

X Series Combines and Front-End Equipment Optimization

“Ready To Harvest” for Barley



John Deere Harvester Works

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Preface

The content of this material is intended to help you know how to choose the best configuration and set up an X Series combine and platform, for any Barley crop and condition before going to the field.

Combine and Field installed bundles are explained for attachments, to enhance performance and Grain Quality in specific Barley conditions.

Setup and Adjustment recommendations are intended as a starting point before harvest season. Additional adjustments and fine tuning will be necessary depending on crop moisture and harvest conditions.

Crop setting checklists and Grain Quality Tips are a quick reference for configurations and operating speeds to help optimize grain quality.

Attachments for HD & RDF headers

Crop Lifters

Install brackets to help prop up down lying crops. *Only recommended for off ground harvesting.*

Not available with Less Gauge Wheels



Divider Rods (HD & RDF)

Optional divider rods can be installed to help divide the crop and help prevent material wrapping between the end of the reel and divider point.



Steel Crop Dividers (HD only)

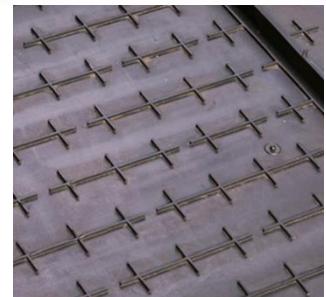
For use in Extremely Heavy, High Yielding, Wet straw Cereal Grains. Advantages are seen more with Auger Platforms.

Dividers can be stored on the back of the head when Side Knives are installed.



Grain Saver Draper Belts (HD only)

Optional side belts designed for small grains to help prevent header grain loss in shatter prone crops.



Top Augers

Top augers push large volume crops against the draper belt to help convey crops to the center of the head.



Fingered Top Augers

Fingered augers provide additional leverage in bushy crops to help convey the crop to the center of the head.



Cleated Center Belt

Recommended for cereals, oil seed, and pulse crops.



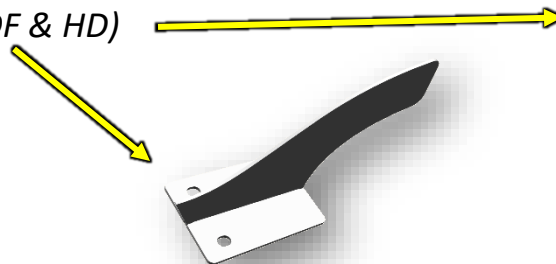
Standard Center Belt

Recommended for soybeans to promote feeding and minimize grain loss at the center section. *(RDF option Only)*



Center Crop Flow Divider

Recommended for light crop to minimize underfeeding. *(RDF & HD)*



Reel Flip-Over Bundle

Recommended to reduce reel wrapping. *(Not compatible with Steel Tine Standard Reel)*



Gauge Wheel Scrapers Recommended to reduce gauge wheels from accumulating material which could cause inaccurate header height position for off ground cutting. *(Gauge wheels only available on HD)*



Recommended Draper Adjustments

Reel Position: the reel needs to only pull crop over the cutterbar onto the side belts. The reel should be operated higher and further out. **Up and Out.** Reel speed should be matched with the ground speed or slightly faster. A reel speed that is TOO FAST can lead to head shatter and cause header loss.



Reel Finger Pitch

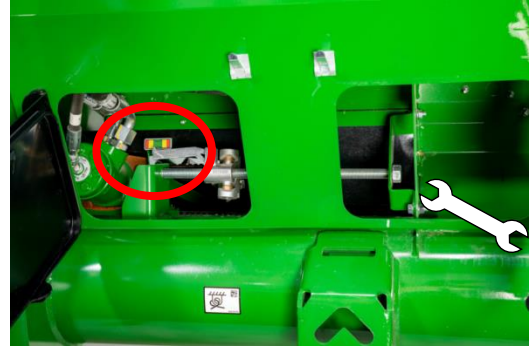
Reel Fingers should be adjusted for crop condition:

- Most aggressive position (pulled back) for down or tangled crop.
- Medium aggressive position (leaned back) for normal crop conditions.
- Least aggressive position (Straight down) for tall standing crop.



