule/Record, page 114.

4.3.4 End-of-Season Servicing

Perform these procedures when storing the machine at the end of the season.

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

Cover the cutterbar to prevent injury from accidental contact with the blades.

- 1. Raise the rotary disc header and engage the lift cylinder safety props.
- 2. Clean the header thoroughly.
- 3. Check for worn components and repair them as necessary.
- 4. Check for any broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at beginning of the next season.
- 5. Replace or tighten any missing or loose hardware. For information, refer to 7.1 Torque Specifications, page 247.
- 6. Lubricate the header thoroughly, leaving excess grease on the fittings to keep moisture out of the lubricated component.
- 7. Apply grease to any exposed threads, cylinder rods, and sliding surfaces of components.
- 8. Oil the cutterbar components to prevent rust.
- 9. Loosen the drive belt.
- 10. Remove the divider rods (if equipped) to reduce the space required for inside storage.
- 11. Repaint all worn or chipped painted surfaces to prevent rust.
- 12. Store the machine in a dry, protected place if possible. If it is to be stored outside, always cover the header with a waterproof canvas or other protective material.

4.4 Lubrication

Proper lubrication is essential to ensuring the service life of the machine.

To avoid personal injury, before servicing header or opening drive covers, refer to 4.1 Preparing Machine for Servicing, page 111.

Greasing points are marked on the machine by decals showing a grease gun and the grease interval, which is specified in hours of operation.

Log the hours of machine operation. Use the maintenance schedule provided in this manual to keep a record of scheduled maintenance. For details, refer to *4.3.1 Maintenance Schedule/ Record, page 114.*



Figure 4.6: Grease Interval Decal

4.4.1 Greasing Procedure

This is a general procedure used any time a component requires grease.

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. Open driveshields at the ends of the header to access greasing points. For instructions, refer to 3.6.1 Opening *Driveshields, page 80*.
- 2. Wipe the grease fitting with a clean cloth before greasing it to avoid injecting dirt and grit into the component.
- 3. Replace any loose or broken fittings immediately.
- 4. Inject grease through the fitting with a grease gun until grease overflows the fitting, unless the instructions specify otherwise.
- 5. Leave excess grease on the fitting to keep out dirt.
- 6. Remove and thoroughly clean any fitting that will not take grease and clean the lubricant passageway. Replace the fitting if necessary.

MAINTENANCE AND SERVICING

First 25 Hours

After the first 25 hours of operation, you will need to check the conditioner drive belt tension and inspect the conditioner roll timing gearbox's lubricant level.

To check the conditioner roll timing gearbox oil level, refer to 4.6.1 *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194.*



Figure 4.7: First 25 Hours

A - Conditioner Drive Belt Tensioner

B - Conditioner Roll Timing Gearbox

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Every 25 Hours

After every 25 hours of machine operation, add grease to the idler/tensioner pivot, the roller conditioner bearing, the driveline U-joints, and the driveline slip joints.

When adding grease, use high temperature extreme pressure (EP2) performance grease with 1% max molybdenum disulphide (NLGI grade 2) lithium base unless otherwise specified.



A - Idler/Tensioner Pivot

D - Slip Joints, Conditioner Drivelines

B - Bearing, Roller Conditioner (4 Places)E - U-Joint, Lower Driveline (2 Places)

C - U-Joint, Upper Driveline (2 Places)

First 50 Hours

After the first 50 hours of machine operation, the conditioner roll timing gearbox's lubricant will need to be changed, the header drive gearbox's lubricant will need to be changed, and the cutterbar lubricant level should be inspected.

To change the conditioner roll timing gearbox oil level, refer to 4.6.1 *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 194*.



Figure 4.9: First 50 Hours

A - Conditioner Drive Belt Tensioner C - Cutterbar B - Header Drive Gearbox

D - Conditioner Roll Timing Gearbox

MAINTENANCE AND SERVICING

Every 100 Hours or Annually

After 100 hours of machine operation, or annually (whichever interval occurs first), the conditioner drive belt tension should be checked, the conditioner roll timing gearbox's lubricant level should be checked, the rotary disc header drive gearbox's lubricant level should be checked, and the forming shield pivot tubes should be lubricated.



Figure 4.10: Every 100 Hours

A - Conditioner Roll Timing Gearbox

B - Header Drive Gearbox

C - Forming Shield Pivot Point Tube (Two Places)

Every 250 Hours

After every 250 hours, or annually (whichever interval occurs first), the conditioner roll gearbox lubricant should be changed, the rotary disc header drive gearbox lubricant should be changed, and the cutterbar lubricant should be changed.



Figure 4.11: Every 250 Hours

A - Header Drive Gearbox

B - Cutterbar

C - Conditioner Roll Timing Gearbox

4.5 Cutterbar System

The cutterbar comes in two cutting widths -3.9 m (13 ft.) and 4.9 m (16 ft.). The 3.9 m (13 ft.) holds eight discs and the 4.9 m (16 ft.) holds ten discs that rotate to a maximum of 2500 rpm at full engine speed. Each disc carries two cutting blades.



Figure 4.12: Cutterbar – R113 SP Shown, R116 SP Similar

The cutterbar (A) comes in two cutting widths – 3.9 m (13 ft.) and 4.9 m (16 ft.). The 3.9 m (13 ft.) holds eight discs and the 4.9 m (16 ft.) holds ten discs that rotate to a maximum of 2500 rpm at full engine speed. Each disc carries two cutting blades.

4.5.1 Lubricating Cutterbar

Correct lubricant and levels are essential to the performance and longevity of the cutterbar.

Checking and Adding Lubricant - Cutterbar

Correct lubricant and levels are essential to the performance and longevity of the cutterbar.

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.

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

- 1. Park the machine on a flat, level surface.
- 2. Lower the rotary disc header onto 25 cm (10 in.) blocks under both ends of the cutterbar.
- 3. Shut down the engine, and remove the key from the ignition.

- 4. Open the cutterbar doors. For instructions, refer to 3.7.1 Opening Cutterbar Doors North America, page 83 or 3.7.2 Opening Cutterbar Doors Export Latches, page 84.
- 5. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.13: Cutterbar Doors – R113 SP Shown, R116 SP Similar



Figure 4.14: Spirit Level on Cutterbar



Figure 4.15: Cutterbar Oil Inspection Plug

6. Use spirit level (A) to ensure that the cutterbar is level in both directions. Adjust the cutterbar position accordingly.

- 7. Clean the area around plug (A). Place a 5 liter (5.2 US qts) capacity container under plug (A).
- 8. Remove plug (A) and O-ring (B) from the cutterbar. The oil level must be up to the inspection plug hole.

NOTE:

If additional lubricant is required, proceed to Step *9, page 126*. If additional lubricant is **NOT** required, proceed to Step *16, page 127*.

IMPORTANT:

Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of the cutterbar components.

9. Reinstall the inspection plug.

Check to be sure all bystanders have cleared the area.

MAINTENANCE AND SERVICING

- 10. Clear all bystanders from the area.
- 11. Start the engine, and raise the header slightly.
- 12. Lower the header onto blocks, so the left end is slightly higher than the right end.
- 13. Shut down the engine, and remove the key from the ignition.
- 14. Add lubricant through the inspection hole used to check the oil level.

IMPORTANT:

Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of cutterbar components.

NOTE:

Refer to the inside back cover of this manual for lubricant specifications.

- 15. Recheck the oil level.
- 16. Check O-ring (B) for breaks or cracks, and replace it if necessary.
- 17. Install plug (A) and O-ring (B).



Figure 4.16: Cutterbar Oil Inspection Plug

18. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.17: Cutterbar Doors – R113 SP Shown, R116 SP Similar

Draining Cutterbar

In order to change the cutterbar lubricant, the cutterbar will first need to be drained.

DANGER

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

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

1. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to *Removing Outboard Rock Guards, page 156*.

NOTE:

The reinforced rock guards are used on model year 2019 and later machines.

- 2. Start the engine and raise the rotary disc header.
- 3. Place a block under each end of the rotary disc header so the right end is lower than the left end.

IMPORTANT:

Always drain lubricant from the right end of the rotary disc header. Draining lubricant from the left end of the rotary disc header may lead to breather contamination or failure.

- 4. Lower the rotary disc header onto the blocks.
- 5. Shut down the engine, and remove the key from the ignition.
- Place a 10 liter (10.5 US qts) capacity container under the lower end of the cutterbar. Clean the area around plug (A) and remove the plug.

IMPORTANT:

Do **NOT** remove hex head bolts (B) securing the cutterbar end plate to the cutterbar, or lubricant leaks may result.

7. Allow sufficient time for the lubricant to drain. Reinstall cutterbar plug (A) when the lubricant has been fully drained.

NOTE:

Do NOT flush the cutterbar.



Figure 4.18: Draining Cutterbar

8. Fill the cutterbar with lubricant before operating the rotary disc header. For instructions, refer to Adding Lubricant to Cutterbar, page 129.

IMPORTANT:

Dispose of used lubricant responsibly.

9. Reinstall the right outboard rock guard. For instructions, refer to Installing Outboard Rock Guards, page 157.

Adding Lubricant to Cutterbar

This procedure should be used when the cutterbar has been completely drained of oil.

If you are checking the oil level or topping it up, refer to *Checking and Adding Lubricant – Cutterbar, page 125*.

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

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

IMPORTANT:

The cutterbar should be completely empty of oil before filling it. For instructions, refer to Draining Cutterbar, page 128.

- 1. Start the engine.
- 2. Raise the header fully.
- 3. Place a block under the right end of the rotary disc header, so the right end is higher than the left end.
- 4. Lower the rotary disc header onto the blocks.
- 5. Shut down the engine, and remove the key from the ignition.
- 6. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to *Removing Outboard Rock Guards, page 156*.

NOTE:

The reinforced rock guards are used on model year 2019 and later.

 Remove access plug (A) from the raised end of the cutterbar and add the EXACT amount of lubricant specified. Refer to the inside back cover of this manual for lubricant types and quantities.

IMPORTANT:

Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of cutterbar components.

8. Reinstall access plug (A). Torque to 30 Nm (22 lbf·ft).



Figure 4.19: Filling Cutterbar

WARNING

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

- 9. Start the engine, and raise the header fully.
- 10. Engage the windrower lift cylinder safety props. For instructions, refer to *3.3 Engaging and Disengaging Header Safety Props, page 23*.
- 11. Shut down the engine, and remove the key from the ignition.

- 12. Remove the block from under the cutterbar.
- 13. Check the lubricant level. For instructions, refer to Checking and Adding Lubricant Cutterbar, page 125.
- 14. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 157*.

4.5.2 Cutterbar Discs

The cutterbar discs provide rotary cutting action. They may need to be replaced from time to time.



Figure 4.20: Interchangeable Cutterbar Discs

Cutterbar discs (A) are interchangeable and can be moved to a spindle that rotates in the opposite direction, so long as the disc is in usable condition and the blades are oriented to cut in the correct direction.

Perform daily inspections to ensure that the cutterbar discs are not damaged or deformed.

The cutterbar discs are **NOT** repairable and must be replaced if they are 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.

Inspecting Cutterbar Discs

Damaged blades may damage the cutterbar. They also cut poorly. Replace damaged blades immediately.

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.

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.
Inspect the cutterbar disc for any deformity on the side of the disc blades. Dimension (A) must not exceed 48 mm (1 7/8 in.). Replace any damaged discs immediately.

IMPORTANT:

Cutterbar discs are **NOT** repairable and must be replaced if damaged.

NOTE:

Dimension (A) is between the cutterbar and the edge of the disc as shown.



Figure 4.21: Cutterbar Disc



Figure 4.22: Cutterbar Disc



Figure 4.23: Cutterbar Disc

 Inspect the discs for abrasion (A) at the cutting blade sides. Replace the disc if the material thickness is less than 3 mm (1/8 in.)

- Inspect cutterbar disc surface (D) for cracks, excessive wear, and check if the disc is distorted. Replace any damaged discs immediately.
- 4. Inspect cutterbar disc edges (E) for cracks, excessive wear, and check if the edge is distorted. Replace any damaged components immediately.
- 5. Ensure that disc blade fasteners (A) are securely attached to the cutterbar disc and that nut shields (B) are present and undamaged. Replace any damaged components immediately.
- 6. Check that cutterbar disc bolts (C) are securely attached to the spindles. Tighten the bolts as needed.

Removing Cutterbar Discs

Cutterbar discs may need to be removed for replacement or so they can be swapped to change the type of crop stream.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Raise the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety *Props, page 23*.
- 4. Open the cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors North America, page 83.



Figure 4.24: Cutterbar Doors – R113 SP

- Place a pin (or equivalent) in front hole (B) of the rock guard to prevent the discs from rotating while you are loosening the bolts.
- 6. Remove four M12 bolts and washers (A).



