

Date: June 25, 2021
Bulletin: MF21-18PMB
Subject: 2200 Series LSB Startup Guide



This startup guide will help train on the proper initial settings for a Hesston 2200 Series Large Square Baler and understand basic field operations

Subject: Initial PDI & Setup

There are several things to look over when the baler first arrives and initial PDI is performed

Inventory Check

- ☐ Knotter Spare Parts Box
- ☐ Knotter Flags
- ☐ Gauge Wheels
- ☐ Monitor (If Equipped)
- ☐ Driveline

Initial Assembly

- ☐ Check tire pressure per book specs
- ☐ Check tire lug nut torque
- ☐ Install gauge wheels
- ☐ Erect handrails
- ☐ Install driveline to baler
- ☐ Remove tandem axle lockout bar

Settings and Adjustments

Clutches

- ☐ Flywheel (73mm/2.87")
- ☐ Packer (30mm/1.18")
- ☐ Pickup (30mm/1.18")

Chain Tension

- ☐ Left auxiliary *
 - ☐ Packer drive *
 - ☐ R/L pickup drives
- *Less than 1" deformation from chain guide.

Oil Levels

- ☐ Main gearbox
- ☐ Knotter lube
- ☐ Chain lube

Sensors

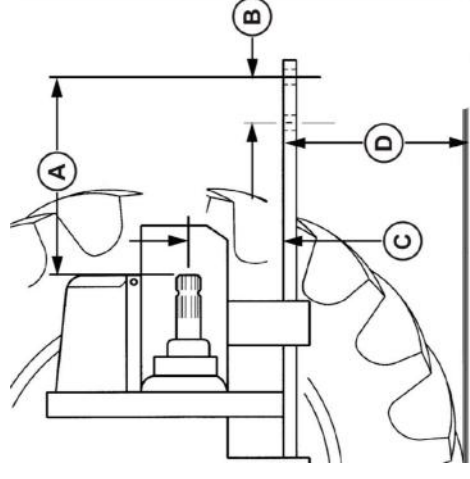
- ☐ Check all sensors for connectivity and proper reading

Subject: Tractor Setup

To properly run in the baler, first the tractor must be setup appropriately for the baler to be connected. Depending on what driveline and drawbar size the tractor is, adjustments may need to be made to ensure no damage is done to the driveline or hitch of the baler.

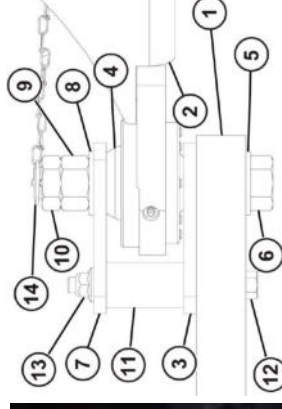
Tractor Draw Bar Setup

- ❑ (A) Type 2 PTO (1 3/8" 21 Spline) – 390 mm to 410 mm (15.4" to 16.1")
Type 3 PTO (1 3/4" 20 Spline) – 490 mm to 510 mm (19.3" to 20.1")
- ❑ (B) 102 mm (4")
- ❑ (C) Cat 2 Drawbar – Minimum of 250 mm (9.8")
Cat 3 Drawbar – Minimum of 260 mm (10.2")
Cat 4 Drawbar – Minimum of 280 mm (11")
- ❑ (D) Cat 2 Drawbar – 330 mm to 500 mm (13" to 19.7")
Cat 3 & 4 Drawbar – 380 mm to 560 mm (15" to 22")

**Tractor Draw Bar Connection**

- ❑ Tractor must be equipped with either a hammer strap (1) or utilize the supplied bolted connection (2)
 - If using bolted connection, make sure to torque the hardware properly
 - Main hitch bolt (6) torque is 850 lb-ft
 - Clevis bolt (12) torque is 210 lb-ft

1 2

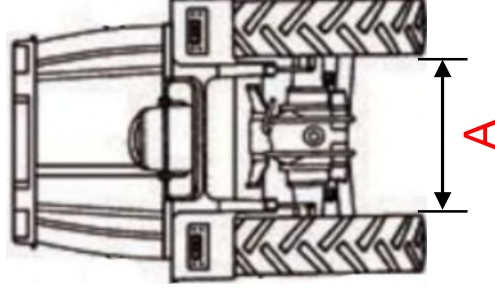


Subject: Tractor Setup

Additionally to hitch and PTO setup, it is advised to widen tractor tire stance to improve windrow clearances as well as remove 3pt quick hitch and possibly 3pt arms to improve turning radius clearance against the baler tongue.

