FREEMAN
A Division of Allied Systems Company

OPERATOR'S MANUAL 1592D

This Manual is for use with Serial No's: ASC-1592-209 and ASC-1592-316 only.

SAFETY

General

The following pages contain general safety warnings which supplement specific warnings and cautions appearing elsewhere in this manual. All electrical and hydraulic equipment is potentially hazardous. You must thoroughly review and understand this Safety Section before attempting to operate, troubleshoot, maintain or service this baler.

Time, money and effort have been invested in making your Baler a safe product. The dividend from this investment is **YOUR PERSONAL SAFETY**.

However, it must be realized that no power-driven equipment can be any safer than the person behind the controls. If you don't operate and maintain your Freeman Baler safely, our efforts will have been in vain.

The safety instructions and warnings, as documented in this manual and shipped with the machine, provide the most reliable procedures for the safe operation and maintenance of your Baler. It's your responsibility to see that they are carried out.

Allied Systems Company cannot anticipate all worksite conditions, local regulations, etc. It is the responsibility of the end user to be aware of and obey any specific worksite, local, state, or national regulations or procedures that are applicable to operating this baler.

NOTE: All possible safety hazards cannot be anticipated so as to be included in this manual. Therefore, you must always be alert to potential hazards that could endanger personnel and/or damage the equipment.

Safety Symbols

The following symbols/terms are used to emphasize safety precautions and notices in this manual:

DANGER

The "DANGER" symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.

WARNING

The "WARNING" symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.

CAUTION

The "CAUTION" symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or equipment damage. Carefully read the message that follows to prevent minor or moderate injury.

NOTICE

The "NOTICE" symbol alerts to a situation that is not related to personal injury but may cause equipment damage.

NOTE: …

The term "**NOTE**" highlights operating procedures or practices that may improve equipment reliability and/or personnel performance, or to emphasize a concept.

Intended Use Statement:

This baler is intended to gather and compress loose, fibrous material (i.e., hay) and form it into rectangular bales. Use in any other way is considered to be contrary to the intended use. If you are unsure of the material you intend to bale, consult the factory.

SAFETY

Operation Warnings

⚠ WARNING

Warning: Failure to observe the following safety rules may result in extreme personal injury, dismemberment or death. It is the operator's responsibility to understand the proper and safe use of this baler.

- Make sure that you read, understand, and obey all of the safety precautions and operating instructions in this Operator's Manual.
- Keep this Operator's Manual with the baler at all times.
- Do not operate the baler unless you are authorized and trained to do so. If it has been some time since you last operated the baler, re-familiarize yourself with the baler before starting, then proceed slowly.
- Do not operate the baler if you are aware of any malfunctions, needed maintenance or repairs.
- Stop the baler immediately if any problems arise.
- Never allow others to ride on the baler.
- Never allow anyone within 10 ft of the baler while the baler is in operation.
- Never operate the baler without all safety shielding in place.
- Keep hands, feet, hair, jewelry and clothing away from moving parts, including but not limited to the pickup, knotter, and PTO shaft.
- Avoid wearing loose clothing which can easily be caught in moving parts.
- Use appropriate signs (i.e., Slow Moving Vehicle sign), signals or warning lights when transporting on highways.
- Always use lights when working at night or in low light conditions.
- Do not start the tractor if the key had been marked with a "DO NOT START" or "RED" tag.
- Know your job-site rules. Some have site specific directions and procedures. The methods outlined in this manual provide a basis for safe operation of the baler. Because of special conditions, your company's baling procedures may be somewhat different from those shown in this manual.
- Never operate any of the tractor's controls from anywhere other than the operator's seat.
- Alert personnel in the area before starting the engine, and make sure everyone is clear. Be sure that all controls are in neutral and the baler is disengaged before starting the engine.
- Each country has its own safety legislation. It is in the operator's own interest to be conversant with these regulations and to comply with them in full. This also applies to local bylaws and regulations in force on a particular worksite.
- Should the recommendations in this manual deviate from those in the user' country, the national regulations should be followed.
- Never attempt to disconnect any of the safety devices built into the baler or tractor.
- Maintain proper clearance from energized equipment, energized power lines or other power sources. High voltage electricity can discharge to ground without direct contact with the baler's or tractor's structure. If the baler or tractor contacts energized equipment, or if electrical energy does discharge through the machine—stay clear, and prevent anyone else from coming in contact with the baler or tractor. If you are on the tractor, stand fast, avoid contact with metal surfaces, and do not permit anyone to come into contact with the tractor or baler. Finally, **Do not jump off**.

SAFETY

Hydraulic Hazards

Be aware of the hazards of pressurized hydraulics:

- Wear personal protective equipment, such as gloves and safety glasses, whenever servicing or checking a hydraulic system.
- Assume that all hydraulic hoses and components are pressurized. Relieve all hydraulic pressure before disconnecting any hydraulic line.
- Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.

- Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin, even through gloves.
- Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.

Maintenance Safety

- Perform all routine maintenance outlined in this Operator's Manual in the time intervals indicated.
- Maintenance, lubrication and repair of this machine can be dangerous unless performed properly. In order to ensure safety, each person working on this baler must have the necessary skills, information, tools and equipment, and satisfy himself that his work method is safe, correct, and meets his own company's requirements.
- Do not attempt to make adjustments, or perform repairs unless you are authorized and qualified to do so.
- Never attempt to service energized equipment alone. Someone capable of rendering aid in the event of accidental shock must be present.
- Do not rely on the hydraulic system to support any part of the baler during maintenance or lubrication. Never stand under a baler component that is supported only by the hydraulic system. Ensure components are resting on their mechanical stops or supported with appropriate safety stands during maintenance or lubrication.
- Never attempt servicing while the baler is moving. Shut off the tractor and secure power.
- Shut off tractor engine, engage the parking brake, disengage the baler, and wait for all movement to stop before adjusting, lubricating, cleaning, or servicing the baler.
- Tag the key switch with a "DO NOT START" sign and/or remove the key.
- Always perform all maintenance and lubrication procedures with the baler on level ground, parked in a safe area.
- Block the tires to keep the machine from rolling.

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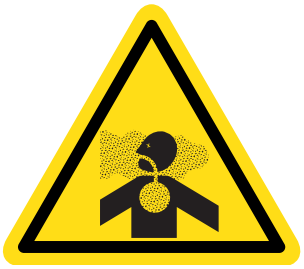
- Any unauthorized modifications made to the baler by the customer or parties other than Allied Systems will relieve Allied Systems Company and your Freeman dealer of any liability for damage or injury.
- Replace any worn parts only with genuine Freeman parts. Call your dealer for assistance.
- Unless specified in service procedures, never attempt maintenance or lubrication procedures while the baler is moving or the engine is running.
- Engine exhaust fumes can cause death. If it is necessary to run the engine in an enclosed space, remove the exhaust fumes from the area with an exhaust pipe extension. Use ventilation fans and open shop doors to provide adequate ventilation.



- Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.
- Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or servicing in an enclosed space. Always shield your eyes when working near batteries. When removing battery cables, disconnect the negative (-) cable first. When installing a battery, always connect the positive (+) cable first. This procedure will help to prevent a spark which could cause an explosion.

- Before making adjustments to the electrical system, disconnect the battery. An electrical spark could cause a fire, explosion or severe burns.

Safety Equipment

- Ensure test equipment is in good condition.
- If an instrument must be held while taking measurements, ground the case of the instrument before energizing equipment.
- Do not touch live equipment or personnel working on live equipment while holding a multimeter. Some types of measuring devices should not be grounded—do not hold such devices while taking measurements.
- Prevent personal injury or equipment damage by using a lifting device with a lifting capacity greater than twice the weight of any equipment to be lifted.
- Always use personal protective equipment (PPE) appropriate to the situation. This may include the use of hearing protection, eye protection, a respirator, a hard hat, leather gloves, steel toed boots, etc.

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Electrical Hazards

- An electric shock could be fatal. Ensure power to the baler is “OFF” before opening electrical panels.
- All electrical cables and connectors must be in good condition (free of corrosion, damage, etc). Use caution in wet weather to avoid danger from electrical shock. Never attempt electrical testing or repair while standing in water.
- Do not wear electrically conductive jewelry, clothing, or other items while working on the electrical system.

Hot Oil Hazards

- Burns from hot oil can be severe—Always allow lubricating and hydraulic oil to cool before draining.

Compressed Air Hazards

- When using compressed air to dry parts, pressure should not exceed 30 psi (200 kPa).
- Air pressure penetrating your skin can be fatal. Never direct compressed air at anyone.

Fire Safety

⚠ WARNING

WARNING: Diesel fuel and hydraulic oil are flammable. Never smoke while handling fuel or working on the fuel system. The fumes in an empty fuel container are explosive. Never cut or weld on or near fuel lines, tanks, or containers. Keep open flames and sparks away from the machine.

Reduce the Risk of Fire

- Keep the baler free of oil, grease, hay, and trash accumulations. Regular cleaning is recommended for fire prevention and general safety. Use an approved solvent to clean machine parts. Never use gasoline or diesel fuel.
- Shut off the engine and electrical equipment while filling the fuel tank. Use extra caution when fueling a hot engine. Always ground the fuel nozzle against the filler neck to avoid sparks.
- Never overfill the fuel or hydraulic tanks. Any overflow could cause a fire. Immediately repair any hydraulic or fuel leaks and clean up any spills.
- Handle all solvents and dry chemicals according to procedures identified on manufacturer’s containers. Work in a well-ventilated area. Make sure you know where fire extinguishers are kept and how to use them.
- Avoid spilling fuel or other hazardous liquids. If a spill occurs, follow local or state regulations for clean-up. Contact your state’s OSHA office for details.
- Always ensure that excess grease and oil accumulation, including spillage, is cleaned up immediately.
- Inspect the baler daily for potential fire hazards and make any necessary repairs immediately.

SAFETY

- Check all the electrical wiring and connections for defects, and repair or replace as necessary. Keep battery terminals clean and tight.
- Never perform welding operations until the entire machine has undergone a thorough cleaning. In addition, cover rubber hoses, disconnect the battery, and have at least a fire extinguisher at hand.
- Hydraulic fluid is flammable. Do not weld on or near pipes, tubes, or hoses that are filled with fluid. Do not smoke when checking or filling the tank. Keep open flames and sparks away from the baler.
- Hay dust is combustible. Do not have an open flame or weld in dusty environments.
- Maintain the engine cooling system to avoid overheating.
- Remember, there is always a risk of fire.

Fire Fighting Equipment

- It is recommended to carry an “ABC” fire extinguisher on the baler or in the pull vehicle at all times. Install it within easy reach of the operator in a position that protects it from damage. Use only a “quick release” type of mount. It is also recommended to carry a four gallon water container with a pump, or as required by local and state law.
- Keep your fire extinguisher(s) fully charged and in good working order. Know how to use them.
- Read and understand the instructions printed on the canisters and learn how to operate them. Learn how to remove the canisters from their mounting brackets in the shortest amount of time.
- Service the extinguisher according to the manufacturer’s specifications. Service after every use, no matter how short a time.

Fire Suppression

- Do not panic. At the first sign of trouble (burning smell, smoke, visible flame, etc), stop the tractor and turn off the engine in the clearest area available, with the tractor upwind from the baler if possible.
- If the fire cannot be extinguished safely, immediately evacuate the area. DO NOT attempt to extinguish it. DO NOT risk personal injury. Contact your local fire department.
- If you have determined that the fire may be safely extinguished, use the fire extinguisher according to the manufacturer’s instructions, or use the water pump, aiming water at the base of the fire.
- When the baler has fully cooled, thoroughly inspect, and make all necessary repairs to return the baler to normal operation.
- Recharge or replace the extinguishers before returning to work.

TABEL OF CONTENTS

SPECIFICATIONS

GENERAL:
working length with bale chute ..... 30' 0" (9144 mm)
working width..... 10'4" (3150 mm)
working height .....11'5" (3480mm)
shipping height (w/o wheels) ..... 9'5" (2895 mm)
shipping width.....8' (2438 mm)
tires .....23.1"(7041 mm) x 26"(79245 mm)
weight .....22,850 lbs. (10,370 kg)

TRACTOR REQUIREMENTS:
horsepower .....180 PTO HP or greater recommended
hydraulics ..... Single Remote
electrical ..... ASE seven pin connector

DRIVE SYSTEM:
PTO speed .....1000 rpm
drive protection .....Clutches and pressure relief valves
hydraulic pump capacity.....80 GPM
oil cooler .....Radiator with automatic reversing electric fan

PICKUP:
working width.....93" (2362 mm)
including 6" side flares.....105" (2667 mm)
drive system ..... Hydraulic Drive
protection.....Slip and overrunning clutches
pickup lift..... Hydraulic cylinder

FEED SYSTEM:
feeder crank.....Three crank crankshaft
feeder crankshaft bearings.....6 tapered roller bearings
feeder crank drive system .....Reversible hydraulic drive
feed fork drive system .....Reversible hydraulic drive

PLUNGER:
speed.....Up to 21 strokes per minute
stroke length..... @. 30" (762 mm)
drive.....4" (101.6 mm) bore hydraulic cylinder

DOUBLE KNOTTING SYSTEM:
knotters..... 6 heavy duty double twine knotters
knotter spacing ..... 7" (177 mm)
knotter lubrication ..... Automatic oil lubrication system
twine storage capacity .....30 balls of twine
twine type .....Plastic, at least 400 lbs. (181 kg) knot strength

BALE CHAMBER:
height .....38" (965 mm), (36" (914 mm), 34.5" (876.3 mm) optional)
width .....46" (1 168 mm)
bale length.....Adjustable up to 9'(2743 mm)
bale weight .....up to 1,600 lbs. (726 kg)

BALE CHAMBER DENSITY CONTROL:
type ..... Adjustable electric density control
density system ..... 4 hydraulic cylinders

GENERAL INFORMATION

The purpose of this manual is to assist the operator in maintaining and operating a Freeman Big Baler Model 1592D. Please read it carefully as it provides important information and instructions that will help you achieve years of dependable equipment performance. Please also refer to 89-015 Baler Operating System Manual for more technical information.

NOTE: Reference to left-hand and right-hand usage throughout this manual refers to the position when seated in the operator's seat, facing forward.

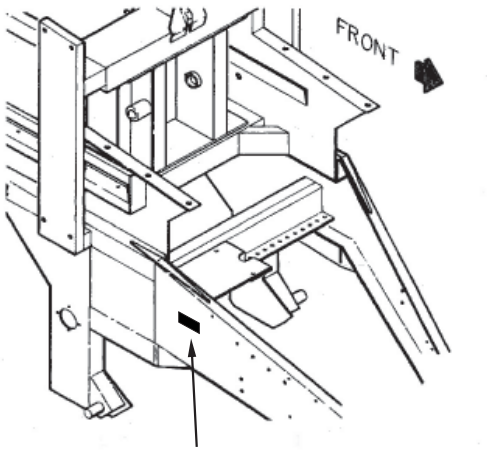
Replacement Parts:

Only genuine Freeman replacement parts should be used to service the baler. These parts are available from your authorized Freeman dealer. To ensure prompt and efficient service when ordering parts or requesting service repairs, remember to provide the dealer with the following information:

1. The correct part description or part number.
2. The model number of the baler.
3. The serial number of the baler.

Serial number location:

The serial number is very important in effectively transacting a parts order or service repair with the dealer. Use the serial number in all correspondence to ensure proper identification of your Freeman baler. The serial number is located on the right front tongue brace as shown.



Serial Number Location

This Manual is for use with:
SERIAL NO. ASC-1592-316 and ASC-1592-209
ORDER NO. PB1592D316

GENERAL OVERVIEW

The Freeman 1592D Big Baler is a high density mechanical baler operated by an electrically controlled mechanical/hydraulic system. The 1592D can handle the toughest jobs including the baling of, Alfalfa, Coastal Bermuda, Sudan, Haylage, Corn Stalks, Biomass and more.

The hydraulically driven components of the 1592D Big Baler make it unique in the agricultural baling industry. A system of electrical components and sensors/switches control the hydraulic functions. Three separate hydraulic systems are interconnected by valving and electrical signals to allow the machine to produce solid, uniform bales with a minimum of operator effort. This state of the art design will provide years of dependable service and low operating cost.

The ICM (In-Cab Monitor) contains a computer processor that is pre-loaded with the 1592D baling software program. The ICM receives input signals from sensors/switches that monitor component positions on the baler. The ICM monitors all these inputs, processing this information following the pre-loaded operating program and sends commands (outputs) to the components on the baler, stopping and starting them as the program dictates.

The baling process begins as the product enters the baler by means of a conventional rotating pick-up. The pick-up delivers material directly to the feed chute. Material is then pushed further into the feed chute by the continuously rotating feeder. The feed fork then carries material from the feeder into the bale forming chamber. When an adequate volume of material is delivered to the bale chamber by the feed fork, the feed sensor mounted on the top of the bale chamber signals the feed fork to stop, thus holding the material up in the bale chamber. At the instant the feed fork stops at its top dead center position, the plunger begins to extend, compressing the product.

While the plunger extends, pressure required to compress the material increases. This increase occurs because the bale density system applies pressure to the top and sides of the forming bale. The density system applies force to create a restriction which increases the force being applied to the forming bale on the plunger until the plunger reaches its preset pressure setting. At this point, density pressure is modulated to maintain the desired forming pressure on the extruding bale. The maximum hydraulic plunger pressure available for forming the bale is 5,000 psi. The plunger reaches the end of its travel and is signaled to return. As the plunger returns, the feed fork starts its cycle, the plunger reaches the home position and the feed fork once again will carry material into the bale chamber. The density control system applies pressure to the forming bale while the plunger is extending and retracting. This complete cycle requires approximately three seconds to occur.

During the tying process, as a bale moves through the chamber, the length of the bale is measured by a meter wheel located in the bottom of the chamber. When an adequate bale length is achieved, a switch signals the control circuitry to begin a tie cycle. The plunger advances as during normal baling. Upon reaching the fully extended position, the plunger begins to return and the knotter assembly begins to operate. While the knotter is in operation, the plunger may stop briefly at a preset point to allow the knotter to complete the first half of its cycle. When the knotter has completed the first half of the tying process, the plunger will continue to return, the feed fork will start and the knotter continues to operate, completing the tying cycle. This cycle also occurs in approximately three seconds.

The 1592D baler is fully automatic. Bale lengths and bale densities are adjustable. Six heavy duty double knotters secure the bale with minimum 400 pound knot strength. To ease service and maintenance, each function of the baler can be operated manually, either in forward or reverse. Pressure relief valves protect the baler's systems from overload. Relief valves eliminate the need for shear bolts. The In-Cab Monitor (ICM) and Remote View Monitor (RVM) make any baling job easy and fast. These features add up to make the Freeman 1592D baler a very efficient and reliable machine.

TRACTOR REQUIREMENTS

PTO:

- Minimum PTO horsepower: 180 (104 kw)
- Steep terrain or soft ground conditions may require a tractor of greater horsepower.
- Type II 1000 rpm, 1-3/8" (35mm)
- Type III 1000 rpm, 1-3/4" (45mm)

ELECTRICAL:

- 12 volt power supplied through ASAE 7-pin connector outlet (for transport lights).

HYDRAULIC SYSTEM:

- System type: open or closed center
- Maximum pressure: 2500 psi (199 bar)
- Hydraulic outlets: one set (pickup lift)
- Refer to the Tractor Operator's Manual for controls locations and operation instructions.
- Minimum drawbar vertical load capacity:
- 3,300 lb (1,500 kg)

ADDITIONAL REQUIREMENTS

- An upright exhaust system.
- Ability to route control cables from baler to operators cab safely.
- Mounting platform for ICM and Bale Viewer.

WARNING

WARNING: Loss of steering or braking control can cause death or serious injury. Use a tractor that is large enough for sufficient steering and braking control.

The Freeman 1592D baler weighs approximately 24,500 lbs (11,100 kg) with a bale in the chamber.

- Do not tow faster than 20 mph (32 km/h).
- Do not tow with a tractor that weighs less than 15,000 lbs (6,810 kg).

CARRY FIRE EXTINGUISHER:

It is recommended to carry an "ABC" fire extinguisher on the baler or in the pull vehicle at all times. It is also recommended to carry a four gallon water container with a pump, or as required by local and state law.

ADJUST TRACTOR WHEELS:

Adjust tractor wheels as wide as possible to increase stability, and to avoid running over the windrow. The optimum windrow width for the baler is 4' (1.2 m).

PREPARING THE EQUIPMENT

WHEEL NUT TORQUE AND TIRE INFLATION PRESSURE

1. Ensure the rear wheel nuts are torqued to 450 ft. lbs. Do not lubricate wheel nuts. After the nuts have been torqued, tow the baler 1/2 mile and recheck the nuts for proper torque before towing a long distance.

⚠ CAUTION

CAUTION: Do not overinflate tires.

2. Inflate 12 ply tires to 28 psi., 16 ply to 36 psi. Inflate pickup tires (4.00 x 8) to 40 psi.

CONNECTING TONGUE

Connect using quantity 10 of 3/4" x 3" Bolts, Structural Washers and Nuts. Torque nuts to 420 ft. lbs. (see Parts Manual for more information).

CONNECTING PICKUP

⚠ WARNING

WARNING: Clear all personnel away from the machine while raising and lowering the baler. Baler could fall and cause injury or death.

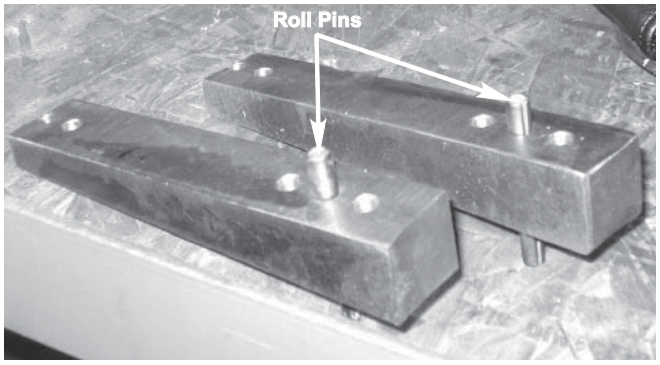


Figure 1-1 Pickup Pivot Wedges

1. Insert roll pins into pickup pivot wedges so the pins are protruding out each side evenly. You will use these pivot pins to secure the pickup to the baler.