Figure 4.25: Cutterbar Disc Bolts

5.

- 7. Remove cutterbar disc cap (A).
- 8. Remove cutterbar disc (B).



Figure 4.26: Cutterbar Disc and Cap

Installing Cutterbar Discs

Ensure that the blades of the installed disc are perpendicular to those on the adjacent discs.

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

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

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Install spacer plate (A) on the spindle.



Figure 4.27: Disc Spindle

- 3. Place a pin (or equivalent) in front hole (D) of the rock guard to prevent the disc from rotating while you are tightening the bolts.
- 4. Position new disc (A) on the spindle so that the blades are perpendicular to those on the adjacent discs.
- Install cutter disc cap (B), and secure the assembly with four M12 bolts and washers (C). Torque the bolts to 85 Nm (63 lbf·ft).



Figure 4.28: Cutterbar Disc and Cap

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

- 6. Remove the pin (or equivalent) from the front hole of the rock guard.
- 7. Close the cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.29: Cutterbar Doors - R113 SP Shown

4.5.3 Replacing Cutterbar Spindles

Cutterbar spindles allow for the rotation of the cutterbar discs. They have either right or left-handed threads, and are equipped with a shear pin.

A shear pin (as shown by [A]) is installed on each disc in order to prevent damage to the cutterbar if the disc collides with an obstacle.

If the disc contacts a large object such as a stone or stump, the pin will shear and the disc will stop rotating and move upwards. The disc will remain attached to the spindle thanks to snap ring (B).

NOTE:

Once the spindle has risen due to shear pin failure, the spindle's bearing will become unloaded. Do **NOT** replace the spindle simply because the spindle exhibits excessive play. Check the play of the spindle after torquing the spindle nut and replacing any damaged shear pins.

Refer to *4.5.9 Replacing Cutterbar Spindle Shear Pin, page 184* for instructions on replacing the shear pin.



Figure 4.30: Cutterbar Spindles

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and are identified by a smooth top on spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and are identified by machined grooves on spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation).
- Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.
- The shear pin will not perform properly if the spindles used are in the wrong orientation.



Figure 4.31: Cutterbar Spindles

Removing Cutterbar Spindles

The cutterbar spindles are secured to the cutterbar frame with 11 nuts and washers.

DANGER

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Park the machine on a flat, level surface.
- 2. Lower the rotary disc header fully.

NOTE:

To prevent oil spilling from the cutterbar while you are removing the disc spindles, ensure that the rotary disc header is on a flat, level surface and is tilted all the way back.

- 3. Shut down the engine, and remove the key from the ignition.
- 4. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.32: Cutterbar Doors – R113 SP Shown



Figure 4.33: Cutterbar Disc Bolts

- 5. Place a pin (or equivalent) in front (B) hole of rock guard to prevent the disc from rotating while you are loosening the bolts.
- 6. Remove four M12 bolts and washers (A)

- 7. Remove cutterbar disc cap (A).
- 8. Remove cutterbar disc (B).

IMPORTANT:

The blades are oriented to cut in one direction or the other. Therefore, swap the entire disc when swapping spindles.



Figure 4.34: Cutterbar Disc and Cap



Figure 4.35: Spacer Plate



Figure 4.36: Left Spindle Hub and Hardware

9. Remove spacer plate (A).

10. Rotate spindle hub (A) to access the nuts, and remove 11 M12 lock nuts and washers (B).

11. Remove spindle (A) from the cutterbar.



Figure 4.37: Left Spindle

Installing Cutterbar Spindles

Ensure that the discs are timed correctly when installing the cutterbar spindles, or damage to the cutterbar may result.



Figure 4.38: Underside of Cutterbar Spindles

IMPORTANT:

Right discs (A) and left discs (B) are timed and must be perpendicular to adjacent discs when they are reinstalled. Misaligned discs could result in the following:

- Disc blades of co-rotating discs hitting each other
- Disc blades of diverging discs hitting adjacent discs

Check the clearance between blades of adjacent discs before tightening the spindle to the cutterbar. Turn the disc by hand to ensure that the disc blades do not contact each other or adjacent discs. If contact occurs or if the alignment is incorrect, lift the spindle to clear the mounting bolts, rotate the spindle 180° while ensuring that the base does not turn, and reinstall the disc. Recheck the timing before bolting the hub down and tightening all of the nuts.

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NOTE:

Right discs (A) and left discs (B) are slightly offset as shown, depending on which idler gear the spindle is turning:

- Spindles that rotate clockwise have left-leading threading ٠
- Spindles that rotate counterclockwise have right-leading threading



DANGER

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

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Park the machine on a flat, level surface.
- 2. Lower the header fully.

NOTE:

To prevent oil from spilling from the cutterbar while installing disc spindles, ensure the rotary disc header is on a flat, level surface and is tilted all the way back.

- 3. Shut down the engine, and remove the key from the ignition.
- 4. Choose a suitable spindle rotation pattern. For more information, refer to 4.5.3 Replacing Cutterbar Spindles, page 135.
- Ensure that spindle O-ring (A) is properly seated, cleaned, 5. and undamaged.



Figure 4.39: Left Spindle O-Ring

6. Insert spindle (A) into the cutterbar.



Figure 4.40: Left Spindle



Figure 4.41: Spindle Orientation



Figure 4.42: Left Spindle Hub

7. Insert studs (A) into the spindle as shown.

NOTE:

The plugs are factory-installed as shown in position (B), but may loosen over time. Ensure that the studs are inserted into the proper location.

IMPORTANT:

Ensure that the clockwise spindles rotate clockwise and that the counterclockwise spindles (with machined grooves) rotate counterclockwise.

IMPORTANT:

The offset gear design of the cutterbar makes it possible to install spindles that rotate in the wrong direction. This will prevent discs from spinning up after impact, resulting in cutterbar component damage.

- 8. Ensure that hub (A) is fully seated into the cutterbar before tightening nuts (B).
- 9. Rotate spindle hub (A) to access the studs, and install 11 M12 lock nuts (B) and washers.

10. Torque the bolts to 50 Nm (37 lbf·ft), following the tightening pattern shown.

NOTE:

The hub has been removed from the illustration for the sake of clarity.

11. Install spacer plate (A).

12. Place a pin (or equivalent) in front hole (D) of the rock guard to prevent the disc from rotating while you are tightening the bolts.

IMPORTANT:

The blades are oriented to cut in one direction or the other. Therefore, swap the entire disc when swapping spindles.

 Position disc (A) on the spindle, ensuring that it is positioned at a 90° angle relative to the adjacent discs.

NOTE:

Turn disc (A) by hand to ensure that the disc blades do not contact each other or adjacent discs.

 Install cutter disc cap (B) and secure the assembly with four M12 bolts and washers (C). Torque bolts to 85 Nm (63 lbf·ft).



Figure 4.43: Tightening Pattern



Figure 4.44: Spacer Plate



Figure 4.45: Cutterbar Disc and Cap

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

- 15. Remove the pin (or equivalent) from the front hole of the rock guard.
- 16. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.46: Cutterbar Doors – R113 SP Shown, R116 SP Similar

4.5.4 Maintaining Disc Blades

Each disc has two blades attached at opposite ends that are free to rotate horizontally on a specially designed shoulder bolt.

The blade (A) has two cutting edges and can be flipped over so that the blade does not need replacing as often.

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

IMPORTANT:

Always use factory replacement parts.

NOTE:

Discs are equipped with 18° bevel-down blades; 11° bevel-down blades are offered as a non-standard option. For more information, refer to the header parts catalog.



Figure 4.47: Disc blades

Inspecting Disc Blades

Inspect the discs regularly for damage and wear. Replace damaged blades immediately.

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. Never work on or beneath an unsupported header. If the header is fully raised, always engage safety props. If the header is off the ground and not fully raised, place blocks under the header.

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

WARNING

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

IMPORTANT:

Damaged blades cut poorly and may damage the cutterbar. Replace damaged blades immediately.

- 1. Place the header in a position where you can access the component that will be serviced.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. If the header is fully raised, engage the safety props. If the header is off the ground and not fully raised, place blocks under the header. Never work on or beneath an unsupported header.
- 4. Check daily that the disc blades are securely attached to the disc.
- 5. Inspect blades for cracks, blade wear (A), and/or elongated holes (B) beyond safe operating limits (C).
- 6. Replace blades immediately when problems are noticed.

IMPORTANT:

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



Figure 4.48: Disc Blades

A - Blade Wear to Center Line

B - Elongated Hole

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

IMPORTANT:

The disc blades have cutting edges on both sides so that 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 3.9.1 Changing Header Cutterbar Crop Stream Configuration, page 93 for instructions.



Figure 4.49: Counterclockwise Disc Rotation



Figure 4.50: Clockwise Disc Rotation

Inspecting Disc Blade Hardware

Inspect the blade attachment hardware each time the blades are changed.

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.

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

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

Refer to *Removing Disc Blades, page 146* and *Installing Disc Blades, page 147* for hardware replacement procedure.

1. Shut down the engine, and remove the key from the ignition.

- 2. When inspecting the blades, check each blade-attachment bolt and replace it if:
 - The bolt has been removed and installed five times
 - Head (A) is worn flush with the bearing surface of the blade
 - Diameter (B) of the bolt neck is 3 mm (1/8 in.) or less
 - The bolt is cracked (C)
 - The bolt is visibly distorted (D)
 - The bolt shows evidence of interference (E) with adjacent parts



Figure 4.51: Disc Blade Bolts

- 3. Check the nuts holding the disc blades. Replace the nuts if:
 - The nut has been previously installed; nuts are one-time-use items only
 - The nut shows signs of wear (A) such that the nut has lost more than half the original height (B) in one or more areas.
 - The nut is cracked



Figure 4.52: Disc Blade Nut

Removing Disc Blades

Be sure to use new nuts whenever you are replacing or flipping disc blades.

DANGER

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Raise the rotary disc header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety *Props, page 23*.
- 4. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.53: Cutterbar Doors – R113 SP Shown, R116 SP Similar

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5. Rotate disc (A) so blade (B) faces forward and lines up with hole (C) in the rock guard.

6. Place a pin (or equivalent) in the front hole of the rock guard to prevent the disc from rotating while you are

Nuts are one-time use items. When you are flipping or

replacing a blade, replace it using a **NEW** nut.

9. Remove shoulder bolt (B) and blade (C).

7. Clean debris from the blade attachment area.



Figure 4.54: Disc Blade Aligned with Hole in Rock Guard



Figure 4.55: Disc Blade

Installing Disc Blades

loosening blade bolts.

IMPORTANT:

8. Remove nut (A) and discard it.

Check the disc blade hardware for damage while you are installing the disc blades. Be sure to always use new nuts when installing disc blades.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

IMPORTANT:

If you are unsure in which direction the spindles rotate, refer to 3.9 Reconfiguring Cutterbar Crop Stream, page 92.

1. Shut down the engine, and remove the key from the ignition.

- 2. Place a pin (or equivalent) in the front hole of the rock guard to prevent the disc from rotating while you are tightening the blade bolts.
- 3. Install new or reversed blade (A) with shoulder bolt (B) onto disc (C).

IMPORTANT:

Nuts are one-time use items. When flipping or changing a blade, replace it using a **NEW** nut.

Install new nut (D) and torque it to 125 Nm (92 lbf·ft). 4.

WARNING

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

5. Close cutterbar doors (A). For instructions, refer to 3.7.3 Closing Cutterbar Doors, page 85.



Figure 4.56: Disc Blade



Figure 4.57: Cutterbar Doors – R113 SP Shown, **R116 SP Similar**

4.5.5 Accelerators

Accelerators are mounted on each outboard disc and are designed to quickly move cut material off the disc and into the conditioner.

A pair of accelerators (indicated by [A] in the illustration) is installed on each disc which is topped with a drum. Two pairs of accelerators are installed on an R113 SP (one pair on the outboard disc at each end of the cutterbar) and two pairs are installed on an R116 SP (one pair on each of the two outboard discs at each end of the cutterbar).

Periodically inspect the accelerators for damage and loose or missing fasteners. Replace damaged components as necessary.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.



Figure 4.58: R113 SP Cutterbar Accelerators



Figure 4.59: R116 SP Cutterbar Accelerators

Inspecting Accelerators

Accelerators should be inspected regularly to ensure that they are in good condition and can effectively move crop off the disc and into the conditioner.

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

- 1. Raise the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety *Props, page 23*.
- 4. Open the cutterbar doors. For instructions, refer to 3.7.1 Opening Cutterbar Doors North America, page 83 or 3.7.2 Opening Cutterbar Doors Export Latches, page 84.