Tractor Tire Stance

- ❑ Since the baler pickup is 89" wide, it is recommended to have a minimum of 90" from inside to inside of the front and rear tires (A).
- Allows for weaving to keep pre-chamber equally full and not run over windrow
- Better stability in steep terrain

**3pt Removal**

- ❑ It is advised to remove 3pt quick hitch and arms
 - Allows for tighter turning radius due to not having to worry about contacting the baler tongue with the arms
 - Allows better access to PTO shaft and drawbar

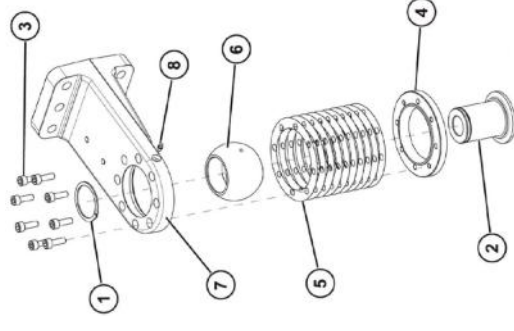


Subject: Tractor Connection

The hitch on the baler is the primary connecting point and must be setup correctly to ensure proper function in the field.

Ball Hitch Setup

- ☐ (6) Ball must move with 50 – 200 lb-ft of force 12” above the ball
 - Preload is set at the factory in this range, but it is best to check
 - If force is too little or too much, shims (5) need to be added or removed
- ☐ (2) Bushing needs to be appropriate size for hitch pin
38.0mm (Cat 3) bushing is factory standard size but other bushings are available:
 - 50.0mm Bushing (Cat 4) – 700213761
 - 1.25” Bushing (Cat 2) – 700193123
 - 1.625” Bushing (Non-Standard Cat 3) – 700193122
 - 2.00” Bushing (Non-Standard Cat 4) – 700193121

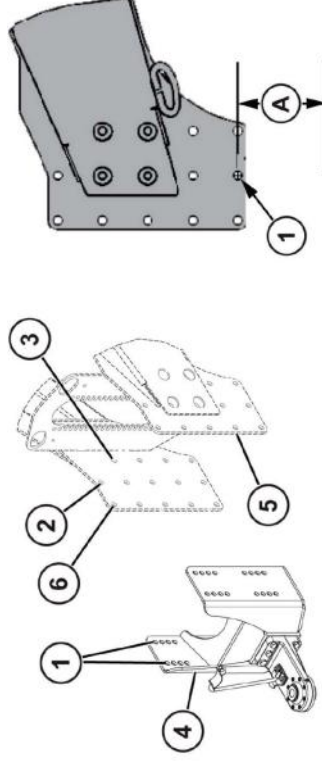


Subject: Tractor Connection

To ensure smooth operation of the baler, the drive line must have equal input and output angles. This reduces vibration and extends the life of the driveline.

Hitch Adjustment

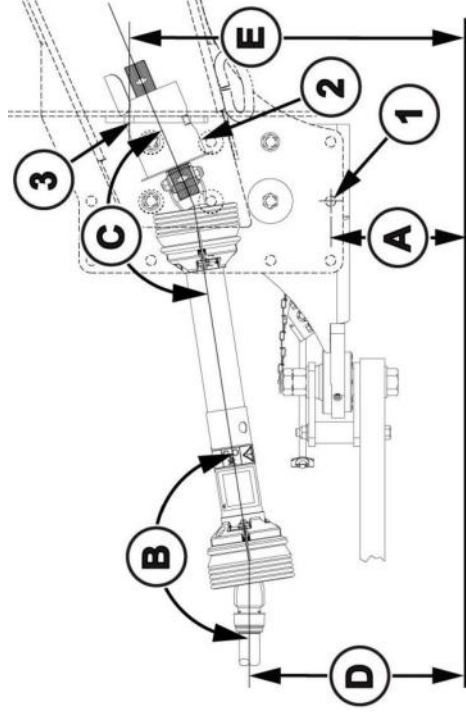
- ❑ (A) Tongue height 550 mm (21.7") to the ground from the center of the hole (1) when connected to the tractor
- ❑ (4) Hitch sub-frame must setup depending on driveline
 - Type 3 PTO – Front & Middle Holes (6 & 2)
 - Type 2 PTO – Middle & Rear Holes (2 & 3)

**Driveline Angle Adjustment**

- ❑ Adjust center carrier bearing (2) so that U-joint angles (B & C) are equal to 169 degrees by solving for (E)
 $E = D + 262 \text{ mm (10.3")}$ for Type 2 driveline

or

$$E = D + 310 \text{ mm (12.2") for Type 3 driveline}$$



**There should be minimal driveline chatter while maneuvering the baler if the hitch and the transitional shaft are correctly positioned.*

Subject: Tractor Connection

Once hitch and PTO connections have been adjusted, the tractor can completely be connected to the baler

