



Operator's Manual

Model: IBEX TX31T Mini Round Baler



ibxequipment.com
833-888-IBEX

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1 Introduction

Congratulations on your purchase of the Ibex TX31 mini round baler. Your machine, if properly operated and maintained, will provide many years of productive use. The purpose of this manual is to help you do this by describing proper safety, operation, and maintenance procedures. Do not attempt to use the machine without thoroughly understanding the information contained in this manual. Contact your Ibex Equipment dealer for assistance if any information described herein is not completely clear.



NOTE: All references made in this manual to right, left, front, rear, top and bottom is as viewed facing the direction of forward travel with implement properly attached to tractor.

1.1 Conditions of Use

Your Ibex TX31 baler is designed to gather, compress, and bind crop materials such as hay, straw, and pine straw, into easy-to-handle round bales. The machine performs best under certain conditions. Use of the machine outside of those conditions could result in poor performance or damage to the machine.

The machine is designed to...

...**work with tractors with 18 – 45 engine horsepower.** Using this machine with a tractor that is outside of the specified power range may result in damage or premature wear of the machine and/or sub-optimal machine function.

...**bale crop that is of optimal length.** Crop material should not be excessively short (< 12”) or excessively long (> 48”).

...**bale windrows of appropriate size.** See Section 4.2b for recommendations on windrow size.

...**bale hay that contains optimal moisture content.** Hay should not exceed 20% moisture content.

...**work in a dry field.** Do not attempt to use the machine immediately after rain or in a muddy field.

...**be operated while exercising the safety instructions detailed in the “Operator Safety” section of this manual.**

1.2 Machine Description

1.2.1 Pickup Lift Lever and Lock Arm

The pickup is held in the raised position during transport using the lift lever (Figure 1, A) and is held in place using the lock arm (B).

1.2.2 Pickup Lower Limit Chain

The lower limit chain (Figure 2, A) sets the minimum height of the pickup tines from the ground.

1.2.3 Tailgate Lift Lever

The tailgate lift lever (Figure 3, A) is pulled to release the bale from the chamber.

1.2.4 Shear Bolt

The shear bolt (Figure 4, A) breaks to prevent damage to the machine in overload conditions. New machines come with a spare set of bolts, inside the left door of the machine. The bolt has a very specific set of specifications engineered to shear at the right amount of resistance in order to prevent damage to the machine. Using shear bolts that are not supplied by your Ibex Equipment dealer can result in damage and will void the machine's warranty. See Section **Error! Reference source not found.** for advice on how to replace the shear bolt.

1.2.5 Pickup Drive Chain

The pickup drive chain (Figure 5, A) transfers power to turn the pickup. The friction clutch (B) slips only in overload conditions to prevent damage to the pickup mechanism. Chain tension is controlled by the idler (C).

1.2.6 Bale Chamber

The bale chamber consists of multiple rollers that turn the bale and form it into a fixed-size cylindrical shape (Figure 6).

1.2.7 Drive Chains

The baler's rollers are turned by a series of drive chains (Figure 7, A). Tension springs (B) provide proper tension to each chain. See Section 6.4.1 for chain tension specifications.

1.2.8 Hydraulic Power Pack

The baler raises the tailgate to eject the bale using a hydraulic cylinder. Hydraulic fluid is pushed into the cylinder by the hydraulic power pack (Figure 8, A), which is powered by the rotating motion of the PTO shaft which turns the roller chain (B).

1.2.9 Bale Density Control

The density selector rod (Figure 9, A) can be placed in one of four holes (B) to vary bale density. See Section 4.3.4 for details.

1.2.10 Bale Chamber Full Indicator

The chamber full indicator rod (Figure 10, A) rises gradually as the chamber fills up and reaches the red zone when the bale is dense enough to eject, according to the density selection.

1.2.11 Full Bale Chamber Alarm

The full chamber horn (11, A) sounds when the bale chamber is full, after the twine arm (Figure 12, A) drops and depresses the activation switch (B). This begins the twine wrapping process.

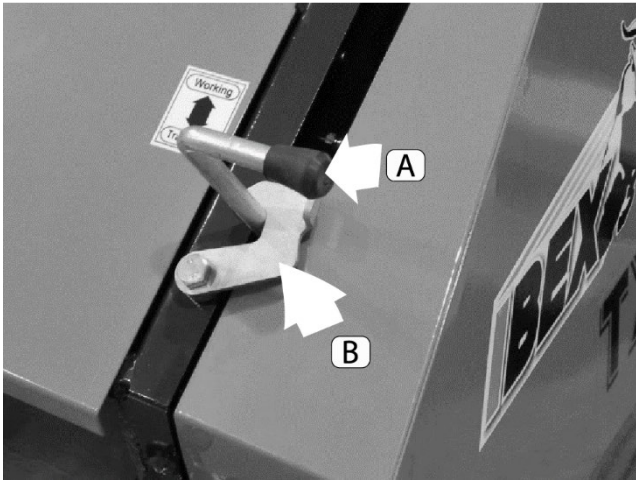


Figure 1 Top left side of baler (pickup lift lever)

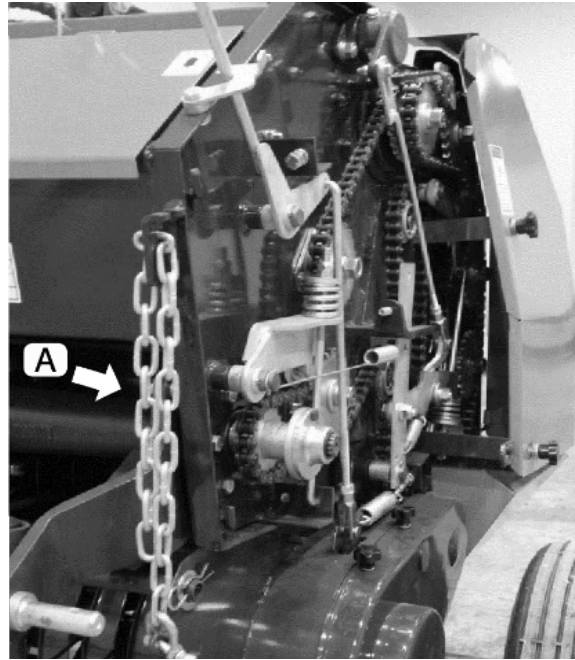


Figure 2 Left side of baler (lower limit chain)

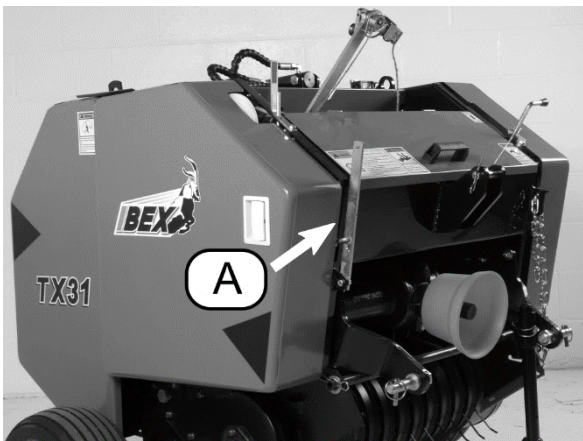


Figure 3 Front of baler (tailgate lift lever)

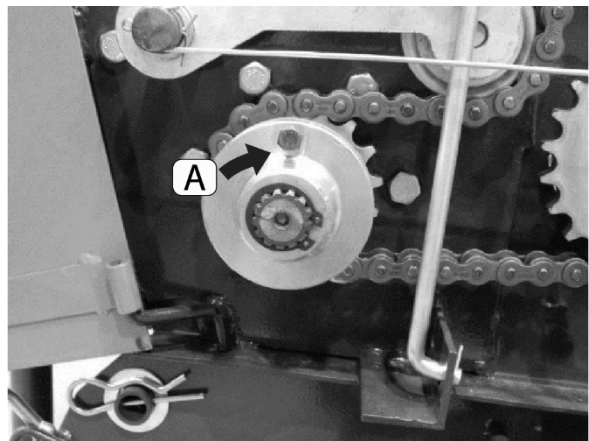


Figure 4 Left side of baler (shear bolt)

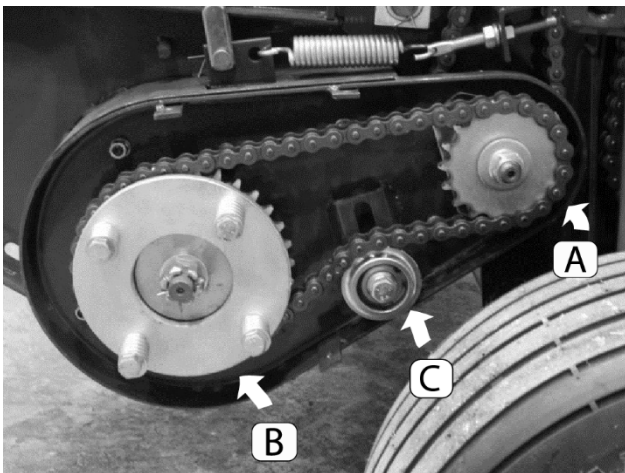


Figure 5 Left side of baler (pickup chain & clutch)

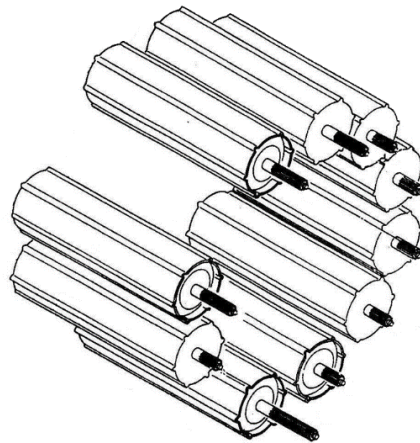


Figure 6 Rollers

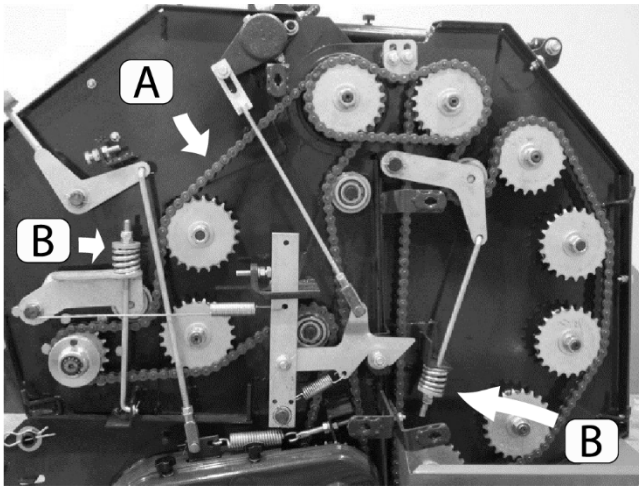


Figure 7 Left side of baler (drive chain & tensioners)