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

5. Inspect accelerators (A) for damage and wear. Replace accelerators if they are worn to 50% or more of their original height or if they are no longer effectively moving crop.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

6. Tighten or replace loose or missing fasteners.



Figure 4.60: R113 SP Cutterbar Accelerators



Figure 4.61: R116 SP Cutterbar Accelerators

Removing Accelerators

Accelerators need to be removed from cutterbar discs when they are damaged, or else when they are so worn that they can no longer effectively move crop from the discs to the conditioner.

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage lift cylinder lock-out valves before going under machine for any reason.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

- 1. Raise the rotary disc header fully.
- 2. Shut off the engine, and remove the key from the ignition.
- 3. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety *Props, page 23*.

4. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.62: Cutterbar Doors – R113 SP Shown, R116 SP Similar

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

5. Remove nut (A), flange bolt (B), and disc blade (C) from the disc. Discard the nut.



Figure 4.63: Accelerator Removal



Figure 4.64: Accelerator Removal

- 6. Remove lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D).
- 7. Repeat Steps *5, page 151* and *6, page 151* to remove the second accelerator.

Installing Accelerators

A new pair of accelerators should be installed on a cutterbar disc whenever the old ones are damaged or so worn that they can no longer effectively move crop off the disc and into the conditioner.

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

1. Place a wooden block between two cutterbar discs to prevent the discs from rotating while you are tightening the blade bolts.

IMPORTANT:

Accelerators are unidirectional: both clockwise and counterclockwise accelerators are used on the cutterbar. Verify the direction of the disc before installing any accelerators.

- 2. Install lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D). Do **NOT** tighten the hardware yet.
- 3. Install new nut (A), flange bolt (B), and disc blade (C) onto the disc.



Figure 4.65: Accelerator Install



Figure 4.66: Accelerator Install

- 4. Torque inside nut (A) to 58 Nm (43 lbf·ft).
- 5. Torque outside nut (B) (closest to the blade) to 125 Nm (92 lbf·ft).
- 6. Repeat Steps *1, page 152* to *5, page 153* to replace the second accelerator.

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

- 7. Remove the wooden block.
- 8. Close the cutterbar doors (A). For instructions, refer to *3.7.3 Closing Cutterbar Doors, page 85*.



Figure 4.67: Accelerator Install



Figure 4.68: R113 SP Cutterbar Doors

4.5.6 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 into contact with stones and other debris. Periodically inspect the rock guards for damage. Replace them as necessary.

Inspecting Rock Guards

Rock guards protect the cutting blades from damage. Inspect them periodically to ensure they are not damaged or worn out.

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. Never work on or beneath an unsupported header. If the header is fully raised, always engage safety props. If the header is off the ground and not fully raised, place blocks under the header.

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. Shut down the engine, and remove the key from the ignition.
- 3. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety *Props, page 23*.
- 4. Inspect the rock guards for wear, cracks, damage, or distortion. Replace rock guards if they are worn to 75% or less of their original thickness.
- 5. Check for loose or missing fasteners. Tighten or replace fasteners as needed.



Figure 4.69: Rock Guards

Removing Inboard Rock Guards

Remove any damaged or worn rock guards to maximize the life of the cutting blades.



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

- 1. Raise the rotary disc header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Remove two hex head screws, washers, and lock nuts (A).



Figure 4.70: Inboard Rock Guards

5. Slide inboard rock guard (A) forward (in the direction of arrow [B]) and remove it.



Figure 4.71: Inboard Rock Guards

Installing Inboard Rock Guards

Ensure that the nuts securing the rock guards are installed on top of the cutterbar when installing an inboard rock guard.

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage lift cylinder lock-out valves before going under machine for any reason.

- 1. Raise the rotary disc header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- Guide the inboard rock guard onto the cutterbar until tabs (A) sit on top of the cutterbar, and the bottom back bolt holes in the rock guard line up with the holes in the cutterbar.



Figure 4.72: Inboard Rock Guards

 Install two hex head screws, washers, and lock nuts (A). Torque the hardware to 68 Nm (50 lbf·ft).

NOTE:

Lock nuts (A) must be installed on top of the cutterbar.



Figure 4.73: Inboard Rock Guards

Removing Outboard Rock Guards

The outboard rock guards are secured to the cutterbar with more hardware than the inboard rock guards.

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

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. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Locate rock guard (B) on the bottom outboard end of the cutterbar. There is one guard on each end of the cutterbar.
- 5. Remove two hex head screws (A).
- 6. Remove washers and lock nuts (C) securing rock guard (B) to the cutterbar assembly.



Figure 4.74: Left Outboard Rock Guard – Rear View

- 7. Remove bolt and washers (A).
- 8. Loosen bolt (B).
- 9. Remove rock guard (C) by sliding it forward.
- 10. Repeat Step *4, page 156* to Step *9, page 157* at the opposite side of the cutterbar.



Figure 4.75: Left Outboard Rock Guard – Side View

Installing Outboard Rock Guards

You will need a rubber mallet to properly seat the outboard rock guard when it is installed.

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

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

- 1. Remove any debris on the cutterbar which could obstruct the installation of the outboard rock guard.
- 2. Raise the header fully.
- 3. Shut down the engine, and remove the key from the ignition.
- 4. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 5. Apply medium-strength threadlocker (Loctite[®] 242 or equivalent) to bolt (B).

NOTE:

Some parts have been removed for the sake of clarity.

- 6. Install bolt (B) with a washer onto the cutterbar.
- Angle rock guard (A) outward as shown. Align the slot in the side plate between the washer and the cutterbar on rear M16 bolt (B).
- 8. Rotate the rock guard towards the center of the header until the tabs on the front of the rock guard are supported by the cutterbar.



Figure 4.76: Left Outboard Rock Guard – Angled

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9. Using a rubber mallet, tap rock guard (A) so it is parallel and flush against cutterbar (B).



Figure 4.77: Outboard Rock Guard



Figure 4.78: Outboard Rock Guard Installed



Figure 4.79: Left Outboard Rock Guard – Rear View

10. Ensure that rock guards (B) and (C) are parallel to one another.

NOTE:

A parallel gap (for example, gap [A]) of 5–7 mm (3/16-1/4 in.) between outboard (B) and inboard (C) rock guards is acceptable. You may need to loosen the next one or two rock guards to change the gap.

- 11. For R113 SP Only: Apply medium-strength threadlocker (Loctite[®] 242 or equivalent) on two hex head screws (C). Loosely install the screws with lock nuts.
- 12. Install M16 x 60 bolt (A) and one washer (B) as shown. Torque bolts (A) and (D) to 251 Nm (185 lbf·ft).
- 13. For R113 SP Only: Torque screws (C) to 54 Nm (40 lbf·ft).

4.5.7 Maintaining Small Drums – R116 SP

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. The small drums are found on an R116 SP header and are attached to the two discs inboard of the large drums.

Inboard drums (B) and (C) are approximately 73 mm (2 3/8 in.) smaller in diameter than outboard drums (A).



Figure 4.80: Cutterbar A - Large Drums C - Small Driven Drum

B - Small Non-Driven Drum

Inspecting Small Drums – R116 SP

Inspect the drums daily for signs of damage or wear.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.81: Cutterbar Doors

- Inspect small drums (B) and (C) for damage and wear. Replace the drums if they are worn at the center to 50% or less of their original thickness. Do NOT repair damaged drums; they must be replaced.
- 5. Examine drums (B) and (C) for large dents. Replace any dented drums to ensure that the cutterbar remains balanced.
- 6. Tighten or replace any loose or missing fasteners.

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

7. Close cutterbar doors (A). For instructions, refer to *3.7.3 Closing Cutterbar Doors, page 85*.



B - Small Non-Driven Drum

Figure 4.82: Cutterbar

- A Large Non-Driven Drums
- C Small Driven Drum



Figure 4.83: Cutterbar Doors

Removing Small Driven Drum and Driveline - R116 SP

The small driven drum is the second drum from the end on the left side of the cutterbar.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.

3. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.84: Cutterbar Doors



Figure 4.85: Driveline Shield



Figure 4.86: Driveline Shield

4. Remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

5. Remove two M10 hex flange head bolts (B) and cover plate (A).

6. Remove four M10 hex flange head bolts (A), top plate (B), and drum top (C).

 Remove one 20 mm M10 hex flange head bolt (B), two 16 mm M10 hex flange head bolts (C), and vertical shield (A).

8. Remove eight M8 hex flange head bolts (A) and two drum shields (B).



Figure 4.87: Driveline Shield



Figure 4.88: Driveline Shield



Figure 4.89: Driveline Shield

9. Remove four M12 hex flange head bolts and spacers (A) securing driveline assembly (B) to hub drive (C).



Figure 4.90: Hub Drive to Driveline Connection



Figure 4.91: Hub Drive to Driveline Connection



Figure 4.92: Driven Drum

10. Slide driveline (A) downwards, tilt it to the side, and pull the driveline up and out of drum.

NOTE:

For clarity, the illustration shows a cutaway view of the drum and the tube shield.

- 11. Remove four M12 bolts and washers (A) holding the drum disc in place.
- 12. Remove drum disc assembly (B).

Installing Small Driven Drum and Driveline - R116 SP

The small driven drum is the second drum from the end on the left side of the cutterbar.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Position drum disc assembly (B) as shown.
- Install four M12 bolts (A) along with the washers that hold the drum disc in place. Torque the hardware to 85 Nm (63 lbf·ft).



Figure 4.93: Drum Disc



Figure 4.94: Hub Drive to Driveline Connection

5. Lubricate spindle splines (A). For specifications, refer to the inside back cover of this manual.

NOTE:

For clarity, the illustration shows a cutaway view of the drum and tube shield.

- 6. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
- 7. Insert splined spindle end (A) into the splined bore of driveline (B).

 Place a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M12 hex flange head bolts (A). Use the bolts and spacers to secure driveline assembly (B) to hub drive (C). Torque the bolts to 102 Nm (75 lbf·ft).



Figure 4.95: Hub Drive to Driveline Connection



Figure 4.96: Driven Drum



Figure 4.97: Driveline Shield

 Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields. Torque the hardware to 27 Nm (20 lbf·ft).

 Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C). Use bolts (B) and (C) to secure the vertical shield. Torque the hardware to 61 Nm (45 lbf·ft). Position top plate (B) and drum top (C) onto the drum as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use the bolts to secure the top plate and the drum top. Torque the hardware to 61 Nm (45 lbf·ft).



- Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of M10 hex flange head bolt (D). Install bolt (D) through cover plate (A) and vertical shield (E). Torque the hardware to 61 Nm (45 lbf·ft).
- 14. Tighten bolts (B) and (D).



Figure 4.98: Driveline Shield



Figure 4.99: Driveline Shield
15. Position vertical driveshield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use bolts (A) to secure the vertical driveshield. Torque the hardware to 61 Nm (45 lbf-ft).

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

16. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.100: Driveline Shield



Figure 4.101: Cutterbar Doors and Curtains

Removing Small Non-Driven Drum - R116 SP

The small non-driven drum is the second from the end on the right side of the cutterbar.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.102: Cutterbar Doors

- 4. Remove four M12 bolts (A) outside the drum.
- 5. Remove disc assembly (B).



Figure 4.103: Non-Driven Drum

Installing Small Non-Driven Drum – R116 SP

Remember to replace the spacer when installing the small non-driven drum.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Ensure spacer (A) is on the spindle.



Figure 4.104: Non-Driven Spindle

- 4. Position non-driven disc assembly (B) onto the spindle as shown.
- Install four M12 bolts (A) and the washers securing the disc assembly to the spindle. Torque the hardware to 55 Nm (40 lbf·ft).

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.



Figure 4.105: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.106: Cutterbar Doors

4.5.8 Maintaining Large Drums – R113 or R116 SP

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. Large drums are attached to the two outboard discs on R113 SP and R116 SP headers.

NOTE:

On an R116 SP rotary disc header, small (inboard) drums (E) and (F) are approximately 73 mm (2 3/8 in.) smaller in diameter than large (outboard) drums (C) and (D). Large drums measure 250 mm (9 7/8 in.) in diameter. Small drums measure 187 mm (7 3/8 in.) in diameter.



Figure 4.107: Cutterbars

A - R113 C - Large Drums

E - Small Drum

- B R116 D - Large Driven Drum
- F Small Driven Drum

Inspecting Large Drums – R113 or R116 SP

Inspect the large drums daily for signs of damage or wear.

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.108: Cutterbar Doors – R113 SP Shown

- Inspect large drums (C) and (D) for signs of damage or wear. Replace the large drums if the drum feed bars are 50% or less of their original thickness. Do NOT repair drums.
- 5. Examine the drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
- 6. Tighten or replace loose or missing fasteners.

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

7. Close cutterbar doors (A).



Figure 4.109: Cutterbars

- A R113 SP C - Large Drums E - Small Drum
- B R116 SP D - Large Driven Drum
- F Small Driven Drum



Figure 4.110: Cutterbars – R113 SP Shown, R116 SP Similar

Removing Large Driven Drums and Driveline - R113 or R116 SP

The large driven drum is on the left end of the cutterbar.