Mechanical Connections

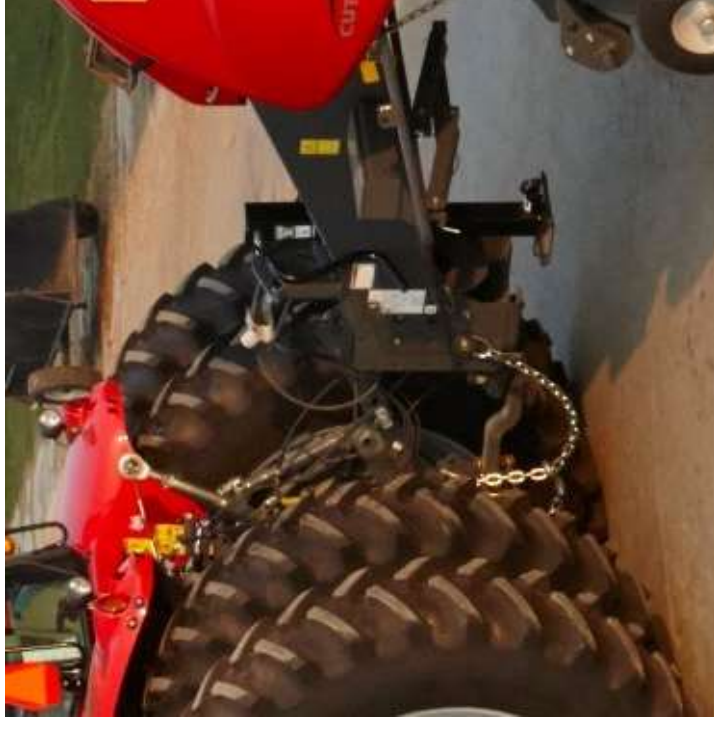
- ☐ Hitch – hammer strap or bolted connection
- ☐ Driveline
- ☐ Driveline cover retention chains
- ☐ Safety transport chain

Hydraulic Connections

- ☐ Pickup lines – raise & lower
- ☐ ProCut Cutter – knife engage & disengage (if equipped)
- ☐ Tandem axle line – lock (if equipped)
- ☐ Hydraulic Jack – raise & lower (if equipped)
- ☐ Brakes – apply (if equipped)

Electrical Connections

- ☐ ISO Bus harness
- ☐ 7 pin lighting harness
- ☐ AgCam (if equipped)
- ☐ Moisture Equipment (if equipped)

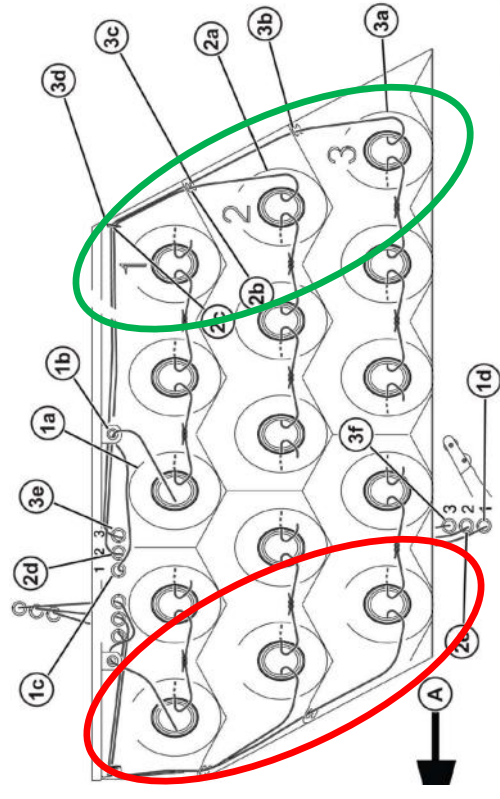


Subject: Twine Loading & Routing

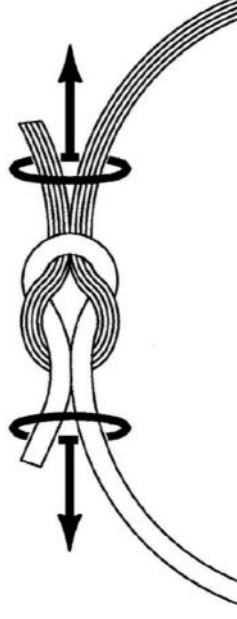
Before the knotter and needle setup and adjustments can be checked, the baler must be filled with twine. Minimum of 8 balls (3x3) or 12 balls (3x4 & 4x4) are required to run in the baler since each knotter requires one ball of twine each for the upper and lower strings.

Twine Ball Placement

- ☐ Fill minimum of 4 or 6 balls on each side of baler
- ☐ Balls in **front** and **back** are primary feeders
- ☐ Total of 30 balls can be filled in baler, 12 for the top twines, 18 for the bottom twines since the bottom twine usage rate is 1.5x the top

**Twine Tying**

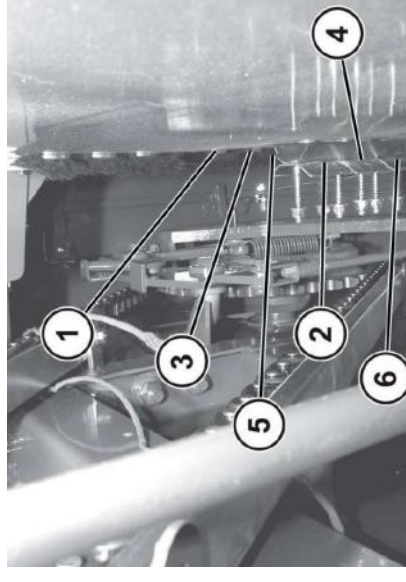
- ☐ Make sure to tie all the appropriate twine balls together to not have a miss-tie due to twine running out
- ☐ Twine tail from middle of the ball is the start and the twine tail from the outside of the ball is the end
- ☐ Tie Twines together using knot shown to minimize chances of knot pulling apart or getting lodged in a tension roller
- ☐ Trim tails to approximately 2"