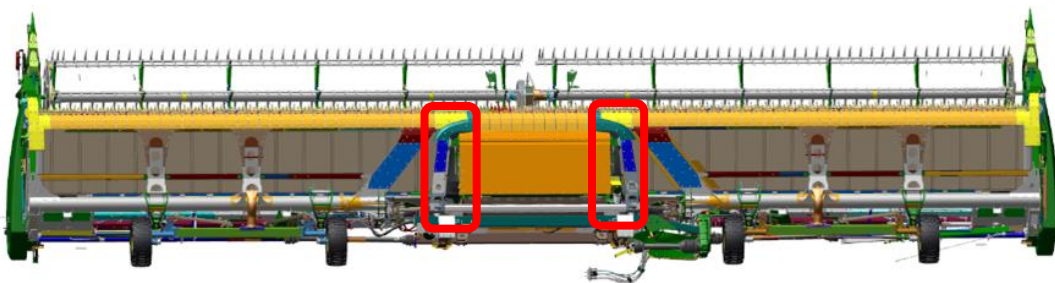
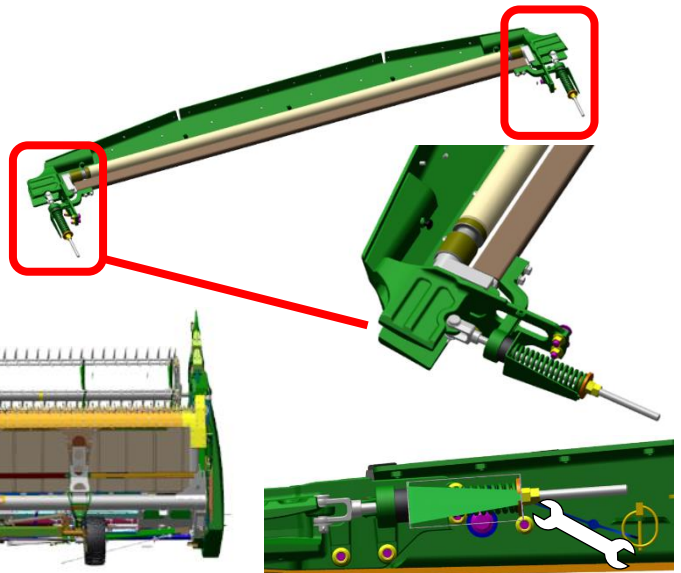
Draper Belt Tension

Check and adjust the draper belt tension on both sides of the header. Adjust so the indicator is in the center of the gauge.



HD Center Draper Belt Tension

Both sides of the center belt will need to be checked. If necessary, tension or de-tension the belt according to the gauge.



Reel Finger Clearance – Proper setting of minimum reel height will protect against unexpected reel movements that can place reel fingers in contact with cutterbar.



RDF:



HDR: With the wings in the down, measure 45mm at the outer reel fingers and 15mm at hinge.



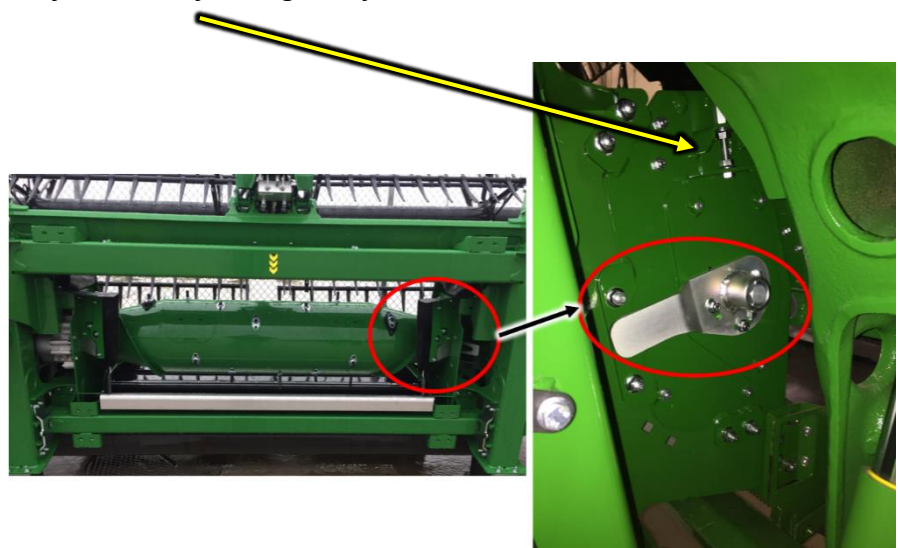
Drum Height Position

The drum height can be raised for higher capacity feeding of high-volume crops.

HD heads have a jack bolt on the sides of the drum for height adjustment.

Feed Drum Finger Timing

With the center feed section in neutral, spin drum until the middle finger has the lowest clearance to the feed floor, this gap should be 40mm. Use handle on RH side of drum to adjust.



Draper Inspection and Adjustments

The following adjustments are critical to ensure that the RD/HD Draper performs to its optimum:

- Sickle Sections
- Knife Guards
- Dual Knife Timing
- Reel Finger Timing

For Optimal performance and durability of cutting components:

Fine Tooth Sections recommended for Barley harvest.