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

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

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Open cutterbar doors (A). Refer to *3.7.1 Opening Cutterbar Doors – North America, page 83* for instructions.

3. Remove four M10 hex flange head bolts (A) and remove

vertical driveshield (B).



Figure 4.111: Cutterbar Doors – R113 SP Shown, R116 SP Similar

Figure 4.112: Vertical Drive Shield

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4. Remove two M10 hex flange head bolts (A) and remove cover plate (B).



Figure 4.113: Cover Plate



Figure 4.114: Top Plate and Drum Top



Figure 4.115: Vertical Shield

5. Remove four M10 hex flange head bolts (A), and remove top plate (B) and drum top (C).

6. Remove one M10 x 20 hex flange head bolt (A), two M10 x 16 hex flange head bolts (B), and vertical shield (C).

7. Remove eight M8 hex flange head bolts (A), and remove two drum shields (B).



Figure 4.116: Drum Shields



Figure 4.117: Hub Drive to Driveline Connection



Figure 4.118: Hub Drive to Driveline Connection

8. Remove four M12 hex flange head bolts and spacers (A) securing driveline assembly (B) to hub drive (C).

9. Slide driveline (A) downwards, and tilt it to the side. Pull the driveline up and out of the drum.

NOTE:

The illustration shows a cutaway view of the drum and tube shield.

- 10. Inside the drum, remove four M12 bolts and washers (A) holding the drum disc in place.
- 11. Remove the drum disc assembly.



Figure 4.119: R113 SP Driven Drum



Figure 4.120: R116 SP Driven Drum

Installing Large Driven Drums and Driveline - R113 or R116 SP

The large driven drum is on the left end of the cutterbar.

A DANGER

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

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

1. Shut down the engine, and remove the key from the ignition.

2. Ensure that spacer plate (A) is on the spindle.



Figure 4.121: Spacer Plate



Figure 4.122: Drum Disc



Figure 4.123: Hub Drive to Driveline Connection

3. Position the drum disc assembly as shown.

NOTE:

Orient the disc so that the blades are perpendicular to those on the adjacent disc.

4. Install four M12 bolts and washers (A) that hold the drum disc in place. Torque the hardware to 85 Nm (63 lbf·ft).

5. Lubricate spindle splines (A). For specifications, refer to the inside back cover of this manual.

NOTE:

The driveline U-joints were greased at the factory and are considered to be lubricated for life. No further lubrication is required.

NOTE:

The illustration shows a cutaway view of the drum and the tube shield.

- 6. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
- 7. Insert splined spindle end (A) into the splined bore on driveline (B).

 Place a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M12 hex flange head bolts (A). Use the bolts and spacers to secure driveline assembly (B) to hub drive (C). Torque the bolts to 102 Nm (75 lbf·ft).

 Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields. Torque the bolts to 27 Nm (20 lbf·ft).



Figure 4.124: Hub Drive to Driveline Connection



Figure 4.125: Drum Shield



Figure 4.126: Vertical Shield

 Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C). Use bolts (B) and (C) to secure the vertical shield. Torque the bolts to 61 Nm (45 lbf·ft). Position top plate (B) and drum top (C) onto the drum as shown. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use the bolts to secure the top plate and drum top. Torque the hardware to 61 Nm (45 lbf·ft).



Figure 4.127: Top Plate and Drum Top

- Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of M10 hex flange head bolt (B). Install bolt (B) through cover plate (A) and top plate (C). Torque the hardware to 61 Nm (45 lbf·ft).
- Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of M10 hex flange head bolt (D). Install bolt (D) through cover plate (A) and vertical shield (E). Torque the hardware to 61 Nm (45 lbf·ft).
- 14. Tighten bolts (B) and (D).



Figure 4.128: Cover Plate and Top Plate

15. Position vertical driveshield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite[®] 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use bolts (A) to secure the vertical driveshield. Torque the bolts to 61 Nm (45 lbf·ft).

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

16. Close cutterbar doors (A). For instructions, refer to *3.7.3 Closing Cutterbar Doors, page 85*.



Figure 4.129: Vertical Shield



Figure 4.130: Cutterbar Doors and Curtains

Removing Large Non-Driven Drums - R113 or R116 SP

The non-driven large drums are held in place with four bolts.

A DANGER

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

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

NOTE:

The illustrations in this procedure depict the R113 SP; the R116 SP is similar.

1. Shut down the engine, and remove the key from the ignition.

2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83 or 3.7.2 Opening Cutterbar Doors – Export Latches, page 84.



Figure 4.131: Cutterbar Doors – R113 SP Shown, R116 SP Similar

Figure 4.132: Non-Driven Drum



Figure 4.133: Non-Driven Drum

- 3. Place a wooden block between the two cutterbar discs to prevent the disc from rotating while you are loosening the blade bolts.
- 4. Remove eight M8 bolts and washers (A) securing cover (B) to the non-driven drum. Remove the cover.

- 5. Remove four M10 bolts (A) from inside the drum.
- 6. Remove the wooden block.
- 7. Remove drum/disc (B).

Installing Large Non-Driven Drums – R113 or R116 SP

Ensure that the spacer is in place before installing the large non-driven drum.

DANGER

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

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

NOTE:

3.

as shown.

85 Nm (63 lbf·ft).

The images used in the procedure are from an R113 SP, the R116 SP is similar.

1. Shut down the engine, and remove the key from the ignition.

Position non-driven drum/disc (B) onto the spindle

4. Install four M12 bolts and washers (A) to secure the drum and disc assembly to the spindle. Torque the hardware to

2. Ensure that spacer (A) is on the spindle.



Figure 4.134: Non-Driven Spindle



Figure 4.135: Non-Driven Drum

5. Install eight M8 bolts and washers (A) to secure cover (B) to the non-driven drum. Torque the bolts to 28 Nm (20 lbf·ft).

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.



Figure 4.136: Non-Driven Drum



Figure 4.137: Cutterbar Doors — R113 SP Shown, R116 SP Similar

6. Close cutterbar doors (A). For instructions, refer to *3.7.3 Closing Cutterbar Doors, page 85.*

4.5.9 Replacing Cutterbar Spindle Shear Pin

To prevent damage to the cutterbar and drive systems, each disc is attached to a spindle containing a shear pin.

If the disc contacts a large object such as a stone or stump, pin (A) will shear and the disc will stop rotating and move upwards. The presence of snap ring (B) ensures that the disc will remain attached to the spindle.

IMPORTANT:

- Ensure that the slots on both shear pins (A) are aligned horizontally.
- Spindles that rotate clockwise have right-leading threading.
- Spindles that rotate counterclockwise have left-leading threading.

NOTE:

Once the spindle has risen due to the failure of the shear pin, the spindle's bearing will become unloaded. The spindle will appear to be damaged. Do **NOT** replace the spindle simply because it has excessive play. Check the play of the spindle **AFTER** torquing the spindle nut and replacing the damaged shear pin.



Figure 4.138: Cutterbar Spindles

Removing Cutterbar Spindle Shear Pin

Once the shear pin on a cutterbar spindle has broken, it will need to be removed.

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.

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. Shut down the engine, and remove the key from the ignition.
- 3. Engage the windrower lift safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 4. Open the cutterbar doors. For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83 or 3.7.2 Opening Cutterbar Doors – Export Latches, page 84.
- 5. Clean any debris from the work area.



Figure 4.139: Cutterbar Doors – R113 SP Shown, R116 SP Similar

- 6. Remove cutterbar disc (for example, disc [A]). For instructions, refer to: *Removing Cutterbar Discs, page 132*
- 7. Remove the drum. The procedure to remove the drum depends on whether you are removing a large drum or a small drum:
 - To remove a driven drum (for example, driven drum [B]), refer to *Removing Large Driven Drums and Driveline R113 or R116 SP, page 173.*
 - To remove a non-driven drum (for example, non-driven drum [C]), refer to *Removing Large Non-Driven Drums R113 or R116 SP, page 180*.



Figure 4.140: Cutterbar – R113 SP Shown, R116 SP Similar



Figure 4.141: Cutterbar Spindle

8. Remove retaining ring (A).

9. Remove the M12 bolt securing safecut spindle-nut wrench (A) to its storage location. Remove the safecut spindle-nut wrench.



Figure 4.142: Safecut Spindle-Nut Wrench Location

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and a smooth top on the spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and machined grooves on the spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation). Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.
- 10. Remove two M10 bolts and washers (A).



Figure 4.143: Cutterbar Spindles



Figure 4.144: Cutterbar Spindle

11. Use the safecut spindle-nut wrench to remove nut (A).



Figure 4.145: Cutterbar Spindle



Figure 4.146: Cutterbar Spindle

12. Remove shear pins (B).

IMPORTANT:

Do $\ensuremath{\textbf{NOT}}$ damage the pin bore on the pinion.

- 13. Remove hub (A).
- 14. Check the nut and hub for damage. Replace them if necessary.

Installing Cutterbar Spindle Shear Pin

Ensure that the grooves in the shear pin are parallel to the cutterbar when it is installed into the spindle.



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.

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

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Fill the space above the bearing with grease.
- 3. Place hub (A) on spindle (C).
- 4. Install shear pins (B) so that both shear pin grooves are parallel to the cutterbar.

NOTE:

Ensure that the ends of shear pins (B) do not protrude past the step in hub (A).



Figure 4.147: Cutterbar Spindle

5. Observe the orientation of the grooves in shear pins (A).

IMPORTANT:

Correct shear pin orientation is critical. Both shear pin grooves (A) must be parallel to the cutterbar. They do not need to be facing in the same direction.

NOTE:

The shaft has been removed from the illustration for the sake of clarity.



Figure 4.148: Shear Pin Orientation

- 6. Install nut (A).
- 7. Retrieve the safecut spindle-nut wrench from the left shield plate.

8. Attach safecut spindle-nut wrench (B) 90° (D) to torque wrench (A).

IMPORTANT:

The safecut spindle-nut wrench **MUST** be used with a torque wrench.

- 9. Position safecut spindle-nut wrench (B) on spindle nut (C). Torque the nut to 300 Nm (221 lbf·ft).
- 10. Return safecut spindle-nut wrench (B) to the left shield plate.
- 11. Inspect the threads of two M10 bolts (A) and replace them if they are damaged.
- 12. Install two M10 bolts and washers (A). Torque the hardware to 55 Nm (40 lbf·ft).



Figure 4.149: Cutterbar Spindle



Figure 4.150: Spindle Nut



Figure 4.151: Cutterbar Spindle

13. Install retaining ring (A).



Figure 4.152: Cutterbar Spindle

- 14. Install the disc or drum. Refer to the relevant procedure:
 - Install cutterbar disc (A). For instructions, refer to *Installing Cutterbar Discs, page 133*.
 - Install driven drum (B). For instructions, refer to Installing Large Driven Drums and Driveline – R113 or R116 SP, page 176.
 - Install non-driven drum (C). For instructions, refer to Installing Large Non-Driven Drums – R113 or R116 SP, page 182.

Ensure the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.



Figure 4.153: R113 SP Cutterbar



Figure 4.154: R116 SP Cutterbar

15. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.155: Cutterbar Doors – R113 SP Shown, R116 SP Similar

4.6 Conditioner Roll Timing Gearbox

The conditioner roll timing gearbox transfers power from the gearbox-driven lower roll to the upper roll.

Conditioner roll timing gearbox (A) is located inside the drive compartment at the right of the header.



Figure 4.156: Conditioner Roll Timing Gearbox

4.6.1 Checking and Changing Lubricant in Conditioner Roll Timing Gearbox

The conditioner roll timing gearbox will need its lubricant changed from time to time. Refer to the Maintenance Schedule for information on how often this procedure should be performed.

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

IMPORTANT:

Check the gearbox lubricant level when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to checking the lubricant level.

1. Lower the header to the ground and adjust the header angle (tilt) so that the top of the conditioner is parallel with the ground.

NOTE:

To help ensure an accurate lubricant level reading for the conditioner roll timing gearbox, set the rotary disc pull-type's skid shoes in the fully raised position. For instructions, refer to *Adjusting Cutting Height, page 88* for instructions.

2. Shut down the engine, and remove the key from the ignition.

3. Open right driveshield (A). For instructions, refer to *3.6.1 Opening Driveshields, page 80.*



Figure 4.157: Right Driveshield

Checking the conditioner roll timing gearbox lubricant level:

- 4. Clean any dirt from around lubricant level sight glass (A) and breather (B) on the inboard side of the gearbox.
- 5. Ensure that the lubricant is level at the top of the sight glass. If necessary, add lubricant through breather (B).
- 6. Top up the lubricant level with gear lubricant if necessary. Refer to this manual's inside back cover for a list of recommended fluids, lubricants, and capacities.