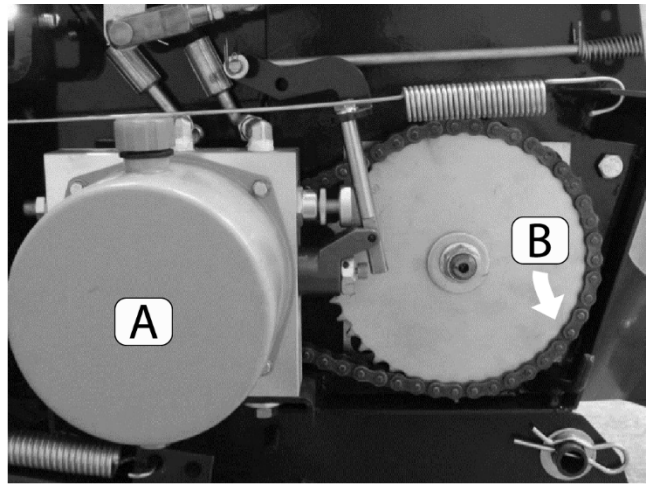


Figure 8 Right side of baler (hydraulic pump & chain)

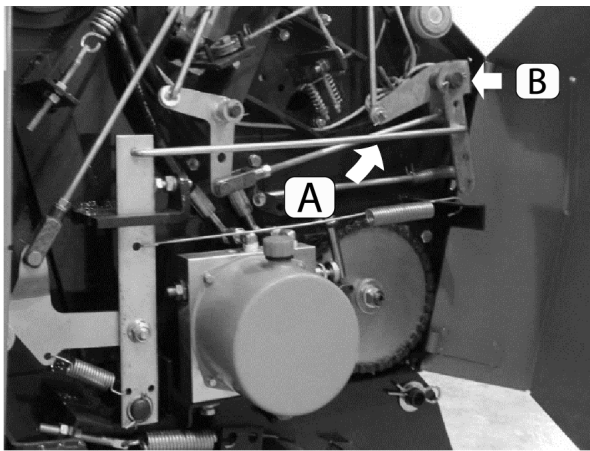


Figure 9 Right side of baler (bale density control)

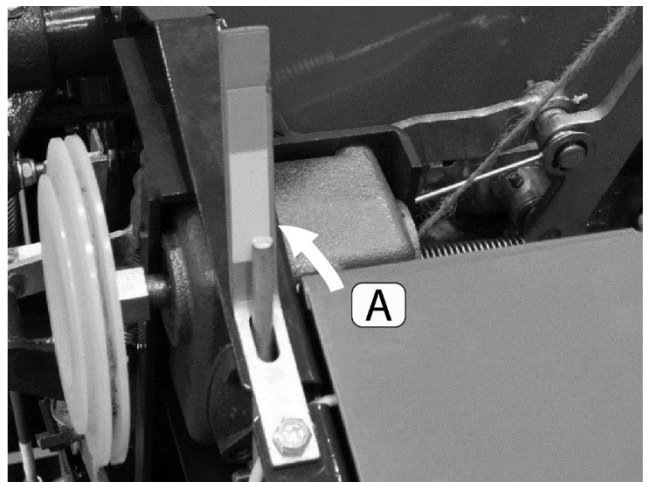


Figure 10 Top right side of baler (chamber full indicator)

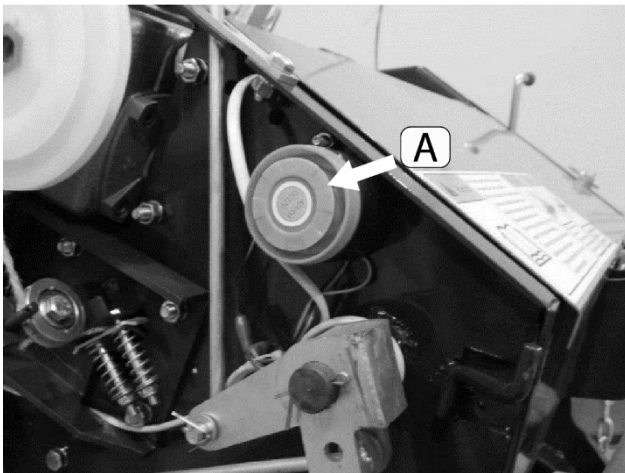


Figure 11 Top right side of baler (horn)

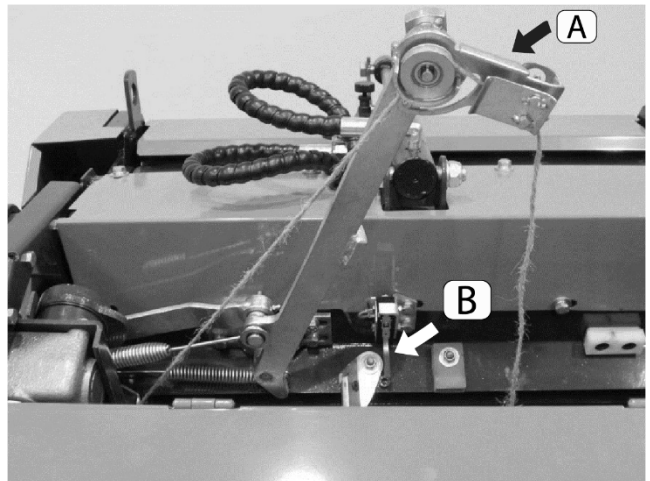


Figure 12 Top front of baler (twine arm and horn switch)

1.2.12 Pickup

The “pickup” (Figure 13, A) is the name for the mechanism that feeds hay into the bale chamber.

1.2.13 Bale Ejection

The bale is allowed to exit the chamber by lifting the tailgate (Figure 14, A). Pulling the tailgate lift lever (B) activates the hydraulic power unit (Figure 8, A) to retract the cylinder (C) to pull the gate open. The gate remains open while the lever is pulled. Once the lever is released, the gate closes.

The bale ejector (Figure 15, A) rolls the finished bale far enough from the machine to allow the gate to close.

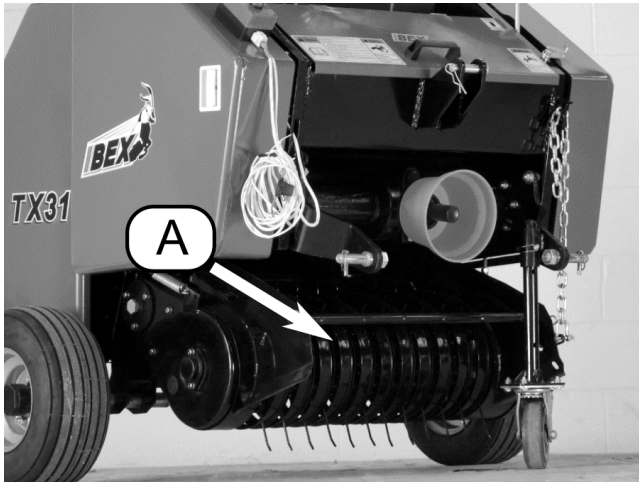


Figure 13

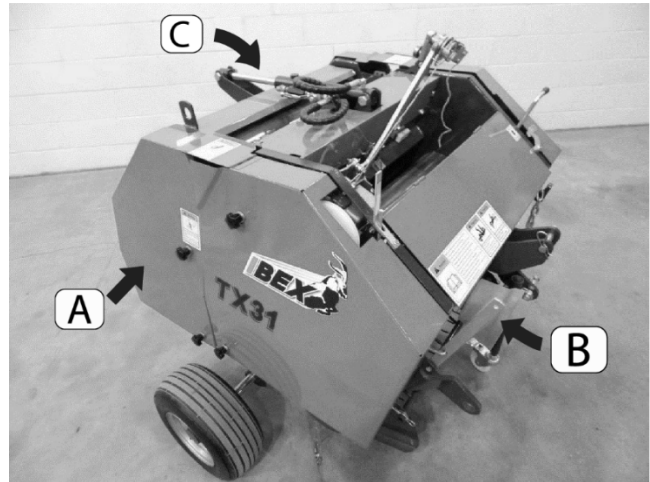


Figure 14

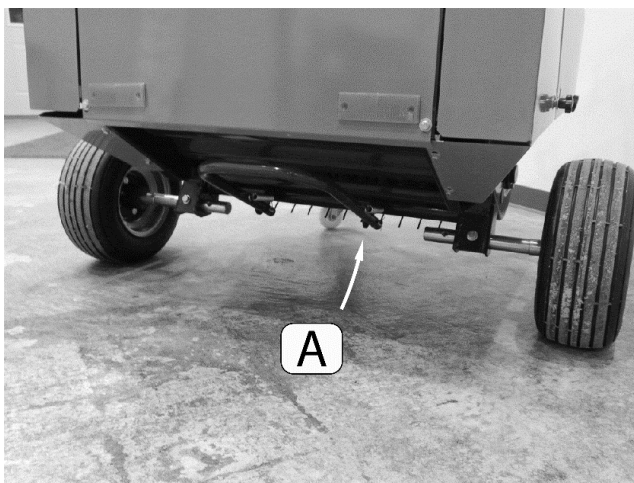


Figure 15

2 Operator Safety

Your safety is important to us. Please carefully read and follow the instructions given below and contained elsewhere in this manual before attempting to operate the machine. Most accidents can be avoided if you fully understand and implement the safety practices discussed in this section.



WARNING: *READ and UNDERSTAND all safety instructions in this section as well as warnings, cautions, and important notes throughout the manual. Serious injury or death may occur unless care is taken to follow these warnings.*

2.1 Tractor Operation Safety

- READ and UNDERSTAND all safety instructions and warnings in the operator's manual for your tractor.
- Understand how to stop forward motion, the engine, and the PTO of your tractor quickly in case of an emergency.
- Do not allow an inexperienced person to operate the tractor or any attachments without supervision.
- Wear proper safety gear at all times.
- Do not operate the tractor while under the influence of alcohol or drugs. Consult a medical professional regarding any prescription medications that you are currently taking and any side effects that could hinder your ability to operate the tractor safely.
- Only operate a tractor that has been properly maintained.
- Only operate the tractor in conditions of clear visibility. Never operate in dark or foggy conditions where visibility is restricted in front and to the sides of the tractor and implement. Ensure that all obstacles, steep slopes in the terrain, and overhead obstructions are visible.
- The tractor must be equipped with a rollover protection system (ROPS) and seatbelts to ensure operator safety in case of a rollover incident.
- Always set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, and wait for all moving parts to stop before leaving the tractor seat.
- Do not operate the tractor or implement while hydraulic oil or fuel is leaking. Oil and fuel are explosive, and their presence could present a hazard. Hydraulic lines are under extreme pressure and, if a break occurs, bursting oil could cause skin injury and/or tissue damage. Turn off the engine and relieve hydraulic pressure before checking for leaks.

2.2 Implement Operation Safety

- Keep body parts, clothing, jewelry, and anything else that is tethered to the body away from moving parts on the baler to prevent entanglement, which could result in serious injury or death.
- Use extreme caution when performing repairs, maintenance, and when removing accumulated material.
- Use care to avoid striking solid objects such as fencing or sign posts. The impact could cause loss of control of the tractor and implement, which could be hazardous.
- The baler must not be modified or altered, particularly with respect to the components that make up the machine's primary function.

3 Tractor Connection



CAUTION: Only attach and detach the baler on a level surface. Always apply the parking brake on the tractor when attaching an implement.