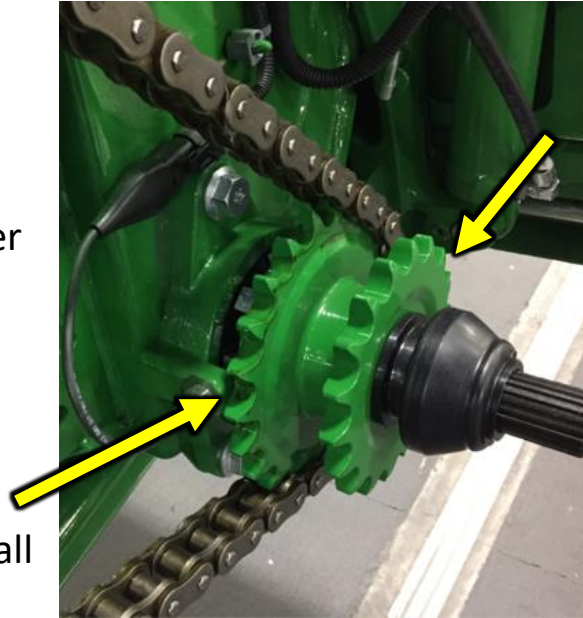
- Inspect for broken or improperly adjusted hold downs Repair or replace as required.
- Inspect for dull or broken knife sections. Repair or replace as required.
- Inspect for dull or worn or broken guard cutting edges. Repair or replace as required.
- Inspect for excessive binding between top of knife sections and top of guard slot. Binding can be caused by bent guards, bent cutter bar or improper position of guards. Repair or replace as required.
- Inspect knife head and knife drive alignment with first guard slot to ensure binding is not present in areas. Repair or replace as required.
- Verify knife hold downs are tight. Knife gap should be the thickness of a business card.
- Verify that complete cutting system turns freely by rotating the drive by hand (drive shaft removed). **Keep hands and fingers away from cutting components while rotating!**

Combine Configuration and Setup

Feeder House Drive Chain Speed

- Conveyor chain speed –
Slow 18T small diameter sprocket
In tougher harvesting conditions,
use the 22T to speed up the feeder
house.

22T is standard in European countries for High Yielding wet straw conditions and the 18T is only for coarse grain or brittle small grains.



Feeder House Drive Chain Tension



18 – 25mm
Check every 50hrs

Replace chain when Idler has
reached the end of adjustment slot.

Back Shaft Speed Feeder House Variable Drive

- Operate the cutter bar slow 520rpm

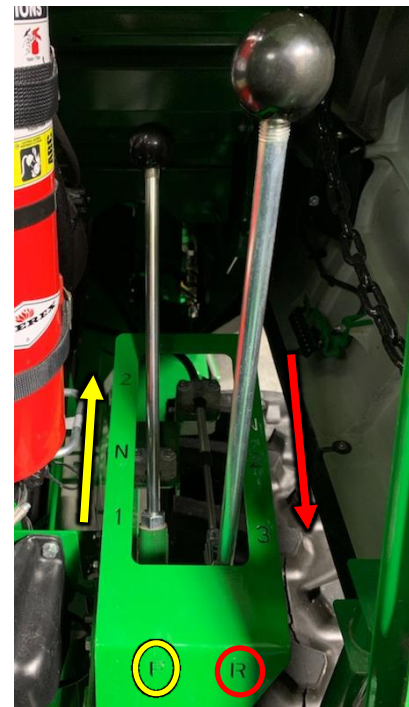


Rotor Speed

- 3rd Gear (720-1300rpm range)

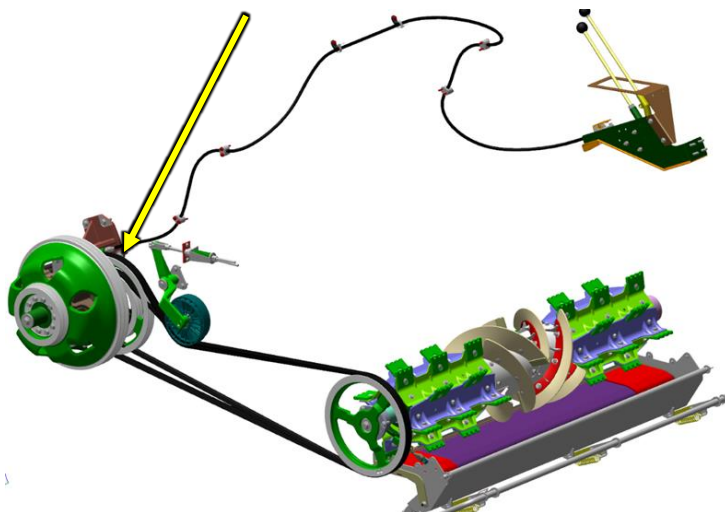
Feed Accelerator Speed

- High speed 2nd Gear – 990rpm
 - W/optional Slow Speed Kit – 698rpm
 - *The Slow Speed Kit is recommended for improved grain quality in Corn.*