Figure 4.158: Roll Timing Gearbox

Changing the conditioner roll timing gearbox lubricant:

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

- 7. Raise the header to provide sufficient access to lubricant drain plug (A).
- 8. Shut down the engine, and remove the key from the ignition.
- 9. Engage the windrower lift cylinder safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.
- 10. Clean around lubricant drain plug (A) on the bottom of the gearbox and around lubricant level plug (B) on the inboard side of the gearbox.
- 11. Place a 1 liter (1.05 qts [US]) container underneath the conditioner gearbox.
- 12. Remove lubricant drain plug (A) using a hex key.
- 13. Allow sufficient time for the lubricant to drain.
- 14. Replace lubricant drain plug (A) and tighten it.
- 15. Fill the gearbox with the specified volume of lubricant as listed on the inside back cover of this manual or until the lubricant is visible in sight glass (B).
- 16. Properly dispose of the old lubricant.



Figure 4.159: Roll Timing Gearbox

4.7 Servicing Header Drive Gearbox

The header drive gearbox transfers power from the hydraulic motor to the cutterbar and to the conditioner. It is located inside the drive compartment at the left end of the header.

The only regular servicing header drive gearbox (A) requires is maintaining the lubricant level and changing the lubricant according to the intervals specified in this manual. For more information, refer to 4.3.1 Maintenance Schedule/Record, page 114.



Figure 4.160: Header Drive Gearbox

4.7.1 Changing Header Drive Gearbox Lubricant

The header drive gearbox will need its lubricant changed from time to time. Refer to the Maintenance Schedule for information on how often this procedure should be performed.

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. Shut down the engine, and remove the key from the ignition.
- 3. Open the left cutterbar door. For instructions, refer to 3.7.1 Opening Cutterbar Doors North America, page 83 or 3.7.2 Opening Cutterbar Doors Export Latches, page 84.

- 4. Clean around lubricant drain plug (A) on the bottom of the gearbox and around lubricant level plug (B) on the inboard side of the gearbox.
- 5. Place a 4 liter (1 gal. [US]) container under drain (A).
- 6. Remove hex plug (A).
- 7. Allow sufficient time for lubricant to drain, replace lubricant drain plug (A), and tighten.
- 8. Remove the lubricant level plug from bore hole (B).
- 9. Remove the plug from fill hole (C).
- 10. Add lubricant through fill hole (C) until the lubricant level is even with bore hole (B). For a list of recommended fluid and lubricant types and amounts, refer to this manual's inside back cover.
- 11. Replace the plugs in bore hole (B) and fill hole (C). Tighten the plugs.
- 12. Clean up any spilled lubricant and properly dispose of any used lubricant and rags.
- 13. Close the cutterbar door. For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 85*.



Figure 4.161: Header Drive Gearbox

4.8 Inspecting Cutterbar Doors

The cutterbar doors protect bystanders from flung objects, and protect the blades from obstacles. They should be inspected periodically.

- 1. Ensure that the door operates smoothly and lies flat when closed. Adjust the doors if necessary.
- Inspect hinge pin bolts (A) and tighten them to 69 Nm (51 lbf·ft) if they are loose.
- 3. Check the door for cracks. Repair the door if any cracks are found.
- 4. Check the door for exposed metal and surface rust. Repair and repaint the door if necessary.
- 5. Check shield/curtain bolts (B) and replace them if they are missing. If they are loose, tighten them.



Figure 4.162: Right Cutterbar Door in Open Position – R113 SP Shown, R116 SP Similar

4.9 Maintaining Curtains

The curtains form a barrier that minimizes the risk of thrown objects being ejected from the cutterbar area. Always keep the curtains down when the machine is being operated.

Rubber curtains are installed at the following locations:

- Inboard curtain (A) attached to the center fixed cover
- Door curtains (B) attached to each cutterbar door
- Outboard curtains (C) attached to each front corner

Replace the curtains if they become worn or damaged.



Figure 4.163: Cutterbar Curtains

4.9.1 Inspecting Curtains

The cutterbar curtains should be inspected periodically for damage and loose or missing hardware.

To reduce the risk of personal injury and machine damage, do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition. Objects in the path of the blades can be ejected with considerable force when the machine is started.

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

Check cutterbar curtains (A) for the following conditions:

- Rips and tears. If any are found, replace the curtain.
- Cracking. While the curtain may look whole, this is an indicator that failure is imminent, and so the curtain should be replaced.
- Missing bolts. Replace any missing hardware before operating the machine.



Figure 4.164: Cutterbar Curtains

4.9.2 Removing Cutterbar Door Curtains

The procedure for removing cutterbar door curtains is the same for both doors.

DANGER

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83 or 3.7.2 Opening Cutterbar Doors – Export Latches, page 84.



Figure 4.165: R113 SP

- 3. Remove seven nuts (A) from the bolt studs.
- 4. Remove aluminum liner (B).
- 5. Remove curtain (C).



Figure 4.166: Cutterbar Door

4.9.3 Installing Cutterbar Door Curtains

Be sure not to overtighten the nuts when installing the cutterbar door curtains.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Insert seven cutterbar door stud bolts (B) into the precut holes on curtain (A).
- 3. Install seven large washers (C).
- 4. Install liner panel (D) against the washers.
- 5. Install seven nuts (E) onto the bolt studs. Torque the nuts to 28 Nm (21 lbf·ft).

IMPORTANT:

To avoid damaging the bolt studs, do **NOT** overtighten the nuts.

6. Close the cutterbar doors. For instructions, refer to *3.7.3 Closing Cutterbar Doors, page 85.*



Figure 4.167: Cutterbar Curtain

4.9.4 Removing Cutterbar Inboard Curtain

Remove the cutterbar inboard curtain if it is torn or cracked.

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



Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.168: Cutterbar Doors – R113 SP Shown



Figure 4.169: Inboard Curtain



Figure 4.170: Inboard Curtain

3. Remove two M10 carriage head bolts (A) and nuts securing curtain assembly (B) to the rotary disc header, and remove the curtain assembly.

- 4. Remove four nuts (A) from the studs on the center shield.
- 5. Remove two curtain brackets (B). Remove the curtain.

4.9.5 Installing Cutterbar Inboard Curtain

Be sure not to overtighten the nuts when the inboard curtain is installed.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.171: Cutterbar Doors – R113 SP Shown

- Install the curtain onto the studs on the center shield. Install two curtain brackets (B) and secure the curtain with four nuts (A).
- 4. Torque the hardware to 28 Nm (21 lbf·ft).

IMPORTANT:

To avoid damaging bolt studs, do **NOT** overtighten the nuts.



Figure 4.172: Inboard Curtain

- 5. Secure two curtain brackets (A) to the center shield using two M10 carriage head bolts and nuts (B).
- 6. Torque bolts (B) to 39 Nm (29 lbf·ft).



Figure 4.173: Inboard Curtain

4.9.6 Removing Outboard Curtains

Remove the outboard curtains if they are damaged or cracked.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

- 1. Shut down the engine, and remove the key from the ignition.
- 2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.174: Cutterbar Doors – R113 SP Shown

3. Remove four bolts, large washers, and nuts (A) securing outboard curtain (B) to the endsheet.



Figure 4.175: Left Endsheet



Figure 4.176: Outboard Curtain

4.9.7 Installing Outboard Curtains

Remove two nuts (A) from the bolt studs.

bracket (C), and remove curtain (D).

Remove nut (B) from the carriage head bolt, remove

The procedure for installing outboard curtains is the same for both sides of the machine.

4.

5.

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

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with blades.

1. Shut down the engine, and remove the key from the ignition.

2. Open cutterbar doors (A). For instructions, refer to 3.7.1 Opening Cutterbar Doors – North America, page 83.



Figure 4.177: Cutterbar Doors – R113 SP Shown



Figure 4.178: Outboard Curtain



Figure 4.179: Left Endsheet

- 3. Install curtain (A) into bracket (B).
- 4. Install two nuts (D) and tighten them.
- 5. Slide bracket (B) into position and install square neck carriage head bolt and flange nut (C).
- 6. Torque flange nut (C) to 39 Nm (29 lbf·ft).

 Install four bolts, large washers, and nuts (A) to secure outboard curtain (B) to the endsheet. Torque the bolts to 39 Nm (29 lbf·ft).

4.10 Conditioner System

The conditioner system is intended to crimp and crush crop stems, helping the crop to dry faster. The conditioner system is attached to the rear of the header.



Figure 4.180: R1 Series Rotary Disc Header – R113 SP Shown, R116 SP Similar

Conditioner System (A)

4.10.1 Inspecting Roll Conditioner

The conditioner bearings, U-joints, and the roll timing gearbox should be inspected periodically for signs of wear or damage.

DANGER

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

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

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Engage the header safety props. For instructions, refer to 3.3 Engaging and Disengaging Header Safety Props, page 23.

4. Remove left and right driveshields (A). For instructions, refer to *3.6.1 Opening Driveshields, page 80*.



Figure 4.181: Driveshields



Figure 4.182: Conditioner Roll Left Bearing



Figure 4.183: Conditioner Drive U-Joints

 Inspect conditioner roll left bearing (A) for signs of wear or damage. If the bearing needs replacing, contact your Dealer.

6. Inspect conditioner drive U-joints (A) for signs of wear or damage. If the U-joints need replacing, contact your Dealer.

 Inspect roll timing gearbox bearings (A) for signs of wear or damage. If the bearings need replacing, contact your Dealer.



Figure 4.184: Roll Timing Gearbox Bearings

4.10.2 Conditioner Drive Belt

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

Inspecting Conditioner Drive Belt

Check the belt tension and inspect for damage or wear according to the intervals specified in the Maintenance Schedule.

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Open left driveshield (A). For instructions, refer to *3.6.1 Opening Driveshields, page 80*.



Figure 4.185: Left Driveshield – R113 SP Shown, R116 SP Similar

- 4. Inspect drive belt (A). Replace it if it is torn or cracked.
- 5. Check that jam nut (B) and adjuster nut (C) are tight.



Figure 4.186: Conditioner Drive

- 6. Measure the length of belt tensioner spring (A). The spring length (B) should be 366 mm (14 3/8 in.) in accordance with spring tension decal (C). If the spring length requires adjustment, refer to *Installing Conditioner Drive Belt, page 212*.
- 7. Close the driveshield. For instructions, refer to *3.6.2 Closing Driveshields, page 81*.



Figure 4.187: Belt Tensioner Spring

Removing Conditioner Drive Belt

Remove the conditioner drive belt if it is torn or cracked.

DANGER

- 1. Lower the header fully.
- 2. Shut down the engine, and remove key from the ignition.
- 3. Open the left driveshield. For instructions, refer to 3.6.1 Opening Driveshields, page 80.

4. Disconnect wire harness (A) from speed sensor (B).

- 5. Turn jam nut (A) counterclockwise to unlock the tension adjustment.
- 6. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C), and release the tension from conditioner drive belt (D).
- 7. Remove drive belt (D).



Figure 4.188: Speed Sensor Assembly



Figure 4.189: Conditioner Drive

Installing Conditioner Drive Belt

Ensure that the length of the tensioner spring is set correctly when installing the conditioner drive belt.

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.

 Install drive belt (A) onto driven pulley (C) first, and then onto drive pulley (B), ensuring that the belt is in the pulley grooves.

NOTE:

If necessary, loosen the jam nut and adjuster nut to relieve the spring tension.

- 4. Measure the length of tensioner spring (C). Dimension (D) should be set to 365 mm (14 3/8 in.) to ensure that the belt is tensioned correctly.
- 5. To adjust the spring tension, loosen jam nut (A).
- Turn adjuster nut (B) clockwise to increase the belt tension, or turn adjuster nut (B) counterclockwise to decrease the belt tension.
- 7. Once the correct spring measurement has been achieved, hold adjuster nut (B) and tighten jam nut (A) against it.
- 8. Reconnect speed sensor (B) to wiring harness (A).

NOTE:

Ensure the speed sensor is installed correctly for the windrower. Use the bottom hole for M1 Series Windrowers; use the top hole for M Series Windrowers.

9. Close the left driveshield. For instructions, refer to 3.6.2 *Closing Driveshields, page 81.*



Figure 4.190: Conditioner Drive



Figure 4.191: Conditioner Drive



Figure 4.192: Speed Sensor

4.10.3 Changing Conditioner

There are several ways that the conditioner can be configured, depending on your particular machine.

If a conditioner change is **NOT** required, proceed to 3.4 Attaching Rotary Disc Header to Windrower, page 26.

The R1 Series Rotary Disc Header can be operated either with no conditioner, with a polyurethane roll conditioner, or with a steel roll conditioner. If the rotary disc header is not conditioner-equipped, a shield must be installed.