3.1 Thread the Twine



NOTE: Not all types of twine work well in this machine. Twine that is marketed as “round baler twine” is often made too thin for your baler’s unique wrapping mechanism. Use twine that is recommended by your Ibex Equipment dealer for best results.

Threading the twine is simpler if done before attaching the machine to the tractor. Follow the steps below.

- a) Place the roll(s) in the chamber facing as shown in Figure 15.
- b) If using two rolls, connect them together by tying the outside end of the right-hand roll (the end trapped under the cover) to the inside end of the left-hand roll (the end in the center of the roll). The knot you create will have to travel through the twine tension mechanism. Split each of these ends in half and tie corresponding ends together, creating two smaller offset knots that will more easily pass through tensioners. By connecting rolls together, you can avoid running out of twine in the middle of wrapping a bale, as well as needing to re-thread the twine.
- c) Thread the twine through the mechanism as shown in Figure 16 - Figure 19 in order from 1-8. The twine storage chamber has a hole on the side to feed the twine through, near the arrow shown in Figure 16. Be sure that the twine is fed through the tensioner shown in Figure 17 next to the label #2, as well as the tensioner at the end of the twine arm shown in Figure 19, near the label #8. As you run the twine through each tensioner and pulley, ensure the tension is not too tight, and that the pulleys spin freely.



NOTE: Proper twine tension is important for smooth operation of the wrapping mechanism. There must be sufficient tension on both tensioners to keep the twine taut, but not so much that it is too difficult to feed the twine off the spool.

- d) Pull the end of the twine so that the twine is taut all the way to the first tensioner. Cut the end of the twine, leaving about 12” of it hanging from the arm. The twine should not reach the bale chamber or the bale will pull it and the bale wrapping mechanism will be triggered prematurely. The twine must also not be too short, or the bale will have a difficult time gripping it when it is time to wrap the bale. You will also see this symptom when using twine that is too thin.