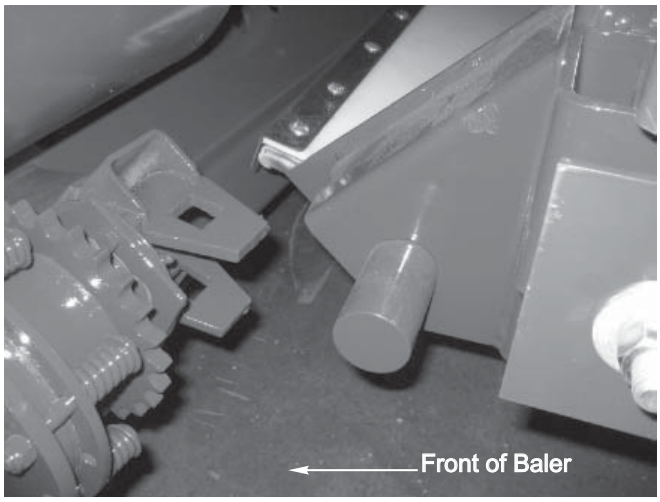


Figure 1-2 Aligning Pickup with Baler

2. Raise tongue of baler just high enough to move the pickup underneath. Line up pickup locking claw to baler pickup pins (see Figure 1-2). Push pickup so the locking claw has surrounded the pin. Place pickup pin through the pickup claw to lock the pickup into place. This needs to be done to each side of the baler. You may have to lower or raise the tongue so the wedge drops freely into place securing the pickup to the baler. Insert roll pin in bottom of pickup pivot wedge so the wedge is secure.

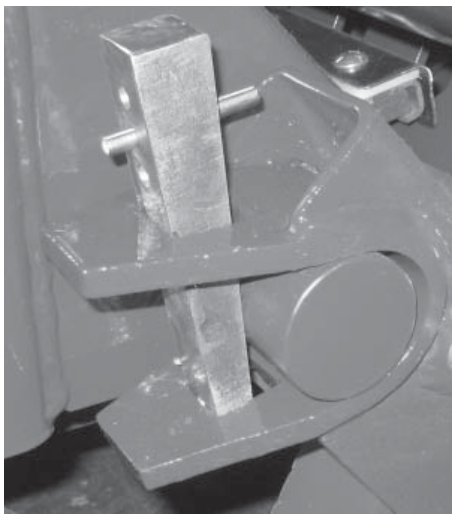


Figure 1-3 Securing Pickup

3. Connect pickup lift arm assembly on right hand side of baler (see Figure 1-4). Secure lift arm to pickup cylinder and baler.

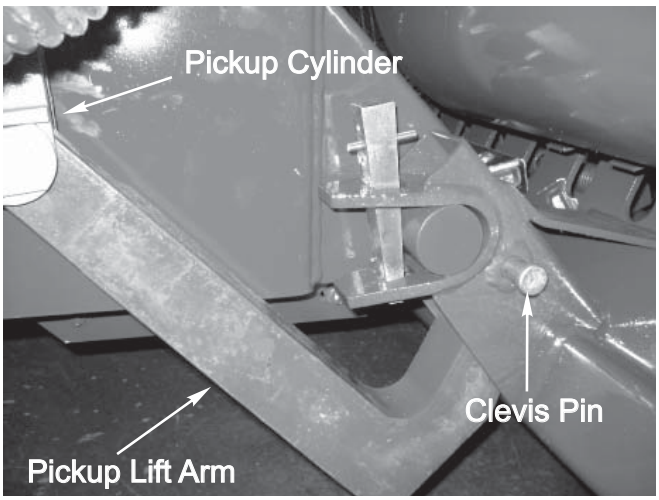


Figure 1-4 Pickup Lift Arm

4. Connect pickup drive chain on left side of baler (see Figure 1-5). Make sure to replace pickup chain guard when finished (see Figure 1-6).

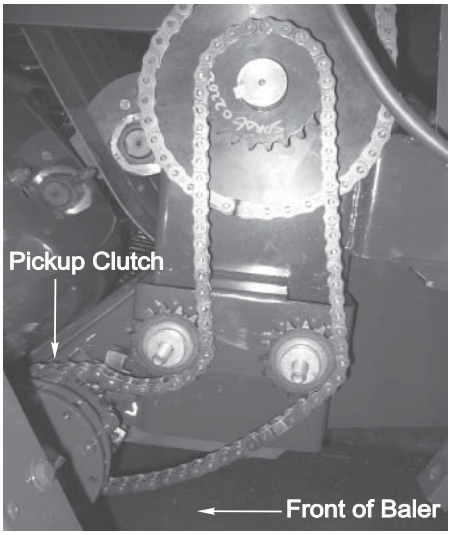


Figure 1-5 Pickup Drive Chain

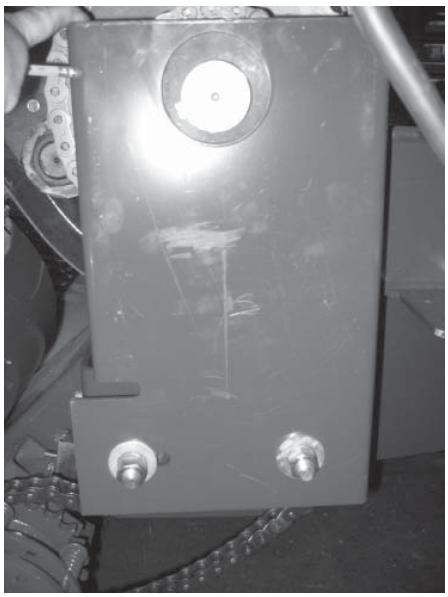


Figure 1-6 Pickup Chain Guard

5. Connect pickup lift spring, lift arm and lift spring bracket. Refer to your Parts Manual for assembly illustration (see Figure 1-7).

Adjust lift spring so front of pickup can be raised by hand with 40 lbs. of pressure.

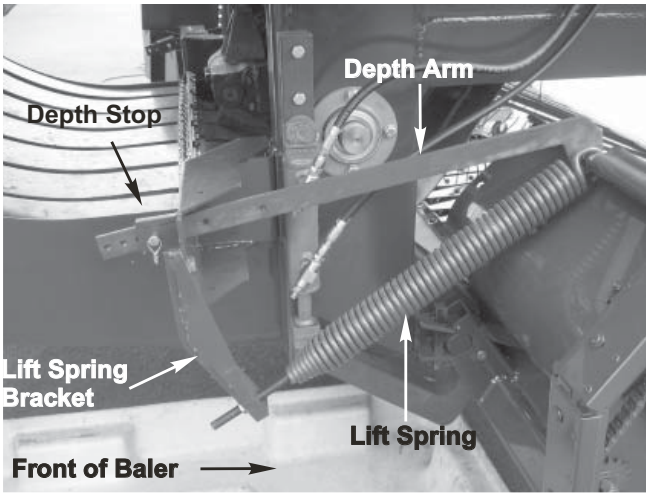


Figure 1-7 Pickup lift spring

ATTACHING BALER TO TRACTOR

1. Before attaching the baler to the tractor make sure the baler is securely resting on level ground. The baler must be powered by a tractor with a minimum of 180 horsepower at 1,000 RPM PTO.

NOTE: Adverse conditions such as soft ground or hilly terrain may require greater horsepower for maximum performance.

2. The front drawbar hitch on the baler can be adjusted up or down or inverted 180° (see Figure 1-8) to achieve proper alignment with the tractor drawbar. The distance from the bottom of the baler hitch mount to the ground should be 17" ± 1". Connect using quantity 8 of 5/8" x 2-1/2" Grade 8 bolts, lock washers and nuts. Torque nuts to 240 ft. lbs.

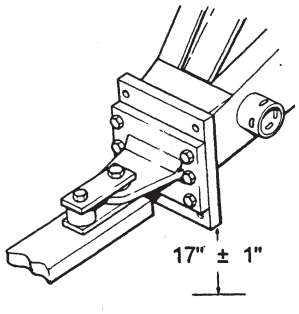


Figure 1-8 Hitch

3. The baler can be equipped or modified as required to work with tractors using either a 1-3/8" or 1-3/4" diameter PTO shaft. The tractor drawbar must be adjusted to provide the proper distance from the end of the tractor PTO shaft to the center of the hitch pin. Follow the SAE standards in Figure 1-10 and for correct adjustment of the tractor drawbar.

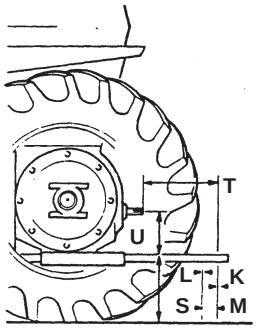


Figure 1-9 Drawbar Hitch on Baler

DIMENSIONS ASSOCIATED WITH TRACTOR DRAWBAR AND POWER TAKE-OFF				
		1-3/8" Diameter		1-3/4" Diameter
K-Hitch pin hole diameter			13/16"	1-5/16"
L-Auxiliary hole diameter			11/16"	11/16"
M-Auxiliary hole spacing			4"	4"
S-Height of drawbar with popular sized tire	Min.		13"	13"
	Max.		22"	20"
T-End of PTO shaft to center of pin hole			16"	20"
U-Top of drawbar to PTO centerline	Preferred.		8"	10"
	Min.		6"	8"
	Max.		12"	12"

Figure 1-10 Tractor Drawbar and Power Take-Off

When the baler is connected to the tractor, the PTO drivelines can now be installed and properly adjusted.

NOTE: Attach drawbar jack to rear left side of baler.

The correct drive line adjustment is achieved by positioning the carrier bearing support bracket either forward, back, up or down and bearing mount angles up or down (see Figure 1-11 and 1-14). The rear (baler) driveline fits either size front driveline.

5. The PTO shaft bearing mount angles, ANG0027391, are designed to be used with either size (1-3/8" or 1-3/4") drivelines. Use quantity 4 of 1/2 x 1-1/2 bolts, lock washers and nuts, torque nuts to 120 ft. lbs. to secure angles to frame . The 3" flange angle bolts to the baler tongue side plates while the 2-1/2" leg mounts the carrier bearing support bracket, MNT0028883. With the 3" flange towards the front of the baler, dimension 'A' is 19", with angle flanges towards rear of baler, dimension 'A' is 15" (see Figure 1-11). (see parts manual for more information).

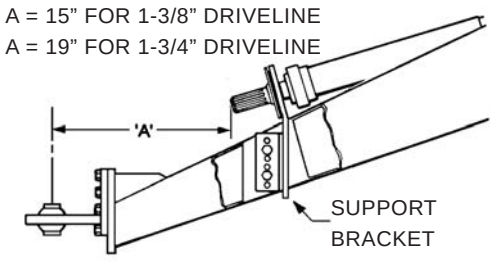


Figure 1-11 Driveline

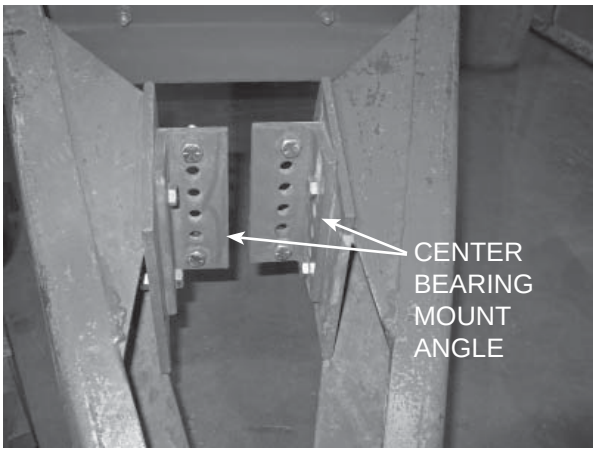


Figure 1-12 Driveline

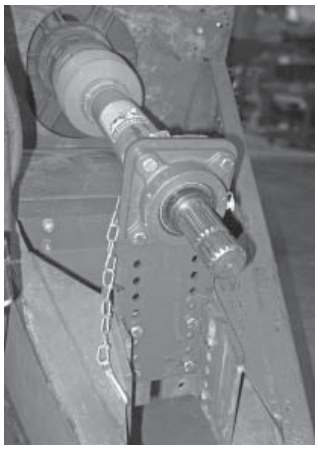


Figure 1-14 Driveline

NOTICE

NOTICE: Grease all points (see page 6-2) on driveline to prevent damage to PTO Shaft Bearing Mount.

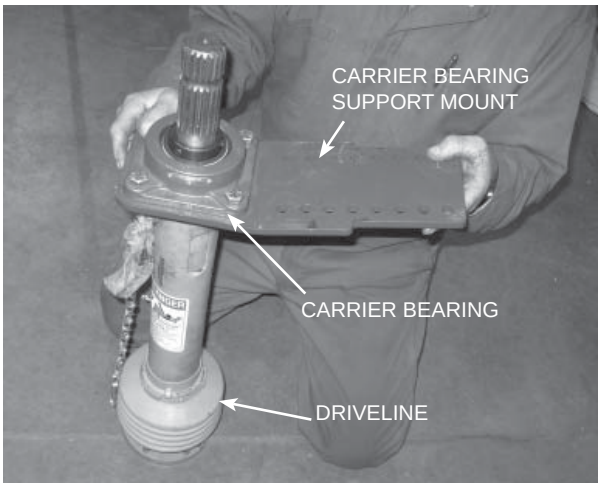


Figure 1-13 Driveline

6. Assemble rear driveline to the baler clutch and the carrier bearing support to center bearing mount angles (See Figure 1-14). Install the front driveline between the bearing support and the tractor PTO shaft, making sure the proper diameter shaft has been selected.

7. The drivelines must be adjusted so the angle of the tractor u-joint, ‘A’, and the angle of the center u-joint, ‘B’ are equal (see Figure 1-15). To achieve equal angles at ‘A’ and ‘B’, adjust the vertical position of the carrier bearing support bracket. If after repositioning the support bracket, the angles are not equal, select the bracket position that allows the closest angle setting. The objective is to achieve, as closely as possible, equal angles as described above while keeping the angle of the u-joint at the slip clutch to a minimum.

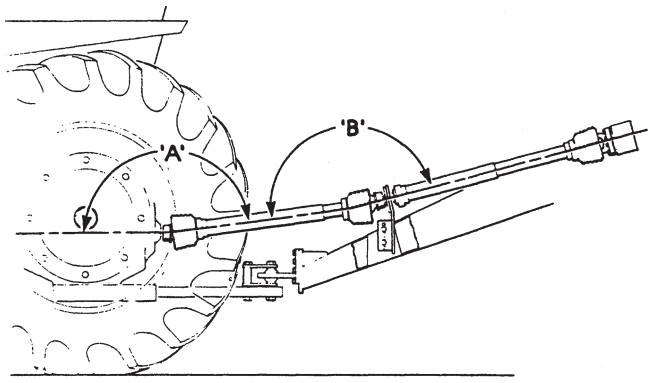


Figure 1-15 Driveline

8. If equal angles are not achieved at ’A’ and ’B’, (see Figure 1-14), either driveline phasing, (alignment of u-joint yokes), illustrated in Figure 1-15 is acceptable. If the angles cannot be made equal, then reposition the driveline yokes as shown. If the angle at ‘B’ is greater than at ‘A’, phase the driveline yokes as shown in Figure 1-16, (E). If angle at ‘A’ is greater than the angle at ‘B’, phase the yokes as shown in Figure 1-16, (D).

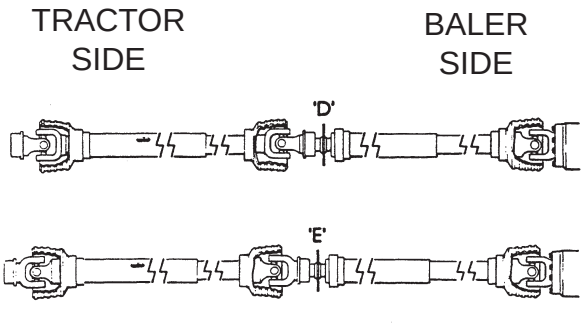


Figure 1-16 Driveline

9. When all adjustments have been properly completed, ensure that the driveline does not interfere with the tractor drawbar, PTO shields or baler draw-bar. On a level surface, pull the baler and turn the tractor left or right until the rear wheel of the tractor is nearly touching the baler drawbar. Attach baler PTO driveline to tractor PTO shaft. Ensure driveline does not bind or interfere with the baler hitch.

CONNECTING TAIL LIGHTS

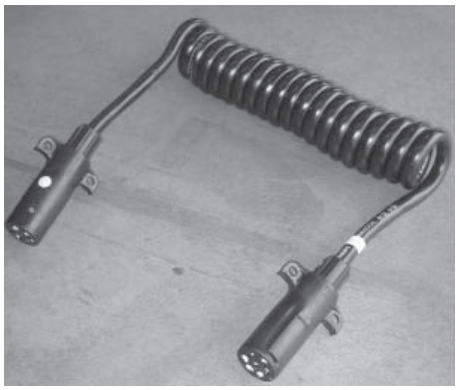


Figure 1-17 7 Pole Connector

- Connect seven-pole connector (see Figure 1-17 and 1-18) to electrical outlet on tractor. If tractor is not equipped with an outlet, contact tractor dealer for outlet installation.
- Amber lights are used for warning; red for rear marker lights.

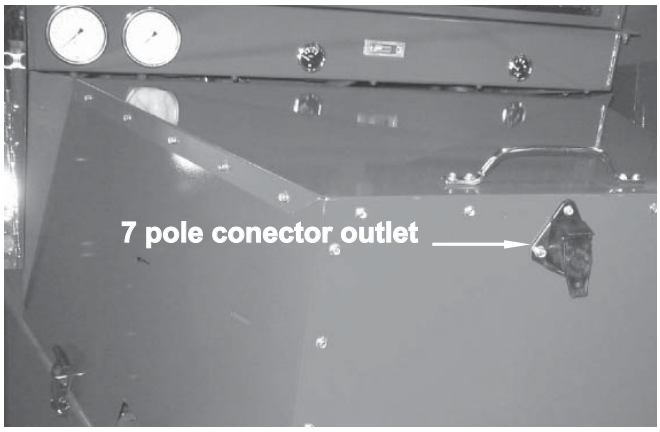


Figure 1-18 7 Pole Connector Outlet

CONNECTING HYDRAULIC HOSES

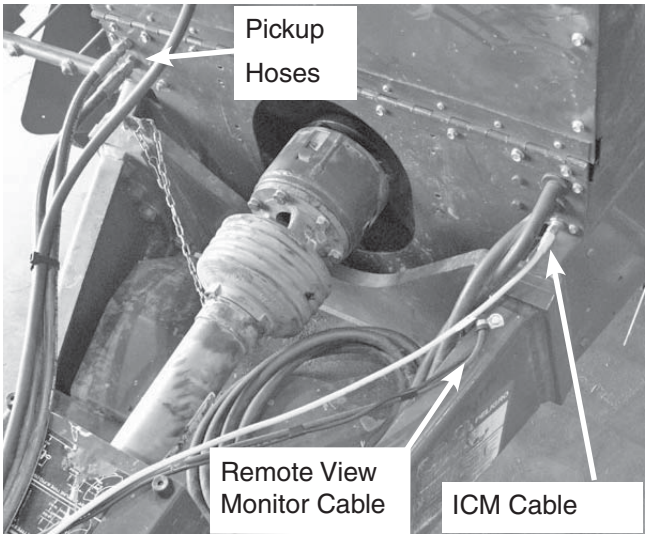


Figure 1-19 - Hydraulic and Electrical Outlets

- Ensure the style of couplers on hoses match the outlets on baler.
- Connect hoses from tractor to pickup lift outlets on baler (see Figure 1-19).
- Switch hoses at tractor outlets if auxiliary hydraulic control lever direction does not match desired movement of pickup lift.
- Ensure ICM cable is securely attached to baler hitch using the cable clamps provided. Keep all cables and hoses routed to prevent tangling or interference with rotating PTO drive line. The baler will not operate if the ICM cable is damaged or broken.

PREPARING THE EQUIPMENT

INSTALLING THE ICM AND RVM

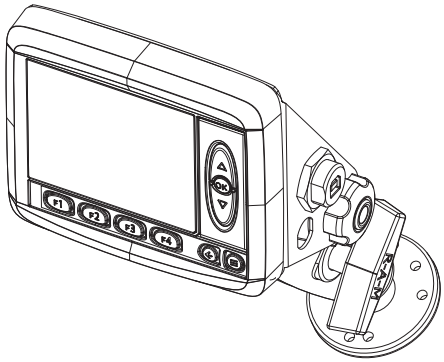


Figure 1-20 - In-Cab Monitor (ICM)

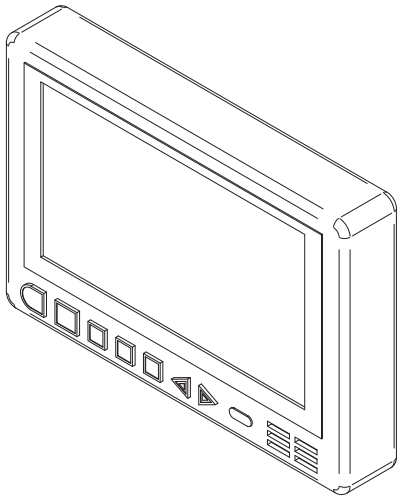


Figure 1-21 Remote View Monitor (RVM)

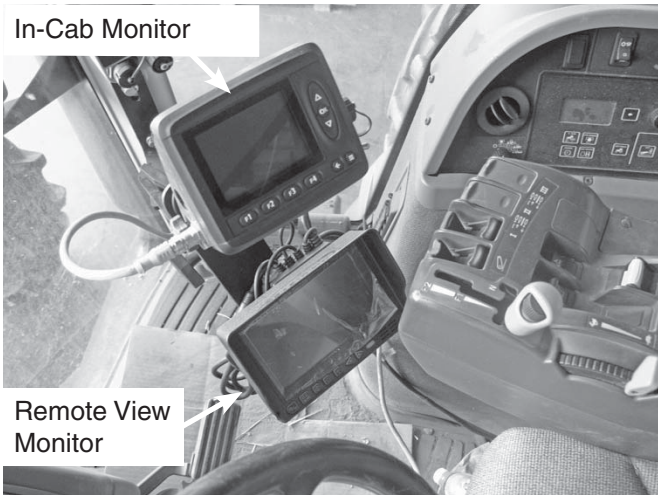


Figure 1-22 Cab Mounted ICM and Remote View Monitor

NOTICE

NOTICE: Extended periods of exposure to direct sunlight can cause an internal temperature exceeding 75°C / 158°F which may cause permanent degradation of the LCD display.