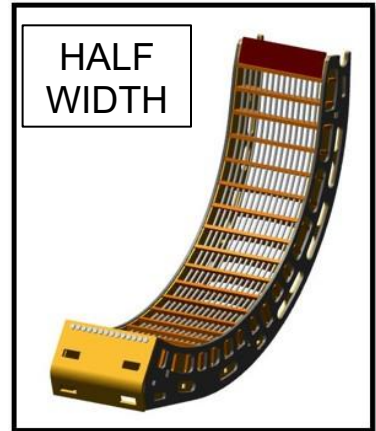
Optional Slow Speed Kit

New Sprocket & Belt

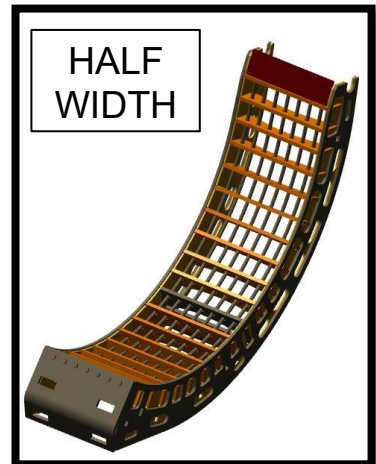


Concave Configurations

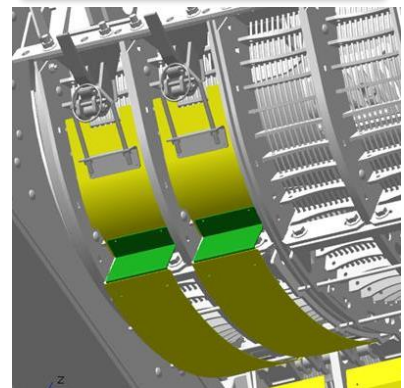
Small Wire (SSS) Concaves recommended in all three positions for harvesting small grains. Overall performance is very good in all moisture conditions. Concaves are half width for ease of handling when changing for other crops. Refer to your Operators Manual for how to Level Concaves (front to rear) and calibrated to “Zero” on clearance to the threshing elements.



(SSL) Using a Large Wire concave in an SSL configuration is great for the majority of harvest conditions in European countries. It is robust enough for high yield cereal grains, providing adequate threshing and separating to match combine performance goals.

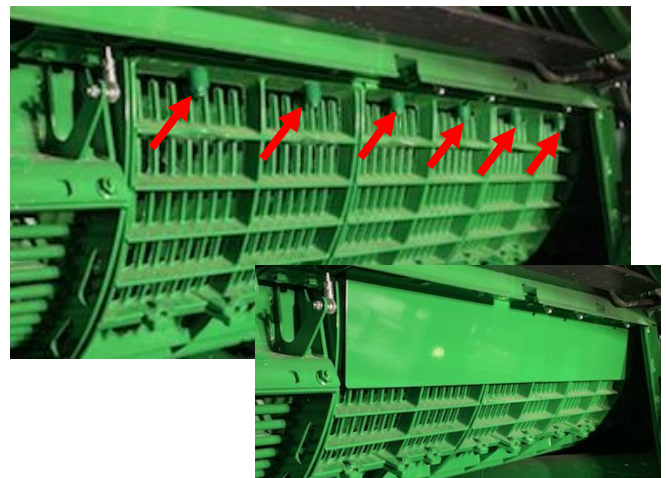


Concave Covers can be added for most conditions where threshing is not adequate.



Separator Grates

Be sure separator grate spacers are in the storage position with the grates flush against the rail for small grains. This will need to be done on both sides of the machine for both rotors to match. Also make sure to reinstall deflector shields.



Separator Grate Covers: Covers a full separator grate for use in dry, high chaff conditions to improve cleaning shoe performance. Up to 2 on each side can be installed.



Cleaning Shoe

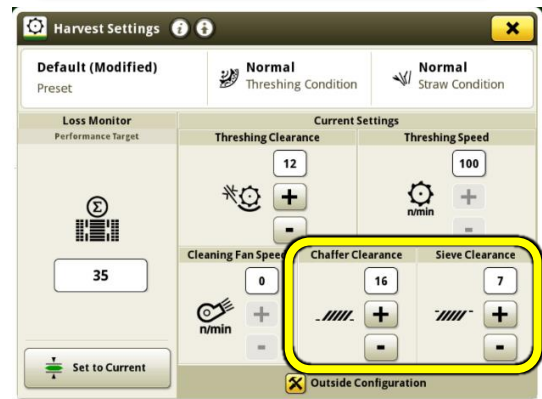
General-Purpose

Chaffer and General-Purpose Sieve are recommended for Barley.