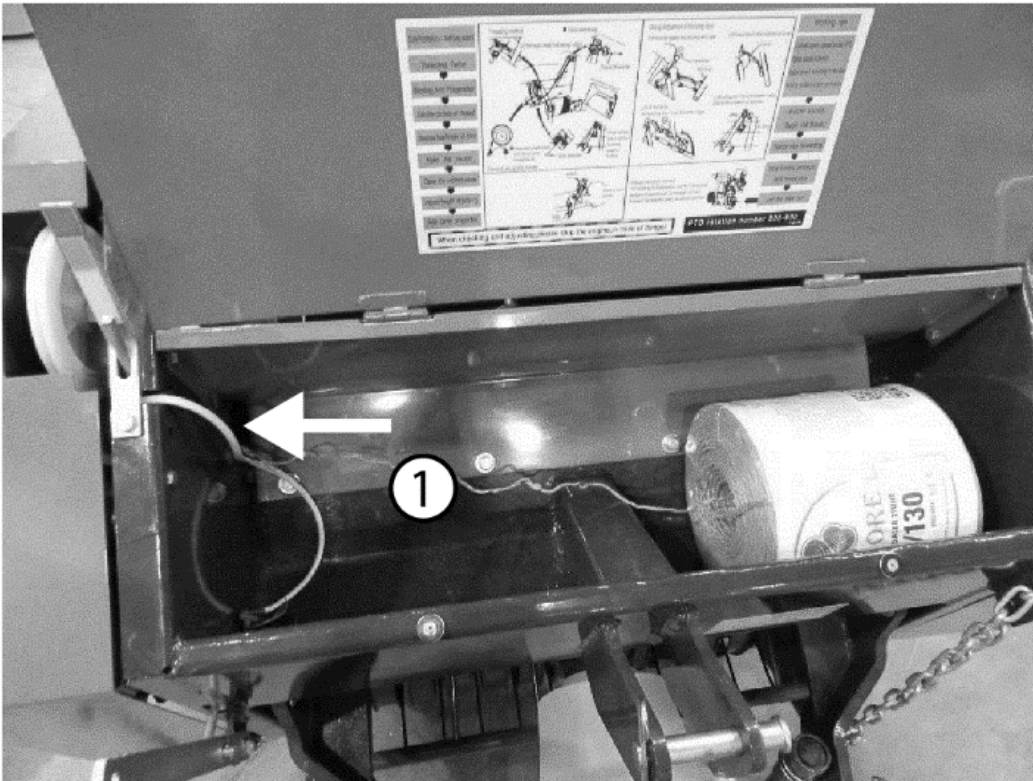


Figure 16

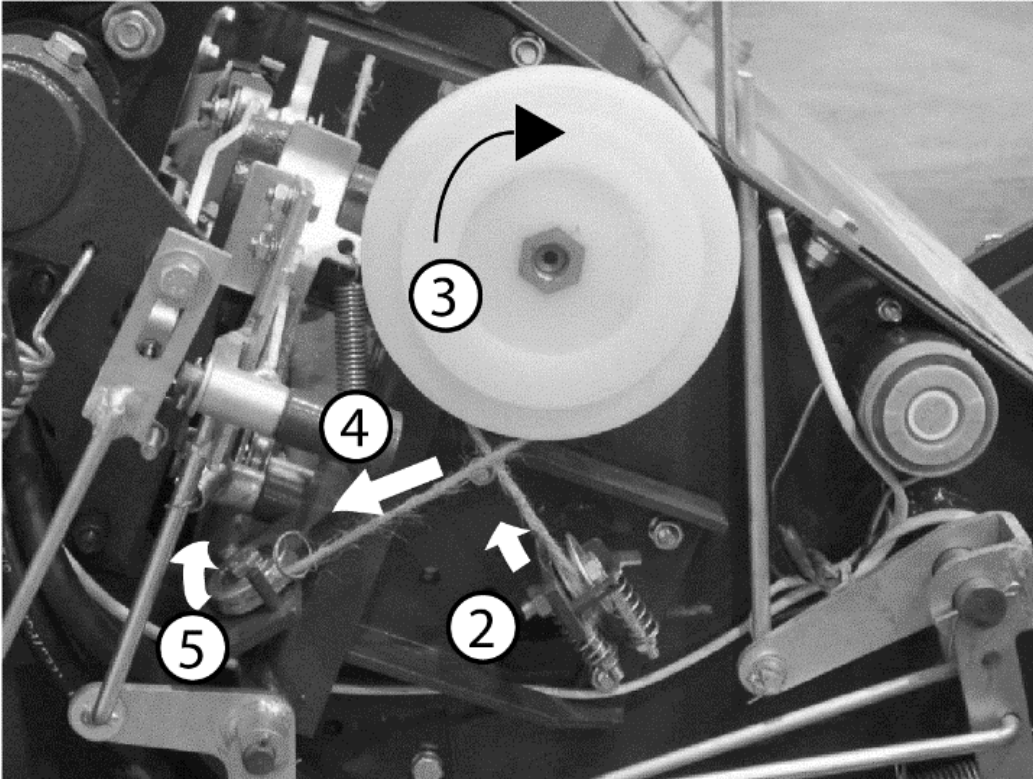


Figure 17 Right side of baler

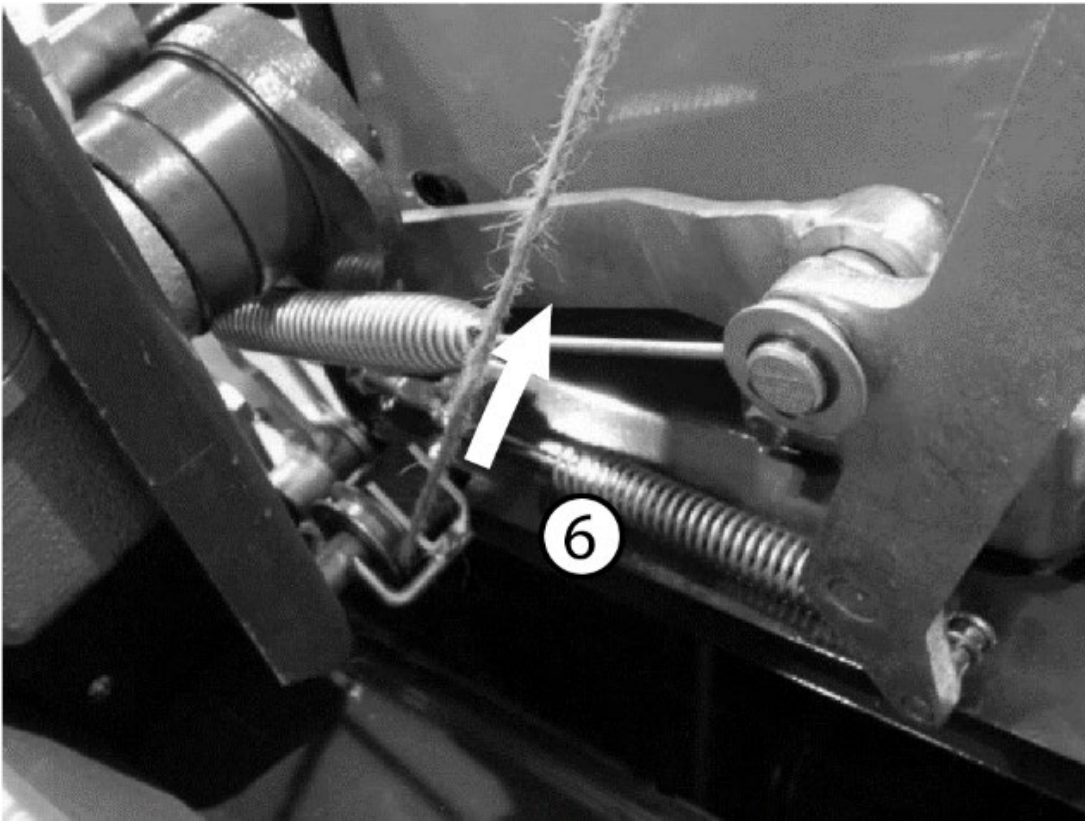


Figure 18

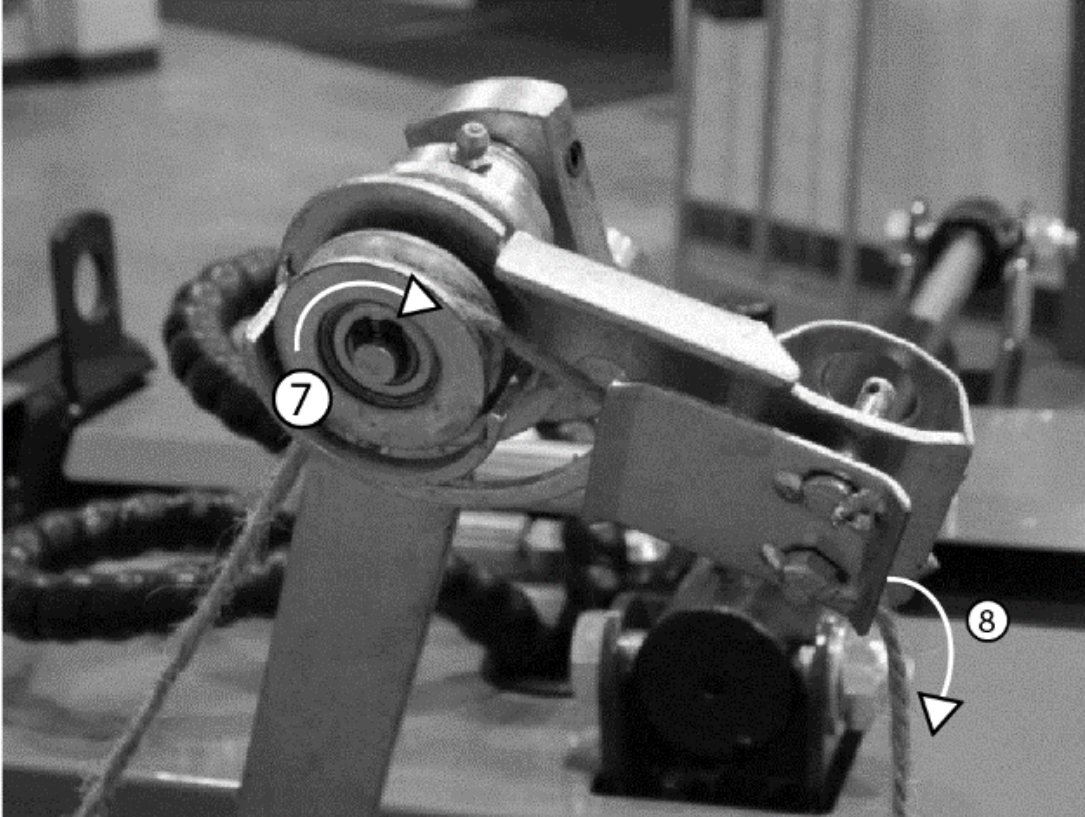


Figure 19

3.2 Connect the Baler to the Three-Point Hitch

- a) Attach and secure the tractor's lift arms to the two lower pins on the baler.
- b) Raise the lift arms slightly to remove weight from the stand and then raise the stand, securing it with the linchpin.
- c) Raise or lower the lift arms to tilt the baler until the top of the baler is **level with the ground**.
- d) Adjust the tractor top link until it aligns with the top link mounting holes on the baler and secure with top link pin.
- e) Tighten sway chains on the tractor's lift arms to center the baler and prevent lateral movement.

3.3 Connect the PTO Shaft



NOTE: If attaching the baler to the tractor for the first time, please note that the PTO shaft may need to be shortened. See our PTO Shaft Cutting Guide for details.

Connect both ends of the shaft by pushing in the locking pin and sliding the yoke onto the PTO of the tractor and baler. Push until the locking pin releases and settles into the groove. Attach the cover's safety chains to a stationary part of the tractor. Leave some slack in the chain to accommodate pivoting movements.

3.4 Attach the Gate Lift Pull Rope

Attach one end of the rope to the gate lift lever if not already attached. Tie the other end of the rope to the tractor's ROPS bar or somewhere inside the cab for easy access during work.



CAUTION: Leave some slack so that the rope does not become taught during regular operation, but not so loose that it becomes entwined in the PTO shaft or other moving parts.

3.5 Check Full Bale Chamber Alarm

The full bale chamber alarm is powered by a 9V battery. The battery is housed inside a black switch box, which is inside a grey protective case. The power switch on the switch box is turned off initially. Be sure to turn the switch on before using the machine.

Test the function of the full chamber horn by depressing the activation switch (see Figure 20).



CAUTION: Do not operate the baler without a working full chamber horn.

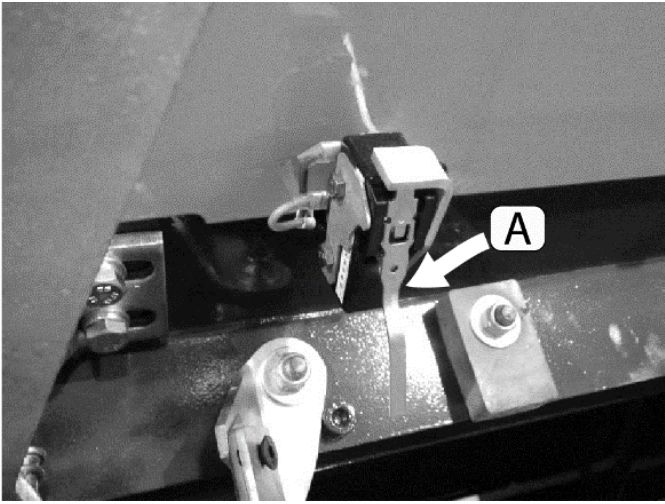


Figure 20

4 Operation

The purpose of this section is to instruct you on the safe and optimal use of your new TX31 baler. Pictures are included for illustrative purposes but may not match your machine exactly. Some pictures show protective covers removed for purposes of clarity. DO NOT attempt to operate the machine while the protective covers are removed.

Every operator of the implement, whether it is you or someone else, must be completely familiar with this section before attempting to use it.

4.1 Operation Procedure

4.1.1 Initial Setup

1. Attach the baler to the tractor as discussed in Section 3.
2. Unlatch the pickup lever lock and lower the pickup. Adjust the height of the pickup with the chain so that the tines are approximately one (1) inch from the ground at their lowest point. For very long grass, the height may be raised some to help avoid dirt mounds. For very short grass and cut straw, the pickup may need to be lowered some for good results. Avoid continual contact with the ground, as this will result in dirty hay and will reduce the life of the pickup tines.
3. Make sure the twine is fed properly over the rollers and around the twine pulley (see Figure 21 - Figure 23 and refer to Section 3.1 for details on how to thread the twine). Pull the end of the twine to ensure it is taut.
4. Attach the tailgate pull rope to the tractor's roll bar so that it can be easily grasped but is not taut.
5. Reset the twine arm as discussed in Section 4.3.6.

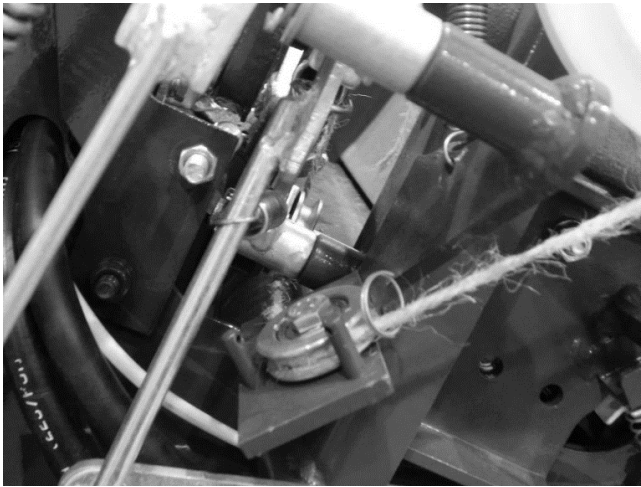


Figure 21 Right side of baler

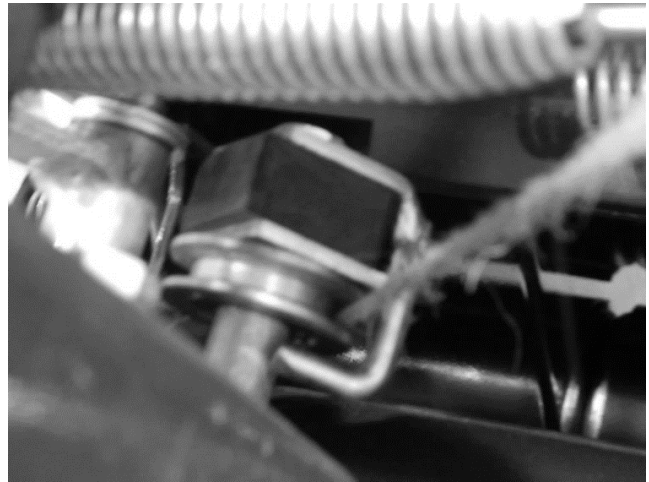


Figure 22



Figure 23

4.1.2 Baling

1. Line up to straddle the first windrow. At idle engine speed, engage the tractor's power take-off (PTO) and then gradually bring the engine RPM up to achieve 540 RPM PTO speed. The PTO should remain engaged and running at 540 RPM during all baling activity.
2. Drive slowly over the windrow and begin picking up the hay or straw. Optimal baling speed will be 2-3 miles per hour, or about a slow walk. The best speed will depend on field conditions and windrow size.
3. Keep an eye on the pickup to make sure the hay is being pulled in by the baler and is not collecting in front of the baler. If material accumulates in front of the baler, stop or slow down until the baler can catch up, and then proceed.
4. The bale chamber indicator provides a visual cue of how full the chamber is. The indicator will not begin to move upward until the bale chamber is about $\frac{3}{4}$ full.
5. Continue forward until the horn sounds. When you hear the horn, stop forward motion immediately. You will then see the twine arm come up out of the twine arm cavity, go past vertical, and then start to move back across the bale. The twine will then be cut and the bale will be ready to eject.
6. Pull on the rope to raise the baler's tailgate. Hold the rope until the bale rolls out, clear of the tailgate, then release the rope. The door will close on its own.



Figure 24

4.1.3 Finishing Work

The following steps should be taken at the end of each day of work. Additional steps are needed if the machine is being stored away for the off-season. See Section 6.5.

1. Shut the implement down by gradually lowering the throttle on the tractor to idle speed before turning off the PTO. Come to a complete stop.
2. Lift the pickup using the lift lever and lock it up in the transport position.
3. Move the implement to its storage location, on level ground.
4. Place the transmission in park or neutral, set the parking brake, and turn the engine off.
5. Lower the parking stand on the baler and secure it in place with the locking pin. Adjust the 3-point hitch as necessary to line up the holes on the stand and secure the locking pin.
6. Chock the baler's wheels. Detach the baler from the tractor. Turn the tractor back on, and drive forward and away from the implement.
7. Perform daily maintenance. See the Maintenance Schedule in Section 6.3.

4.2 Recommendations for Good Results

a. **Successful baling starts with good mowing and raking.**

Be sure to time the cutting phase so that the hay is not too short, and not too long. Stalks should be between 18 and 36 inches. Shorter and taller hay is difficult to bale.

While cutting, ensure that there is sufficient overlap between cutting swaths that no hay is left uncut. Uncut hay can make it hard for the baler to pick up the cut hay and can get tangled in the baler pickup. This in turn can cause the pickup's slip clutch to slip. When the pickup slips, hay gets bunched up in front of the baler and is likely to clog.

Adjust the raking procedure so that the optimal windrow size and uniformity is achieved. If the crop is heavy (thick crop, extra tall when cut, etc.), only rake a partial swath, which will put less hay in the windrow. If the crop is very light, you may need to rake two swaths together to get the optimal windrow.

The optimal windrow will have a width of about 28-32 inches and a height of about 12-16 inches. The more uniform the windrows, the smoother the operation will be and the more consistent the bale weights will be. The result will be different depending on the rake used, the height and thickness of the crop at the time of cutting, the moisture in the crop, and a number of other factors.