Mount the In-Cab Monitor and Remote View Monitor within operator's reach and comfort zone (see Figure 1-22).

Route and connect In-Cab Monitor and Remote View Monitor (RVM) cables from baler to cab. (See Figure 1-19).

NOTICE

NOTICE: ICM and Remote View Monitor cables should be securely attached from baler to cab out of the way of moving parts to prevent cable damage.

Mounting Considerations:

Position the In-Cab Monitor (ICM) per the following instructions:

Mount the ICM above RVM or in a side-by-side position. (see Figure 1-22)

- Position the unit to prevent cable folding, crushing, or wear. Less than 3" (75 mm) clearance will stress the cabling and distort the seals in the connectors.
- Leave sufficient room behind the unit to insert connectors to ensure that environmental specifications are met.

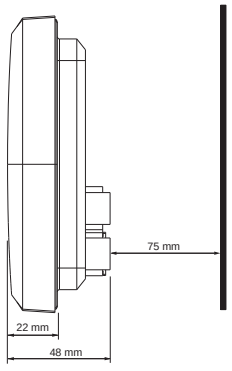


Figure 1-23 In-Cab Monitor (ICM)

- Position the unit so there is no risk of exposure to external heat, e.g. from the engine or heater.
- The best readability will be achieved by positioning the front face of the unit towards the operator.

TOWING THE BALER

WARNING

WARNING: Loss of steering or braking control can cause death or serious injury. Use a tractor that is large enough for sufficient steering and braking control.

- The Freeman 1592 baler, with a bale in the chamber, weighs approximately 24,500 lbs. (11,100 kg).
- Do not tow faster than 20 mph (32 km/h).
- Do not tow with a tractor that weighs less than 15,000 lbs (6,810 kg).
- Do not tow without Safety Chain securely connected from baler to tractor.

To prepare for towing:

- Ensure that the tractor used is large enough to safely transport a baler without brakes.
- Clean out any accumulated crop, chaff, or dirt on the pickup. Open shield and clean out any material that has on or around the pickup clutch.
- Hitch baler to tractor (refer to Attach Baler to Tractor in “Preparing the Equipment” section).
- Connect Safety Chain from baler to tractor.
- Raise pickup.
- Raise and secure bale chute.
- Ensure that a slow moving vehicle (SMV) sign is properly installed on rear of baler and is in good condition.

TWINE INSTALLATION AND THREADING

NOTICE

Twine must always feed out from the top of the twine ball to prevent the twine from spooling.

There are four twine boxes on the baler. The lower twine is stored in the rear twine boxes and the upper twine is kept in the front boxes.

The knotters and their related items are numbered in this example from 1 to 6 starting at the left side of the baler. For this example we will route the twine to the far right #6 knotter. Other knotters are threaded in a similar manner. Needles must be in the home position before starting (see Figure 5-2 Page 5-2).

When tying twine balls in series, always feed from the center of the ball. A surgeon's knot is recommended to ensure knot stability and prevent untying (see Figure 1-24).

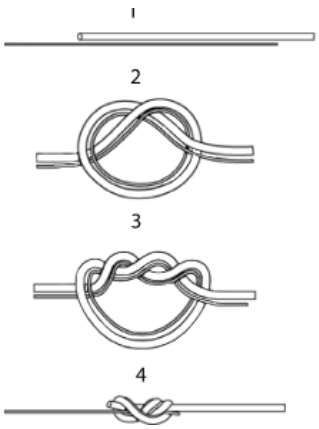


Figure 1-24. Surgeon's Knot

BOTTOM TWINES

The #6 knotter takes its bottom twine from the front column of the right, rear twine box. Pull the free end of twine from the twine ball and rout it through the twine guide at the front of the twine box (see Figure 1-25).

Figure 1-25. Twine Ball Placement

Next, route the twine through the front most eye on the twine guide mount on the frame, below the rear twine box (see Figure 1-26). The twine for knotter #5 will route through the center eye and knotter #4 through the rear eye.

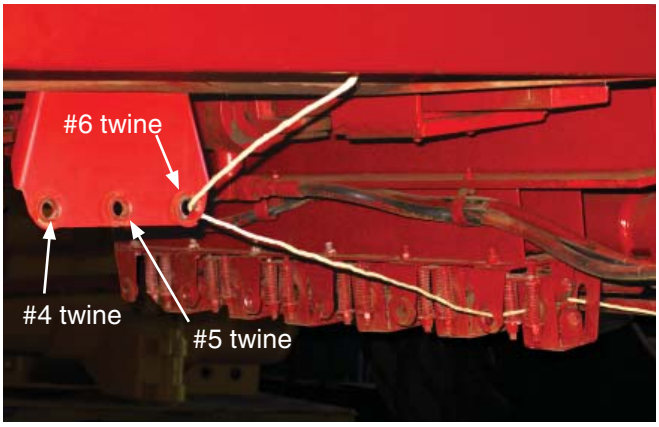


Figure 1-26. #6 Twine Routing

Next, route the twine to the rear twine guide eye in the right, #6 twine tensioner assembly. From there, thread the twine between the tensioner springs and through the second tensioner guide eye. Push the twine off to the side of the rollers as shown (see Figure 1-27).

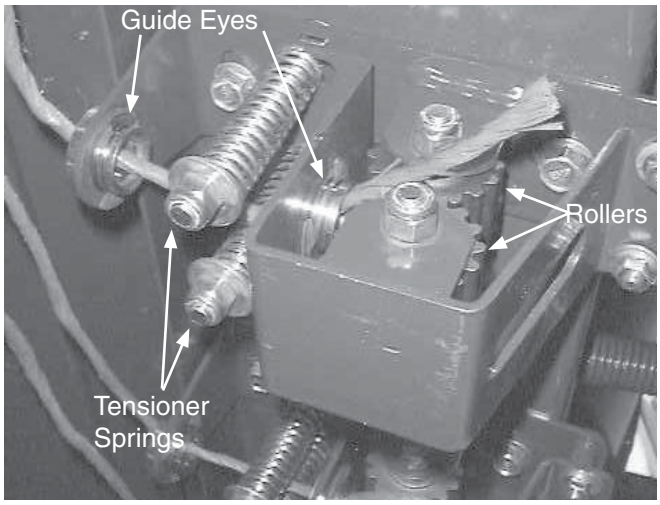


Figure 1-27. #6 Twine Into Tensioner Assembly

Route the twine around the tensioner rollers and through the oval shaped slot in the front of the tensioner frame (see Figure 1-28).

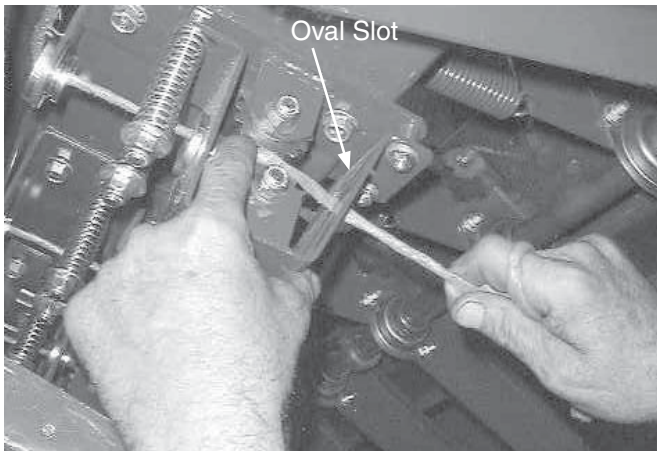


Figure 1-28. #6 Twine Out Of Tensioner Assembly

Be sure the tensioner rollers turn freely when spring force is not applied to them. Loading the tensioner may seem difficult at first but with practice it becomes easier. Most operators develop their own technique, which is usually loosely based on the method shown here.

To load the twine into the tension rollers, push the twine into the engaging roller teeth while pulling on the loose end coming through the oval slot (see Figure 1-28). A fair bit of pressure on the twine may be necessary in order to get the roller teeth to “grab” the twine.

If the above methods yields negative results, use a pry bar to pull the moveable roller away from the stationary roller as noted in Figure 1-29.

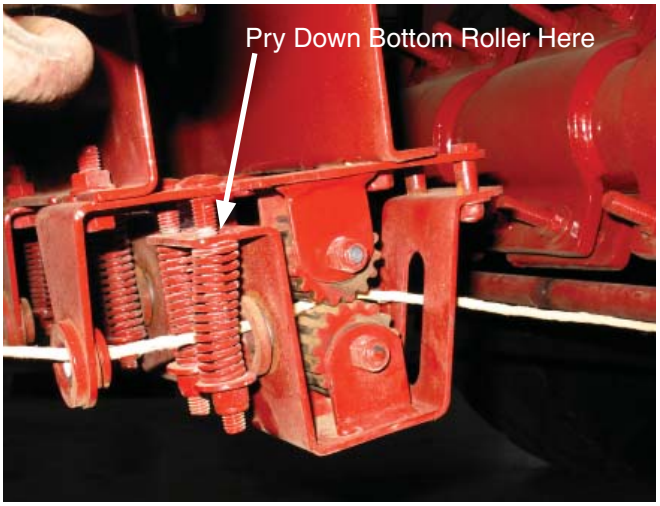


Figure 1-29. Loaded Twine Tensioner Rollers

With the twine tightly wedged into the engaging teeth, give a firm pull on the loose twine end. This should pull the twine into the center of the tensioner rollers (see Figure 1-30).

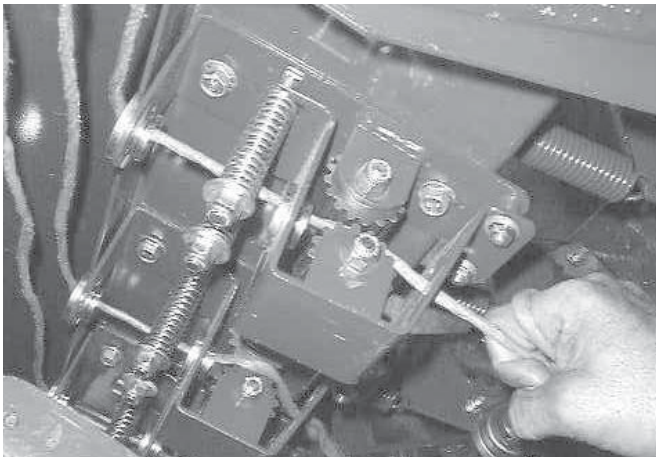


Figure 1-30. Loading Twine Tensioner Rollers

If the twine pulls loosely around the rollers, try again to wedge the twine into the roller teeth, this time applying more force to the twine where the roller teeth engage.

Check twine tension with a spring scale. (See Figure 1-31) Twine tension should measure 22-25 lb after break away (as the tension rollers are spinning).

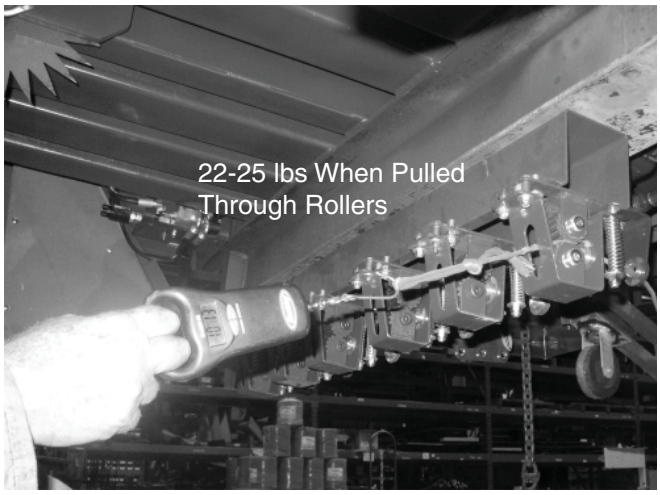


Figure 1-31. Measuring Twine Tension

After the tensioner is loaded, route the twine under the twine guide pipe and around the front roller on the slack puller then through the eye at the rear of the slack puller (see Figure 1-32).

Figure 1-32. Lower Slack Puller

Next, route the twine up between the two rollers at the tip of the needle. Route the twine from the needle, over the twine guide pipe and tie it to the frame member behind the needle (see Figure 1-33).

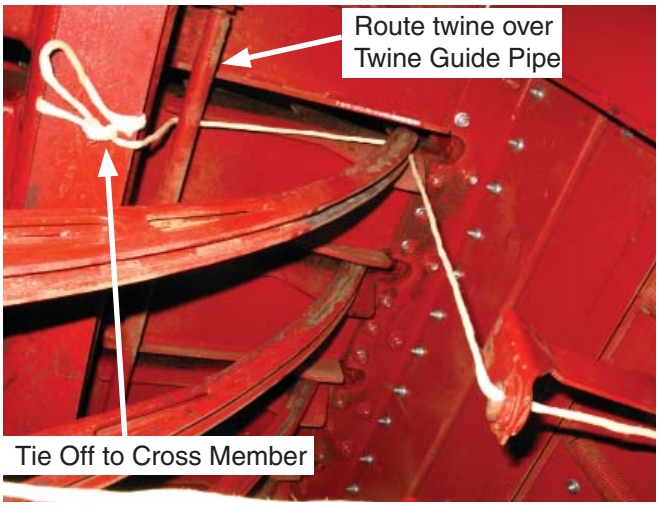


Figure 1-33. Through Needle

The remaining needles are threaded in a similar manner.

NOTICE

Once the knotter has cycled and loaded the twine into the knotter, remove the twine from the cross members. Twine on the bottom could damage the twine guide pipe (See Figure 1-33 & Figure 1-37).

TOP TWINES

The routing for the top twines is much more direct so will not be discussed in as much detail as the bottom. All top twines have similar routing to what is shown here.

The twine boxes for the upper twine are mounted on either side of the front of the baler. Knotters #1 - #3 pull twine from the left twine box, #4 - #6 the right twine box.

The #6 knotter takes twine from the bottom row of the right twine box. Pull the free end of twine from the top of the twine ball and route through the twine guide at the bottom rear of the twine box (see Figure 1-34).

From the front twine box, route the twine up through the guide in the front end of the tensioner. The #6 twine should go under the two hoses while the #4 & 5 twines will go over the hoses as shown in Figure 1-34.

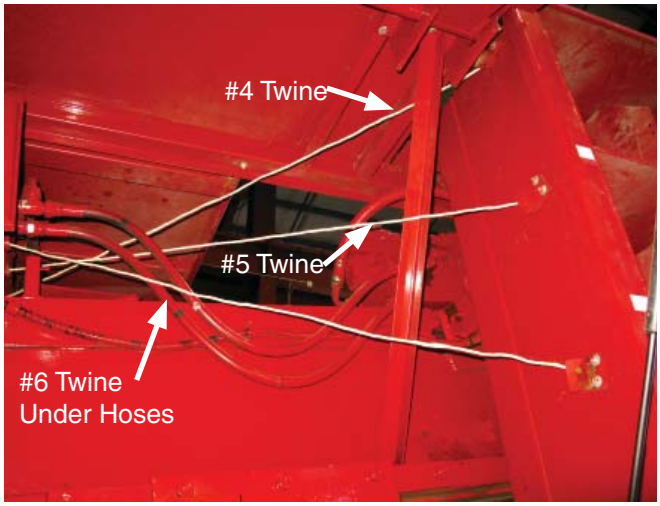


Figure 1-34. Upper Twine, Twine Box

Load the twine in the top twine tensioner in the same manner as described for the bottom tensioners earlier (see page 1-9).

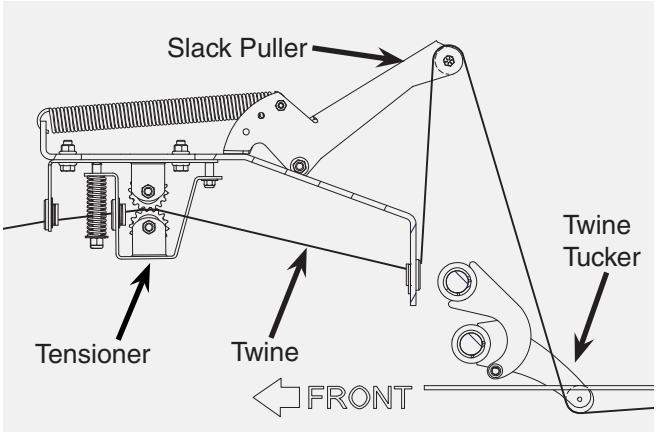


Figure 1-35. Upper Twine Routing

From the twine tensioner, route the twine through the rear eye, up over the slack puller roller and down through the twine tucker roller (see Figure 1-35).

For knotter #5 only, route the twine through the additional guide after leaving the tensioner (see Figure 1-36). This guide is to keep the #5 twine clear of the bale chamber fill sensor.

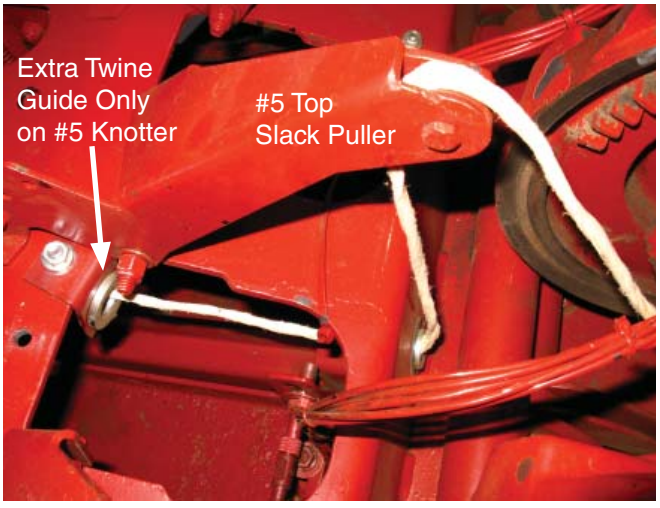


Figure 1-36. #5 Twine Guide After Tensioner

Route the top twine under the twine finger then tie off to the cross member behind the knotter (see Figure 1-37).

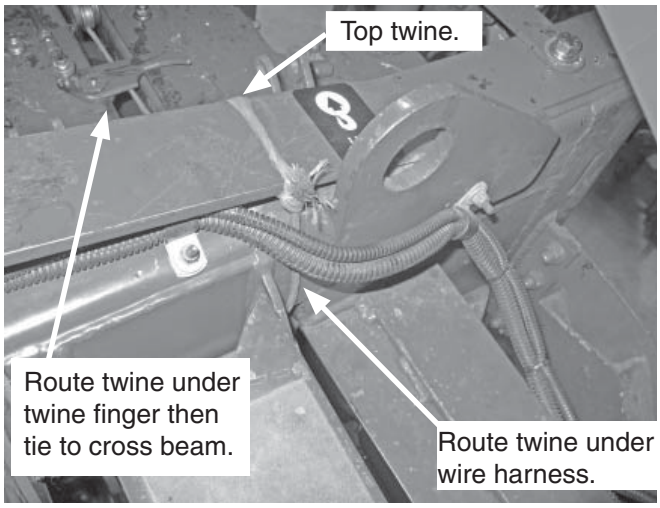


Figure 1-37. Tieing Twine to Cross Member

NOTICE

Once the knotter has cycled and loaded the twine into the knotter, remove the twine from the cross members. Twine on the bottom could damage the twine guide pipe (See Figure 1-33 & Figure 1-37).

CONTROLS

INTRODUCTION TO THE BALER OPERATING SYSTEM

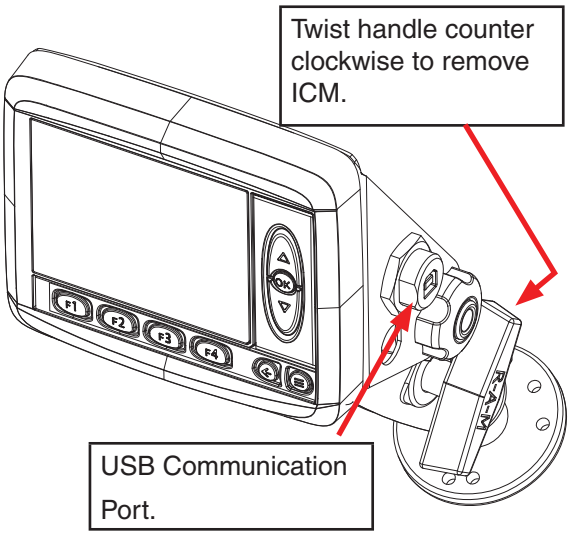


Figure 2-1 In-Cab Monitor (ICM)

The Baler Operating System consists of:

- In-Cab Monitor (ICM)
- Input / Output Control Modules (XA2)
- Machine / Baler Sensors

The ICM is used to control the functions of the baler and provide a display of its performance during operations. Multiple screens are utilized to monitor the baler, make adjustments to its operation, and perform problem diagnostics.

The ICM screens are divided into two groups; baling and machine setup.

The main baling screens consist of four (4) screens; Baling, Auto Statistics, Field Counts, and Functions.

The screens for setup of the machine are protected by a password, and should only be accessed after reading and understanding the 1592 Baler Operating System Manual (89-015).

Function and purpose of Input / Output Module (XA2):

- Receives commands from the ICM
- Monitors signals from the machine sensors
- Sends control signals to machine components (i.e. pump, tension manifold, etc.)

The ICM uses a CAN-bus cable to communicate with the XA2 modules.

The XA2 modules receive instructions from the ICM to drive hydraulic valves and other electrically operated components. They also interface with sensors on the machine and relay this information through the communication cable back to the ICM.

USING IN-CAB MONITOR (ICM) AS REMOTE CONTROL

The ICM can be used remotely for diagnosing and making baler adjustments outside of the tractor cab.

Care should be taken when removing the ICM from the cab as damage to the ICM will make the baler inoperable. When moving the ICM, one hand can be placed on the top portion of the mount to prevent the unit from falling when loosened.

The ICM is mounted directly to the Mounting Plate on the tractor. It must be removed by twisting the knob on the side of the mount counterclockwise to remove the stand.

When the ICM is used remotely, extreme caution must be exercised regarding safety around the machine and with the ICM. Recommended safety precautions when using the ICM outside of the tractor cab are as follows:

- Tractor must be on level and solid ground.
- Tractor brakes and/or transmission must be locked.
- An extra long communication cable should be used in place of the tractor cab communication cable.
- ICM should never be placed in a location where it may be inadvertently activated or damaged.