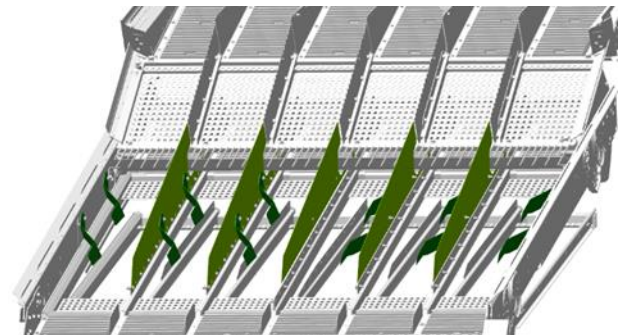
Be sure chaffer and sieve are calibrated so the opening exactly matches the cab display setting.

If openings do not match, follow the Factory Cal procedures.



Sidehill Performance Package

Recommended for sidehill conditions to help retain a level shoe load in sidehill conditions for proper grain cleaning and preventing grain loss from uneven and overloaded bays. Includes full-length tall chaffer dividers and crop deflectors.

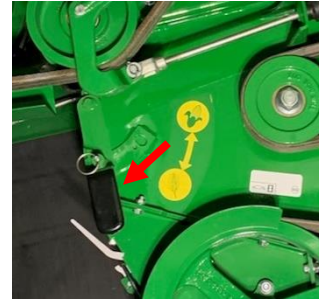


Front chaffer should be set at 25mm for ALL crops.



Active Tailings System

Set the lever DOWN to the closed position to tighten the concave for barley.



Chopper speed in High

Push lever in, to small grains position.



Adjustable Knife Bank Engagement

Depending on preferred residue size.

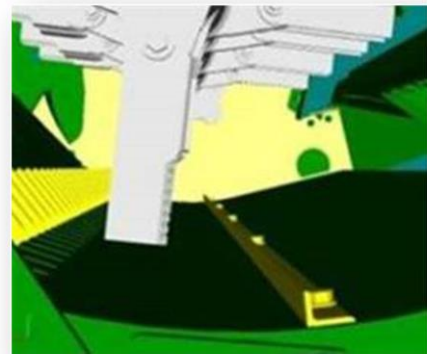
- Manual engagement
- In cab adjustment (if equipped.)



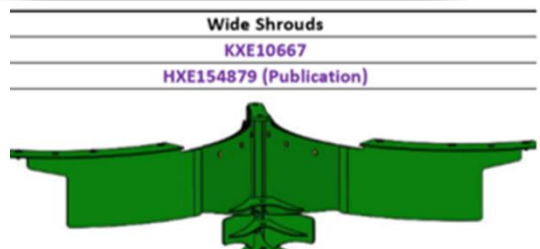
Additional Residue Sizing Option

Adding the straw chopper controller bar reduces the stem cut length when desired. The controller bar is installed to the chopper floor.

Risk: Controller bar increases horsepower usage.



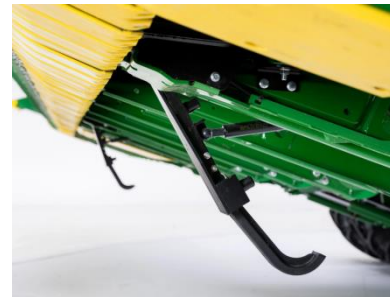
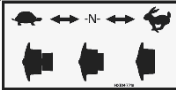
Wide Shrouds: If having trouble spreading 50ft+, these can help increase spread width.



Barley Adjustment Checklist (*Outside*)

Front End Equipment

- Reel Finger pitch set in the middle (position 3) for moderate aggressiveness. *Adjust as needed to crop condition*
- Center Section set on high speed
 - *If in very dry conditions the center section in low can reduce head shelling*
- Unpin Automatic Header Height Control sensors (*RDF*)



Feeder House

- Feeder House Chain Speed = 18T – Set on 22T if in tough feeding down conditions.
- Feed Accelerator shifted into High Speed 2nd Gear
- Rotors shifted into 3rd Gear (720-1300rpm)

Cleaning System

- Measured Chaffer and Sieve settings match display
 - Left and right side of elements match
- Front chaffer set to 25mm (All crops)
 - *Closing the front chaffer can nozzle air flow and reduce capacity*

Separator

- Separator grate spacers in the storage position
- Concaves leveled/zeroed (SSS or SSL in EU High Yielding conditions)
- Install separator covers as needed to even out shoe load.
- Active tailings Set to Small Grains

Residue

- Counter knife engaged only as far as required
 - *Over chopping takes more power and fuel*