NOTE:

These instructions apply to all conditioners. Exceptions are identified where applicable.

Removing Conditioner

The conditioner is very heavy. Removing it will require the use of a forklift or equivalent lifting device.

- 1. Detach the header from the windrower.
- 2. Open the driveshields. For instructions, refer to *3.6.1 Opening Driveshields, page 80.*
- 3. Remove the conditioner drive belt. For instructions, refer to *Removing Conditioner Drive Belt, page 211.*
- 4. **M1 Series and M205:** Move hose bundle (A) clear of the frame and lay it on the header.

5. **M155 and M155E4:** Remove two bolts (A) securing hose bracket (B) to the header frame. Place the hose bundle and

the bracket onto the header. Do NOT disconnect the hoses



Figure 4.193: M1 Series and M205 Hose Bundle



Figure 4.194: M155 and M155E4 Hose Support

215622

from the motor.

WARNING

To prevent the frame from slipping off of the forks, ensure that the frame is secured to the forks. Failure to secure the frame to the forks could result in death or serious injury.

6. Support and secure the adapter frame for lifting. Use one of the two methods below:

Method 1:

 Attach straps (A) to adapter frame (B) and to the forklift forks. Straps with a minimum working load of 454 kg (1000 lb.) should be used.



Figure 4.195: Supporting Frame Using Straps

Method 2:

- To protect the finish on the frame, wrap packing foam (A) (or equivalent) around the frame at approximately the locations shown.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise the forks and lift the frame slightly. The forks should **NOT** directly contact the frame.
- c. To secure the frame to the forks, wrap chain (C) around the end of the forks and attach the other end of the chain to the forklift.
- Lift the header with the forklift and place 150 mm (6 in.) wooden blocks (A) under the skid shoes. Lower the header onto the blocks and allow the header to tilt forward.



Figure 4.196: Supporting Frame Using Chain



Figure 4.197: Header on Blocks

8. Remove nut (A) securing bolt (B), washer (C), and washer shims (D) from the center-link support. If necessary, adjust the height of the forks lifting the frame. Retain the hardware for reinstallation.

NOTE:

Some transparencies are used in the illustration to help clarify the position of shims (D).



To prevent the frame from slipping off of the forks, ensure that the frame is secured to the forks. Failure secure the frame to the forks could result in death or serious injury.

Stand clear when the frame is being detached, because the frame may shift when the bolts are removed.

- 10. Remove bolt (A) from frame (C). If necessary, adjust the height of the forks to improve access to bolt (A). Repeat this step at the opposite side of the frame. Retain the hardware for reinstallation.
- 11. Slowly and carefully back the forklift away from the header until the frame is clear of the header. Move the frame away from the work area, lower it to the ground, and disconnect it from the forklift.
- 12. Attach spreader bar (A) to a forklift or equivalent lifting device, and attach chains to lugs (B) on conditioner (C). Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).



Figure 4.198: Center-Link Support



Figure 4.199: Left Side of Adapter Frame



Figure 4.200: Spreader Bar

13. Loosen two M16 hex head bolts (A) at each side of the conditioner.



Figure 4.201: Left Side of Conditioner – Right Side Similar

14. Loosen two carriage bolts (A) securing conditioner gearbox support (B) to the header.

To prevent the conditioner from falling backward, ensure lifting chains are secure and tight. Failure to do so may result in death or serious injury.

Stand clear when detaching frame as frame may shift when bolts are removed.

15. Adjust the height of the forks to raise the conditioner slightly. Remove the loosened bolts and retain the hardware for reinstallation.

WARNING

Ensure that the spreader bar is secured to the forks so that it cannot slide off the forks or towards the header. Failure to do so could result in death or serious injury.

- 16. Using the forklift, lift conditioner (A) off of header (B). Avoid contact between the top of the conditioner and center-link anchor (C).
- 17. Move the frame away from the work area, set it on the ground, and remove the chains securing the conditioner to the spreader bar.



Figure 4.202: Conditioner Gearbox



Figure 4.203: Lifting Conditioner

Installing Conditioner

The conditioner is very heavy. Installing it will require the use of a forklift or equivalent lifting device.

1. Attach spreader bar (A) to the forklift (or an equivalent lifting device) and attach chains to lugs (B) on the conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

Ensure that the spreader bar is secured to the forks so that it cannot slide off the forks or towards the header while you are attaching the conditioner to the header. Failure to do so could result in death or serious injury.

- 2. Lift conditioner (C) and align it with the header opening.
- Carefully align pin (B) at each end of conditioner (A) with lug (C) on the header. Lower conditioner (A) until pins (B) engage lugs (C) on the header. Avoid contact between the top of the conditioner and the center-link anchor.



Figure 4.204: Lifting Conditioner



Figure 4.205: Installing Conditioner



Figure 4.206: Left Side of Conditioner – Right Side Similar

 Align the mounting holes and install four M16 x 40 hex head bolts (A) with the heads facing inboard (two per side). Secure the bolts with four M16 center lock flanged nuts. Do **NOT** tighten the nuts yet. Align the holes in support (B) with the mounting holes in the header frame. Install two carriage bolts (A) to secure conditioner gearbox support (B) to the header. The bolt heads must face inboard. Torque the nuts to 69 Nm (51 lbf·ft).

7. Remove the lifting chains from the conditioner and move

8. If necessary, install the conditioner drive components. For instructions, refer to *Installing Conditioner Drive, page 222*.

To prevent the frame from slipping off of the forks, ensure that the frame is secured to the forks. Failure to do so could result

6. Torque nuts (A) to 170 Nm (126 lbf·ft).

WARNING

in death or serious injury.

the lifting device clear of the work area.



Figure 4.207: Conditioner Gearbox



Figure 4.208: Left Side of Conditioner – Right Side Similar

9. Support and secure the adapter frame for lifting. Use one of the two methods below:

Method 1:

- a. Attach straps (A) to adapter frame (B) and the forklift forks. Use straps rated for overhead lifting with a minimum working load of 454 kg (1000 lb.).
- b. Pick up the frame and position it against the header.



Figure 4.209: Supporting Frame Using Straps

Method 2:

- To protect the finish on the frame, wrap packing foam (A) (or equivalent) around the approximate frame locations shown.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise the forks and lift the frame slightly. The forks should not directly contact the frame.
- c. To secure the frame to the forks, wrap chain (C) around the end of the forks and attach it to the forklift.
- d. Pick up the frame and position it against the header.
- 10. Slowly move the conditioner forward until lift arm (C) is aligned with mounting holes (A) and (B) in the frame.



Figure 4.210: Supporting Frame Using Chain



Figure 4.211: Frame – Left Side Shown



Figure 4.212: Frame Attachment – Left Side Shown

- 11. Install bolt (A) through frame (B) and bushing (D) in the lift arm. Repeat this step for the opposite side of the machine.
- 12. Check gaps (C) between bushing inner steel sleeve (D) and frame (B). If there is a gap, install 1.2 mm thick flat washers to minimize the gap on both sides of the bushing.
- 13. Remove bolt (A).

- Apply anti-seize compound to the shank of bolt (B). Do NOT apply anti-seize to the bolt threads. Install washer (A) onto bolt (B).
- 15. Install bolt (B) with washers (C) as determined in Step 12, page 220.
- 16. Install three washers (D) and nut (E) onto the bolt. Torque the bolt to 339 Nm (250 lbf·ft).
- 17. Repeat Step *12, page 220* to Step *16, page 221* for the opposite side.



Figure 4.213: Frame Attachment – Cross Section View



Figure 4.214: Center-Link Support



Figure 4.215: Header on Blocks

- With flat washer shim (A) on both sides of the center-link support, install securing bolt (B) and washer (C) through the conditioner center-link support bracket and the center-link support.
- 19. Install nut (D) and torque it to 339 Nm (250 lbf·ft).

NOTE:

WARNING

in death or serious injury.

Some transparencies are used in the illustration to help clarify the position of shims (A).

To prevent the frame from slipping off of the forks, ensure that the frame is secured to the forks. Failure to do so could result

20. Lift the header and remove wooden blocks (A) under the

21. Remove any straps or chains securing the frame to the forks, and back the forklift away from the work area.

skid shoes. Lower the header to the ground.

22. **M155 and M155***E4* **Windrowers:** Position the hose bundle and hose support (B) onto the adapter and secure it with bolts and nuts (A).

23. M1 Series and M205 Windrowers: Reposition hose

Installing Conditioner Drive Belt, page 212.

25. Close the driveshields. For instructions, refer to 3.6.2

24. Install the conditioner drive belt. For instructions, refer to

Figure 4.216: M155 and M155E4 Hose Support



Figure 4.217: M1 Series and M205 Hose Bundle

Installing Conditioner Drive

bundle (A) on the frame.

Closing Driveshields, page 81.

This procedure describes the installation of conditioner drive components on a machine that was originally supplied with no conditioner. The procedure is similar for machines which have a conditioner installed.

If a conditioner is to be installed on the R113 SP, refer to *Installing Conditioner, page 218* and *Installing Conditioner Drive Belt, page 212*.

 Remove drive cover (A) from the left side of the header by removing hex head bolt (B), flat washer (C) and nut (D). Slide the cover off of pins (E).



Figure 4.218: Drive Cover

 Position tensioner assembly (A) as shown. Secure it with M16 x 120 bolt (B) and nut (C). Torque nut (C) to 50 Nm (37 lbf·ft).



Figure 4.219: Tensioner



Figure 4.220: Tensioner

- 3. Install spring (A) into forward hole (B) in the frame.
- Install eyebolt (C) onto spring (A) and tensioner (D). Secure eyebolt (C) to tensioner (D) with hardened washer (E), two M10 nuts (F), and straight pin (G).

NOTE:

Install the conditioner drive belt after reattaching the header to the adapter.

4.10.4 Replacing Discharge Shield – No Conditioner

If the discharge shield on a header not equipped with a conditioner is damaged, it will need to be replaced.

Removing Discharge Shield – No Conditioner

Discharge shields may need to be removed for machine service, but a rotary disc header without a conditioner should **NOT** be operated without the discharge shield.

- 1. Disconnect and remove the header from the windrower. For instructions, refer to the header operator's manual.
- 2. On both ends of the header, remove four M16 hex head bolts, nuts, and flat washers (A) securing shield (B) to header panel (C).



Figure 4.221: Left Side of Header – Right Opposite



Figure 4.222: Left Side of Header – Right Opposite

3. Lift shield (A) until pins (B) (one on each side) disengage from the slots in support (C).

Installing Discharge Shield – No Conditioner

Discharge shields may need to be removed for machine service, but a rotary disc header without a conditioner should **NOT** be operated without the discharge shield.

 Position shield (A) until pins (B) (one on each side) engage the slots in support (C) and the bolt holes in shield (A) align with holes (D) in the header.



Figure 4.223: Left Side of Header – Right Opposite

- 2. Secure shield (B) to the header with four M16 hex head bolts (A), nuts, and flat washers.
- Ensure the bolt heads face inboard and torque the nuts to 261 Nm (193 lbf·ft).



Figure 4.224: Left Side of Header – Right Opposite

4.10.5 Replacing Driveshields

If driveshields are missing, severely damaged, or are not securely installed due to damage, they must be replaced.

Removing Driveshields

The driveshields can be removed without the use of tools.

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure depict the left driveshield; the right driveshield is similar.



Figure 4.225: Left Driveshield



Figure 4.226: Tool to Unlock Driveshield

1. Remove lynch pin (A) and tool (B) from pin (C).

2. Insert the flat end of tool (A) into latch (B) and turn it counterclockwise to unlock the latch.



Figure 4.227: Tool to Unlock Driveshield and Latch



Figure 4.228: Driveshield

3. Pull the top of driveshield (A) away from the header and lift the driveshield off of the pins at the base of the shield.

Installing Driveshields

The driveshields can be installed without the use of tools.



To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure depict the left driveshield; the right driveshield is similar.

- 1. Position driveshield (A) onto pins (B) at the base of the driveshield.
- 2. Push the driveshield so that latch (C) is engaged.
- 3. Check that driveshield (A) is properly secured.



Figure 4.229: Driveshield and Latch



Figure 4.230: Tool to Unlock Driveshield

4. Replace tool (B) and lynch pin (A) on pin (C).

Replacing Driveshield Latch

The driveshield is an important safety component. If the latch is not holding the driveshield securely, it will need to be replaced.

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown depict the left driveshield; the right driveshield is similar.

1. Remove driveshield (A). For instructions, refer to *Removing Driveshields, page 226*.



Figure 4.231: Driveshield

- 2. Remove and retain hex nut and flat washer (A) securing the latch to the backside of the driveshield.
- 3. Remove the existing latch and replace it with the new part.
- 4. Reinstall retained hex nut and flat washer (A).