⚠ WARNING

WARNING: Always make sure everyone is clear of baler before using In-Cab Monitor (ICM) remotely.

⚠ WARNING

WARNING: Maintain a safe distance from all moving components when remotely operating the baler with the ICM (In-Cab Monitor).

NOTICE

NOTICE: Always use the extra communications cables when using the ICM remotely. Disconnecting routed communication cable between the Baler and the Cab could cause the cable to become damaged.

NOTICE

NOTICE: Use care when remotely using the ICM. The 1592 baler cannot be used if the ICM is not functional.

MONITOR OVERVIEW

Figure 2-2 Bale Screen

1. Function Buttons (activates function above button)
2. Navigation Arrow Button (scrolls through operator screens)
   Press and hold to return to main Baling Screen
3. Menu Button (Read and understand operating system manual before use)
4. Toggle Switch (Monitor and Baler Power ON/OFF)
5. Input Buttons (changes and sets functions)
6. Display Screen

NOTES

BALE SCREEN - FUNCTION BUTTONS & MANUAL CONTROL

Figure 2-3 Bale Screen

Theory of Operation
The Bale Screen is the main display used by the operator for all baling and basic diagnostics of problems. The functions indicated on the Bale Screen shown are used for the following functions:

- Start / Stop Baling
- Fully extend Plunger to clear chamber
- Set Target Plunger Pressure to control tension
- Manual control of the Feeder, Feed Fork, & Plunger

F1 1. CONTROL OUTPUT DISABLE

Function:
Disables the control system for the baler by halting all signal outputs. System will still monitor input signals.

Adjustment Objective:
To halt all operations of the baler controlled by the system.

WARNING

WARNING: Although the control system is disabled, the tractor PTO may still be operating. Operator must disengage the tractor PTO to bring the baler to a complete stop.

Adjustment Procedure:

1. Press F1 to disable the control system.
2. The symbol above F1 will change to a check mark and the Sequence (see reference #5 on Figure 2-3) will change to DISABLED
3. A warning message will pop up. F2 will need to be pressed to acknowledge the message.
4. Press F4 twice to change the Sequence to Pause. At this point the Indicator above F4 should indicate “GO”.

NOTE: When in the Pause Sequence, F4 will need to be pressed once more to start baling.

F2 2. CLEAR PLUNGER

Function:
Fully extends the plunger to its maximum stroke to clear the chamber of as much material as possible. This feature would also be used if the Feed Fork is stalled.

Adjustment Objective:
To fully clear the chamber of material and or fully extend the plunger cylinder.

Adjustment Procedure:
Press and hold F2 to fully extend the Plunger.

NOTE: Plunger Drift Compensation (see page 6-1) must be turned on in order for the plunger to return automatically if not currently attempting to extend (sequence 4). Otherwise, use the Manual Operation Controls (see bale screen reference #5 on Figure 2-3) to select and operate the plunger.

F3 3. PLUNGER PRESSURE

Function:
Establishes a target for the Plunger Pressure that is used to control the tension applied when creating a bale.

Adjustment Objective:
To establish a target for the Plunger Pressure

Adjustment Procedure:

1. Press F3. The text above F3 will turn red.
2. Press △▽ to adjust the value to the desired pressure. This target pressure should not be set above 6500 psi.
3. Press OK to save the setting.

[See Default Settings in manual 89-015]

F4 4. GO

Function:
Begin or pause baling

Adjustment Objective:
To start or pause the baling operation.

Adjustment Procedure:

1. Press F4, the baler should begin operating and the image above the button should change to read “PAUSE”.
2. Press F4 again to Pause the baler. If pressed, the plunger will complete its stroke before pausing. The image above the button should change to read “GO”.

5. BALING SEQUENCE DISPLAY

The operator can monitor the baling sequence during operation. The sequence display is located above the time indicator above F4. The sequence of steps is as follows.

1. **DISABLED:** Disables all outputs from the XA2 modules. No functions can be run in this sequence.
2. **Pause:** Baler not in the Automatic mode; operator presses F4 to GO and baling process sequence starts.
3. **Forks Cycle:** Feed Fork rotates (cycles) until enough material is gathered to raise Full Chamber Paddles which activate sensor S-3 (See Sensor Locations and Chart on page 5-18).
4. **Feed Fork Stop:** The ICM receives a signal from the Feed Fork Stop sensor S-2 (See Sensor Locations and Chart on page 5-18) and sends signal to XA2 to stop Feed Fork (valve is shifted to neutral).
5. **Plunger Extends:** When feed fork stops, plunger extends until it reaches the extend cushion set point (see Plunger Settings page 6-2 in 89-015 manual).
6. **Plunger Retracting:** plunger retracts until it reaches the retract cushion set point (see Plunger Settings page 6-2 in 89-015 manual). Sequence repeats until bale is determined to be correct length.
7. **Knotter Tying:** knotter cycles completing entire bale sequence.

6. FUNCTION SELECT FOR MANUAL OPERATION

Function:
Selects the system for manual control (Feed Fork, Feeder, and Plunger).

Adjustment Procedure:
Used to manually operate the Feed Fork, Feeder, and Plunger.

1. Press OK to select the system to manually control Feed Fork, Feeder, and Plunger. Selected system will be displayed at the top of the display.
2. Use ▲▼ to control the selected system.

NOTE: When “Plunger” is selected through the Function Select for Manual Operation the plunger cylinder cannot be fully extended, but will stop at cushion set points, unlike the clear plunger function

NAVIGATION


Proceeds to the Auto Statistics screen

MENU


Proceeds to the Main Screen

NOTES

BALE SCREEN - DISPLAYS, INDICATORS, & GRAPHS

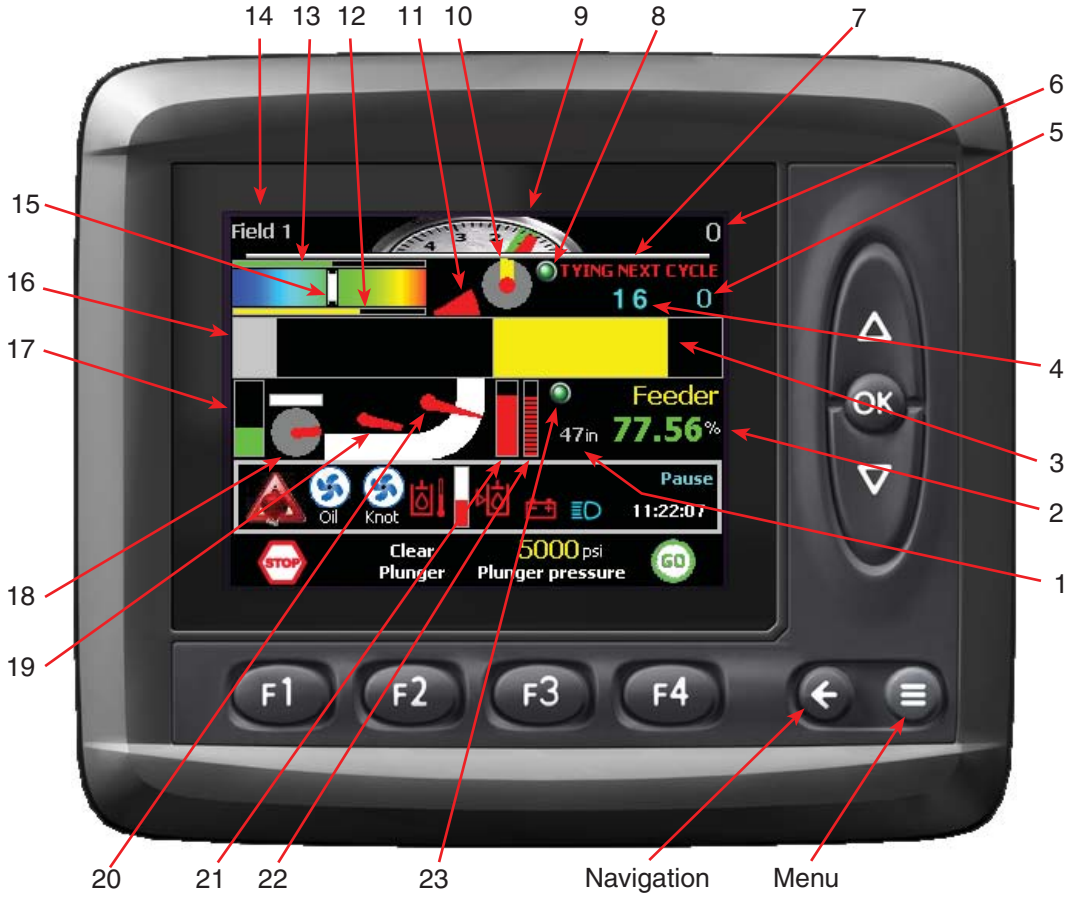


Figure 2-4 Bale Screen

Theory of Operation

The Bale Screen is the main display used by the operator for all baling and basic diagnostics of problems. The functions indicated on the Bale Screen shown are used to monitor the operation of the baler during operation.

1. CURRENT BALE LENGTH DISPLAY

This displays the length of the current bale being formed in the chamber.

2. % TENSION DISPLAY

Displays the percent of tension pressure currently being applied in the tension system to create restriction to cause the plunger pressure to rise to the Target Plunger Pressure. 100% = maximum tension available and 0% = no tension applied.

With the Tension Control set to “Auto” from the Auto Statistics screen (see reference #4 on Auto Statistics screen page 2-15) the tension % will adjust automatically as conditions (moisture) change in order to maintain the desired Target Plunger Pressure.

Note: Changes in material conditions and moisture content will cause this value to vary.

3. BALE LENGTH GRAPH & DISPLAY

This is a value display of the length of the bale. The graph will be initially black and will turn yellow to show a bale being formed. It will start on the left with a new bale and end at the right when the knotter has cycled, completing the bale. The value above the graph displays the length of the bale as it is being formed in the chamber.

4. CURRENT BALE FLAKE COUNT DISPLAY

Displays the number of flakes in the bale being formed. This value will reset to zero once a bale has tied.

5. PREVIOUS BALE FLAKE COUNT DISPLAY

Displays the number of flakes in the previous bale.

6. BALE COUNT DISPLAY

Displays the bale count for the selected field (see reference #14 on Figure 2-2)

7. TYING NEXT CYCLE

This illuminates when the machine will tie on the next cycle. This will display when the bale has reached the preset length, and the XA2 has been signaled to start the knotter after the next plunger stroke, or the Tie Knot Next function has been activated (see page 2-15 for more information).

8. KNOTTER HOME INDICATOR

This indicator will turn green when the knotter has rotated to the home position and the stop pad has activated the S-12 knotter home sensor (see page 2-15 for more information). This indicator will illuminate gray when the knotter is away from the home position

9. AVERAGE FEED FORK REVOLUTION PER PLUNGER (FRP) INDICATOR

This indicator displays the average revolutions per plunge over the last five (5) plunger cycles. As conditions permit, the operator should try to achieve 1 Feed Fork revolution while keeping the Feed Fork Pressure Indicator in a comfortable zone. The windrow size to baler ground speed are optimized when the indicator is turning to yellow. This allows the baler to operate as efficiently as possible.

If more than one Feed Fork revolution is required to fill the chamber, the ground speed of the baler may be increased so more material is being supplied to the feeder to fill the chamber by the Feed Fork.

10. KNOTTER POSITION INDICATOR

This indicates the relative position of the knotter. The home position is with the yellow portion of the indicator pointing up at 12:00.

11. FULL CHAMBER INDICATOR

The indicator will raise when the chamber is full during the auto baling sequence.

12. TARGET PLUNGER PRESSURE INDICATOR

This yellow bar provides a visual indicator of the desired plunger pressure. Used for a quick comparison with the current peak plunger pressure.

13. FIELD AVERAGE PLUNGER PRESSURE

This green bar is used for a quick comparison with the current peak plunger pressure. Resets with Restart Averages on the Auto Statistics screen (see F4 page 2-15).

14. FIELD BEING BALED AND COUNTED

Displays the name of the field being baled and counted. Field name can be changed in the Field Counts screen (see page 2-19 for more information).

15. PLUNGER PRESSURE DISPLAY & GRAPH

A graphical representation of the current Plunger Pressure (0 to 7,500 psi) taken from a pressure transducer (S-24) in the hydraulic system. The white bar will stop at the highest pressure for the current stroke. It will hold this value until the plunger begins another extend cycle.

16. PLUNGER POSITION GRAPH

Indicates the current position of the Plunger during its stroke. The graph will be initially black and will turn gray as the plunger advances. It will start on the left at the start of a cycle, move to the right as the Plunger compresses the crop in the chamber.

17. PICK UP / FEEDER PRESSURE GRAPH

Graphically indicates the Pick Up / Feeder pressure (PSI). The graph will change color depending upon the measured pressure as follows:

- Green = Safe operating pressure (0 - 2,500 psi)
- Yellow = Optimal operating pressure (2,500 - 3,000 psi)
- Red = Near stalling (over 3,000 psi)

18. PICKUP INDICATOR

Indicates active motion of the Pickup. The spinning indicator reveals whether the pickup is stalled or rotating where the green/white bar graph above shows relative speed from 0 to 220 rpm. The pickup speed sensor measures the time between sensor triggers to calculate speed and updates the reading about 3 times a second at full PTO rpm.

The operator can use the graph to monitor the speed of the pickup for plugging. Maximum speed on the graph is equivalent to a pickup speed of 220 rpm.

19. FEEDER INDICATOR

Indicates that the Feeder is operating. There is no position sensor on the feeder so the display will show rotation of the feeder if the Feeder Valve is receiving a signal to rotate. If the Feeder is stalled or the PTO is disengaged, the display will continue to show the Feeder rotating if the valve is signaled to operate.

20. FEED FORK INDICATOR

Indicates the position of the Feed Fork. The Feed Fork position is monitored by a position sensor which will indicate the direction of rotation. The Feed Fork indicator will not rotate when the Feed Fork is plugged. The Feed Fork will stop at the highest point when the chamber is full and the Plunger extends.

21. FEED FORK PRESSURE (CURRENT) INDICATOR

Graphically indicates the pressure of the active Feed Fork cycle. The graph will change color depending upon the measured pressure as follows:

- Green = Safe operating pressure
- Yellow = Optimal operating pressure
- Red = Near stalling

22. FEED FORK PRESSURE (PREVIOUS) INDICATOR

Graphically indicates the pressure of the previous Feed Fork cycle. The graph will change color depending upon the measured pressure as follows:

- Green = Safe operating pressure
- Yellow = Optimal operating pressure
- Red = Near stalling

23. NEEDLE HOME INDICATOR

This indicator will turn green when the Needle Yoke is in the home position. This indicator will show dark gray when the Needle Yoke is away from the home position and or the knotter is cycling.


Proceeds to the Auto Statistics screen


Proceeds to the Main Screen

NOTES

BALE SCREEN - SERVICE INDICATORS & WARNINGS

Figure 2-5 Bale Screen

Theory of Operation
The Bale Screen is the main display used by the operator for all baling and basic diagnostics of problems. The functions indicated on the Bale Screen shown are used to monitor the baler for function of particular systems or problems.

Several of the indicators will generate a warning screen when activated. These warning screens are located in the 89-015 Operating System Troubleshooting section page 23-1. Please consult this section for more information regarding the warning screens.

1. ACCUMULATOR LOW PRESSURE WARNING INDICATOR

Function:
Monitors the hydraulic system for low pressure. If the hydraulic system pressure drops below 200 psi, the warning indicator will be illuminated. The indicator will be illuminated if the main pump charge pressure drops below 200 psi.

NOTE: The indicator will be illuminated if the ICM is on, but the tractor PTO is not engaged.

2. OIL COOLING FAN ON / OFF INDICATOR

Function:
Displays the status of the Oil Cooling Fan, and will be illuminated when the fan is on. The fans are controlled by settings entered in the Oil Cooler screen (see manual 89-015 for more information).

3. KNOTTER FAN ON / OFF INDICATOR

Function:
Displays the status of the Knotter Fans, and will be illuminated when the fans are on. The fans turn on when "GO" F4 is activated and turn off when "PAUSE" F4 is selected again to pause baling. The fans can also be controlled from the Functions screen (see page 2-23). There is also a manual switch located near the rear left-hand service ladder for turning the fans ON and OFF.

4. OIL OVER TEMPERATURE INDICATOR

Function:
This will illuminate when the temperature is above the Overheat Temp setting (see manual 89-015 for more information). When the temperature exceeds the Oil Over Temperature the machine will cease operation after the current plunger cycle to protect the hydraulic system from damage from heat.

5. OIL TEMPERATURE INDICATOR

Function:
Graphically displays the oil temperature between 100° F to 220° F.

6. LOW OIL INDICATOR

Function:
This will illuminate when the oil level in the hydraulic reservoir has dropped below the oil level switch. When the oil level is below the level switch, the baler will stop baling after the current bale cycle. See the Operating Troubleshooting section for more information regarding the warning screen.

7. BATTERY LOW VOLTAGE INDICATOR

Function:
Indicator will be illuminated when the system voltage has dropped below 11.5 volts indicating the charging system should be inspected. If the voltage continues to drop below 9.5 volts, a pop-up message window will be displayed.

8. WORK LIGHTS ON / OFF INDICATOR

Function:
Displays the status of the Work Lights, and will be illuminated when the lights are on. See the Functions screen for operating the Work Lights (see page 2-23).

9. TIME

Function:
Displays the current time. The time can be set from Preferences on the Main screen (see manual 89-015).


Proceeds to the Auto Statistics screen


Proceeds to the Main Screen

NOTES

AUTO STATISTICS

Figure 2-6 Auto Statistics Screen

Theory of Operation
The Auto Statistics screen is used by the operator for the following:

- Initiate tying of the bale
- Setting the bale length
- Activating and monitoring of the Tension Mode (Automatic or Manual)
- Monitor the Plunger position and performance
- Monitoring the bale length and flake size (current & last bales)

Note: If you wish to periodically reset the Average Plunger Pressure and Average Tension while in the same field, you must periodically go into the Field Count Screen and reset the field count which also resets these two items for this screen. If you do not want to reset the field you are counting, select another field and reset, and then return to the field you desire. See page 2-19 item 2 for information on resetting the field count.

F1 **1. CONTROL OUTPUT DISABLE**

Function:
Disables the control system for the baler by halting all signal outputs. System will still monitor input signals.

Adjustment Objective:
To halt all operations of the baler controlled by the system.

WARNING

WARNING: Although the control system is disabled, the tractor PTO may still be operating. Operator must disengage the tractor PTO to bring the baler to a complete stop.

Adjustment Procedure:

1. Press F1 to disable the control system.
2. The symbol above F1 will change to a check mark.
3. A warning message will pop up, and F2 will need to be pressed to acknowledge the message.
4. Press F4 to twice to change the Sequence to Pause. At this point the Indicator above F4 should indicate “GO”.

NOTE: When in the Pause Sequence F4 will need to be pressed once more to start baling.

F2 2. TIE KNOT NEXT / NOW

Function:
Allows the operator to tie the bale at any time before it has reached its predetermined length, but it must have minimum of three flakes. This function has two options; Tie Knot Now or Tie Knot Next. Both options occur like a normal knotter cycle except the Tie Knot Now option starts the plunger cycle as soon as the Feed Fork activates SW-2 Feed Fork Stop. This occurs regardless of condition of the SW-3 Full Chamber Paddles (see manual 89-015 for more information).

Adjustment Objective:
To tie off the bale before it has reached its full length.

Adjustment Procedure:

1. Press F2. The indicator for Tie Knot NEXT will illuminate green. If left in this state the plunger/knotter cycle will begin normally when the full charge sensor has been activated.
2. Press F2 again. The indicator for Tie Knot NOW will illuminate red. If left in this state the plunger/knotter cycle will begin as soon as SW-2 Feed Fork Stop is activated.
3. Press F2 again. Both indicators will turn off, and the tie function will be disabled. Pressing “Pause” and then “GO” will cancel the Tie Knot NEXT/NOW function.

⚠ WARNING

WARNING: The baler will automatically perform a tie cycle even if the machine is not baling.

F3 3. BALE LENGTH

Function:
To set the desired bale length (1 inch = 25.4 millimeters)

Adjustment Objective:
To set the desired bale length (1 inch = 25.4 millimeters)

Adjustment Procedure:

1. Press F3. The text above F3 will turn red.
2. Press ▲▼ to adjust the value to the desired setting. The maximum setting can not be more than 200 (inches).
3. Press OK to save the setting.

[See Default Settings in manual 89-015]

F4 4. RESTART AVERAGES

Function:
Clears the memory for items 6 - 9 and begins new averaging.

5. KNOTTER FAN ON / OFF INDICATOR

Function:
Displays the status of the Knotter Fans, and will be illuminated when the fans are on. The fans turn on and off by pressing the ▼ arrow. The fans can also be controlled from the Bale screen (see page 2-13). There is also a manual switch located near the rear left-hand service ladder for turning the fans ON and OFF.

6. FORK CYCLES / PLUNGE DISPLAY

Function:
Displays the average number of Feed Fork Cycles per Plunger cycle. The average is taken over five (5) plunger cycles. The value is capped at 5 cycles/plunge to ignore conditions such as turning at windrow ends and cleanup.

7. AVERAGE STROKES PER BALE DISPLAY

Function:
Displays the average Plunger strokes per bale which is also the average number of flakes per bale. The average is taken over the current field and is reset when the field count is reset. Changing the field without resetting the field count will make this value erroneous.

8. AVERAGE PLUNGER PRESSURE DISPLAY

Function:
Displays the average Plunger Pressure (psi) since the last time the bale count was reset for the selected field.

9. STROKES PER MINUTE DISPLAY

Function:
Displays the Strokes Per Minute based on the measured cycle time for the last Plunger cycle.

10. WORK LIGHTS ON / OFF INDICATOR

Function:
Displays the status of the Work Lights, and will be illuminated when the lights are on. The fans turn on and off by pressing the  arrow.

11. PLUNGER POSITION DISPLAY AND INDICATOR

Function:
The numbers shown in gray indicate the preset positions for the Extend and Retract Plunger Cushions. The numbers in green indicate the last recorded Retract and Extend Plunger true stop positions. The position indicator is based on the full stroke of the Plunger Cylinder, and shows the values of the set versus the true Plunger Cushions (see Plunger Cushions Setup in manual 89-015 page 6-15 for more information).