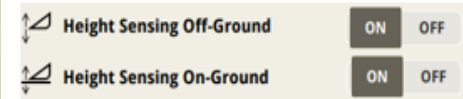
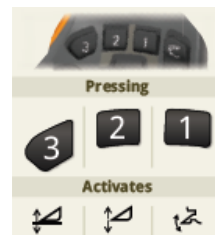
Barley Adjustment Checklist (*In-Cab adjustments*)

- Back shaft Speed = 520rpm
- Cleaning Fan speed = 700-1030rpm
- General Purpose Chaffer = 10-18
- General Purpose Sieve = 5-10
- Front Chaffer = 25
- Rotor Speed = 800-1250
- Concave Clearance = 8-22

Auto Header Controls

- Height Resume
- Height sensing *off-ground*
- Lateral Tilt
- Fore/Aft Resume
- Auto Reel Speed
- Auto Belt Speed

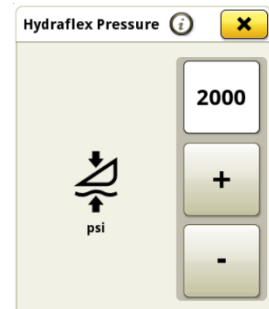
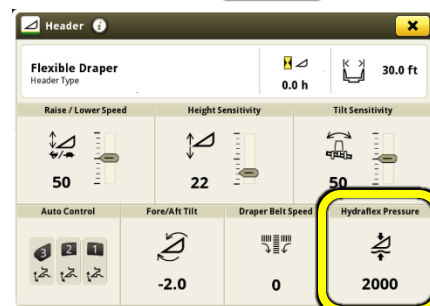
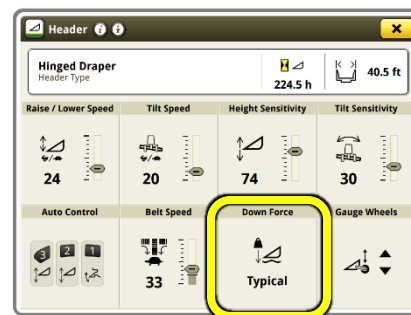
- *RDF headers will have the ability to run both Off-Ground and On-Ground height sensing for harvesting in down crop conditions.*



- Set the Ground Conditions Settings (HD)

- Very Firm
- Firm
- Typical
- Soft
- Very Soft

Note: *The Softer the setting the more "ridged" the suspension.*



- Set the Ground Conditions Settings (RDF)

When cutting off ground, increase cutter bar pressure to Max HydraFlex pressure.

Start of Harvest

- ❑ Rotate the left- and right-wing manual override valves clockwise to the harvesting position & verify the left and right Service wing lock safety valves are vertical in the unlocked position.
- ❑ Measure crop and set header cut height.
 - Depending on the desired amount of remaining stubble, cut height should be as high as possible without missing shorter seed heads.
 - Taking in excessive straw consumes more power, fuel and can increase losses.
 - This is especially true in green/tough straw conditions where wet material can hinder separation.
- ❑ Set reel position. Reel Finger angle position for minimal disturbance to the crop, helping the crop onto the belt minimizing head shatter. Adjust reel finger angle adjustment handle away from cutter bar.
- ❑ Set Draper Belt Speed. Belt speed should be matched to machine ground speed and/or crop conditions for optimum feeding performance.

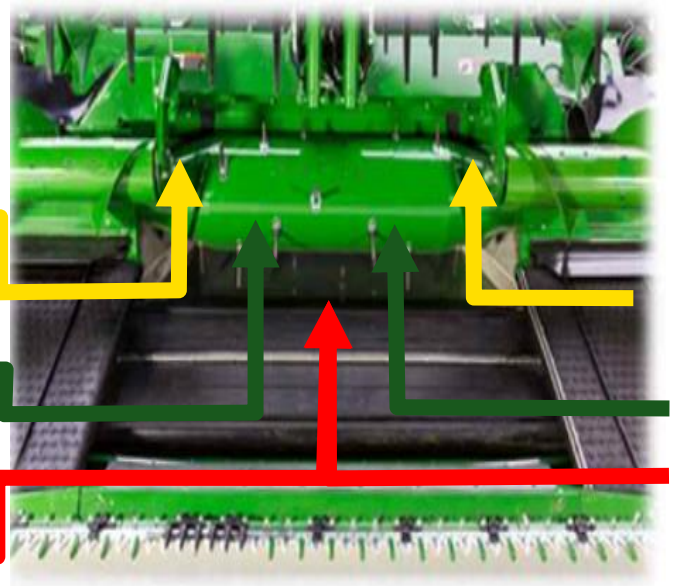


Manual Override Valve & Safety Wing Lock Ball Valve Unlocked

Too Slow: Crop is feed too far on outsides, can cause crop wrapping under belts, and bunching in feed drum