Figure 4.232: Backside of Driveshield

- 5. Remove two carriage bolts (A), replace stud and clip assembly (B) if it is worn or damaged, and reinstall the carriage bolts.
- 6. Reinstall the driveshield. For instructions, refer to *Installing Driveshields, page 228*.



Figure 4.233: Stud and Clip Assembly

4.11 Electrical System

The header's electrical system is powered by the windrower. The electrical harness from the header connects to the windrower, supplying power to the hazard and signal lights. It also receives signals from the header speed sensor.





Electrical harness (A)

Speed sensor (B)

4.11.1 Maintaining Electrical System

Proper maintenance of the electrical system helps prevent future problems.

- Use electrical tape and cable ties as required to prevent the wiring harness from dragging or rubbing.
- Keep the lights clean and replace any defective bulbs.

4.11.2 Replacing Amber Hazard/Signal Light Fixture

Replace the amber hazard or signal light fixtures if they are damaged or inoperable.

DANGER

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.

3. Remove four nuts (A) and bolts (B) securing the light to the bracket.

NOTE:

Only three bolts are shown in the illustration.

- 4. Remove the light and disconnect it from the electrical harness.
- 5. Connect the new light to the electrical harness.
- 6. Position the new light on the bracket, insert bolts (B), and install and tighten four nuts (A).
- 7. Check the operation of the new light.



Figure 4.235: Amber Hazard Light

4.11.3 Replacing Amber Hazard/Signal Bulb

Replace the amber hazard or signal bulbs if they are damaged or inoperable.

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. Shut down the engine, and remove the key from the ignition.
- 3. Remove two Phillips screws (A) from the fixture. Remove the plastic lens.
- 4. Replace the bulb, and reinstall the plastic lens and screws.



Figure 4.236: Plastic Lens and Screws

4.11.4 Replacing Header Speed Sensor

If the header speed sensor malfunctions or is damaged, it will need to be replaced.

- 1. Lower the header fully.
- 2. Shut down the engine, and remove the key from the ignition.
- 3. Open the left driveshield. For instructions, refer to 3.6.1 Opening Driveshields, page 80.

- 4. Remove plastic fastener (B) from the bracket. Cut cable tie (E) securing the sensor wire to the wiring harness.
- 5. Disconnect wire harness (C) from speed sensor connector (D).
- 6. Remove nut (F) from the end of the speed sensor and remove the sensor from bracket (A).
- Remove the nut from the end of the new speed sensor. Install the new sensor into bracket (A) and secure it with nut (F).

NOTE:

Ensure that the speed sensor is installed into the correct hole for the application. Different MacDon windrowers require the speed sensor to be in different positions: use the bottom hole for M1 Series Windrowers; use the top hole for M155*E*4 or M155 SP Windrowers.

- 8. Connect the speed sensor wire to harness (C).
- Install plastic fastener (B) in the small hole in bracket (A). Secure the speed sensor wire to fastener (B) with a cable tie, allowing a gap of 102–104 mm (4 4 3/16 in.) between the fastener and sensor.
- 10. Secure the speed sensor wire to header harness (C) with plastic cable tie (E). Ensure that the wires are clear of the belt and the pulley.
- Adjust nuts (A) as required to achieve a 2–3 mm (1/16–1/8 in.) gap (B) between speed sensor (C) and pulley (D). Ensure that the sensor face and the pulley face are parallel. Bend bracket (E) as required.
- 12. Tighten nuts (A) to 12 Nm (9 lbf·ft).
- 13. Close the driveshield. For instructions, refer to *3.6.2 Closing Driveshields, page 81.*
- 14. Start the windrower, engage the header, and check the operation of the speed sensor on the monitor. The sensor may require recalibrating. Refer to the windrower operator's manual for the calibration procedure.



Figure 4.237: Header rpm Sensor



Figure 4.238: Header rpm Sensor

4.12 Hydraulics

Consult this section for general information on the hydraulic system. Detailed procedures for maintaining and repairing the hydraulic system are beyond the scope of the operator's manual.

4.12.1 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of damage or leaks. Replace any damaged or leaking hoses immediately. Follow all applicable safety procedures while inspecting and maintaining the hydraulic system.

- Avoid high-pressure fluids. Escaping fluid can penetrate the skin, causing serious injury. Relieve the pressure from the hydraulic system before disconnecting any hydraulic lines. Tighten all hydraulic connections before applying pressure. Keep your limbs away from pin holes and nozzles, which can eject fluids with enormous force.
- 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.

Figure 4.239: Hydraulic Pressure Hazard



Figure 4.240: Testing for Hydraulic Leaks

• 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. Overhauls must be performed in an environment free of dust and debris.

Chapter 5: Options and Attachments

Consult this section to learn about additional hardware and configuration options for your machine. Contact your Dealer for more information.

5.1 Performance Kits

Performance kits allow your machine to cut different types of crop in different conditions. The following kits are available through your MacDon Dealer. The Dealer will require the bundle number for pricing and availability.

5.1.1 Tall Crop Divider Kit

Tall crop dividers attach to the ends of the machine for clean crop dividing and cutterbar entry in tall crops.

The kit includes left and right dividers and attachment hardware.

MD #B5800



Figure 5.1: Tall Crop Divider — Left Side Shown

5.1.2 No Conditioner Kit

The R1 SP Series Rotary Disc Header can be operated without a conditioner. The kit includes required the rear windrow shielding and curtain.

MD #B5818

5.1.3 Polyurethane Roll Conditioner Kit

Roll conditioners allow for faster cut crop drying times by crimping and crushing the crop stem as it exits the machine. A polyurethane roll conditioner is better suited for crushing stems while providing reduced crimping and is recommended for alfalfa, clover, legumes, and similar crops. The kit includes the conditioner and installation hardware.

MD #B6557

5.1.4 Steel Roll Conditioner Kit

Roll conditioners allow for faster cut crop drying times by crimping and crushing the crop stem as it exits the machine. Steel rolls with a larger roll gap (up to 25 mm [1 in.]) may be desirable for thick-stemmed cane-type crops; however, too large a gap may cause feeding problems. Steel rolls are recommended for these types of situations. The kit includes the conditioner and installation hardware.

MD #B6558

5.2 Hydraulic Drive Conversion Kits

Headers are factory-configured for use with either M155 and M155*E4* SP Windrowers, or M1 Series Windrowers. Headers can be reconfigured for use on the alternative windrower options by using hydraulic conversion kits.

5.2.1 R1 to M1170 Hydraulic Drive Kit

The Hydraulic Drive kit is required for an R1 Series Rotary Disc Header originally configured for use with an M155 or M155*E4* SP Windrower to operate correctly with an M1 Series Windrower. This kit is also required to run an R113 SP Rotary Disc Header with an M1240 Windrower and M205 SP Windrower.

MD #B6845



Figure 5.2: Hydraulic Drive Kit (MD #B6845)

5.2.2 M1240 Case Drain Kit

When connecting the R113 SP Rotary Disc Header to an M1240 SP Windrower, the Case Drain kit must be installed onto the M1240. This kit contains an alternative case drain line which is routed directly to the hydraulic reservoir and includes a special set of 1/2 in. hydraulic couplers.

MD #B6698



Figure 5.3: Case Drain Kit (MD #B6698)

Case drain (A)

5.2.3 M155 and M155E4 Hydraulic Drive Conversion Kit

The Hydraulic Drive kit is required for an R1 Series Rotary Disc Header originally configured for use with an M1 Series Windrower to operate correctly with M155 or M155*E4* Self-Propelled Windrowers.

Hydraulic drive kit (A)

MD #B6272



Figure 5.4: Hydraulic Drive Kit (MD #B6272)

5.2.4 M205 Compatibility Kit

The M205 Compatibility kit is required for an R113 Rotary Disc Header originally configured for use with an M1170 Windrower to operate on an M205 Self-Propelled Windrower.

MD #257188



Figure 5.5: M205 Compatibility Kit (MD #257188)
Chapter 6: Troubleshooting

Refer to this table if you encounter problems while operating your machine.

6.1 Performance Problems

If your machine is in good mechanical condition but is not performing to your satisfaction, consult this table.

Problem	Solution	Refer to
Symptom: Cutterbar plugging		
Dull, bent, or badly worn disc blades	Replace the disc blades.	 Removing Disc Blades, page 146 Installing Disc Blades, page 147
Build-up of dirt between the rock guards	Decrease the header angle and increase the float. In some conditions, it may be necessary to carry the header slightly using the header lift cylinders.	 3.8.1 Cutting Height, page 87 Refer to windrower operator's manual
Conditioner drive belt is slipping	Adjust the conditioner drive belt tension.	4.10.2 Conditioner Drive Belt, page 210
Symptom: Ragged or uneven cutting o	f crop	
Header angle is too flat for the guards to pick up downed crop	Increase the header angle.	3.8.1 Cutting Height, page 87
Downed crop	Adjust the header angle to cut closer to the ground.	3.8.1 Cutting Height, page 87
Header float is too light, causing the header to bounce	Switch to a heavier float setting.	Refer to the windrower operator's manual
Excessive ground speed	Reduce the ground speed.	—
Symptom: Strips of uncut crop left on	field	
Dull, bent, or badly worn disc blades	Replace the disc blades.	 Removing Disc Blades, page 146 Installing Disc Blades, page 147
Build-up of dirt between the rock guards	Decrease the header angle and increase the float. In some conditions, it may be necessary to carry the header slightly using the header lift cylinders.	 3.8.1 Cutting Height, page 87 Refer to windrower operator's manual
Excessive header speed	Reduce the header disc speed.	—
Foreign object on the cutterbar	Disengage the header and stop the engine. When all moving parts have completely stopped, remove the foreign object.	4.5.2 Cutterbar Discs, page 130
Disc is not turning	Replace the spindle shear pin.	4.5.9 Replacing Cutterbar Spindle Shear Pin, page 184
Ground speed too slow	Increase the ground speed.	_
Symptom: Conditioner rolls plugging		
Ground speed is too fast	Reduce the ground speed.	
Roll gap too large for the proper feeding of crop	Decrease the roll gap.	• Adjusting Roll Gap – Polyurethane Rolls, page 96

Problem	Solution	Refer to
		Adjusting Roll Gap – Steel Rolls, page 97
Roll gap is too small in thick-stemmed cane-type crops	Increase the roll gap.	 Adjusting Roll Gap – Polyurethane Rolls, page 96 Adjusting Roll Gap – Steel Rolls, page 97
Swath baffle set too low	Raise the swath baffle.	3.10.4 Forming Shields – Roll Conditioner, page 101
Roll speed too low	Increase the disc speed.	—
Foreign object between the rolls	Disengage the header and stop the engine. When all moving parts have completely stopped, remove the foreign object.	4.5.2 Cutterbar Discs, page 130
Cutting height is too low	Decrease the header angle in order to raise the cutting height.	3.8.1 Cutting Height, page 87
Backing into the windrow	Raise the header before backing up.	_
Rolls improperly timed Adjust the roll timing.		Adjusting Roll Timing, page 99
Symptom: Uneven formation and bund	hing of windrow	
Swath baffle (deflector) bypassing or dragging crop	Adjust rear deflector for proper crop control.	Positioning Rear Baffle – Roll Conditioner, page 102
Forming shields are improperly adjusted	Adjust the roll conditioner forming shields.	 Positioning Forming Shield Side Deflectors – Roll Conditioner, page 102 Positioning Rear Baffle – Roll Conditioner, page 102
Roll gap is too large	Adjust the roll gap.	 Adjusting Roll Gap – Polyurethane Rolls, page 96 Adjusting Roll Gap – Steel Rolls, page 97
Conditioner rolls are running too slowly	Maintain the rated header speed.	Refer to windrower operator's manual
Symptom: Uneven windrow formation	in light crop	
Uneven crop feeding	Reduce the header speed.	Refer to windrower operator's manual
Symptom: Plugging behind end hourgla	ass deflectors	
Ground speed is too slow	Increase the ground speed.	—
Dirt building up on the cutterbar	Remove the crop deflectors attached to the rear of the cutterbar.	3.11.3 Removing Cutterbar Deflectors – R116, page 106
Symptom: Not cutting short enough in	down crop	
Ground speed is too fast	Reduce the ground speed.	
Broken, bent, or dull blades	Replace the blades or turn the blades over.	 Removing Disc Blades, page 146 Installing Disc Blades, page 147

Problem	Solution	Refer to			
Cutting height is too highIf field conditions allow, adjust the header angle so that it is steeper. This will lower the cutting height.		3.8.1 Cutting Height, page 87			
Symptom: Material being pulled out by roots when cutting, and tall crop leaning into machine					
Crop in the conditioner rolls before the crop is cut	Increase the roll gap.	• Adjusting Roll Gap – Polyurethane Rolls, page 96			
		 Adjusting Roll Gap – Steel Rolls, page 97 			
Symptom: Damaged leaves and broker	stems				
Insufficient roll gap	Increase the roll gap.	• Adjusting Roll Gap – Polyurethane Rolls, page 96			
		• Adjusting Roll Gap – Steel Rolls, page 97			
Roll timing is off	Check the roll timing and adjust it if	• Checking Roll Timing, page 99			
	necessary.	• Adjusting Roll Timing, page 99			
Symptom: Cutting height varies from o	ne side to the other				
Float is not properly balanced	Adjust the header float.	Refer to the windrower operator's manual			
Symptom: Slow crop drying					
Crop is bunched in windrow	Adjust the forming shields or the baffle.	• Positioning Forming Shield Side Deflectors – Roll Conditioner, page 102			
		• Positioning Rear Baffle – Roll Conditioner, page 102			
Rolls are not crimping crop sufficiently	Decrease the roll gap.	• Adjusting Roll Gap – Polyurethane Rolls, page 96			
		• Adjusting Roll Gap – Steel Rolls, page 97			
Symptom: Excessive drying or bleaching	g of crop				
Excessive crimping of crop	Increase the roll gap.	• Adjusting Roll Gap – Polyurethane Rolls, page 96			
		• Adjusting Roll Gap – Steel Rolls, page 97			
Crop is spread too wide in the windrow	Adjust the forming shields.	Positioning Forming Shield Side Deflectors – Roll Conditioner, page 102			
		 Positioning Rear Baffle – Roll Conditioner, page 102 			

Problem	Solution	Refer to		
Symptom: Poorly formed or bunchy windrows				
Forming shields not properly positioned	Adjust the forming shields.	 Positioning Forming Shield Side Deflectors – Roll Conditioner, page 102 Positioning Rear Baffle – Roll Conditioner, page 102 		

6.2 Mechanical Problems

If your machine develops mechanical problems, consult this table for guidance.