The Plunger Cushions are the point in the stroke where the Plunger must stop, but due to varying conditions from flake to flake, the actual stopping position may vary before or after the cushions. Comparing the green values to the gray values may reveal the condition where the Plunger Auto Position system requires adjustment. If the green value is not cycling above and below the gray value, but remaining either higher or lower than the gray value for several plunger strokes, then refer to the Plunger Settings screen (see Plunger Settings in manual 89-015 page 6-1 for more information).

12. TENSION MONITOR DISPLAY

Function:
Displays the Tension Pressure (psi) and Output (%) as follows:

TENSION= Current Output (%) setting if Manual Tension Mode is selected (see reference #4 on Figure 2-6). NOTE: This value is not displayed with the Automatic Tension Mode is selected.

Pressure = Current Tension Pressure. The higher the pressure, the more pressure is being applied when making a bale. This pressure transducer is optional and if available, it must be set up in the "machine configuration".

If in Automatic Mode, a higher pressure will indicate more Tension Pressure is required to maintain a Target Plunger Pressure. This could mean that the material being baled is dry. A lower pressure will indicate less Tension Pressure is required and the material is wetter.

Output = Current Tension Output (%). This is the percentage of Full Tension Pressure being applied to generate the Tension Pressure.

Avg. Out = Average Tension Output (%). This is the average percentage of Full Tension Pressure being applied for a selected field. The value is reset when the Field Count for the selected filed is reset (see page 2-19).

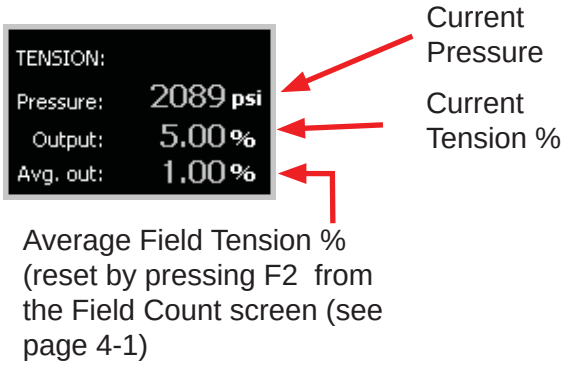


Figure 2-7 Tension


Returns to the Field Counts screen


Proceeds to the Main screen

FIELD COUNTS

Figure 2-8 Field Counts Screen

Theory of Operation
The Field Counts screen is used to record and display the number of bales made per field (up to 10), and monitor the operating hours of the baler.

Controls are provided that allow the operator to assign a unique identification to each field, reset the count, and adjust the current field count.

F1 1. CONTROL OUTPUT DISABLE

Function:
Disables the control system for the baler by halting all signal outputs. System will still monitor input signals.

Adjustment Objective:
Halts all baler operations controlled by the system.

⚠ WARNING

WARNING: Although the control system is disabled, the tractor PTO may still be operating. Operator must disengage the tractor PTO to bring the baler to a complete stop.

Adjustment Procedure:

1. Press F1 to disable the control system.
2. The symbol above F1 will change to a check mark and the Sequence on the Bale screen will change to DISABLED.
3. A warning message will pop up. F2 Will need to be pressed to acknowledge the message.
4. Press F4 twice. At this point the Indicator above F4 on the bale screen should indicate “GO”.

NOTE: When in Pause, F4 will need to be pressed once more to start baling.

F2 2. RESET COUNT

Function:
Resets the Field Count to zero (0) for the selected field (see reference #8 on Figure 2-8). Resetting the count will also reset the calculations for Average Plunger Pressure and Average Tension.

Adjustment Objective:
Reset the Field count to zero (0) for the selected field (see reference #8 on Field Counts screen).

Adjustment Procedure:

1. Press and hold F2 for at least one (1) second.
2. The count displayed for the selected field should change to zero (0) in both the field count column for the selected field and the value displayed in the upper right hand corner of the display.
3. The current value for the "Life Bales" (see reference #10 on Field Counts screen page 4-1) will be transferred over to the "Life bales @ start" column (see reference #14 on Field Counts screen).

F3 3. BALE LENGTH

Function:
To set the desired bale length (1 inch = 25.4 millimeters)

Adjustment Objective:
To set the desired bale length (1 inch = 25.4 millimeters)

Adjustment Procedure:

1. Press F3. The text above F3 will turn red.
2. Press ▲▼ to adjust the value to the desired setting. The maximum setting can not be more than 200 (inches).
3. Press OK to save the setting.

[See Default Settings in manual 89-015]

F4 4. ADJUST COUNT

Function:
Sets the current field count to a different value. This command would be recommended when re-baling so as not to record an incorrect bale count.

Adjustment Objective:
Set the current field count to a different number.

Adjustment Procedure:

1. Press and hold F4 .
2. Use the ▲▼ arrow to adjust the bale count. The Bale Count (see reference #11 on Field Counts screen page 2-8) value in the upper right hand corner of the screen will change as the buttons are used.

5. PROGRAM VERSION DISPLAY

Function:
Displays the version of the control program loaded on the ICM.

6. RUN HOURS DISPLAY

Function:
Displays the total hours that the baler has been operated in the Automatic mode. This time begins when the "Go" button on the Bale Screen (see page 2-3) has been pressed and the baler is operating. The value of this display can not be adjusted.

7. FIELD SELECT (OK)

Function:
Changes the selected field when baling.

Adjustment Objective:
Changes the selected field displayed.

Adjustment Procedure:

1. Press OK. The field list screen will be displayed.
2. Use ▲▼ to select the desired field (1 through 10).
3. Press OK to select a field.
4. The Field number (see reference #8 on Field Counts screen page 2-8) will be displayed to the left of OK, and the Field Name (see reference #3 on Field Counts screen page 2-8) will be displayed in the upper left corner of the screen.

8. FIELD NUMBER DISPLAY

Function:
Displays the Field Number for the selected field.

9. LIFE HOURS DISPLAY

Function:
Displays the Life Hours that baler power has been turned on. The value of this display can not be adjusted.

10. LIFE BALES DISPLAY

Function:
Displays the total number of bales made by the baler. This will only count knotter cycles that are during the auto baling sequence, so tying in the “Test” screen will count bales but cycling the knotter in a setup screen will not. The value of this display can not be adjusted.

11. BALE COUNT DISPLAY

Function:
Displays the current bale count for the selected field.

12. FIELD NAME

Function:
Displays the unique identification created for a field. This is the only location where the Field Name is displayed.

13. FIELD COUNT DISPLAY

Function:
Displays the current bale count for a field.

 Returns to the Bale Screen

 Proceed to the Main screen

NOTES

FUNCTIONS

Figure 2-10 Functions Screen

Theory of Operation
Used for monitoring and control of various baler functions, including:

- Opening Tension Rails
- Turning on Work Lights & Knotter Fan
- Access to the Machine Settings
- Monitoring of key system functions
- Manual operation of the baler systems, including the Knotter

F1 1. CONTROL OUTPUT DISABLE

Function:
Disables the control system for the baler by halting all signal outputs. System will still monitor input signals.

Adjustment Objective:
To halt all operations of the baler controlled by the system.

WARNING

WARNING: Although the control system is disabled, the tractor PTO may still be operating. Operator must disengage the tractor PTO to bring the baler to a complete stop.

Adjustment Procedure:

1. Press F1 to disable the control system.
2. The symbol above F1 will change to a check mark and the Sequence (see reference #4 above on Functions screen above) will change to DISABLED.
3. A warning message will pop up, and F2 will need to be pressed to acknowledge the message.
4. Press F4 twice to change the Sequence to Pause. At this point the Indicator above F4 should indicate “GO”.

NOTE: When in the Pause Sequence F4 will need to be pressed once more to start baling.

F2 2. OPEN RAILS

Function:
Opens the tension rails to allow the bale or material in the chamber to be removed.

Adjustment Objective:
To open the tension rails

Adjustment Procedure:

1. Press F2. The tension rails will fully open.
2. Press F2 again to close the tension rails, or start the baler using the “GO” button (see page 2-5)

F3 3. FUNCTION & PREFERENCES MENU

Function:
Accesses the Function and Preferences screen.

Adjustment Objective:
Allows access to the Function and Preference screen to set operator preferences.

Adjustment Procedure:
Press F3 to go to the Function and Preference screen (see page 2-27).

F4 4. MACHINE SETTINGS MENU

Function:
Accesses the Machine Settings to configure and setup the operation of the baler.

Adjustment Objective:
Allows access to the Machine Settings to configure and setup the operation of the baler.

Adjustment Procedure:

1. Press F4. The PIN code screen will appear. The code to enter for access to the Machine Settings is “1889”.

Figure 2-11 Pin Code Screen

2. Press ▲ twice to enter “1” in the 1st space.
3. Press OK.
4. Press ▼ twice to enter “8” in the 2nd space.
5. Press OK.
6. Press ▼ twice to enter “8” in the 3rd space.
7. Press OK.
8. Press ▼ once to enter “9” in the 4th space.
9. Press OK twice.
10. The Machine Settings Menu will appear.

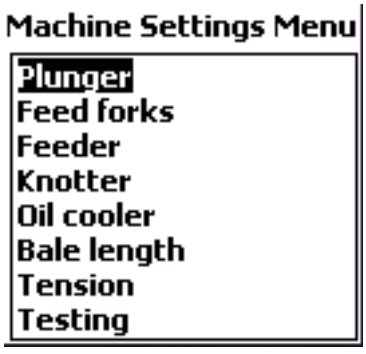


Figure 2-12 Machine Settings Menu

5. FUNCTION SELECT FOR MANUAL OPERATION

Function:

Selects the system for manual control from (Feed Fork, Feeder, Plunger, and Knotter).

Adjustment Procedure:
Used to manually operate the Feed Fork, Feeder, Plunger, and Knotter.

Steps

1. Press to select the system to manually control (Feed Fork, Feed, Plunger, Knotter). Selected system will be displayed at the top of the display.

   NOTE: If the Knotter is selected, a message screen will be displayed to remind the operator that the Plunger should be fully extended before operating the needles (acknowledges the message). The Plunger can be selected and manually controlled using this same command.

2. Use to control the system.

6. CONTROL SYSTEM VOLTAGE DISPLAY

Function:
Displays the current system voltage for each of the system control modules. The voltage should be above 11.5 volts, and is usually between 12 to 14 volts.

7. SYSTEM DATE

Function:
Displays the current date.

8. BATTERY LOW VOLTAGE INDICATOR

Function:

Indicator will be illuminated when the system voltage has dropped below 11.5 volts and the charging system should be inspected. If the voltage continues to drop below 9.5 volts, a pop-up message window will be displayed. See the Operating Troubleshooting section for more information regarding the warning screen.

9. LOW OIL INDICATOR

Function:
Indicator will be illuminated when the oil level in the hydraulic reservoir has dropped below the oil level switch. When the oil level is below the level switch the baler will stop baling after the current bale cycle. See manual 89-015 Operating Troubleshooting section page 23-1 for more information regarding the warning screen.

10. HIGH OIL TEMPERATURE INDICATOR

Function:
This is a fixed setting temperature switch set at 220° F (104° C). The indicator will be illuminated above this temperature setting, and operation of the baler will be stopped after the current bale cycle. See the Operating Troubleshooting section for more information regarding the warning screen.

11. OIL TEMPERATURE INDICATOR

Function:
Displays the current temperature of the hydraulic system measured at the hydraulic reservoir.

12. SYSTEM TIME

Function:
Displays the current time.

13. OIL OVER TEMPERATURE INDICATOR

Function:
This indicator illuminates when the temperature is above the user input found in the Machine Settings Menu/Oil Cooler/Temp Settings screen (see above). It can be used as a warning indicator that the oil is getting hot so that action may be taken before the baler actually shuts down.

14. NEEDLE HOME INDICATOR

Function:
This indicator will turn red when the Needle Yoke is in the home position near the bottom of its travel. This indicator will not be red when the Needle Yoke is away from the home position.

15. KNOTTER HOME INDICATOR

Function:
This indicator will turn red when the knotter has rotated to the home position (12:00) and the stop pad has activated the sensor. The indicator will not be lighted when the knotter is away from the home position.

16. KNOTTER POSITION INDICATOR

Function:
This indicates the relative position of the knotter. The home position of the knotter is with the black portion of the indicator pointing up at 12:00. As shown, the knotter is in the home position.


Returns to the Bale Screen


Return to the Main screen

FUNCTIONS & PREFERENCES

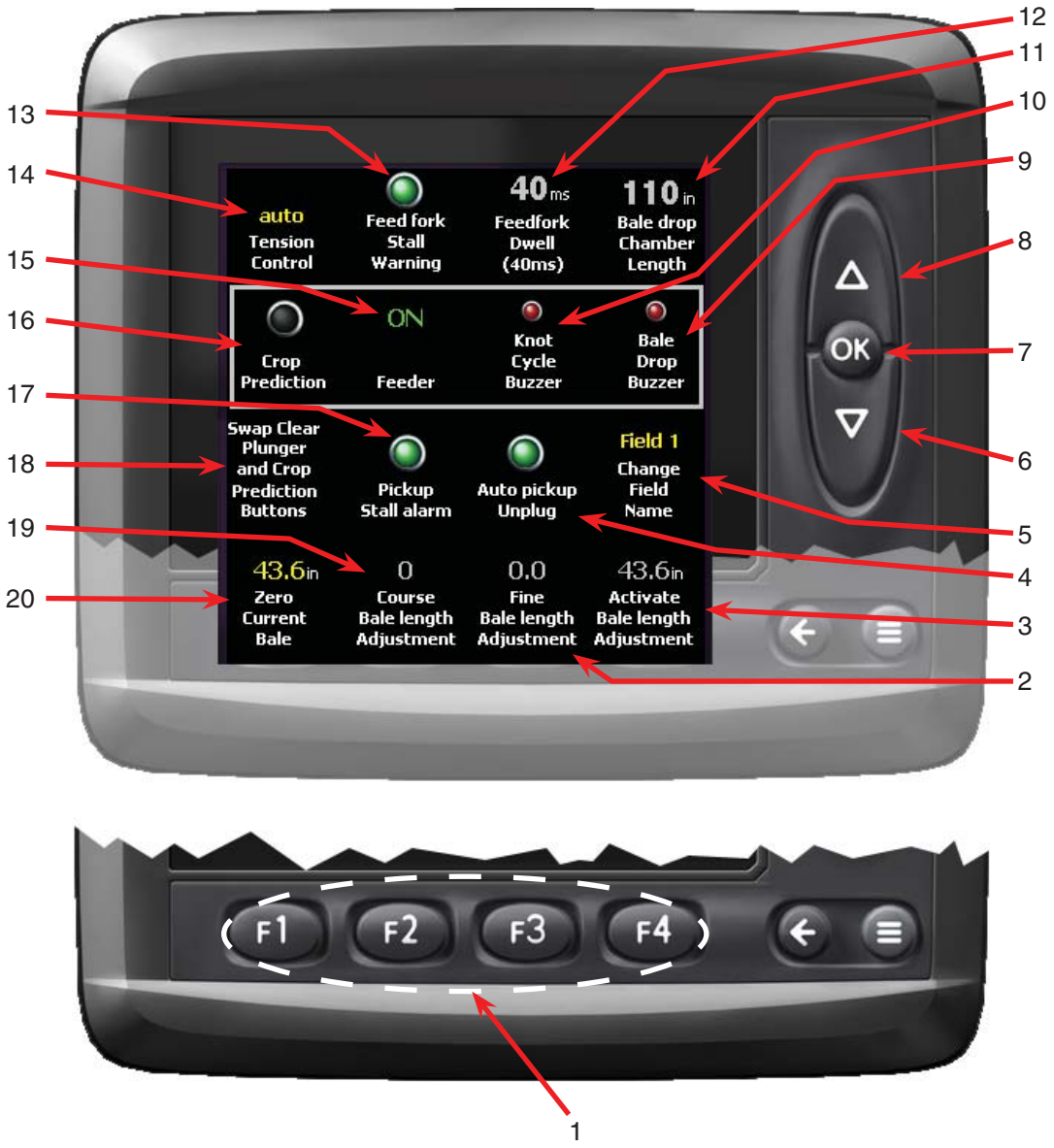


Figure 2-13 Functions and Preferences Screen

Theory of Operation
Used for changing user options.

ADJUSTMENT PROCEDURE:
Use the arrows to activate the desired row, which will be displayed inside the light gray box in the middle of the screen.

1. **FUNCTION BUTTONS** F1 F2 F3 F4

Function:
Activates the function above the button, inside the gray box in the middle of the screen.

2. FINE BALE LENGTH ADJUSTMENT

This row is used to manually set the current bale length. This will rarely be used, i.e. if you have to pull a full bale out of the chamber while a new bale is just being formed, the extracted bale may rotate the star wheel and give a false reading of the current bale length. These adjustments would be used to accurately set the current bale length:

Your target bale length is above F4.

Holding F1 will set the target length to about 27".

Pressing F2 will add 27" to the target length.

To fine tune the target length, Press F3, then use the up/down arrows to get the desired target length, Press OK.

Press and hold F4 to accept your bale length changes and have them stored in memory. This will override the last saved value.

3. ACTIVATE BALE LENGTH ADJUSTMENT

See Item #2 above.

4. AUTO PICKUP UNPLUG

Turns the Auto Pickup Unplug function on and off. Green = on.

5. CHANGE FIELD NAME

Will bring up the Field Names screen. Use it to change the name of the current field.

6. PUSH ▽ TO SCROLL DOWN IN MENU

7. PUSH OK TO RETURN TO BALE SCREEN

8. PUSH △ TO SCROLL UP IN MENU

9. BALE DROP BUZZER

Turns Buzzer on and off. Red = on. This buzzer is used to signal about when a bale should be dropping off the tail chute, so that the twines/knots may be viewed in the rear camera display. The timing of this buzzer is adjusted by Bale Drop Chamber Length (11).

10. KNOT CYCLE BUZZER

Turns buzzer on and off. Buzzer will sound to let you know when the knotters cycle. Red = on.

11. BALE DROP CHAMBER LENGTH

Used to adjust the timing of when the Bale Drop Buzzer (9) sounds. Increasing the value will cause the buzzer to sound later, decreasing the value will cause the buzzer to sound earlier.

12. FEED FORK DWELL

This adjusts the amount of time, after the Feed Fork stop sensor is activated, before the feed fork is stopped. Adjustable between 40 - 120 ms.

13. FEED FORK STALL WARNING

Turns the Feed Fork stall alarm on and off. Green = on.

14. TENSION CONTROL

Switches between automatic and manual tension pressure control.

15. FEEDER

Turns the feeder on and off.

16. CROP PREDICTION (SEE # 18)

Not to be used under normal baling circumstances. Green = On. Contact your Service Technician for more information.

16. CLEAR PLUNGER (SEE # 18)

Will cycle the plunger to clear the bale chamber.

17. PICKUP STALL ALARM

Turns the Pickup stall alarm on and off. Green = on.

18. SWAP CLEAR PLUNGER AND CROP PREDICTION BUTTONS

Replaces the Crop Prediction button with the Clear Plunger button (see 16.)

19. COURSE BALE LENGTH ADJUSTMENTS

See Item #2 above.

20. ZERO CURRENT BALE

See Item #2 above.

FRONT PANEL

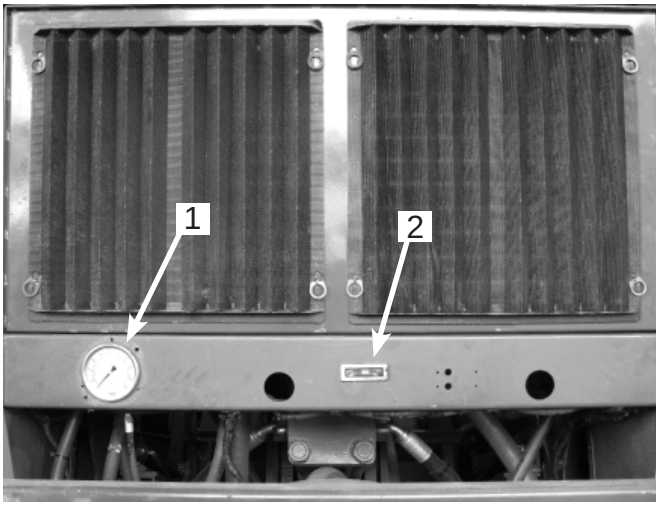


Figure 2-14 Front Panel

1. Plunger Pressure
2. Hydraulic Fluid Filter Condition Indicator

   Change filters when the yellow indicator reaches the red area on the indicator (when oil 170° F or above).

HYDRAULIC OIL RESERVOIR LEVEL DETECTOR

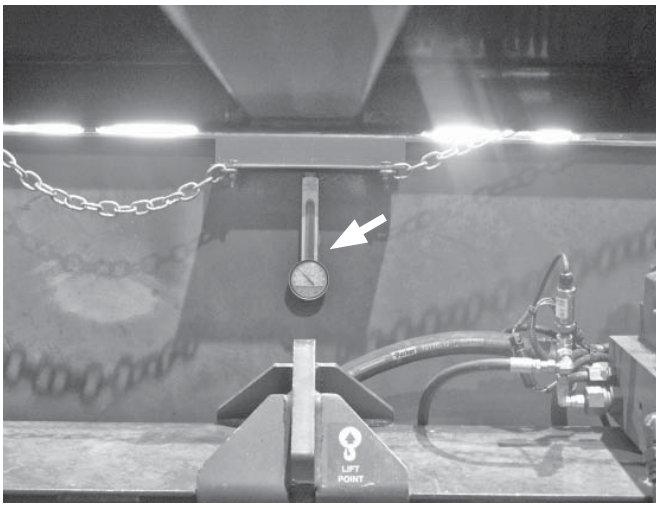


Figure 2-15 Oil Level and Temperature Gauge

The oil level gauge is located on the front or rear of the oil reservoir, depending on individual baler. Check oil level daily.

REMOTE VIEW CAMERA

Figure 2-16 Remote View Camera

The Remote View Camera (RVC) provides a clear view of the bale chute area via the Remote View Monitor. The mounting angle is adjusted for viewing each tied bale as it exits the baling chamber. While the work lights are in use, a camera light above the RVC provides additional illumination to improve bale chute area monitoring. If obscured, maintain the camera lens clarity by wiping with a clean, soft towel or optical wipe.