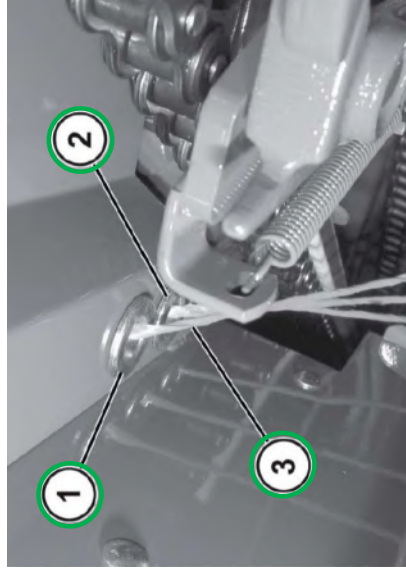
Subject: Twine Loading & Routing

Upper Twine Routing

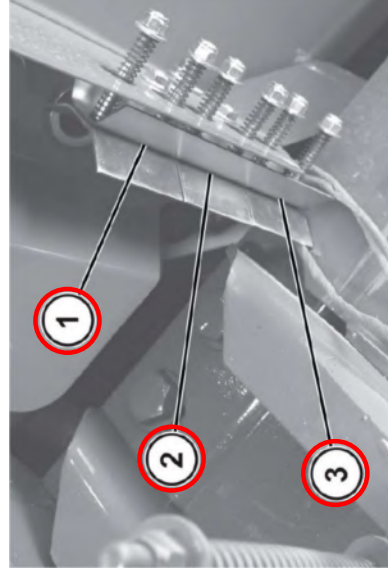
- ☐ Front balls are for upper twines
- ☐ Route twine through eyelets in twine box on each side (A-1, 3, & 5)
- ☐ Route twine through spring tensioners on each side (A-2, 4 & 6)
- ☐ Route twine through knotter stack frame eyelets on each side (B-1, 2, & 3)
- ☐ Route twine through knotter stack tensioners on each side (C-1, 2, & 3)
- ☐ Route twine through tensioner gears (D-2, 4, 6, 7, 8, & 9)
- ☐ Route twine under finger shaft (E-1); through slacker arm roller (E-2); through tucker arm roller (E-4) for each knotter
- ☐ Route twine tail down into chamber where it can be tied to lower twine or tucked in between bale flakes