- b. **Do not run the baler at a slow PTO speed!** The recommended PTO speed is 540 RPM. Engine speed is not the same as PTO speed. Check your tractor's manual to see where 540 PTO RPM is on the tachometer.
- c. **Drive the tractor at the right forward speed.** Drive the tractor at the fastest forward speed possible that will allow a continuous, steady flow of hay into the chamber. Driving slower than necessary will cause disruption in the flow of hay and will result in inefficient hay accumulation and bale formation. If you feel you often need to slow down, most likely the windrow is too large.
- d. **Dry the hay the right amount of time.** Many problems can be traced to crop that is too dry. Hay is best baled at approximately 15% moisture content. Very dry hay will result in lightweight and inconsistent bales and may often cause twine not to wrap properly or at all. If the twine arm does not come up after the horn sounds, drive forward a few feet, adding more hay into the chamber. Using a higher density setting may also be required when baling very dry material.

Baling hay that has more than 20% moisture content is not advisable, mostly because it could result in fungal and bacterial growth and a dangerous rise in temperature and, possibly, fire! Another good

reason not to bale wet hay is that it tends to be more difficult to bale. Wet hay is more dense and can overload the baler, even on the lightest density setting.

- e. **Avoid misshapen bales.** To avoid misshapen bales, crop should be evenly distributed across the full width of the baler pickup. For very small windrows, it may be necessary to weave to the left and right while baling to make sure edges of bales are fully formed.

4.3 Operational Adjustments

4.3.1 Adjusting Twine Tension

- When installed, twine must be held in tension so that it properly engages the twine pulley, does not detach from the guide rollers, and is cut consistently when it is finished wrapping a bale. At the same time, if the tension is very tight, it may be too tight for the bale to pull and feed twine through the system.
- Twine tension should be adjusted during each use so that it is not too tight and not too loose.
- There are two tensioners – one at the right side of the baler where the twine exits the chamber (Figure 25, A) and one at the top of the twine arm (Figure 26, A).

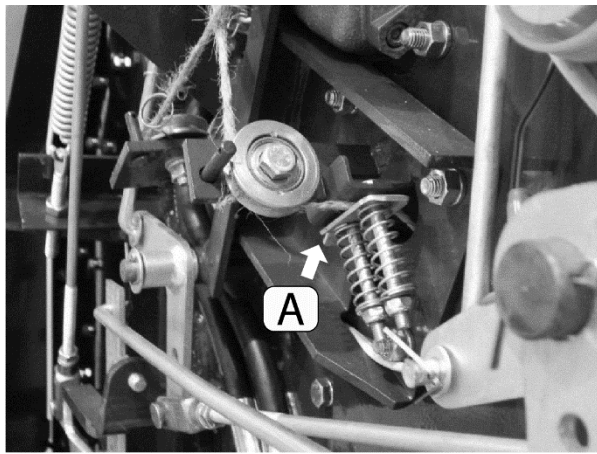


Figure 25 Right side of baler

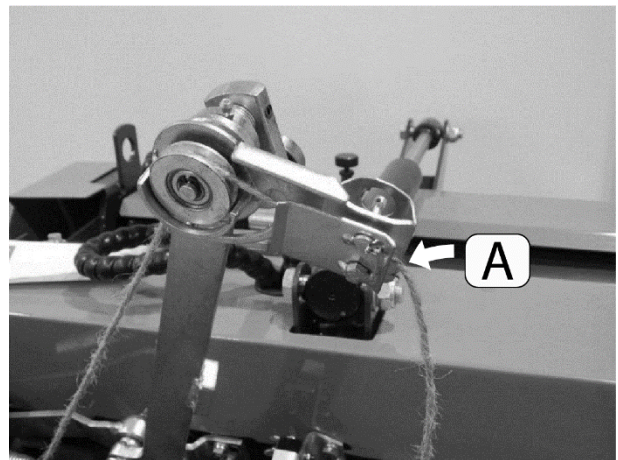


Figure 26

4.3.2 Adjusting Pickup Height

- For optimal operation, the tines of the pickup should be about one (1) inch from the ground in normal conditions. In bumpy or rocky fields, a clearance of up to two (2) inches or more may be suitable to prevent damage to pickup components. For baling light hay cuttings or straw, the pickup may need to be lowered.
- Adjust the pickup height by lifting it with the lift lever (Figure 27, A) and using the lower limit chain (B) to keep it in place.
- The pickup may be lifted and locked in the transport position by means of the lift lever and transport lock (Figure 27, A).

4.3.3 Adjusting Number of Wraps per Bale

- The twine pulley (Figure 28, A), which controls the number of windings of twine on each bale, is behind the cover on the right side of the machine.

- There are two twine installation positions on the pulley. Using the larger diameter slot will result in the twine winding around the bale approximately 11 times, while the smaller diameter will result in approximately eight (8) wraps.
- Use the larger diameter slot (more wraps) when bales will need to be handled more, or when the baled product is short and/or very dry. Use the smaller wheel for longer hay and to conserve twine.

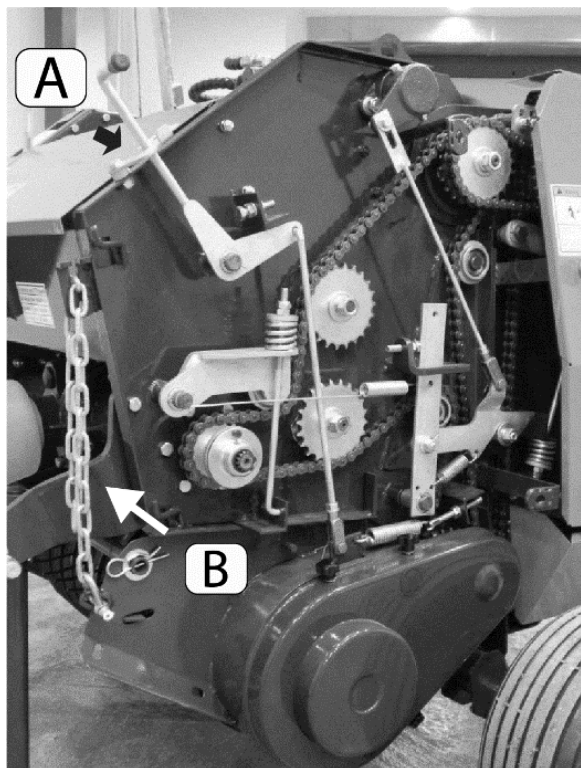


Figure 27 Left side of baler

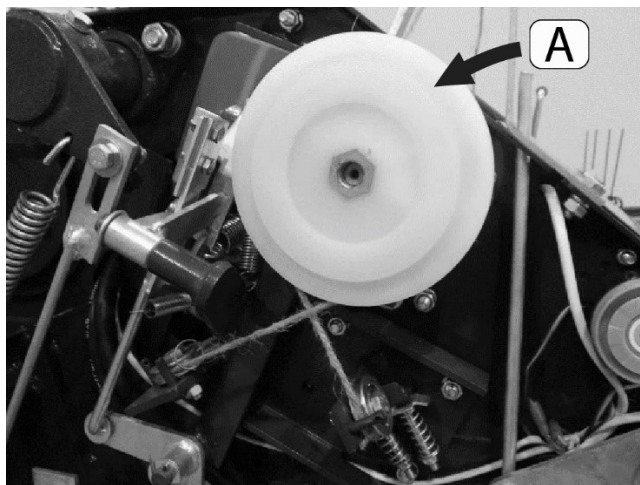


Figure 28 Right side of baler

4.3.4 Adjusting Bale Density

- The baler can be set to produce bales different densities by adjusting the connecting rods on the right side of the baler. Two different adjustments are possible.
 - 1) In most cases the outer rod (Figure 29, A) can be moved to a different hole in the front adjustment plate (B). For **lower density** bales, move the rod to an **upper hole**. For **higher density** bales, move the rod **downward**.
 - 2) The inner rod (Figure 30, A) can also be moved to a different hole in the boomerang-shaped back adjustment plate (B), but please note that normally this adjustment is not necessary. Changing the position on the boomerang-shaped plate will cause a much larger change in bale density than the front plate. Use the top hole for lighter bales and the bottom hole for heavier bales. After making this adjustment, additional fine-tuning can be done by moving the outer rod mentioned in option 1.
- In general, drier hay and straw will require a higher density setting for best performance, while hay with higher moisture, and especially green hay, should be set at a lower density.
- When increasing density, always move one hole at a time until you reach the desired bale density.
- If a shear bolt is broken when the chamber is full, but the bale has not yet started the wrapping process, replace the shear bolt and reduce bale density.



NOTE: The highest density settings will often cause the shear bolt to shear before the twine arm is triggered to drop. It is best to work at the lowest density possible to prevent the shear bolt from shearing.

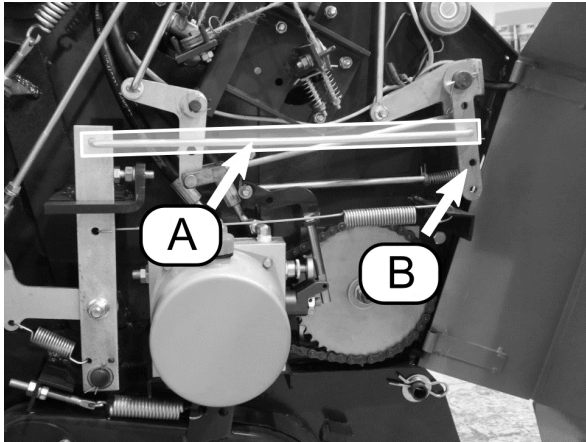


Figure 29 Right side of baler

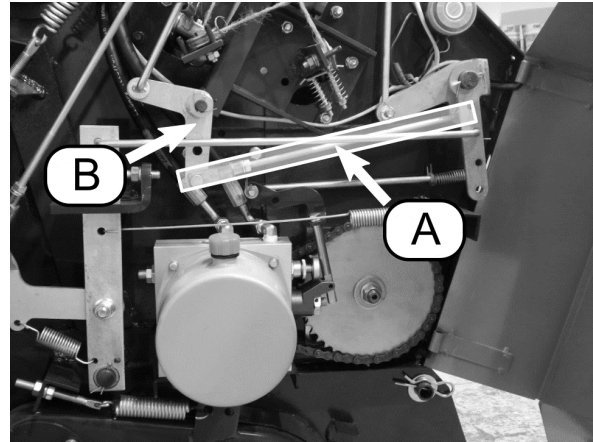


Figure 30 Right side of baler

4.3.5 Adjusting Tailgate Closing Speed

- The opening and closing action of the tailgate can be slowed down or sped up to suit your preference by adjusting the position of the flow control valve (Figure 31, A).
- Hydraulic flow can be stopped for maintenance or other purposes by turning the stop valve (B) upward so that it is perpendicular to the cylinder.

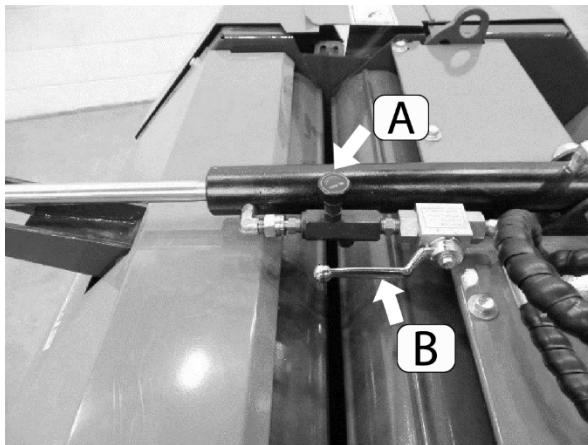


Figure 31

4.3.6 Resetting the Twine Arm

- **IMPORTANT: The twine arm must be fully reset for the automatic wrapping mechanism to function properly.**
- The reset procedure, as discussed in steps 1-3 below, should be performed **once, each time you begin baling** and any time the automatic wrapping mechanism fails to perform as expected. The reset procedure performs automatically during the baling process.