Use the Remote View Monitor to spot mis-ties as bales leave the baling chamber. When mis-ties occur, check knotter settings in Maintenance and Adjustment Settings starting on page 5-1.

OPERATING BALER

HOW THE BALER WORKS

Pickup

1. Windrowed crop is picked up by pickup tines and moved into the throat of the feed chute.
2. As material enters the feed chute, the continuously rotating feeder pushes crop further into the feed chute for accumulation.

Compression

3. Feed fork carries the accumulated material up feed chute and into bale chamber.
4. When an adequate amount of crop has entered bale chamber, the feed fork stops and holds the material up in chamber, while plunger begins to extend and compress the crop.
5. As the plunger is applying pressure to the end of the forming bale, the density system is applying pressure to top and sides of the bale through four hydraulic cylinders.
6. When the preset plunger pressure is reached, the density system reduces the pressure applied to the sides of the bale and the bale is allowed to move.
7. After the plunger fully extends, reverses, and is almost fully retracted, the feed fork loads another batch of material into the bale chamber. This cycle will continue until the preset bale length is reached.

Knotting

8. When the preset bale length is reached, the plunger will extend to compress the bale for the last time.
9. As the plunger begins to retract, the knotting cycle begins. The plunger will stop momentarily to allow the twine needles to extend between the plunger and bale.
10. After the needles are extended, the plunger will finish retracting, and the feed fork will start to load another batch of material into the bale chamber.
11. The twine needles return to their home position, completing the knotting cycle.
12. As the next bale is produced in the bale chamber, the finished bale is pushed further back until it slides off bale chute.

OPERATING THE BALER

To start the baler and begin baling, the toggle switch on the ICM is flipped to the ON position, The Freeman startup screen should initialize.

When power is applied, the ICM checks component locations, the temperature, and level of the hydraulic oil. On the tractor mounted control box, the display flashes its start up menu showing your dealer's name. The baling screen will then appear.

Two components must be in the home position before the baling process can begin; the plunger and knotter. If power is applied and the plunger is away from the home position, the plunger will automatically retract to the retracted stop position as long as the Plunger Drift Compensation is activated. See the Operating System Manual 89-015 for additional information .

If the knotter or needle yoke are not in the home position (see Figure 5-2 page 5-2) when the ICM is turned on, then the plunger will not extend when the full chamber sensor paddles are activated. However the machine will be able to run in automatic mode until a message popup appears explaining that the needles and or the knotter are not in the home position and the machine will exit out of the Automatic Mode. There are two approaches that can be taken to remedy this situation. Which approach you take will depend on why the needle and knotter did not return to home position. Below are 2 suggested actions. For additional options please refer to the Baler Operating Systems Manual under the knotter trouble shooting section:

1. If the needles have not yet reached Top Dead Center (TDC) and the knotter has not yet tied a knot, the knotter can be run slowly in reverse while in the Functions screen until returned to the home position. With the PTO at half speed, slowly jog the needles until they are at the home. When the needles are in the home position, the Needle Yoke Drive Rod should make a straight line along its length that intersects with the center of the Needle Yoke Drive Sprocket.

2. If the needles have already reached TDC and the knotter has already begun to tie a knot, then the needles and knotter should be run at full speed to completely and adequately tie the knot. First, enter the Knotter menu under “Machine Settings Menu” from the Functions screen. Then bring the PTO up to 1000 RPM. Make sure no one is near the machine. Press F2 “Cycle Knotter Once”. This will automatically engage the needles and allow them to complete the tying sequence and bring the needles home.

At this point the needles should be in the home position.

The Baler should be allowed to warm up before actual baling. During this warm up period, operate the PTO at approximately 500 RPM. Hydraulic oil temperature must be at a minimum of 32° F (0° C) before baling.

To begin baling, increase PTO speed to 1000 RPM. Move baler over windrow and press F4 to start the feed system and proceed forward. Ideal ground speed should provide the baler enough material to activate the plunger with every cycle of the second feeder, or about 21 times per minute. Rough ground conditions that limit the travel speed, or uneven windrows, will have little effect on bale quality because the 1592D Plunger is activated only when the chamber is full.

Excessive ground speed and windrow volume may cause the feed system to stall, plugging feed system. There are two methods for solving this issue. Machines equipped with the automatic unplugging feature will allow you time to back up your machine. It will drive the first feed forward and then reverse in an attempt to unplug the system. If the automatic unplugging feature is not successful, it can be manually unplugged by using the forward and reverse features of the first feeder. A plugged feed chute and chamber will require manually operating the plunger. Refer to the Manual Control section of this book for instructions for manual operation. After unplugging the baler, select a ground speed to prevent further overfeeding.

The 1592D will be most efficient when operating at peak capacity. Greatest bale density is obtained by providing many small feeds to each bale. Peak production capacity of the baler will not necessarily be achieved by producing bales of highest obtainable density. For information pertaining to feed rates, density control, and bale length refer to sections of this book covering feed sensor adjustment, density adjustment and bale length adjustment.

PREPARING FOR THE FIELD

NOTICE

Inspect the field for any objects (stones, limbs, etc.) that could damage the baler, or interfere with its proper operation.

1. Load and route twine (see page 1-8 for more information).
2. Check Lubrication and Service schedule (see page 6-1).
3. Adjust pickup height:

   Operated by the auxiliary hydraulic control lever on the tractor.
4. Set bale length:

   Please refer to Baler Operating System Manual 89-015 for more information.

   To Adjust:

   Push F3 and use △/▽ and OK from AUTO FUNCTIONS screen on the ICM.
5. Set Tension to 300 lbs initially then raise as needed.

   To Adjust:

   From the Bale screen, press F3 and use UP/DOWN arrows to adjust and OK to set (see page 2-5).

STARTUP PROCEDURE

1. Read entire manual before operating the Freeman 1592D baler.
2. Ensure twine needles are in their home position (refer to Position Twine Needles in Maintenance and Adjustments section for instructions).
3. Start tractor and run at low RPM.
4. Engage PTO and increase its speed to 500 to 700 rpm. Run baler without baling until the hydraulic fluid temperature is at least 32° F (O° C).
5. Toggle the ICM switch to ON (the ICM will briefly run system checks before the baling screen will display. The ICM may find a startup error and prompt you to fix the error. Follow the on screen instructions.)

   NOTE: See Baler Operating System Manual 89-015 for more information.

6. The Baling screen displays and you are ready to bale (see Figure 2-2 page 2-3)
7. Choose desired plunger pressure for baling by pressing F3 from the Bale screen. Use UP/DOWN/OK buttons to adjust.
8. Press "GO" (F4) on the ICM and proceed baling.

SHUT DOWN PROCEDURE

1. Disengage power-take-off (PTO).
2. Set tractor park brake.
3. Toggle POWER switch to OFF on Baler Control Box.
4. Shut off tractor engine and remove key.

⚠ WARNING

WARNING: Baler components can move if the flywheel is still turning causing death or serious injury. Flywheel coast down time can be up to 1 minute if shutdown at idle PTO speed, or 1-1/2 minutes if shutdown at 1000 PTO rpm. Wait for flywheel to stop before working on or near the baler.

5. Wait for baler flywheel and all moving parts to Stop.

TYING OF BALE

⚠ DANGER

DANGER: Twine needles and needle yoke move suddenly during knotting cycle and can cause death or serious injury if contacted.

KNOTTING CYCLE - FIRST BALE IN CHAMBER

The first bale tends to be loose and unusable, since there is not enough resistance to increase density. This bale is left untied and will fall off the bale chute in small pieces (to be baled up later) as the second bale is formed.

NOTE: The twines must be properly installed and tied together before initializing (refer to Install Twine in “Preparing the Equipment” section).

1. When the preset bale length is reached, the knotting cycle begins and bale is tied with six twines.
2. Check the Remote View Monitor and look for any mis-ties on the bale being ejected.

   NOTE: If any mis-ties, follow instructions on page 1-11 (see Figures 1-35 and 1-36).

⚠ WARNING

Shut off tractor engine and wait for all movement to stop before adjusting, lubricating, cleaning or servicing the baler.

3. Resume baling.

OPERATING BALER

PICKUP HEIGHT

Pickup Lift : Operated by the auxiliary hydraulic control lever on the tractor.

Adjust pickup teeth to be as high as possible above ground - normally 1 “ (25.4 mm) - without leaving any crop.

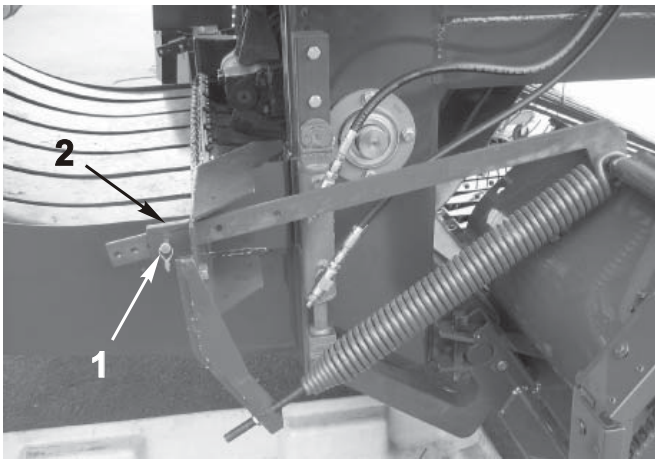


Figure 3-1 Pickup Height

To adjust:

1. Raise pickup using Pickup Lift lever in tractor.
2. Remove locking pin (1).
3. Slide stop block (2) along bar to desired hole; insert locking pin.

- Move toward pickup to increase pickup height; move away to decrease.
- Stop block can be turned end-for-end for small adjustments.

4. Lower pickup before resuming operation.

BALE DENSITY

Plunger pressure indicated by the plunger pressure gauge is relative to bale density. Most baling operations require plunger pressure in the 3,800 to 4,500 PSI range. Maximum baling pressure is 5,000 psi. Type and condition of crop may need pressure adjustments to get the desired density.

The tension valve located on the right rear of the machine, (see Figure 3-3), is adjustable from the ICM (see Baler Operating System Manual 89-015). Observe changes in plunger pressure after each adjustment of the tension valve. Several plunger strokes may be necessary to normalize the pressure setting.

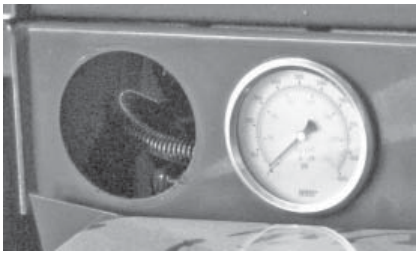


Figure 3-2 Plunger Pressure Gauge

NOTE: Actual pressure is displayed when the plunger is almost at full extension.

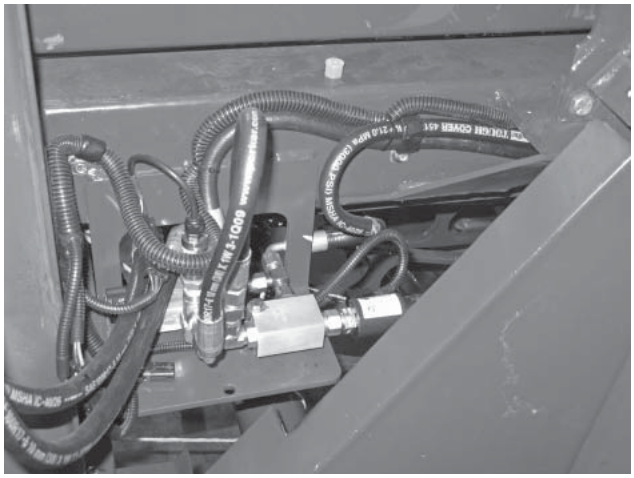


Figure 3-3 Tension Valve

BALE LENGTH

The bale length adjustment sensor is located on the left rear side near the service ladder. Bale length is measured by a potentiometer driven by the star wheel shaft. The IQAN system stores the potentiometer reading at the start of a bale and calculates the number of revolutions and position required to tie off another bale. With this system, bale length can be adjusted from the cab at any time as well as calibration of the sensor.

UNPLUGGING THE BALER

DANGER

DANGER: Baler intake can pull you in, causing death or serious injury. Stay clear of pickup reel and feed intake area. Baler can take in crop faster than you can let go.

- NEVER feed crop in by hand.
- NEVER remove any material from baler intake while it is running.
- NEVER attempt to unplug baler by hand while it is running. Use the reversing feature to unplug.
- ALWAYS disengage power take-off, shut off tractor engine, set park brake, remove key, and wait for flywheel to stop before unplugging by hand or servicing.

UNPLUG FEEDER

Plugging the feeder is typically caused by over-feeding material into it. Reduce ground speed as necessary to prevent plugging. Please refer to Baler Operating System Manual 89-015 for more information.

NOTICE

Do not reverse feeder with pickup raised in highest transport position.

TO UNPLUG:

1. Make sure everyone is clear of machine.
2. Check Feed Fork / Feed Chute to make sure it isn't plugged. A plugged Feeder Fork and Feed Chute can cause the Feeder to Plug.
3. Press OK button until Feeder is displayed on In-Cab Monitor screen and press Down Arrow button to reverse Feeder. There will be slight delay before feed fork starts to move.
4. If feeder continues to stall, repeat steps 1 - 3 as necessary to remove plug.

UNPLUG FEED FORK / FEED CHUTE

DANGER

DANGER: Never attempt to unplug the baler by hand while the baler is running. Contact with moving parts can cause death or serious injury. ALWAYS disengage power take-off, shut off tractor engine, set park brake, remove key, and wait for flywheel to stop before unplugging by hand.

Plugging the feed chute and stalling the feed fork is typically caused by over-feeding material into it. Reduce ground speed as necessary to prevent plugging.

TO UNPLUG:

NOTICE

The plunger can not be extended if the twine needles are protruding into chamber. This can cause damage to baler. If needles are protruding into chamber, refer to Position Twine Needles in "Maintenance and Adjustments" section for directions to retract them (see page 5-2).

1. Make sure everyone is clear of machine.
2. Press OK button until feed fork is displayed on In-Cab Monitor screen and press Down Arrow button until feeder area is unplugged.
3. If feed fork continues to stall, repeat steps 1 - 2 as necessary to remove plug.

EMPTYING THE BALE CHAMBER

DANGER

DANGER: Never attempt to unplug the baler by hand while the baler is running. Contact with moving parts can cause death or serious injury.

NOTE: Any length bale can be made when emptying the bale chamber. However, it is easier to remove a small bale rather than a large one.

1. Press Tie Knot NOW (F2) button from AUTO STATISTICS screen on In-Cab Monitor to tie current bale in chamber.
2. NOTE: See Baler Operating System Manual 89-015 for more information.
3. Once Tie Knot NOW function is complete, open tension rails fully by pressing Open Rails (F2) button from the FUNCTIONS screen on ICM.
4. Turn OFF power to tractor and baler, follow Shut Down procedure on page 3-3.

CAUTION

CAUTION: Bale chute can be slippery and cause injury if you fall. Use caution when mounting, dismounting, and working up on chute to remove a bale.

5. Remove material from chamber.

DOUBLE KNOTTING PROCESS

The double knotter process is very similar to the standard knotter process. The main distinction, of course, is that two knots are tied instead of one during each cycle. It is important to remember that the knotter shaft and needles still only perform one complete cycle. The key difference is in the cam gears, which have gear teeth and cam lobes for operating the twine disc, bill hook, and knife arms twice per knotter revolution. One knot is tied while the needle is near the top of the stroke, the second knot is tied while the needle is on the downward part of the stroke.

Before the knotters can tie, the top and bottom twines must be tied together. During normal baling, this happens on the previous tie cycle. If the baler is starting empty, the twines must be tied together by the operator before starting to bale. During baling the twines, which are tied together, are fed out along the bale.

The top twine feeds from the top twine box, through a series of guides, to the tensioner. From the tensioner, the twine goes to another guide, up around the top slack puller roller (see Figure 4-1), down around the twine tucker roller, and lays along the top of the bale. The top twine runs rearward along the top of the bale until the point where it has been tied to the bottom twine at the top rear edge of the bale. During baling, the top slack puller is held down firmly by the top twine passing through it under tension from the tensioner.

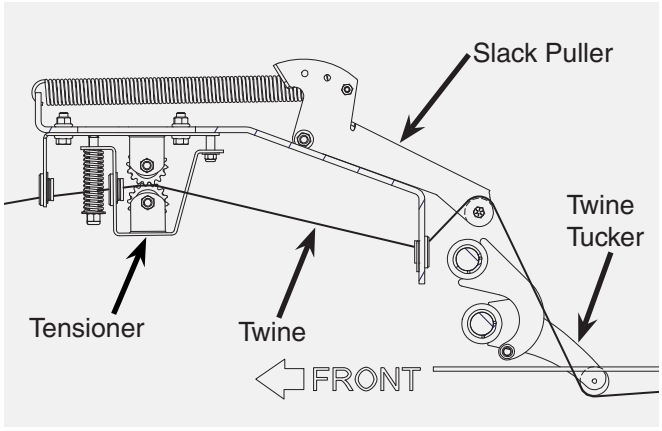


Figure 4-1 Slack Puller to Twine Tucker

The bottom twine feeds from the side twine boxes at the front of the baler, through a series of eyes to the tensioner. From the tensioner, the twine goes around the roller in the slack puller and up between the rollers in the needle tip (see Figure 4-2). From the needle, the twine continues rearward along the bottom of the bale. At the end of the bale the bottom twine runs up between the bales to the top corner where it has been tied to the top twine.

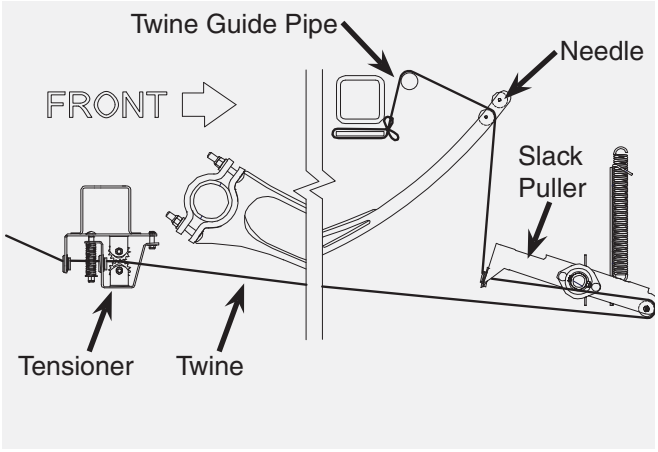


Figure 4-2 Slack Puller to Twine Needle

During bale formation, the twine finger is across the needle slot, the knife arm is at full extension, and the twine tucker is low (see Figure 4-3) in order to pass the twine under the finger.

DOUBLE KNOTTING PROCESS

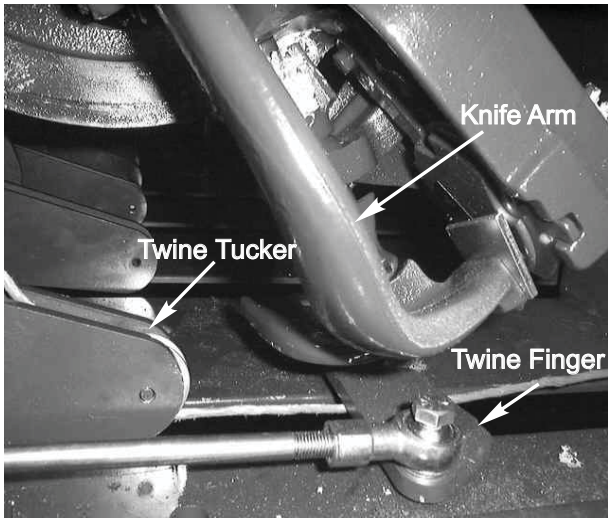


Figure 4-3 Twine Tucker in Low Position

As with a standard knotter, the tie cycle starts when the bale has reached a predetermined length. When the bale length trip bar activates the knotter motors, the shaft starts to turn and the needles begin to move up into the chamber. As the needles move, they carry the bottom twine up around the front end of the bale. When the needles approach the chamber top plate, the twine finger retracts across the slot to be ready to grab the twine from the needle. Also, the twine tucker rises out of the needle's path.

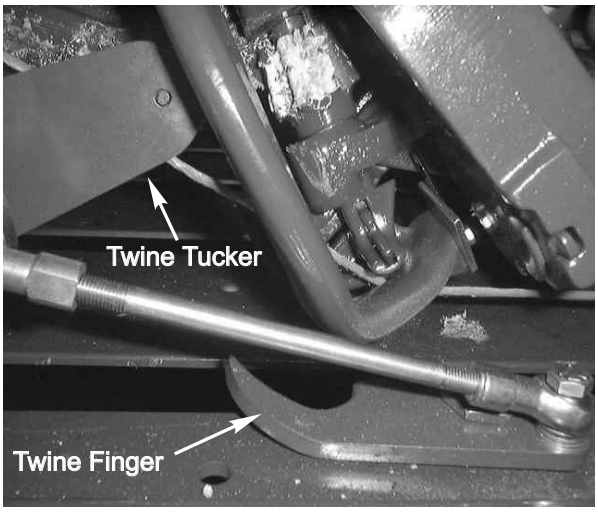


Figure 4-4 Twine Tucker Rises

As the needle comes through the top plate, it catches the top twine from the tucker in the top needle roller. At the same time, the twine finger grabs the twine, which the needle brought up, and moves it into position in the V of the knife arm. The top twine is also laid into the knife arm V as the needle carries it upward.

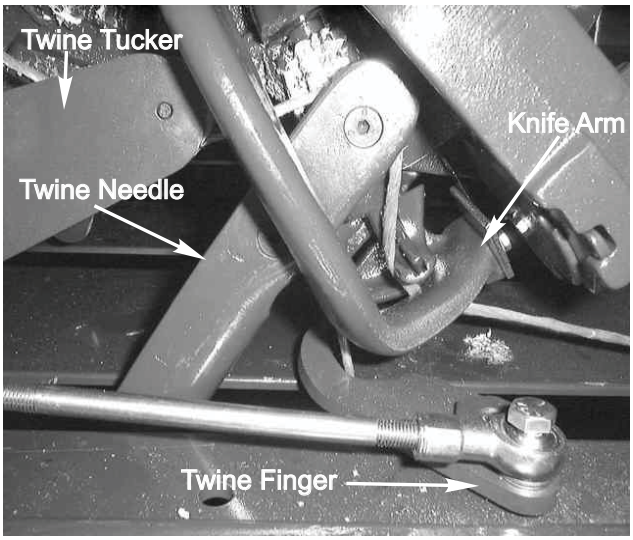


Figure 4-5 Knife Arm V

The needle continues upward, where it lays the twines across the bill hook and into a notch in the twine disc.