A

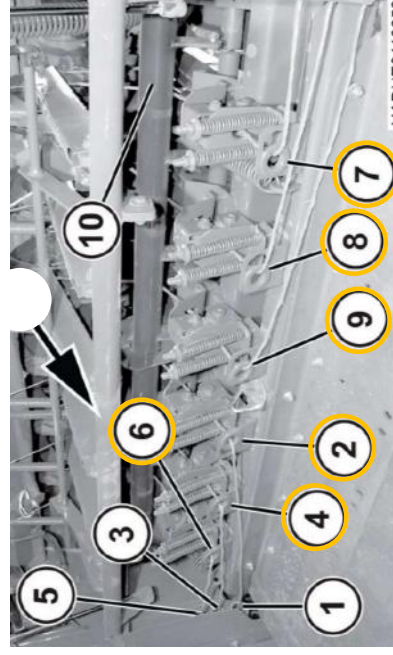


B

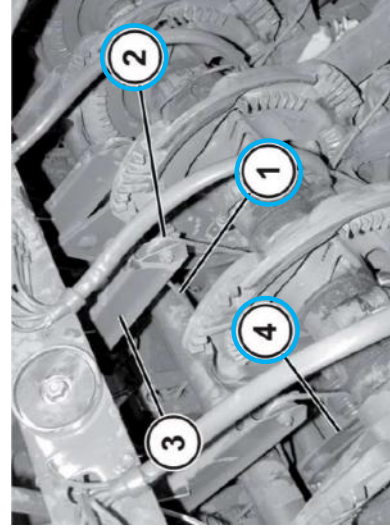


C

D



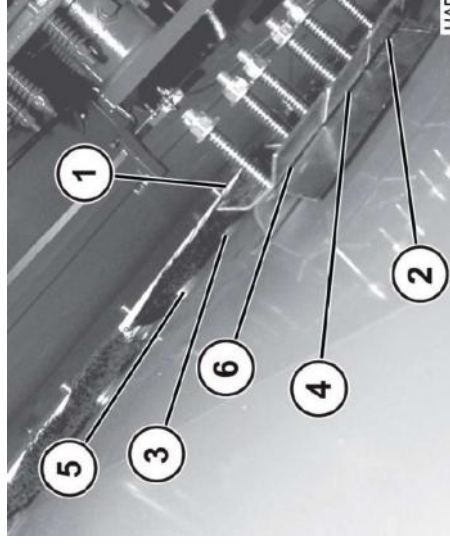
E



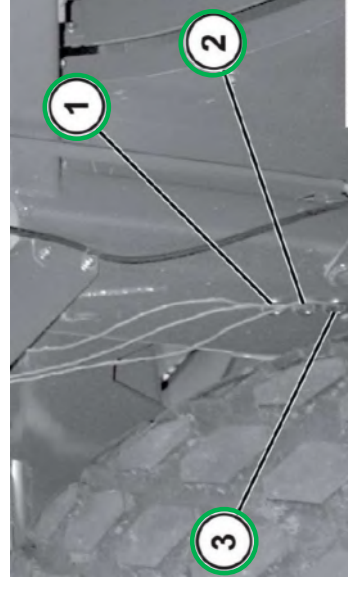
Subject: Twine Loading & Routing

Lower Twine Routing

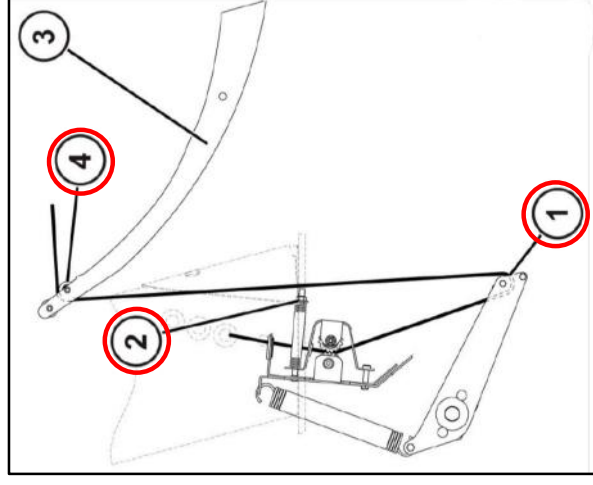
- ☐ Rear balls are for lower twines
- ☐ Route through eyelets in twine box on each side (A-1, 3, & 5)
- ☐ Route twine through spring tensioners on each side (A-2, 4 & 6)
- ☐ Route twine through frame eyelets on each side (B-1, 2, & 3)
- ☐ Route twine through gear tensioner (C-2); through lower slacker arm roller (C-1); through second needle roller (C-4)
- ☐ Tie off twine tail to either upper twine that was dropped previously or to twine hooks under main frame (D-1)



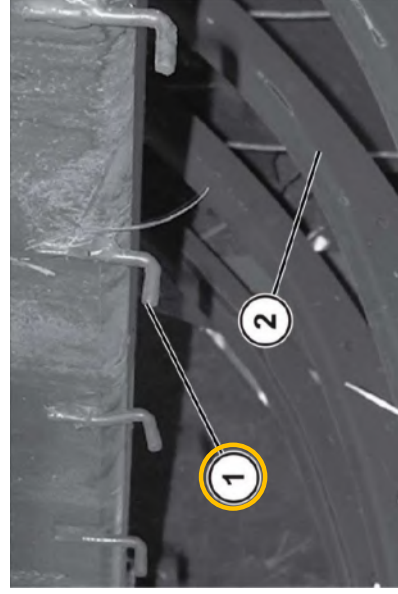
A



B



C



D

Subject: Knotter Setup

Knotter functionality check and setup is performed at the factory, but its always good to ensure the settings and adjustments are correct. This will also help when adjusting for particular crop conditions that may be seen such as straw or corn stover.



- ❑ Make sure knotters are home. This needs to be checked first to make sure all components are being measured at the proper timing.



- ❑ Twine fingers should be at 90° or slightly retarded. Press the finger towards the front of the baler to measure.



With tails

- ❑ Twine discs should show the entire slot if there is twine in the disc.

Leading edge of the slot should be close to even with the holder when there are tails from the previous knot present.



Without tails

Subject: Knotter Setup

Knotter Head

- ☐ Pull knotter heads up to check for binding
- ☐ Knotter should not fall down under its own weight
- ☐ Check for wiper arm slop and bill hook clearance
- ☐ Twine disc and bill hook tension should start 2 to 3 flats beyond finger tight
- ☐ Worm gear should be snug on the taper. When the nut is tight, shims should barely move when pushed on by hand.
- ☐ Check that tucker rollers are tight



Knotter Lube

- ☐ Fill knotter lube canister with oil
- ☐ Make certain all lube points on knotter stack are receiving oil
- ☐ Good practice to over oil knotters for first 200 bales to ensure system is purged and knotters are lubed well



**Aim for consistency starting out, each machine will need to have its own individual adjustment based on the crop being baled and the twine being used. In crops with high spring back (ie; rye grass straw, barley straw) higher bill hook tension and lower twine disc tension could be required. In more dense crops (ie; stover, alfalfa) lower bill hook tension and higher twine disc tension could be required.*

Subject: Needle Setup

Needles must be run up by hand during the PDI process!