1. There is a release lever (Figure 32, A) on the outside of the pivot box (B). Press the lever outward, toward the outside of the baler, to release the twine arm.

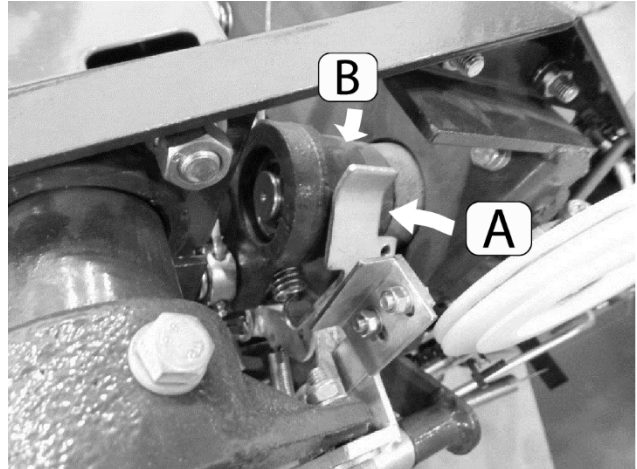


Figure 32 Right side of baler

2. If the twine arm was previously reset, it will quickly drop. If it was not reset, pulling on the release lever will not cause any change. In either case, turn the pulley (Figure 33) in the clockwise direction until the twine arm begins to rise. The arm may continue to go further downward as you turn the pulley, before it begins to rise.

Note: if the twine is wrapped around the pulley, it will likely get caught when turning the pulley by hand. It is often better to unwind the twine from the pulley first, and re-install it once the rest process is complete.

3. Grasp the twine arm and pull up and toward the outside of the baler until the arm is as far to the right side (pulley side) as it will go. Push the arm back toward the center of the baler until the arm is in the resting position shown in Figure 34. You will feel the arm pull itself toward the left, and then it will stop at its natural resting position. Pull the hanging twine until it is taut. Cut off any excess twine hanging from the end of the arm beyond 12 inches.

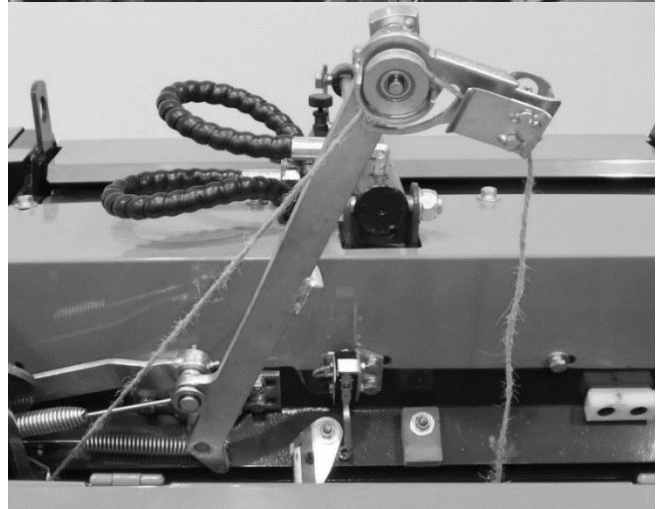
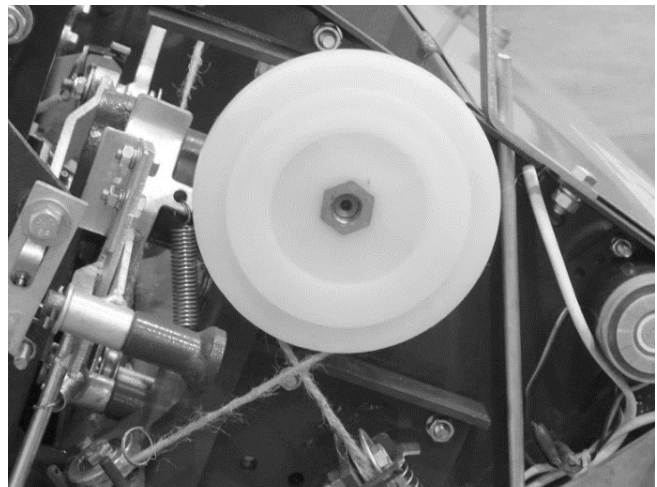


Figure 34

4. Perform Step 1 again to test whether the reset was successful. If pushing the release lever causes the arm to drop, this will confirm that you know how to properly perform the reset procedure. If it does not, try following Steps 2 & 3 again to ensure that the rest is properly done.

5 Troubleshooting

This section includes a few of the most common troubleshooting questions and answers. For additional technical assistance, contact your Ibex Equipment dealer.

5.1 Why is the baler breaking shear bolts?

- The baler is being overloaded.
 - The twine arm may not be dropping at the appropriate time. Be sure that the twine arm is properly reset (see section 4.3.6 for details on how to reset the twine arm).
 - Ensure your windrows are no wider than the baler pickup. The optimal windrow will have a width of 28-32 inches and a height of 12-16 inches.
 - Ensure the ground speed of the tractor is appropriate. The windrow should flow smoothly and continuously into the baler. Not so fast as to cause bunching in front of the pickup, and not so slow that the feed of crop into the machine is spotty.
 - Ensure the alarm horn is functioning properly. If you do not hear the horn sound, you may continue to feed crop material into the chamber after it is full, which will lead to shear bolt breakage.
- Debris is clogged or jammed in or around the bale chamber. If a previous jam occurred, ensure all material was removed from the bale chamber and from around all rollers.
- The PTO is being engaged at a high tractor engine RPM. Be sure to engage the tractor's PTO at low throttle and slowly bring it up to 540 PTO RPM.

5.2 The baler just broke a shear bolt. How do I get the stuck hay out?

- The hydraulic pump will still run when the shear bolt is sheared/not present. Continue to run the PTO and try to eject the bale by opening the tailgate.
- If the bale is jammed in the baler and will not just fall out, raise the tailgate and turn off the on/off valve on the hydraulic cylinder to keep the tailgate suspended. Use a tool such as a pitchfork to remove the stuck crop material. Do not place any body parts inside the bale chamber.

5.3 How do I replace the shear bolt?

- **Important: Only replace the shear bolt with one supplied by your Ibex Equipment dealer.** To line up the two plates on the shear bolt sprocket, first put the PTO in neutral or disconnect the PTO from the tractor. Then turn the PTO shaft by hand in order to line up the two holes. If you are using a prybar or other tool to turn the PTO shaft at the joint, be careful not to damage the grease fitting.
- If the holes are close to being aligned, you can push a screwdriver, punch, or a similar item through the holes and twist it until the holes are well aligned; this will make insertion of the bolt easier.
- Insert the shear bolt and secure the lock nut to keep the bolt in place. It's easiest to put the nut on the inside and the bolt head on the outside.

5.4 Why did the rollers stop turning?

- The shear bolt is sheared. See Section 5.3 for advice on how to replace the shear bolt.

5.5 Why did the pickup stop turning?

- The pickup is protected by a slip clutch (Figure 5) that will slip if there is an obstruction, to prevent damage to pickup components. It is important to stop the PTO right away if you notice that the pickup is not turning. Continuing to run the machine while the pickup is jammed will cause the slip clutch friction discs to burn out and can also damage other components of the clutch if left to slip too long. Find the source of obstruction and remove it before continuing.
- Check for crop material, twine, or other debris wrapped or caught in the pickup strippers or tines.
- Check for bent or missing pickup strippers.
- Ensure that the slip clutch plates are in good condition and the slip clutch is properly adjusted. Adjust the springs as needed so that their compressed length is approximately one (1) inch (27mm).
- Ensure the slip clutch has no debris wrapped around it.

5.6 Why is crop getting jammed inside the baler?

- PTO speed is too slow. Ensure the PTO is at 540 RPM.
- Windrows are poorly formed when raking. Windrows that are uneven, with empty patches and large clumps of crop, are more difficult to bale. Make your baling work easier by raking at an even speed and making sure to aim the rake evenly over the swath of crop material. This will create a more even windrow.
- The windrow is too large. The optimal windrow will have a width of 28-32 inches and a height of 12-16 inches. The rake should be adjusted to form the necessary windrow size.
- Cut crop was cut too short. If the crop is too short when cut, or if it is cut with a mower that chops it into small pieces, these small pieces will get jammed. The cut crop should be at least a foot tall, preferably taller.
- Forward speed is not well-matched to the PTO speed. To make a well-formed bale, you should aim to keep the flow of crop into the baler as smooth as possible. The windrow should flow smoothly into the baler. You should be able to drive forward at a moderate speed and have the crop feed in continuously. Not so fast as to cause bunching in front of the pickup, and not so slow that the feed of crop into the machine is spotty.
- A previous jam occurred, and not all of the jammed crop was removed. Be sure to carefully remove all stuck debris from inside the bale chamber after a jam occurs.

5.7 Why is the baler leaving behind crop material on the ground?

- Crop was cut too short or was not cut with a hay mower. Crop that is cut shorter than 12" will be difficult or impossible to bale successfully because it can easily fall between the pickup tines. Optimal crop height at cutting is 12 – 48". Mowers that are not designed for cutting hay such as rotary cutters (brush hogs) will chop up the material into smaller pieces and are not appropriate for use in cutting hay.
- The baler and pickup need adjustment.
 - Ensure that the top of the baler is level with the ground. Adjust the top link as needed.
 - Ensure the pickup lift lever (Figure 1) has been moved out of transport position and into the working position.
 - Adjust the pickup tines so that they are about one (1) inch above the ground in normal conditions. In bumpy or rocky fields, a clearance of up to two (2) inches or more may be suitable to prevent damage to the pickup.

- Windrows are too small. The optimal windrow will have a width of 28-32 inches and a height of 12-16 inches. This may require raking additional windrows together into one with a light cutting.

5.8 Why is the tailgate not shutting all the way, shutting too slowly, or not latching?

- Crop material is obstructing the tailgate from fully closing. Remove crop material or other debris from the area of the mating surface of the door and main frame of the baler.
- The hydraulic pump is low on oil. Check the oil level in the hydraulic pump as specified in the Maintenance Schedule (section 6.3).