Optimal: 2 streams from belts just barely come together making a smooth wide stream of crop entering drum. This ensures each rotor is fed evenly

Too Fast: Both belt streams come to together in the center intermixing the crop, creates 1 stream which is difficult to utilize the full width of the separator. Can create slug feeding and drum plugging



Overloading the cleaning system with chaff

- In dry or tough to thresh conditions, excessive chaff on the cleaning system can reduce capacity. To mitigate this, do the following:
 - Install full separator grate covers to cover up to 2 full separator grates to reduce chaff loading
 - Ensure machine is not over-threshing and processing the straw excessively
 - As a general guideline, after power shutdown if chaff on chaffer is above the bay dividers work to reduce the chaff with grate covers and settings changes
 - Air from the cleaning fan will take the path of least resistance. Ensuring the chaff load on the shoe is balanced will allow for a cleaner grain tank and prevent grain loss.



Notice chaff level is at top of dividers, in this condition, attempt to reduce chaff with less aggressive settings and/or separator



Same field, same condition with grate covers and optimized settings, notice reduced chaff on chaffer and more exposed dividers

- Cut as high as possible to take in a minimal amount of the plant, this is especially true in green straw conditions where the wet material can hinder separation.
 - In dry conditions any extra material harvested can be easily ground up and overload the cleaning system.

Harvest a short distance, perform a power shutdown and inspect machine/ground for leaks, grain loss, and grain tank cleanliness

- Header to Feeder House connection
- Stone trap seals
- Shoe seals
- Auger trough and grain tank clean out closed

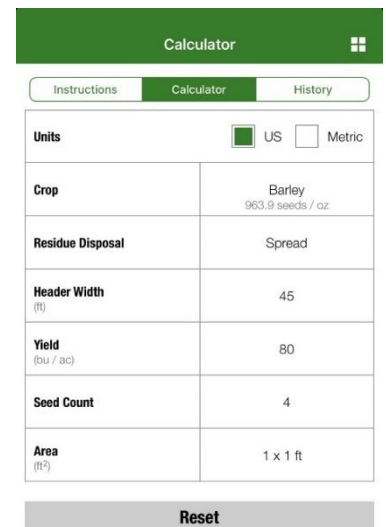
Checking Harvest Loss

1. Preharvest loss
2. Header loss
3. Machine loss
4. Rotor loss
 - a. Un-threshed loss
 - b. Threshed loss
5. Shoe loss



Calculate Loss Equipment Plus App

1. Verify crop type
 - *Change by selecting the menu at the top left of the screen*
2. Identify Residue Disposal
 - Spread
 - Windrow
3. Input the Header Width
4. Input the current Yield
5. Measure and input the Seed Count grain loss found
6. Identify the Area measured for known seed count



0.29% **0.23 bu/ac**



Grain Loss Algorithm

Starting in Model Year 2022, X Series and S Series machines come set with the Area-based grain loss algorithm as default.

Area-based loss display algorithm is similar in units of kernels per area. The algorithm considers machine header width, speed, and loss levels. The area-based logic should be the most consistent display algorithm option when harvesting over a range of different speeds and crop conditions, along with the most correlation with the above traditional grain loss checks on the ground behind the machine.

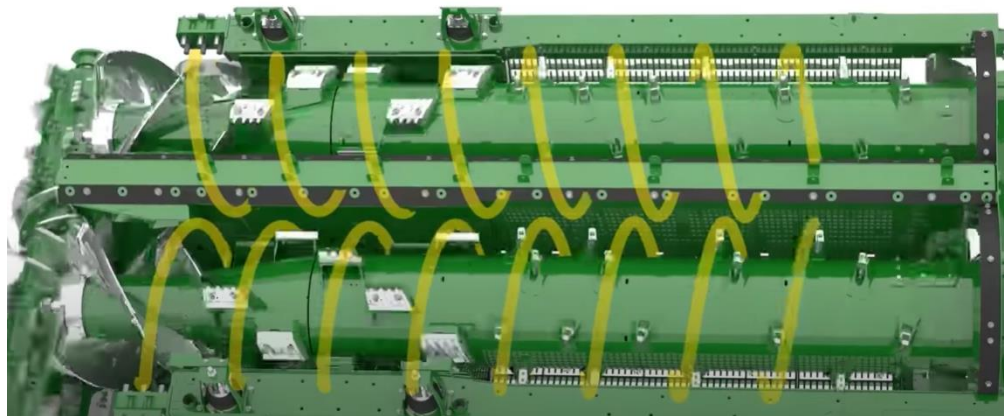


Harvesting Productivity

Grain feed rate (bu/hr or tn/hr) is an important factor in harvest optimization that is easy to overlook. Ground speed may remain the same but as grain feed rate changes this can affect losses significantly.