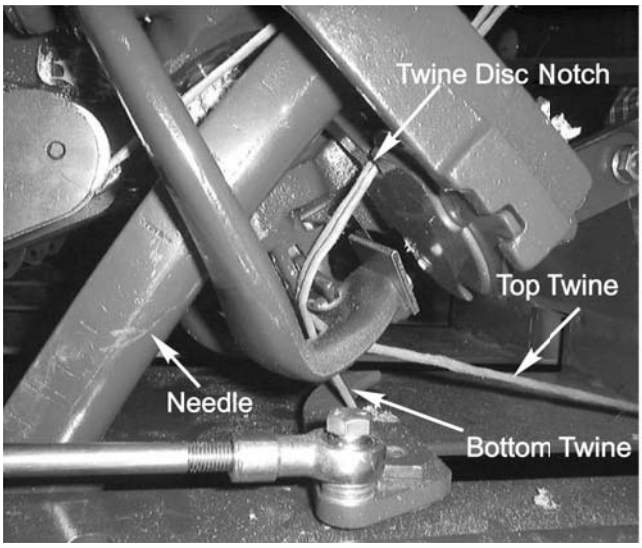


Figure 4-6 Twine in Twine Disk Notch

When the needle is at the top of its travel, the twine disc starts to rotate, gripping the two twines in the twine disc notch.

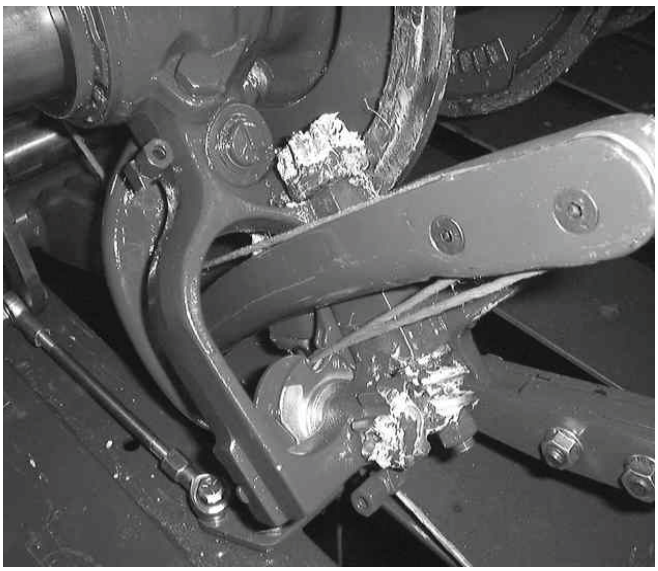


Figure 4-7 Twine Disk Gripping Top & Bottom Twines

As the needle starts down, the bill hook begins to rotate. It is important at this moment that the twines have been positioned properly on the bill hook by the twine finger and knife arm.

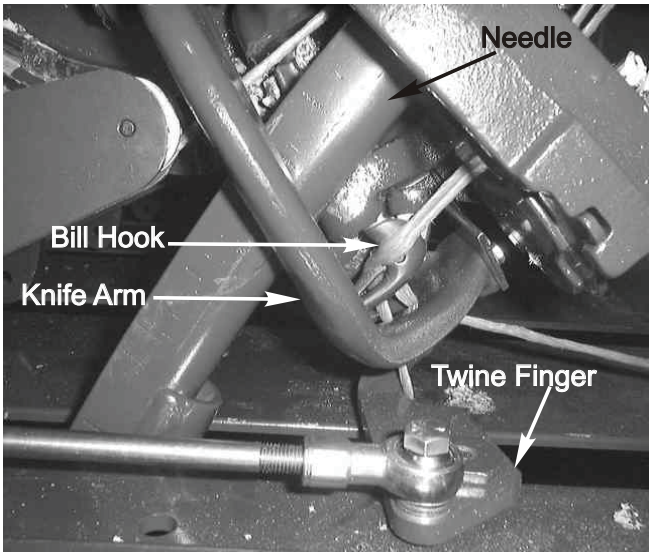


Figure 4-8 Twine on Bill Hook

When the bill hook has gone about a half revolution, the trigger opens in order to grab the twines coming from the twine disc, which has rotated about 90°.

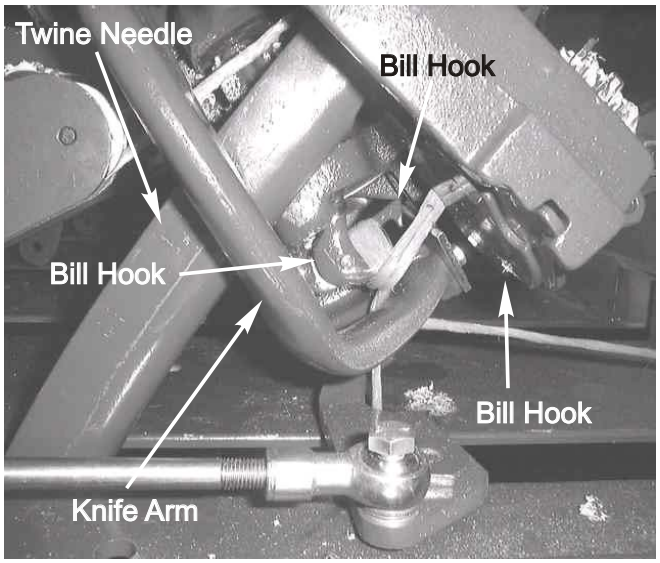


Figure 4-9 End of First Knot

When the trigger closes over the twines (see Figure 4-10), the knife arm sweeps across, cutting the twines between the bill hook and the twine disc while wiping the finished knot from the bill hook. This is the end of the “first knot” tied. Meanwhile, the needle has retracted (see Figure 4-11) from the knotter leaving the top and bottom twines in the next notch of the twine disc. Remember that the first knot is actually the knot that finishes the bale just formed. The next knot (second knot) starts the formation of the next bale.

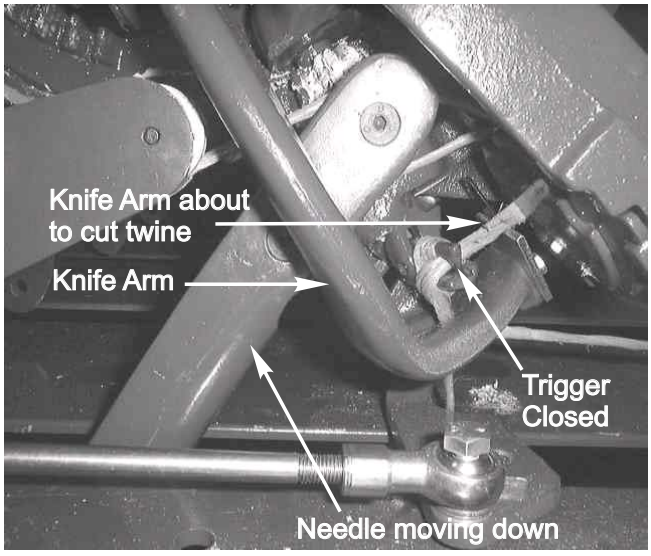


Figure 4-10 Twine Needle Yoke in Home Position

DOUBLE KNOTTING PROCESS

While the knife arm strips the first knot, the twine finger retracts again and the needle drops below the chamber top. Now both top and bottom twines are held together in the twine disc. Once the needle is out of the way the twine tucker drops the top twine below the chamber top plate where the twine finger will be able to grab it.

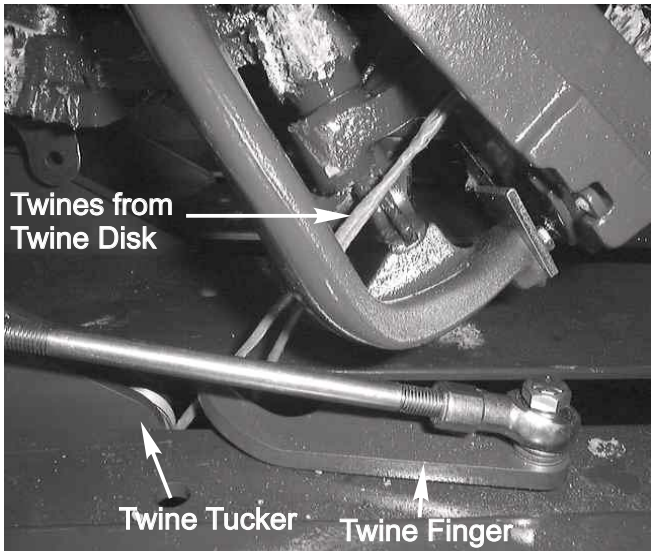


Figure 4-11 Twine Needle Yoke in Home Position

This is where the slack pullers do their job. If the twines are not held tight as the needle leaves the knotter, a loop of twine could get around the bill hook or let the twine slip out of the notch in the twine disc.

When the needle drops, the top slack puller works to keep the twine snug by raising.

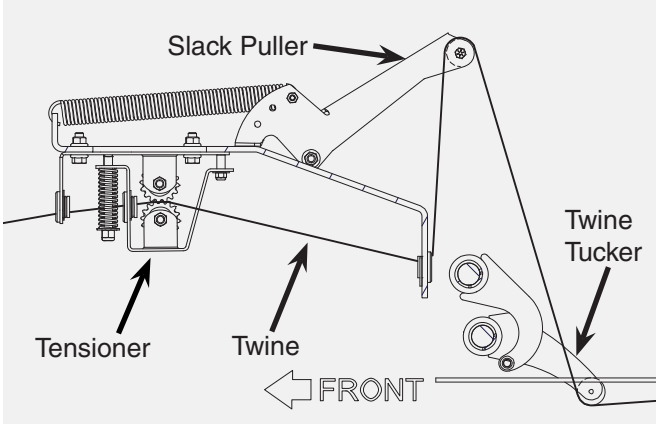


Figure 4-12 Knot Sensor

The twine finger grabs both the top twine (from the tucker) and the bottom twine (from the needle) and moves them both into position in the knife arm V. This lays the twines neatly over the bill hook as they continue up to where they are still held by the twine disc.

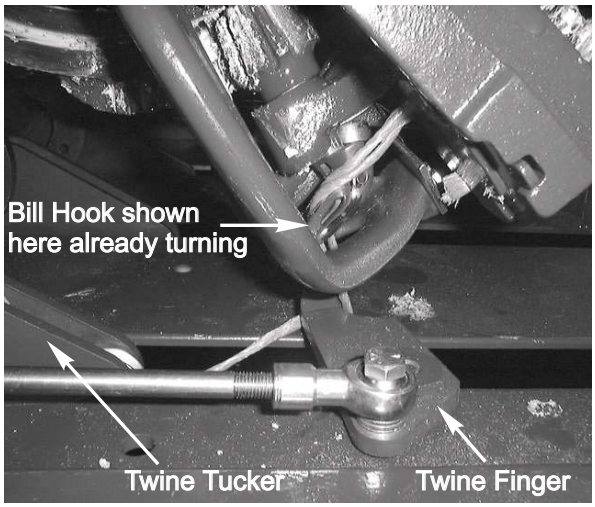


Figure 4-13 - Bill Hook Turning

When the twines are laid in position, the twine disc starts to rotate again, as does the bill hook. As before, when the bill hook has rotated about half way the trigger opens in order to grab the twines coming from the twine disc notch which has now rotated clockwise about 90° (see Figure 4-13).

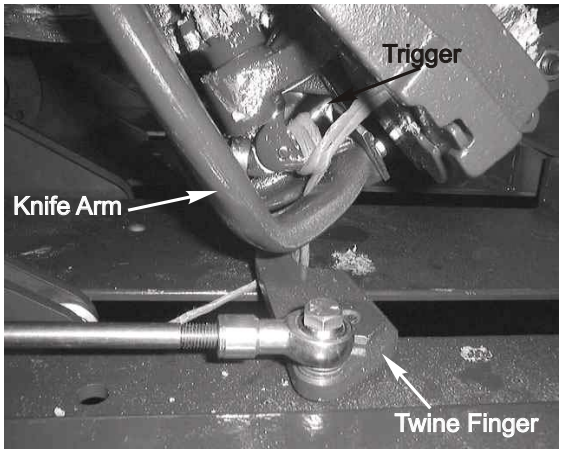


Figure 4-14 End of Second Knot

This is the end of the “second knot.” The top and bottom twines are now tied together, ready to be fed out as the next bale forms. As the bale is formed, the twine is pulled tight from the slack pullers.

NOTE: It is normal for the tails of the second knot to be held by the trigger for one or two plunger strokes. Do not mistake this for the knot hanging on the bill hook.

MAINTENANCE AND ADJUSTMENTS

⚠ WARNING

Shut off tractor engine before adjusting, lubricating, cleaning or servicing the baler.

⚠ WARNING

Many of the procedures outlined below require the use of the In-Cab Monitor (ICM) near the baler. The ICM will allow the operator to position machine components such that they may be inspected or adjusted. Do not operate the machine with the In-Cab Monitor unless you are familiar with its use. Always run the machine at the lowest possible PTO speed when using the ICM during maintenance checks on the baler. Stay well clear and keep others clear of all moving parts while using the ICM. Once the machine is in the desired position, turn off the machine and disengage the PTO before performing any work.

NOTICE

Keep ICM cables intact on baler. Removing them may cause damage to the cables. Use the extra cable that is equipped with the baler when using the ICM around the baler.

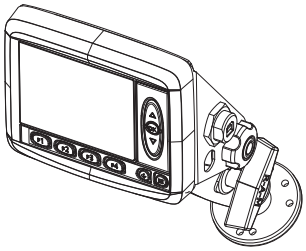


Figure 5-1. In-Cab Moniior (ICM)

IMPORTANT! Before running the knotter using the ICM, always fully extend the plunger and hold for one full second. Leave the plunger in the extended position in order to hold the material out of the needle path while the knotter shaft turns.

⚠ WARNING

Knotters can cause serious hand injuries. Keep hands clear during operation.

⚠ WARNING

Falling from the baler can cause serious injury. Stay off if it is not level or if its surface is slippery. When on top, stay in designated walking area.

⚠ WARNING

Wait for all movement to stop before servicing baler.

KNOTTER COMPONENTS:

Please refer to your 1592D parts book for illustrations of knotter parts.

Needle: Although typically not considered to be a knotter component, the needle is necessary, since it presents the twine to the knotter. As the needle comes through the knotter, it lays the twine across the bill hook and into a notch in the twine disc. The needles operate one cycle per bale.

Knotter Frame: The knotter frame has no function related to knot tying. The frame simply provides a means of locating all the knotter components properly and mounting them to the baler.

Cam Gear: Sometimes called the main gear, the cam gear drives all the components located in the knotter frame. The cam gear is driven by a key in the knotter shaft and makes one complete revolution for each bale tied. The cam gear has a cam track for operating the knife arm, a set of gear teeth for operating the bill hook, and a set of gear teeth for operating the twine disc.

Twine Disc: The twine disc controls the twine delivered by the needle and positions it for the bill hook. The twine disc has four notches and makes a quarter turn each time a knot is tied. The twine disc is driven by the worm shaft, which is in turn driven by the cam gear. At rest, the twine disc must be positioned such that one of the notches is pointing up.

Twine Holder: The twine holder holds pressure on the twine while it is controlled by the twine disc. The twine holder curves around such that as the twine disc rotates, there is always at least one twine disc notch covered by the holder.

Twine Holder Spring: The twine holder springs apply force to the twine holder. The springs are attached to the knotter frame by a single bolt which is loosened or tightened to vary the amount of holding force on the twine.

Twine Disc Cleaner: The cleaner sits in the groove between twine disc plates and removes debris from the disc as it rotates.

Bill Hook and Trigger: The bill hook and trigger together perform the most complicated function of the knotter group. This component is what actually ties the twine into a knot. The bill hook is driven by the cam gear and makes one complete revolution each time a knot is tied. The trigger action is controlled by the roller which runs on a cam surface of the knotter frame as the bill hook rotates. At the end of rotation, the bill hook cam closes the trigger.

Bill Hook Cam and Spring: The bill hook cam applies force to the trigger. The amount of force applied is adjusted by tightening or loosening the nut which holds the spring in place. The force between the cam and the trigger determines how tightly the trigger clamps down on the twine at the very end of the bill hook rotation.

Knife Arm: The knife arm performs more separate functions than any other single knotter component. The knife arm is driven by the cam gear and completes one extend and retract cycle each time a knot is tied. The most obvious function of the knife arm is carrying the knife which cuts the twine after the bill hook has completed its rotation. The next most important thing the knife arm does is strip the knot off the bill hook at the end of the tie cycle. For this reason the knife arm is sometimes called a stripper arm. Finally, the knife arm guides the twine and prevents it from falling off the tip of the bill hook. This happens both as the needle enters the knotter (when the twine finger presses the twine against the bill hook) and as the needle leaves the knotter (when the twine held in the holder is laid over the bill hook).

Twine Finger: The twine finger delivers the twine to the bill hook. Twine fingers are driven by a cam on the knotter shaft and complete one extend and retract cycle each time a knot is tied. As the needle comes through the top of the chamber, the twine finger hooks the twine and holds it where the bill hook will wrap it up as the bill hook rotates.

Twine Tucker: The twine tucker is only used on double knotter style machines. When tying the second knot, the twine tucker “tucks” the twine below the twine finger so the twine finger can hook the twine and deliver it to the bill hook. The twine tucker is driven by a cam on the knotter drive sprocket and operates one complete cycle per bale.

Slack Puller: The slack pullers are only used on double knotter style machines. There are different style slack pullers for the top and bottom twines. Slack pullers are spring activated and operate continuously during baling operation. The main function of the slack puller however, is to keep the twine tight as the needle leaves the knotter while tying the second knot. Without the slack pullers, the twine would lay loosely over the bill hook and would be difficult to wrap into a tight knot.

Twine Tensioner: The twine tensioners produce drag on the twine between the twine storage area and the knotters. On double knotter machines, the tensioners must be tight enough to cause the twine to stretch the slack puller springs.

POSITION TWINE NEEDLES

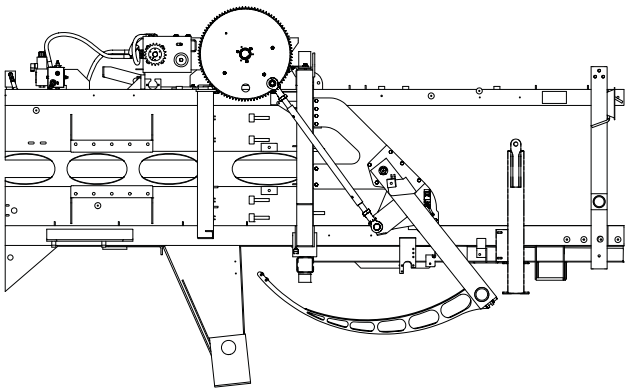


Figure 5-2. Twine Needle Yoke in Home Position

If the twine needle yoke is not in its home position as shown, perform the following:

1. Using the ICM, navigate to the FUNCTIONS screen and press the OK button to scroll to "Knotters". Use the ▲ ▼ arrows to activate the knotter in the appropriate direction.

⚠ WARNING

Maintain a safe distance from all moving components when operating the baler with the In-Cab Monitor (ICM) remotely.

2. Press OK button to navigate to Knotter function.
3. Press UP/DOWN arrow buttons to move needle yoke back in home position (see Figure 5-2).

KNOTTER ADJUSTMENTS

Double Knotter Adjustments, #209 & #316

These adjustments are specifically for use on the following machinery:

- ASC-1592-0316
- ASC-1592-0209

Instructions

- Make each adjustment to the knotter in the order that they appear.
- Measurements labeled “Field Adjustment” must be setup prior to going to the field. This designation indicates that the adjustment requires adjustment in the field to match the field conditions.

1. ANGLE OF KNOTTER (KNOTTER ANCHOR POINT)

Target Measurement: 3-5/16" +/- 1/16 measured from the top of the knotter top plate to the center of the knotter anchor.

Adjustment Objective:

Knotter position is important to set the knotter position for the needle such that the top and bottom twines are captured correctly in the assembly during the knotting process.

Adjustment Procedure:

Loosen the two clamping bolts and adjust the link of the knotter anchor mount until the target measurement is achieved.

2. TIMING OF THE TWINE HOLDER DISC AND TWINE HOLDER DISC CLEANER

Target Measurement: Left-hand side of the Twine Holder Disc Cleaner should be flush with the Left-hand side of the Twine Holder Disc +/- 1/32 when the Twine Disc Cleaner is centered in its as-built range of movement.

Adjustment Objective:

The timing of the Twine Disc Cleaner and the Twine Holder Disc should be correct to allow for proper loading of the twine into the knotter.

Adjustment Procedure:

1. Set the knotter in the home position.
2. Measure the distance between the Twine Holder Disc and the Twine Holder Disc Cleaner. The Twine Disc Cleaner is non-adjustable and should be centered in its range of movement when the measurement is taken.
3. If adjustment is necessary, verify the Twine Disc Cleaner is centered in its range of movement before adjusting the Twine Disc.
4. Check Twine Disc Cleaner and Twine Disc for sharp edges and either replace or de-burr these sharp edges before completing setup. All surfaces contacting the Twine must be smooth and a finger nail should not hang up when run over surface.

3. TWINE HOLDER DISC SPRING (FIELD ADJUSTMENT)

Target Measurement: 23 full turns counterclockwise from position with spring bottomed-out.

Adjustment Objective:

Adjust the spring to provide adequate tension holding force on the twine when knot is formed on the Bill Hook and when the twine is pulled during the knotting operation.

Adjustment Procedure:

1. Tighten the Twine Holder Disc Spring bolt clockwise until all of the available take-up in the Twine Holder Spring is gone.
2. Adjust the Twine Holder Disc Spring bolt counterclockwise to achieve the above target measurement.

4. BILL HOOK TRIGGER SPRING SETTING (FIELD ADJUSTMENT)

Target Measurement: Adjust bolt 1/2 turn from when the nut is snug against the spring but there is no pre-load on the spring.