Make sure the baler has twine and that the twine is tied in the chamber. Pull the twine back so that the needles catch the strings as if it were going through an actual tie cycle.



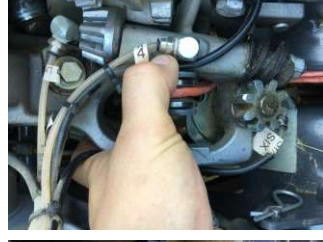
- ❑ 1. Stop as the needles come up through the chamber floor. All needles should be centered in the chamber floor slots. Also check that there is no excessive rubbing on the needle protection cones.



- ❑ 2. Stop as the needle comes up under the tucker roller. The tucker roller should be centered or offset to the left of the needle roller. Rollers should be close without contact.



- ❑ 3. Stop as the second needle roller is just above the twine disc. The second roller should be no more than 3mm above the twine disc and should not contact the disc.



- ❑ 4. The needle should pass through the center of the knotter floor before slightly rubbing against the knotter head. 1 - 6lbs of force should be required to pull the needle away from the head.

To make needle position adjustments, loosen the 4 carriage bolts at the needle base. Tightening the right bolts will pull the needle tip to the right and left to the left. Tightening the bottom bolts will increase twine disc clearance and tightening the top bolts will decrease clearance. If any adjustment is made, the needles will need to be run up a second time to verify that earlier adjustments are still correct.

Subject:

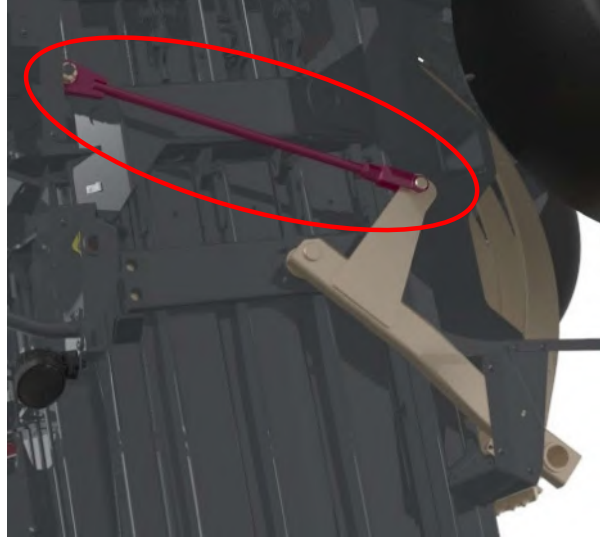
Needle Setup



- ☐ The last stop is when the needles are fully penetrated. Check this by opening the left knottor shield and watching for the con-rod to be aligned through the knottor shaft axis. From this point, measure from the face of the twine disc to the center of the needle second roller. This should be 120 - 130mm (4.725 - 5.118").

To change the penetration, break loose the jam nuts on each con-rod and turn the con-rod accordingly. Be sure to adjust the rods one turn at a time while alternating between them. This will help keep the needle carriage square to the baler frame throughout the adjustment.

- ☐ Check that needle roller hardware is tight and that rollers spin freely while the needle is fully penetrated.



If any changes were made through the needle adjustment process, then the needles need to be returned to the home position, twine pulled back, and the needles ran up by hand again to check all the new adjustments against the original settings.

Subject: Pickup Settings

Adjusting the baler pickup is very important in the preservation of the crop being baled and preventing any potential damage to the machine.

Pickup Adjustments

- ☐ Adjust stop height to limit how far down the pickup can go
 - Pickup tines should be far enough off the ground to not pickup and dirt but yet not leave any crop
- ☐ Adjust gauge wheel height
 - Gauge wheels should not ride on the ground but be lower than the pickup tines to protect them
- ☐ Adjust pickup flotation spring
 - Pickup should float over the terrain but not bounce constantly
- ☐ Adjust windguard height
 - Windguard should be low enough to keep the volume of material smoothly flowing into the pickup
 - Springs should only take up the first inch of movement

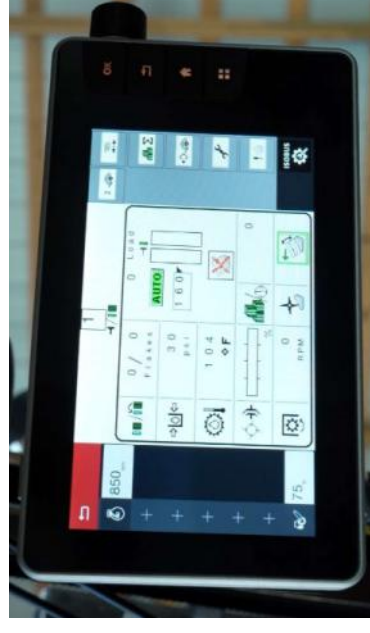


Subject: Starting Bale

Once all initial settings and adjustments have been made the baler is ready for the field. The first couple bales will not be perfect and may need to be broke apart and re-baled, but the process below will hopefully minimize that.