5.9 Why does the twine arm drop down but not come back up?

- PTO speed is too slow. Ensure the PTO is at 540 RPM.
- Incorrect twine. Not all sizes and types of twine work well in this machine. Twine that is marketed as “round baler twine” is often made too thin for the baler’s unique wrapping mechanism. The correct type of poly twine is usually marked as 9000/130 or simply 9000. Thinner twine will not be gripped enough by the baler to pull it into the chamber. Thicker twine will not fit properly in the components of the twine system.
- Crop is too dry. Very dry crop will result in lightweight and inconsistent bales and may often cause twine not to wrap. If the twine arm does not come up after the horn sounds, drive forward a few feet, adding more crop into the chamber. Using a higher density setting may also be required when baling very dry material. If regularly baling dry crop or trying to make light bales, adding grip tape or rubberized coating to the intake roller surface will improve results.
- The bale has been fed unevenly - left to right. Usually caused by windrow of inappropriate size (too small or too large). The optimal windrow will have a width of 28-32 inches and a height of 12-16 inches. This may require raking additional windrows together into one with a light cutting.
- Improper twine installation. Refer to section 3.1 for twine installation instructions.
- Improper twine tension. When installed, twine must be held in tension so that it properly engages the white twine pulley, does not detach from the guide rollers, and is cut consistently when it is finished wrapping a bale. At the same time, if the tension is very tight, it may be too tight for the bale to pull and feed twine through the system.
- Faulty twine pulley bearing. Check that all twine pulleys spin freely.
- Improper lubrication of twine components. Check lubrication at all twine arm pivot joints. Add 1 to 2 pumps of grease in all grease fittings and spray all bushings with high quality penetrating oil.

5.10 Why will the twine arm not drop?

- The twine arm is not properly reset. See section 4.3.6 for instructions on how to reset the twine arm.
- The bale density setting is set too high for the conditions. See section 4.3.4 for instructions on how to lower the bale density.
- The pivot points on the twine arm are not well-lubricated. This can cause the arm not to reset properly on its own during the wrapping procedure. Grease all visible grease fittings each day you plan to use the machine.

- Damaged or missing twine arm spring(s). Several springs are in place to control the motion of the wine mechanism. Check if any are damaged or missing.

5.11 Why is twine not being cut at the end of the wrapping cycle?

- Dull cutting blade. Check that the cutting blade is in good condition and is sharp. **It can be replaced with a standard utility knife blade.**
- Blade holder cannot swing freely. The blade holder should be able to swing freely at the pivot point, so that it can get out of the way when the twine is first being fed across the bale, and it must fall back down into place. The nut has a nylon insert that prevents it from unthreading, so it does not need to be very tight. Leave it slightly loose to allow free movement.

6 Maintenance

6.1 Maintenance Safety

- Never attempt to lubricate, adjust, or remove material from the baler while it is in motion or while tractor engine is running.
- Wear protective gear such as goggles and gloves if using high pressure air or water to clean the baler.
- Always perform maintenance with the machine positioned on a level surface.

6.2 Initial Maintenance

There are a few steps that are important to take before the first time the baler is put into use. Perform these steps well in advance of use to avoid difficulty caused by unforeseen issues.

- Check oil in main gearbox, twine gearbox, and hydraulic pump.
 - The main gearbox does not have a fill plug, sight window, or dip stick to indicate the oil level. If you would prefer not to drain and re-fill the gearbox, you can hook up and turn on the PTO and turn it right back off. Then open the fill plug and peer into the gearbox and check that the gears are coated with oil
 - The fill plug of the twine gearbox is also the fill level plug. Remove the plug and check that there is some oil present.
 - The hydraulic pump does not have a fill plug, sight window, or dip stick to indicate the oil level. Remove the fill plug and peer into the reservoir. There should be some oil visible.
- Add grease to all grease fittings.
- Lubricate all pivoting linkage joints with chain lube or white lithium grease.
- Lubricate all chains using chain lube.

6.3 Maintenance Schedule

Action	Interval			Specifications
	As Needed	Each Day of Use	100 Hrs. or Each Season	
LUBRICATION				
Main gearbox – change oil			X	Gear oil: SAE 90 (such as 80w90), EP (extreme pressure), 36oz (1.1 qt)
Twine gearbox – change oil			X	Gear oil: SAE 90 (such as 80w90), EP (extreme pressure)
Hydraulic pump – change oil			X	Hydraulic Fluid (same type used in tractor), 58 oz (1.8 qt)
Tailgate hinge – grease zerk	X	X		NLGI No. 2 Grease

Shear bolt sprocket – grease zerk	X	X		NLGI No. 2 Grease
Twine arm base pivot point – grease zerk	X	X		NLGI No. 2 Grease
Twine arm crank bar pivot points – grease zerk	X	X		NLGI No. 2 Grease
PTO shaft – lubricate	X	X		Lubricate at grease fittings and inner metal tubes
Chain tension arm pivot points – lubricate	X	X		Spray a penetrating chain/cable lubricant
Linkage pivot points – lubricate	X	X		Spray a penetrating chain/cable lubricant
Roller chains – lubricate	X	X		Spray a penetrating chain/cable lubricant
GENERAL MAINTENANCE				
Check nut/bolts – tighten any that are loose	X	X		
Roller chains – tighten any that are loose	X	X		See Section 6.4.1
Twine knife – inspect and replace if dull	X		X	Use standard utility knife blade
Tire air pressure – check and inflate	X	X		Maximum pressure: 28 psi
Operational adjustments	X	X		Carry out as specified in Section 4.3
General machine cleaning	X	X		Remove visible dirt/debris from inside and outside of machine. Avoid use of water.
Full bale chamber alarm horn battery – replace	X		X	9V battery
Electrical wires for horn – inspect for wear and replace	X		X	18 gauge wire
Thorough machine cleaning			X	Clean as discussed in Section 6.5
Components with bare metal – apply paint, oil, or grease to prevent rust			X	

6.4 Routine Maintenance

6.4.1 Hydraulic System

The pump that activates the tailgate lift cylinder (Figure 35) takes tractor hydraulic fluid – the same type you would normally use for your tractor’s hydraulic system. There is no dip stick, level plug, or sight

window to check the oil level as the oil level in the tank varies according to conditions. The fill cap does appear to have a dip stick on it (Figure 36), however this is only a cap, not a measuring device. The factory specification of 1.8 quarts of oil is for when the machine is first filled. When draining oil from the system, much of it will remain inside the hydraulic components. It is best to refill with the same amount of oil that was drained.

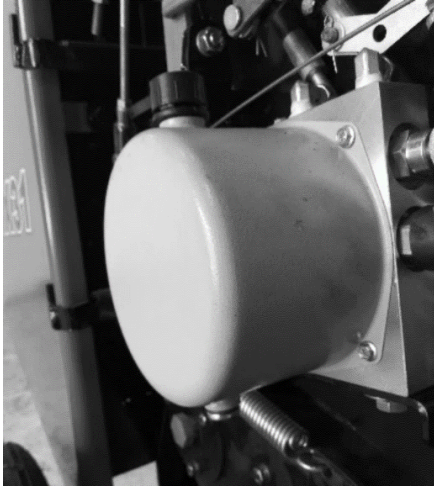


Figure 35 Right side of baler (hydraulic pump)



Figure 36 Right side of baler (fill cap)

6.4.2 Main Gearbox Lubrication

The main gearbox (Figure 37, A) comes with oil filled to the halfway point. When changing the oil, drain it completely using the drain plug at the bottom of the gearbox. Re-install the plug and re-fill the gearbox from the top fill hole with 36 oz (approximately 1.1 qt) of oil. There is no fill level plug, sight window, or dip stick to indicate the oil level. See Section 6.3 for the required service interval and gear oil specifications.

6.4.3 Twine Gearbox Lubrication

The twine gearbox (Figure 38, A) comes with a small amount of gear oil. See Section 6.3 for gear oil specifications. To change the oil, you will first need to remove the twine storage container lid (B). There are several screws securing it. Remove the screws and the lid to gain access to the side of the box to drain and more easily re-fill the oil. Measure the amount drained and re-fill the gearbox with the same amount.

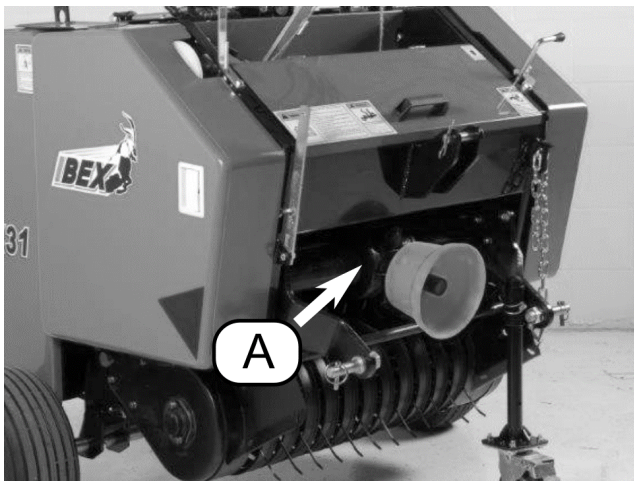


Figure 37 Main gearbox

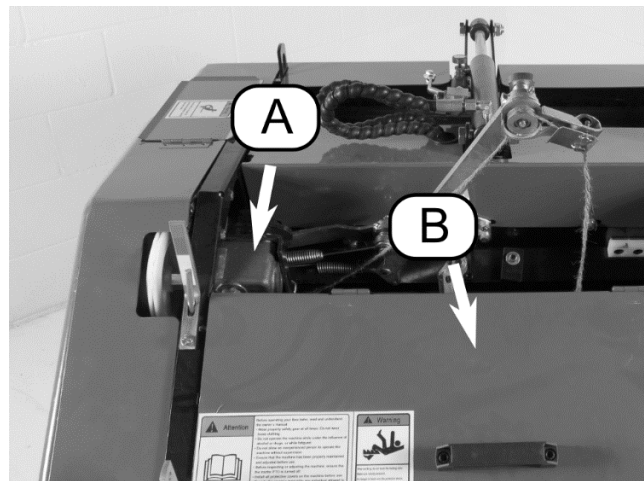


Figure 38 Twine gearbox

6.4.4 Roller Chain Tension

Roller chains stretch slightly over time with normal use. Significant stretching takes place during initial use on a new machine. A loose chain will cause sprockets to wear prematurely and result in sub-optimal function of the roller system. Check chain tension by depressing a longer length of chain to observe the degree of flexion.

Adjust main drive chain tension by shortening or lengthening tensioner springs (Figure 39, A,B) and by changing position of tension plate (C). Optimal spring length specifications are **1 7/16 inches (36mm) for spring A** and **1 1/2 inches (38mm) for spring B**. If the tension plate (C) is at the proper setting, the joint chain (D) should deflect **approximately 1/8 inch (3mm)** when pressed upward from below.

Tension of the hydraulic power pack drive chain (Figure 40, A) is adjusted by moving the position of the power pack with respect to the drive sprocket (B). Optimal tension will result in **approximately 3/16 of an inch (5mm) of deflection**.

Pickup drive chain tension (Figure 41, A) is adjusted by changing the position of the tension pulley. Optimal tension will result in **approximately 0.12 inches (3mm) of deflection**.

6.4.5 Pickup Slip Clutch Tension

The baler's pickup comes equipped with a slip clutch protection mechanism. When pickup components experience excessive resistance, the clutch will slip to prevent damage. The clutch's tension springs (Figure 42, A) apply pressure to resist slipping and must be tensioned properly. They are normally set at the correct tension at the factory, with spring length at approximately **one (1) inch (27mm)**. They should be adjusted to this length if the clutch begins to slip during normal use. However, each time the clutch slips, the friction discs inside the clutch experience wear. The discs should be replaced if worn.