Problem	em Solution Refer to		
Symptom: Excessive noise			
Bent disc blade	Replace the blade.	 Removing Disc Blades, page 146 Installing Disc Blades, page 147 	
Conditioner roll timing is off	Check the roll timing and adjust it, if necessary.	 Checking Roll Timing, page 99 Adjusting Roll Timing, page 99 	
Bent drum deflector	Replace the drum.	4.5.8 Maintaining Large Drums – R113 or R116 SP, page 170	
Conditioner roll gap is too small	Check the gap and adjust it, if necessary.	 Checking Roll Gap, page 95 Adjusting Roll Gap – Polyurethane Rolls, page 96 Adjusting Roll Gap – Steel Rolls, page 97 	
Symptom: Excessive vibration or noise	in header		
Mud deposits found on the conditioner rolls	Clean the rolls.	—	
Conditioner rolls are contacting each other	Increase the roll gap.	 Adjusting Roll Gap – Polyurethane Rolls, page 96 Adjusting Roll Gap – Steel Rolls, page 97 	
Conditioner rolls are contacting each other	Check the roll timing.	Checking Roll Timing, page 99	
Symptom: Excessive heat in cutterbar			
Incorrect level of lubricant in cutterbar —either too little or too much	Drain the lubricant and refill it with the amount specified in this manual.	Draining Cutterbar, page 128	
Symptom: Frequent blade damage			
Mud on the cutterbar	Remove the mud from the cutterbar. Do NOT allow mud to dry on the cutterbar.	_	
Spindle bearing failure	Replace the spindle bearing.	 Removing Cutterbar Spindles, page 136 Installing Cutterbar Spindles, page 138 	
Header float is too heavy	Increase the float.	Refer to windrower operator's manual	
Material wrapped around spindle	Remove disc and remove material.	 Removing Disc Blades, page 146 Installing Disc Blades, page 147 	
Machine is cutting too low in rocky field conditions Decrease the header angle and, increase the float.		 3.8.1 Cutting Height, page 87 Refer to windrower operator's manual 	

Problem	Solution	Refer to
Ground speed is too high in rocky field conditions. At high ground speed, the header tends to dig rocks from the ground instead of floating over them	Reduce the ground speed.	—
Disc blades are incorrectly mounted	Check all blade mounting hardware and ensure that the blades move freely.	Inspecting Disc Blades, page 142
Symptom: Excessive wear of cutting co	mponents	
Header angle is too steep	Reduce the header angle.	3.8.1 Cutting Height, page 87
Crop residue and dirt deposits found on the cutterbar	Clean the cutterbar.	_
Mud on found on the cutterbar	Remove mud from the cutterbar. Do NOT allow mud to dry on the cutterbar.	_
Symptom: Machine pulling to one side		
Header is dragging on one end and pulling to that side	Adjust the header float on both ends.	Refer to the windrower operator's manual
Symptom: Breakage of conditioner roll	timing belt	
Belt is not seated in the proper groove in the pulley	Align the belt.	<i>4.10.2 Conditioner Drive Belt, page 210</i>
Foreign object found between the rolls	Disengage the header and stop the engine. When all moving parts have completely stopped, remove the foreign object.	Inspecting Conditioner Drive Belt, page 210
Belt pulleys and idlers misaligned	Align pulleys and idler.	See MacDon Dealer
Symptom: Conditioner roll does not rot	ate	
Faulty drive belt	Check the drive belt pulleys.	Inspecting Conditioner Drive Belt, page 210
Symptom: Disc does not turn when eng	aging header	
Hydraulic hoses are not connected	Connect the hydraulic hoses.	3.4 Attaching Rotary Disc Header to Windrower, page 26
Poor electrical connection at the pump solenoid	Check the connection at the windrower.	Refer to windrower operator's manual
Faulty header drive gearbox	Check the gearbox.	 4.7 Servicing Header Drive Gearbox, page 197 4.7.1 Changing Header Drive Gearbox Lubricant, page 197
Symptom: Header slows when going up	hill	
Hydraulic oil level in the windrower is low	Add oil to the windrower reservoir.	Refer to windrower operator's manual
Symptom: Header runs while unloaded	, but slows or stops when starting to cut	
Defective hydraulic motor	Repair or replace the hydraulic motor.	See MacDon Dealer
Defective hydraulic pump in the windrower	Repair or replace the pump.	See MacDon Dealer

Problem	Solution	Refer to
Defective relief valve in the windrower	Repair or replace the relief valve.	See MacDon Dealer
Cold oil in the hydraulic drive system	Reduce ground speed until the oil reaches operating temperature.	_

Chapter 7: Reference

The reference chapter provides additional information such as torque specifications and a unit conversion chart.

7.1 Torque Specifications

The following tables provide 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.
- Use torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and cap screws by using their identifying head markings.

Jam nuts

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

Self-tapping screws

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

7.1.1 Metric Bolt Specifications

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

Nominal	Torque (Nm)		Torque (lbf	·ft) (*lbf·in)
Size (A)	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

Table 7.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut



Figure 7.1: Bolt Grades

Nominal	Torque (Nm)		Torque (lbf·ft) (*lbf·in	
Size (A)	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

Table 7.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Table 7.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal	Torque (Nm)		Nominal Torque (Nm)		Torque (lbf	·ft) (*lbf·in)
Size (A)	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 7.2: Bolt Grades



Figure 7.3: Bolt Grades

Nominal	Torque (Nm)		Torque (lbf	·ft) (*lbf·in)
Size (A)	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



Table 7.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Figure 7.4: Bolt Grades

7.1.2 Metric Bolt Specifications Bolting into Cast Aluminum

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

	Bolt Torque			
Nominal Size (A)	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	Nm	lbf∙ft	Nm	lbf∙ft
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	-	-	_	_

Table 7.5 Metric Bolt Bolting into Cast Aluminum



Figure 7.5: Bolt Grades

7.1.3 O-Ring Boss Hydraulic Fittings – Adjustable

Standard torque values are provided for this type of hydraulic fitting. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

Torque values are shown in following table below.

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

- 5. Install fitting (B) into port until backup washer (D) and O-ring (A) contact part face (E).
- 6. Position the 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 the final condition of the fitting.



Figure 7.7: Hydraulic Fitting

CAE Deah Size	Thread Size (in.)	Torque Value ⁷		
SAE Dash Size		Nm	lbf·ft (*lbf·in)	
-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	

Table 7.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

^{7.} Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

	Thread Size (in.)	Torque Value ⁸		
SAE Dash Size		Nm	lbf∙ft (*lbf∙in)	
-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	

Table 7.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable (continued)

^{8.} Torque values shown are based on lubricated connections as in reassembly.

7.1.4 O-Ring Boss Hydraulic Fittings – Non-Adjustable

Standard torque values are provided for this type of hydraulic fitting. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

Torque values are shown in following table below.

- 1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
- 2. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
- 3. Apply hydraulic system oil to the O-ring.
- 4. Install fitting (C) into port until the fitting is hand-tight.
- 5. Torque fitting (C) according to values in Table 7.7, page 252.
- 6. Check the final condition of the fitting.



Figure 7.8: Hydraulic Fitting

	Thread Circ (in)	Torque Value ⁹		
SAE Dash Size	inread Size (in.)	Nm	lbf∙ft (*lbf∙in)	
-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	

Table 7.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

7.1.5 O-Ring Face Seal Hydraulic Fittings

Standard torque values are provided for this type of hydraulic fitting. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

Torque values are shown in following table below.

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

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



Figure 7.9: Hydraulic Fitting



Figure 7.10: Hydraulic Fitting

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

- 3. Align the tube or hose assembly so that the flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
- 4. Thread tube or hose nut (D) until it is hand-tight. The nut should turn freely until it is bottomed out.
- 5. Torque the fittings according to values in Table *7.8, page 253*.

NOTE:

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

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

Table 7.8 O-Ring Face Seal (ORFS) Hydraulic Fittings

	Thread Size (in.)	Tube O.D. (in.)	Torque Value ¹⁰	
SAE Dash Size			Nm	lbf·ft
-3	Note ¹¹	3/16	-	-
-4	9/16	1/4	25–28	18–21
-5	Note ¹¹	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 ¹¹	7/8	-	-
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167

^{10.} Torque values and angles shown are based on lubricated connection as in reassembly.

^{11.} O-ring face seal type end not defined for this tube size.

REFERENCE

	Thread Size (in)	Tube O.D. (in)	Torque Value ¹²	
SAE Dash Size Inread Size (in.)		Nm	lbf·ft	
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

Table 7.8 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)

7.1.6 Tapered Pipe Thread Fittings

Standard torque values are provided for this type of hydraulic fitting. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

Torque values are shown in following table below.

Assemble pipe fittings as follows:

- 1. Check components to ensure that the fitting and port threads are free of burrs, nicks, scratches, and any form of contamination.
- 2. Apply pipe thread sealant (paste type) to the external pipe threads.
- 3. Thread the fitting into the port until it is hand-tight.
- 4. Torque the connector to the appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table 7.9, page 254. Make sure that the tube end of a shaped connector (typically 45° or 90°) is aligned to receive the incoming tube or hose assembly. Always finish alignment of fitting in the direction of tightening. Never back off (loosen) the pipe threaded connectors to achieve alignment.
- 5. Clean all the residue and any excess thread conditioner with an appropriate cleaner.
- 6. Assess the final condition of the fitting. Pay special attention to the possibility of cracks to port opening.
- 7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

NOTE:

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

Table 7.9 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended TFFT	Recommended FFFT
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

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

7.2 Conversion Chart

Both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement are used in this manual. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

Quantity	SI Units (I	Metric)	Factor	US Customary Units	s (Standard)
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	Ν	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm ³ or cc	x 0.061 =	cubic inch	in. ³
Weight	kilogram	kg	x 2.2046 =	pound	lb.

Table 7.10 Conversion Chart

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Recommended Lubricants

Keep your machine operating at top efficiency by using only clean lubricants and by ensuring the following:

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

IMPORTANT:

Do **NOT** overfill the cutterbar when adding lubricant. Overfilling could result in overheating and failure of cutterbar components.

Specification	Description	Use	Capacities	
Lubricant: Grease	Lubricant: Grease			
SAE Multipurpose	High temperature extreme pressure (EP) performance with 1% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	_	
SAE Multipurpose	High temperature extreme pressure (EP) performance with 10% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	_	
Lubricant: Gear Lubricant				
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R113 Cutterbar	8 L (8.5 qts [US])	
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R116 Cutterbar	10 L (10.5 qts [US])	
SAE 85W-140	Fully synthetic oil API GL-5 minimum, SAE J2360 preferred	Conditioner roll timing gearbox	0.7 L (0.75 qts [US])	
SAE 80W-140	Fully synthetic oil API GL-5 minimum, SAE J2360 preferred	Header drive 90° gearbox	1.65 L (1.74 qts [US])	

Table .11 Recommended Lubricants

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