Starting A New Bale

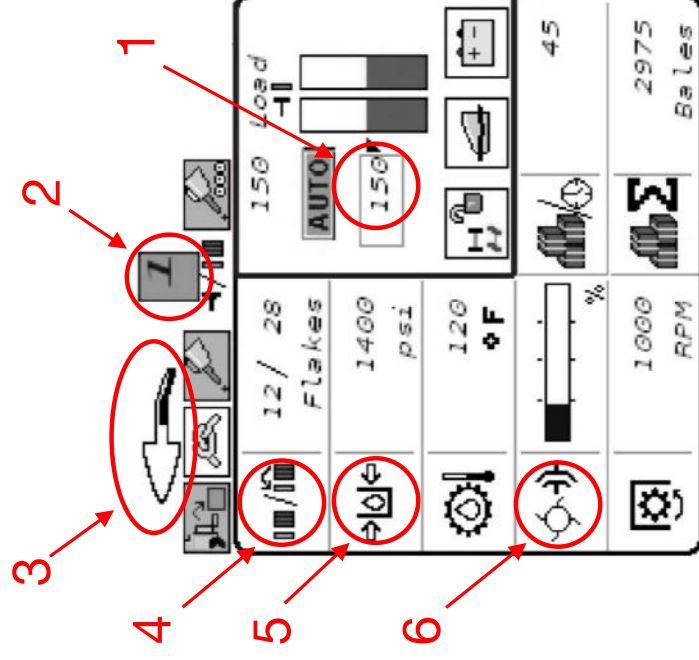
- ☐ Turn star wheel so that it is almost ready to trip and tie a knotted cycle
 - This will create approximately a 6' initial bale that will be broken and re-baled
- ☐ Set plunger load to 60% of desired final load setting
 - This will allow a fairly tight second bale to be made that hopefully will not need to be re-baled due to density
- ☐ Part way through second bale increase load to 90% of desired load setting
- ☐ Adjust bale length when second bale reaches close to desired length
- ☐ After second bale is tied, increase to 100% of desired load
- ☐ Check third and fourth bales for length and adjust accordingly



Subject: Baler Operation

During baler operation, there are six main things to watch to achieve consistent quality bales. Other indicators such as miss-tie or oil notifications need to be watched as well to keep the baler functioning properly

1. Plunger Load (1) dictates how dense the bale will be, this setting is very dependent on the crop being baled and the twine being used as to what will be the maximum load. The operator sets the desired load and the baler automatically adjusts pressure to achieve the load.
2. Flakes per Plunger Stroke (2) indicates how full the baler is running, in ideal conditions the flakes and plunger run 1:1
3. Driving Arrows (3) indicate which way the operator needs to drive to keep the bale chamber fed evenly
4. Flake Counter (4) shows current flakes and flakes from last bale. Depending on the crop and bale length, flake count should be between 30 & 50
5. Cylinder Pressure (5) indicates how much force it is taking in the chamber to achieve the desired plunger load. This can reveal a couple things: how dry the crop is since dryer crop takes more pressure to achieve density; and how close you are to maximum load with that particular crop.
6. Packer Clutch Slip (6) indicates how hard the baler is being fed, a slight amount of slip is normal, but excessive indicates too much crop is entering the pre-chamber.



Plunger load values vary greatly depending on the baler platform and the crop being baled. Below is a general guideline of load ranges for bale size and crop.

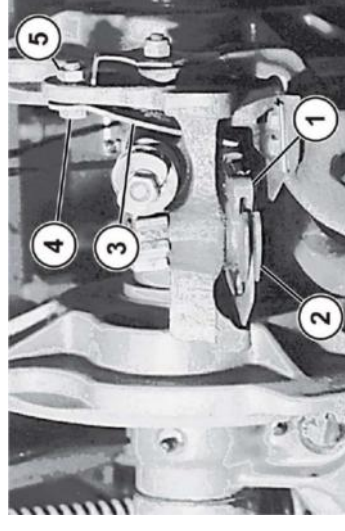
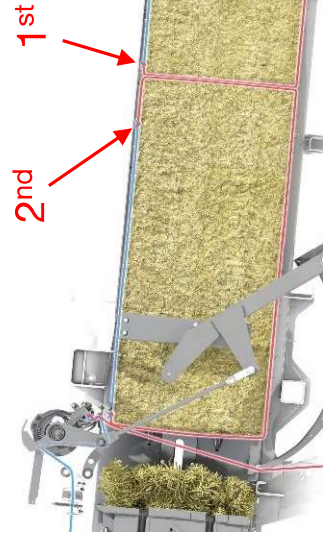
Baler	Dry Hay (Alfalfa & Grass)	Silage (30% + Moisture)	Max Load
2250 (3x3)	130 – 160	120 – 140	210
2270 (3x4)	225 – 270	180 – 210	330
2270XD (3x4)	225 – 315	210 – 255	465
2290 (4x4)	280 – 360	260 – 300	440

Subject: In Field Adjustments

Once the baler has been started and cycled through several bales, some adjustments may need to be made to optimize the performance. The first key area is the second knot tail length. The second knot is the knot tied last in the cycle, which is actually the “first” knot of the bale being formed.