- Verify losses as feed rates increase to maximize efficiency.
- Use display to monitor changes in bu/hr or tn/hr

The 3-stage rotor chamber helps crop expand as it travels through the rotors for improved separation. Slightly faster than traditional rotor speeds are necessary for the X-Series as the Dual 24in rotors are smaller than the Single 30in S-Series rotor. The increase in RPM is to match the equivalent rotor tip speed of the Single rotor. With faster speeds, more centrifugal force is applied to the heavier grain. This force helps separate the grain from the MOG as it travels through the rotor cage.



Grain Quality Tips for Barley

1. Check concaves for level front to rear. Concaves out of level may cause a pinch point increasing damage potential.
2. Calibrate and “Zero” the concave position sensor.
3. Check all the auger flighting to be sure there are no sharp edges.
4. Minimize free grain in tailings/re-thresher as much as possible.

Extra measures to reduce chances of grain damage in specialty crops:

5. Do not unload grain tank completely empty. Leave some grain in the tank to cover the augers to minimize damage.
6. Do not fill the grain tank over top of the loading auger. The barley boiling up above the loading auger can add to grain damage.
7. Do not unload the grain tank at high idle.

Tough Threshing Barley

1. Make sure the rotor is full of material. If not, increase ground speed to increase material in the threshing section for improved grain on grain threshing before decreasing concave clearance.
2. Increase Rotor speed to improve threshing
3. Install concave covers or additional covers to help increase threshing and keep crop in the threshing section longer.
4. After all possible separator adjustments have been exhausted, close the sieve to force more grain into the active tailings system and reduce unthreshed grain in the grain tank.
5. As a last resort Install a small wire interrupter concave in the front concave location ***only*** to increase threshing capacity.

NOTE: Plugging may occur.

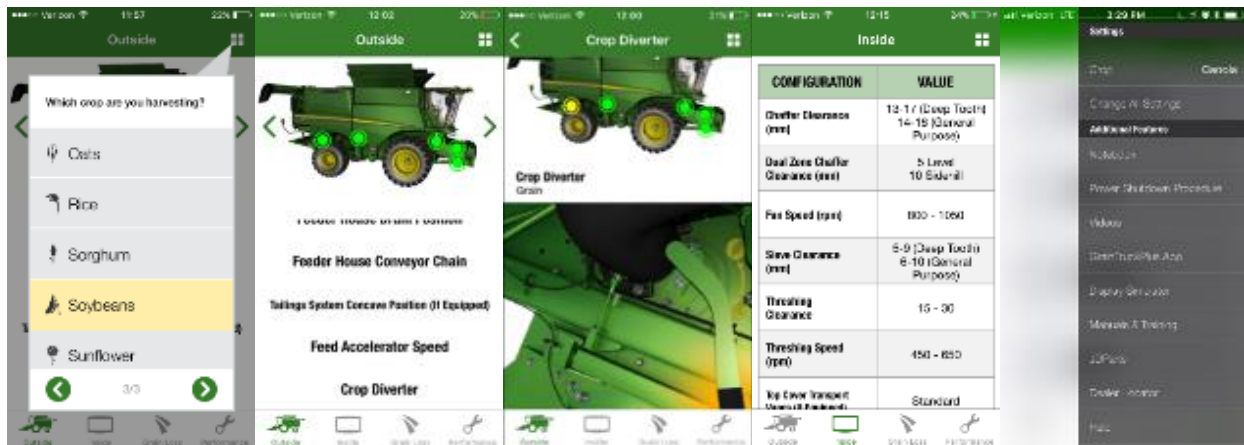
Harvesting Terraces with HD headers

- **Problem**
 - *Harvesting Perpendicular to the Terrace with HD headers*
- **Solution**
 - Hydro handles button 2 and 3 can save cut height, HFAT, ground condition for quick changes between heights
 - Holding the feeder house/head lower button will lower the cutter bar without disabling height sensing when the button is released the head will returned to previously set target
 - Cut height encoder/dial on the arm rest can be used for adjustments to cut height without accessing header page

Grain Tank Cleanliness for Barley

- **Problem**
 - *Sticks and stalk pieces in grain tank*
- **Solution**
 - Increase fan in 50RPM increments without blowing grain out the back.
 - Close chaffer opening by 2mm to help remove sticks and pieces.

Download the Equipment Plus App for quick information on, settings, grain loss calculator, JDParts, videos, procedures and much more.



Visit the GoHarvest YouTube channel for detailed videos on Power Shutdown procedure, CombineAdvisor, ActiveTerrain Adjustment, and many more.



<https://www.youtube.com/watch?v=3KR77OTdNKU&list=PL1KGsSJ4CWk7jzH744F1bByhwXWAlxmFj>

NOTES