6.4.6 Pickup Suspension

The pickup is suspended with two (2) springs (Figure 43, A), one on each side. The length of the spring should be approximately **1 7/8 inches (48mm)** when the pickup is released into working position. Tension can be adjusted if necessary by adjusting the position of the nuts (B).

6.4.7 Twine Tension

Twine tensioners keep the twine in place and prevent problems with the operation of the automatic bale wrapping mechanism. The tension springs should provide enough pressure to perform this purpose without inhibiting twine release. Check that the springs are in place and are not damaged. Test the system by pulling quickly and steadily on the end of the twine and then stopping abruptly. It should not be excessively difficult to pull twine and twine should remain in place along the threading path. Adjust spring tension as needed by turning the nuts at the end of the threaded screws (Figure 44 & Figure 45).

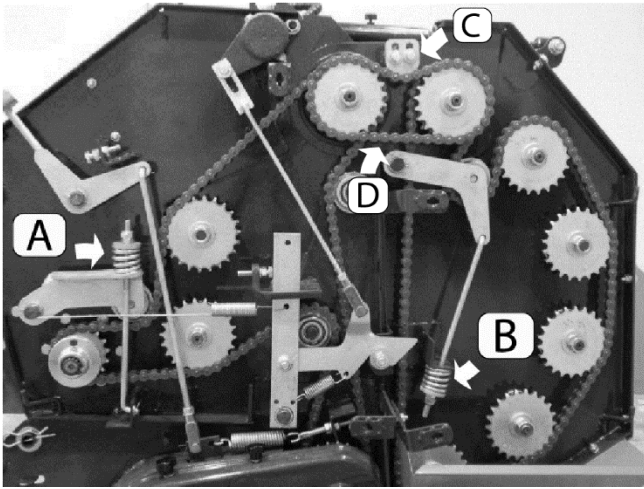


Figure 39 Left side of baler (chain tensioners)

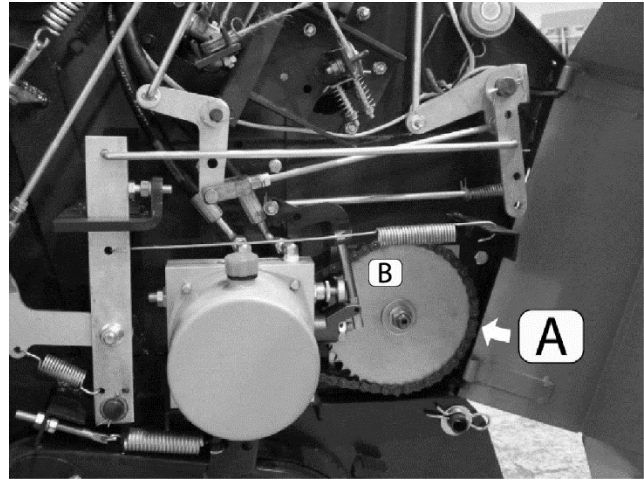


Figure 40 Right side of baler (hydraulic pump chain)

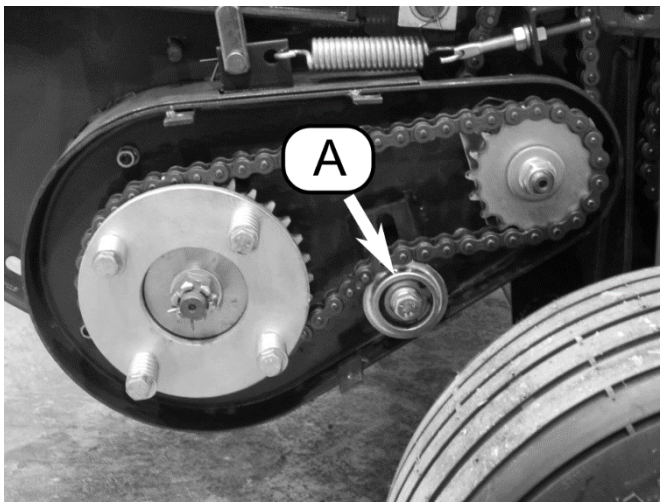


Figure 41 Left side of baler under cover (pickup chain tensioner)

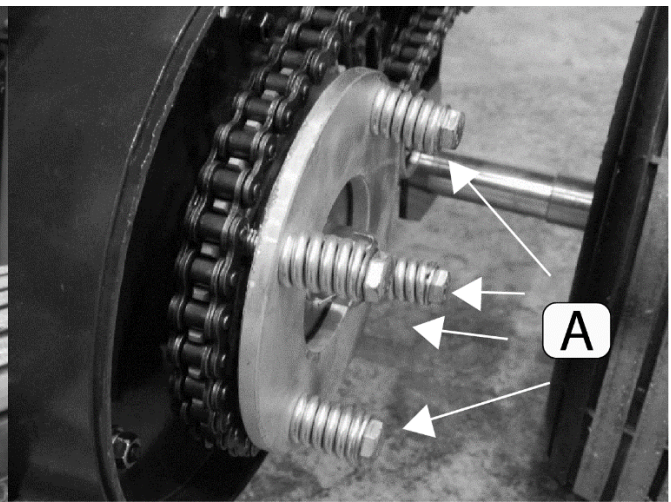


Figure 42 Slip clutch tension springs

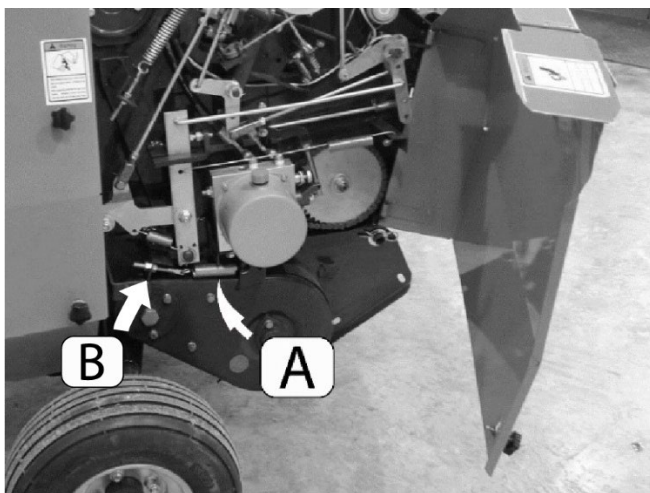


Figure 43 Right side of baler (pickup suspension spring)

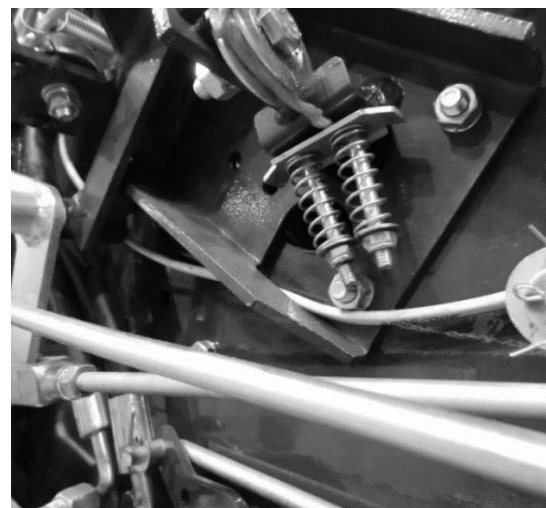


Figure 44 Right side of baler

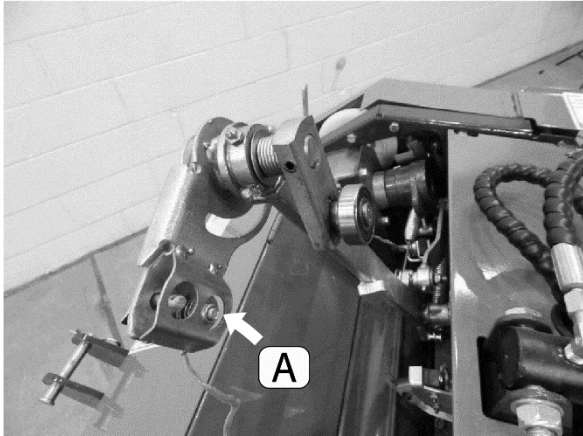


Figure 45

6.4.8 Twine Cutting Blade

The twine cutting blade (Figure 46, A) will be subject to gradual wear during normal use. Replace as necessary. The blade can be replaced with a standard utility knife type blade. Loosen screws and pull blade to release and use reverse steps to install new blade. Use caution when replacing the blade to prevent injury.

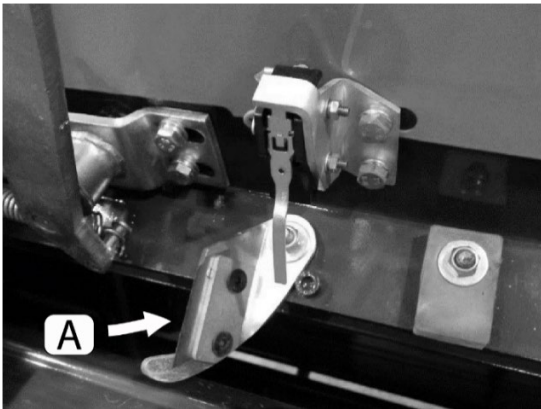


Figure 46

6.5 End of Season Storage

After using the machine for the last time of the season, perform the following actions to prepare the machine for storage after completion of daily maintenance procedures.

- Remove all covers and clean all parts of the machine of dirt and debris. Thoroughly clean the inside of the pickup, the bale chamber, and other hard to reach areas where debris tends to accumulate. Compressed air is recommended for hard-to-reach areas. Do not use compressed water near bearings or grease fittings.
- Perform a full inspection of the machine to check for any damaged components. Replace as needed.
- Check tire pressure and inflate as needed. Check tires for signs of wear.
- Lubricate the machine according to the Maintenance Schedule in Section 6.3.
- Apply paint or grease to any bare metal surfaces to prevent rust.
- Remove the 9V battery that powers the bale chamber full alarm horn.
- Store the machine in a well-ventilated indoor space. If no indoor space is available, cover the machine with a plastic tarp, removing it occasionally to allow accumulated moisture to dissipate.
- Inspect the machine occasionally for any accumulation of moisture, rust, or other problems and address accordingly.

6.6 Beginning of Season

Before the first use of the season on a used machine, perform the following actions to ensure trouble-free operation.

- Inspect the machine for any rust, animal nests, or other problems.
- Clean the machine thoroughly of any dirt or debris that has accumulated in the off-season.
- Check tire pressure and inflate as needed. Check tires for signs of wear.
- Lubricate the machine according to the Maintenance Schedule in Section 6.3.
- Apply paint or grease to any bare metal surfaces to prevent rust.
- Install the 9V battery that powers the bale chamber full alarm horn. Check electrical wires for any signs of wear. Replace as needed. Test horn function using the switch and replace battery as necessary.
- Connect the machine to the tractor as discussed in Section 3. Start the machine with the tractor at idle engine speed. Check for any operating problems. Test tailgate cylinder function.
- Before attempting to bale for the first time, create a windrow of hay or straw from a small area of field/stand and attempt to bale it. Address any and all problems before attempting to begin work.