Knotter Adjustments

- ❑ Twine disc tension effects the tail length of the knot, this is the primary adjustment that needs to be made if knots are pulling apart or are leaving long cut tails on the top of the bale.
 - Loosening the bolt (A-4) will lengthen the knot tail, tightening will shorten. Make adjustments $\frac{1}{6}$ th of a rotation at a time (one bolt head flat). Tighten lock nut (A-5) after adjustment.
 - Both the tails on the knot and cut laying on the bale should be 1” in length.
- ❑ Bill hook tension effects the tension of the knot, this can also effect tail length, but is a much less forging adjustment, which is why it is suggested to adjust twine discs first.
 - Tightening nut (B-1) will make a tighter knot and a longer tail, loosening will make a loose knot and a short tail. Only adjust $\frac{1}{6}$ th of a rotation at a time (one nut flat).
 - Knot should just slide off billhook with slight pressure applied.

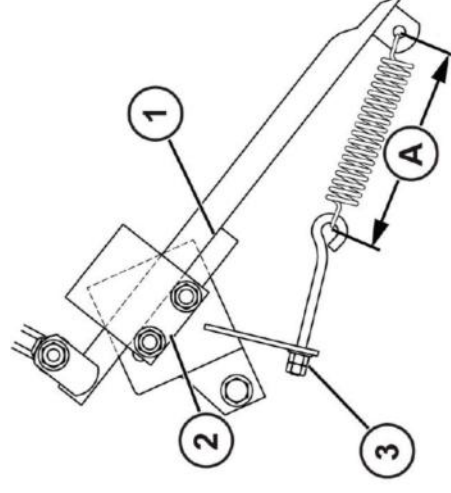
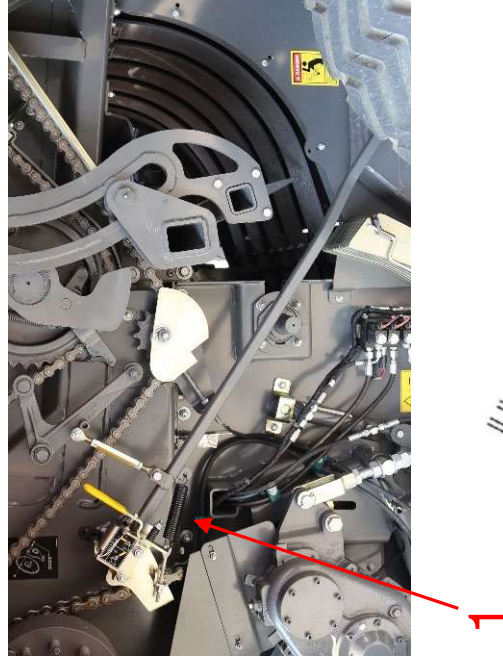
**A****B**

Subject: In Field Adjustments

The second key area is stuffer trip tension, this effects how the flake is formed in the pre-chamber before being compressed by the plunger in the main chamber. Ideally, the stuffer and plunger are working in a 1:1 ratio while filling the entire pre-chamber.

Stuffer Trip Adjustment

- ❑ Stuffer trip is controlled by the tension spring (1), factory setting for (A) is 7.1" for the 2250 and 6.7" for 2270, 2270XD, and 2290
 - Depending on crop and conditions, the tension may need adjusting. Loosening (3) will decrease the tension on the stuffer trip door, tightening will increase tension.
 - If baling at a slow ground speed and stuffer door is continuously tripping without the pre-chamber being completely full, tension needs to be increased.
 - If baling at a moderate to high ground speed and pre-chamber is full but not achieving 1:1 ratio with the plunger strokes, tension needs to be decreased.



Subject: Emptying Chamber

At the end of the season or when needing to perform maintenance inside the chamber, the bale can be ejected. It is also optional to only eject the bale in the back of the chamber when changing fields.

Ejecting A Bale

- ☐ Trip stuffer fork to clear pre-chamber*
- ☐ Tie off partial bale in chamber*
 - It is best to have at least 3 feet worth of bale to tie off, this gives the ejector fingers enough crop to engage
- ☐ With baler running, decompress chamber through the monitor
- ☐ After baler has gone through decompression cycle, shut off PTO and let the baler come to complete stop
- ☐ Raise pickup to transport position and lock tractor hydraulic SCV to continue to supply oil to the pickup lift circuit
- ☐ Use ejector teeth selector to choose how many teeth are engaged depending on how much of the chamber needs to be cleared
- ☐ Operate toggle switch back and forth to eject bales out of the chamber

***Only required if cleaning out entire chamber for end of season or maintenance**