Adjustment Objective:

The setting on the spring should be strong enough such that the knot has sufficient tails to not be too short and not too long that it forms a “Bow Knot”. In-shop testing was conducted on serial number ASC-1592-0316 on 7/13/2011. Results showed that adjustments from ½ turns to 1 ½ turns made a good looking knot. To reduce wear the lowest number of required turns was selected. However, this is a “Field Adjustment” and different field conditions could require a different target value.

Adjustment Procedure:

1. Set the knotter in the home position.
2. Using a wrench loosen the jam nut
3. Using a wrench adjust the bolt to the appropriate position and then adjust to match the target measurement above.

5. NEEDLE PENETRATION ABOVE TWINE DISC

Target Measurement: 5” (+/- 1/4”) (see Figure 5-3).

Adjustment Objective:

Adjust needle to meet target measurement.

Adjustment Procedure:

1. Bring needles to top dead center.
2. Loosen the nuts on the right-hand and left-hand drive rods and turn the drive rods equally:
   A. Clockwise to shorten
   B. Counterclockwise to lengthen
3. Measure the distance as shown and adjust the drive rods equal amounts until the above measurement is achieved as measured only on needle #1 (left-hand side of machine) and on needle #6 (right-hand side of machine). Once both needles have the same measurement, move to the next step.
4. Verify that both Needle Yoke Drive Rods are exactly at top dead center. Adjust the individual QD bushings to bring both rods to Top Dead Center (see "Knotter Drive Sprocket Timing" on page 5-9).

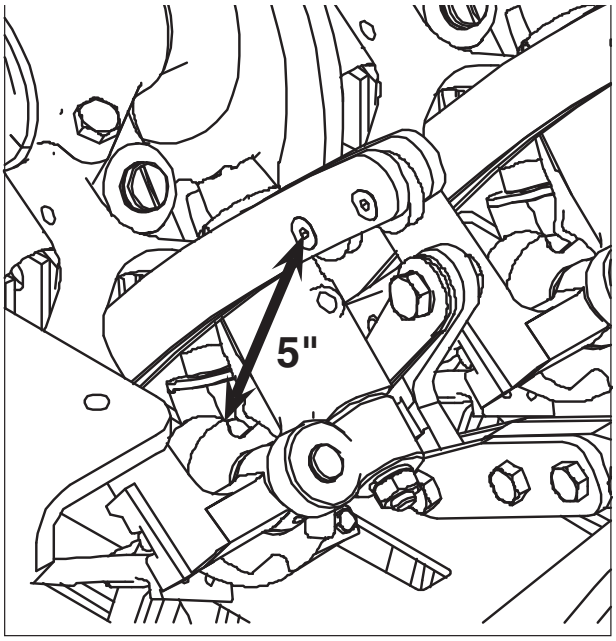


Figure 5-3. Needle Penetration Above Twine Disc

5. With both needles at Top Dead Center, turn the rods slightly from clockwise and counterclockwise back and forth. Both drive rods should require the same amount of force to rotate. If they do, this will indicate that they are driving equally and this setup is complete. If they require different amounts of force to rotate, conduct the next step.
6. The drive rod that required the most force should be lengthened by ½ turn increments and re-checked with the other drive rod. When both drive rods are pulling equally at Top Dead Center, both needles must measure within the target measurement range but need not be the same measurement.
7. Verify that the needles do not hit the sides of the needle slots when at top dead center.

6. NEEDLE ROLLER TO TWINE DISC DISTANCE (FIELD ADJUSTMENT)

Target Measurement: 1/4” +/- 1/16” as measured from the edge of the bottom roller as the tip is just above the Twine Disc.

Adjustment Objective:

Adjust angle of needles to meet the target measurement. The needle roller should be at the Twine Disc.

Adjustment Procedure:

Use the adjusting bolts on the bottom of the needle that attach the needle to the needle yoke to move the needle forward or backwards to achieve the adjustment.

7. NEEDLE TO KNOTTER FRAME SIDE TO SIDE POSITION

Target Measurement: The right-hand side of the Needle may rub against the needle slot, as long as there is no more than 3 lbf. required to deflect the needle from the inside surface of the knotter frame. The needle can have no more than 1/32" of clearance to the knotter frame.

Adjustment Objective:

Adjust needle alignment to knotter frame such that the needles do not damage the knotter frame and or unnecessary wear or leave to much space to properly guide the twine into the Twine Disc.

Adjustment Procedure:

1. Bring the needles up into the knotter frame. Observe their interaction with the knotter frame.
2. Verify the target measurement for each needle as it is coming through the knotter to top dead center, at rest at top dead center and as it leaves the knotter from top dead center through a full knotter cycle.

8. MAX DEPTH OF TUCKER ARM & TUCKER TWINE OVERLAP

Target Measurement: 2-3/16" -1/16", + 3/16" (as measured from the top of the Top Plate to the bottom of the Tucker Roller on the tip of the Tucker Arm) (see Figure 5-4).

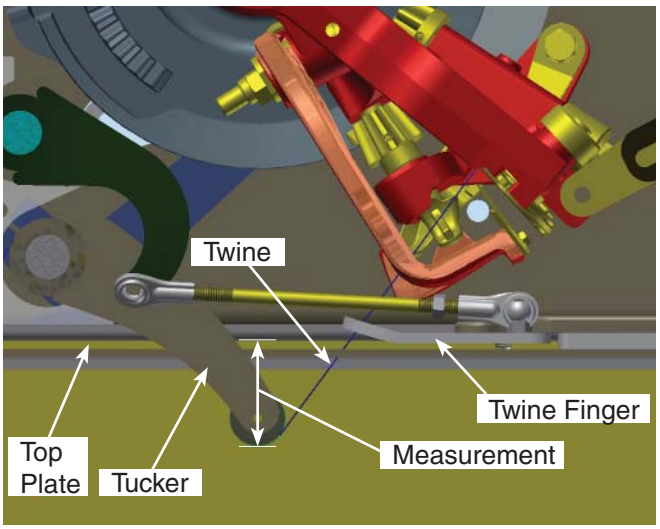


Figure 5-4. Tucker Arm Depth

Adjustment Objective:

Adjust the tucker to get the maximum amount of engagement of the twine around the Tucker Roller without the Tucker Arm hitting the front end of the Needle Slot.

Adjustment Procedure:

1. With the 2nd knot about to form, loosen the Tucker Drive Arm and rotate the Tucker Shaft such that it meets the desired measurement.
2. Verify that the tucker does not contact the front of the needle slot.
3. Tighten the clamp bolt on the Tucker Drive Arm.

Tucker Twine Overlap: Measurement of Twine Finger Overlap on the Top Twine is taken after Twine Fingers and Needles have been set. Minimum 3/16" overlap. Tucker Arm must not contact the front edge of the needle slot (see Figure 5-5).

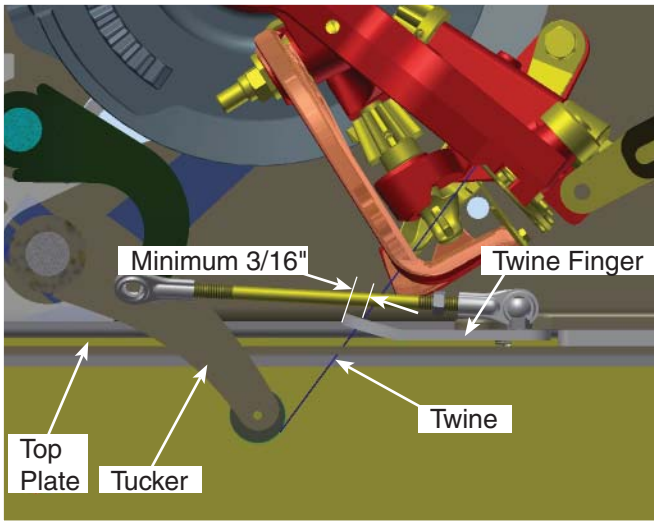


Figure 5-5. Twine Finger Overlap

9. MAX HEIGHT OF TUCKER ARM

Target Measurement: 1/4" +/- 1/16 clearance between Tucker roller and back of needle.

Adjustment Objective:

The Tucker must return high enough so the needle does not contact it, but not too far as to allow the needle to miss the top tucker twine.

Adjustment Procedure:

Adjust the tucker shaft stop bolt to achieve the above measurement.

10. POSITION OF TUCKER TO NEEDLE (SIDE TO SIDE ALIGNMENT)

Target Measurement: Tucker aligned 3/16” to 1/4” to the left-hand side of the needle (see Figure 5-6).

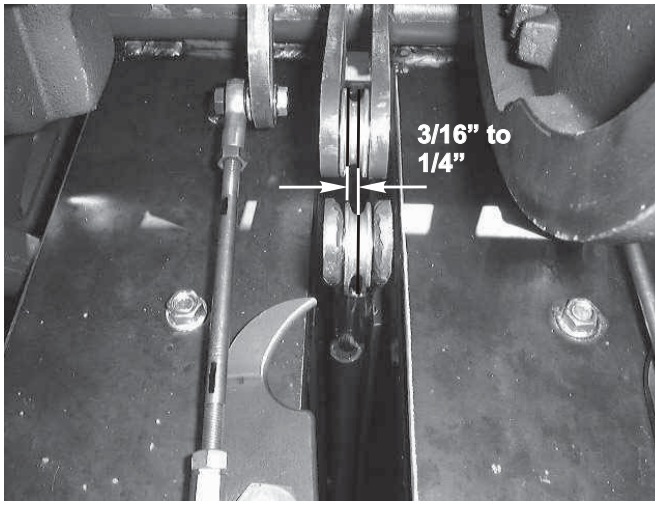


Figure 5-6. Tucker Roller to Needle Roller Alignment

Adjustment Objective:

Adjust the Tucker Shaft so the distance between the center line of the Top Needle Roller and the Tucker Roller meets the target measurement.

Adjustment Procedure:

Adjust the Tucker Shaft side to side to achieve the target measurement.

11. POSITION OF TWINE FINGER DRIVE SHAFT (SIDE TO SIDE)

Target Measurement: 1/2" +1/2”/-0” Measured from the left-hand side of the #1 needle slot to the left-hand surface of the #1 Twine Finger Drive Rod Arm (see Figure 5-7). Maintain at least 1/8” of space between the right-hand end of the Twine Finger Drive Shaft and the inside surface of the Tucker Drive Cam.

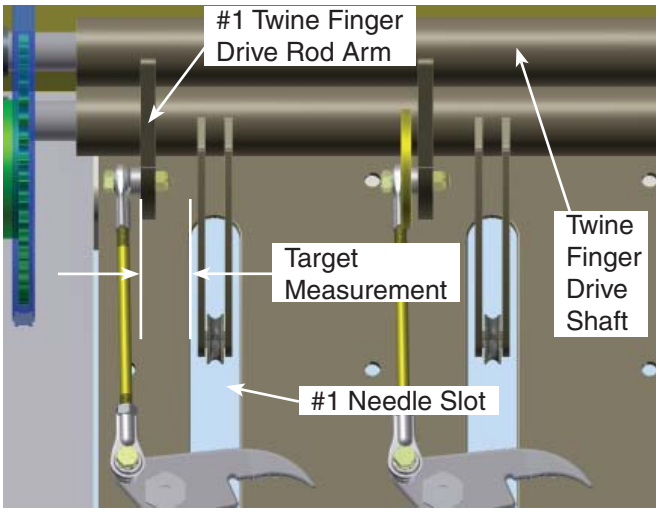


Figure 5-7. Position of Twine Finger Drive Shaft

Adjustment Objective:

Adjust the Twine Finger Drive Shaft right or left to meet the target measurement.

Adjustment Procedure:

1. Loosen set screws on both ends of the shaft.
2. Slide the Twine Finger Drive Shaft side to side to meet the desired measurement.
3. Tighten set screws on both ends of shaft when complete.

12. POSITION OF ADJUSTABLE TWINE FINGER MOUNT

Target measurement: 3/16" (+/- 1/16) (see Figure 5-8).

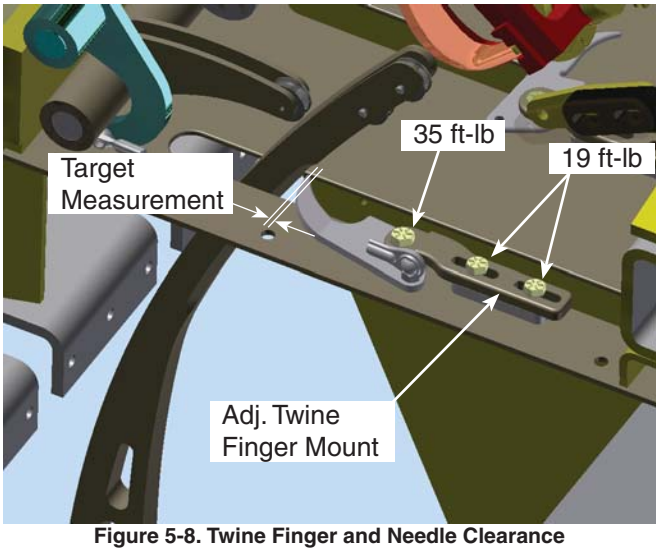


Figure 5-8. Twine Finger and Needle Clearance

Adjustment Objective:

The Twine Finger should not contact the needles when extending or retracting.

Adjustment Procedure:

1. Loosen the bolts on the Adjustable Twine Finger Mount.
2. Remove the Twine Finger Drive Rods from the Twine Fingers.
3. With the Needles at Top Dead Center rotate the Twine Finger into the Needle Slot to the closest point to the needle. Move the Adjustable Twine Finger Mount forward and backwards to reach the target measurement.
4. Torque the Adjustable Twine Finger Mount bolts as shown in Figure 5-8.

13. SETUP OF THE TWINE FINGER DRIVE SHAFT TIMING AND POSITION

Target Measurements:

Inside of Twine Finger Drive Arm to Tucker Drive Shaft with Twine Fingers Extended: 1/4" +/- 1/16” (see Figure 5-9).

Adjustment Objective

The Twine Fingers should be setup such that when the Twine Fingers are fully extended, the twine finger drive shaft arm does not interfere with the Tucker Shaft and when they meet the distance from the 4x4 to the tip of the twine finger (see next step).

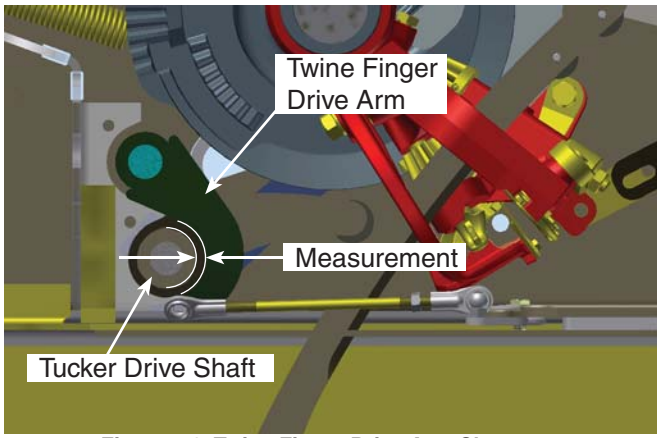


Figure 5-9. Twine Finger Drive Arm Clearance

Adjustment Procedure

1. Start with the knotter in the home position.
2. Loosen and remove the Twine Finger Drive Shaft Arm from the Twine Finger Drive shaft.
3. Rotate the Twine Finger Drive shaft such that the inside radius of the Twine Finger Drive Shaft meets the target measurement above.
4. Attach the Twine Finger Drive Arm to the Twine Finger Drive Shaft and maintain the first two target measurements and rotate the Twine Finger Drive Arm until the cam follower touches the Twine Finger Drive Cam.
5. Tighten the clamp bolt on the Twine Finger Drive Arm to the Twine Finger Drive Shaft and attach the spring.

14. POSITION OF TWINE FINGER EXTENDED

Target Measurement: Measurement from the Tip of the Twine Finger to the 4x4 should be 7-3/8” +/- 1/8" when the Twine Finger is fully extended (see Figure 5-10).

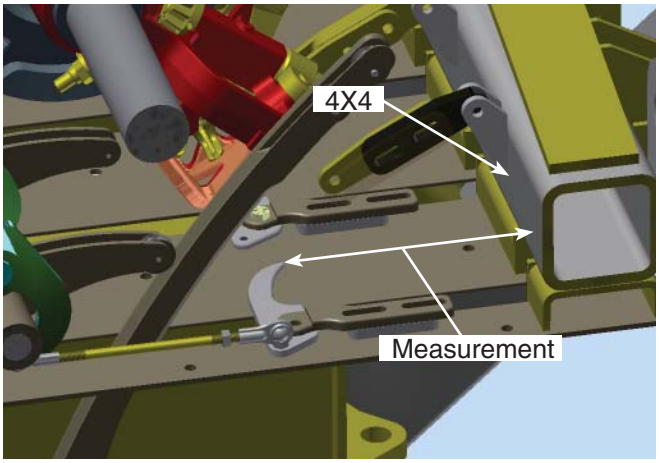


Figure 5-10. Twine Finger Extended

Adjustment Objective:

The Twine Finger should be adjusted so it loads the twine into the Bill Hook.

Adjustment Procedure:

1. Start with the Knotter in the home position.
2. Make sure the Twine Finger Drive Rods are attached to the Twine Fingers. Twine Fingers should be part number KNT037142B.
3. Adjust the length of the Drive Rods to attain the desired measurement. Each end of the drive rods should have at least ¼” of thread engagement with the ball joint threads.

15. POSITION OF TWINE FINGER RETRACTED

Target Measurement: Flush with needle slot +/- 1/16" (see Figure 5-11).

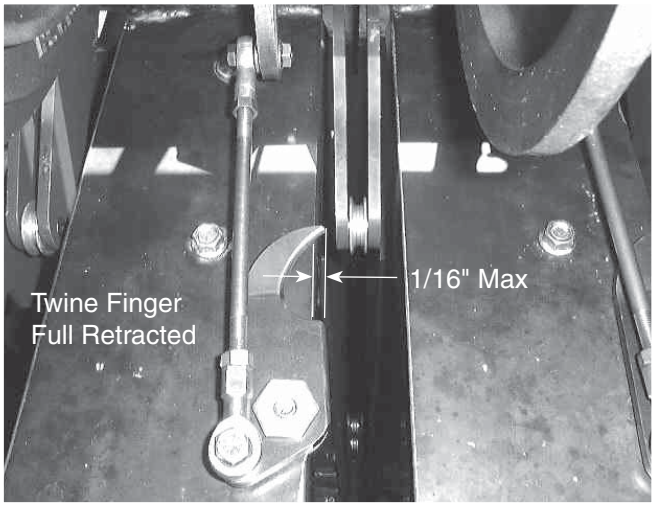


Figure 5-11. Twine Finger Position Retracted

Adjustment Objective

The retracted position of the twine fingers should be such that they do not interfere with the Tucker and are not hit by the needles when the needles are cycling.

Adjustment Procedure

1. Mark sure that the above steps have already been conducted before proceeding.
2. Rotate the knotter such that the cam follower is off of the Twine Finger Drive Cam and the Twine Fingers are in the retracted position.
3. Adjust the Twine Finger Drive Cam Arm stop bolt until the Twine Fingers meet the target measurement.

16. TOP AND BOTTOM TWINE TENSIONER TENSION SETTING

Target Measurement: 22 to 25 lbf of pull required to pull twine through tensioners when using Bridon Cordage twine 400 lbf knot-strength twine measured after break-away (see Figure 1-31 on page 1-10).

Adjustment Objective:

Adjust bolts to meet target measurement. The tension should be set high enough to cause the twine to stretch the slack puller springs.

Adjustment Procedure:

1. Pull the twine at straight out of the tensioners and measure the force. The force is measured after the break-away point (after the twine begins to pull through the tensioner).
2. Using a wrench, loosen or tighten the nuts on the tensioner spring equal amounts until the desired twine pull has been reached.
3. Repeat steps 1 and 2 until the target measurement is reached.

KNOTTER DRIVE SPROCKET TIMING

The knotters and needle yoke are driven by two hydraulic motors. Each of the motors drive a sprocket mounted on a QD bushing (see Figure 5-15) at each end of the knotter shaft. Slight variations in the manufacture of the shaft keyways, sprockets, and QD bushings may cause the holes in the drive sprockets which operate the needle yoke to be slightly mistimed. Proper needle adjustment requires that the needle yoke drive arms be driven evenly from each end of the knotter shaft. This is only possible if the drive sprockets are in time.

Sprockets that are out of time will pull one side of the needle yoke on the up stroke and the other side of the needle yoke on the down stroke. This will cause the needles to run toward one side of the needle slots on the up stroke and the toward the opposite side of the needle slot on the down stroke.

NOTE: Before checking or adjusting drive sprocket timing, be sure to verify that the Needle Yoke Drive Rod lengths are set correctly (see "5. Needle Penetration Above Twine Disc" on page 5-4).

The drive sprockets will need to be timed any time the sprockets are removed and reinstalled. To check sprocket timing, use the diagnostic controller to run the needles up into the chamber and stop them when the top needle roller is just even with the chamber top (see Figure 5-12).

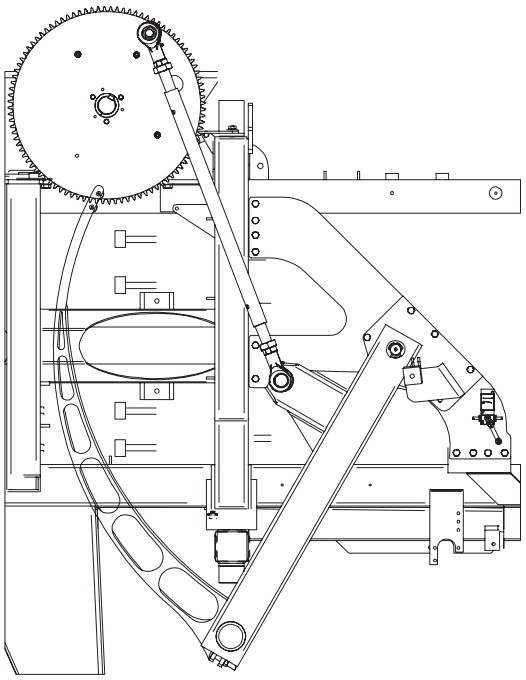


Figure 5-12. Needle on Upstroke

Measure the distance from the side of the needle to the side of the needle slot (see Figure 5-13).

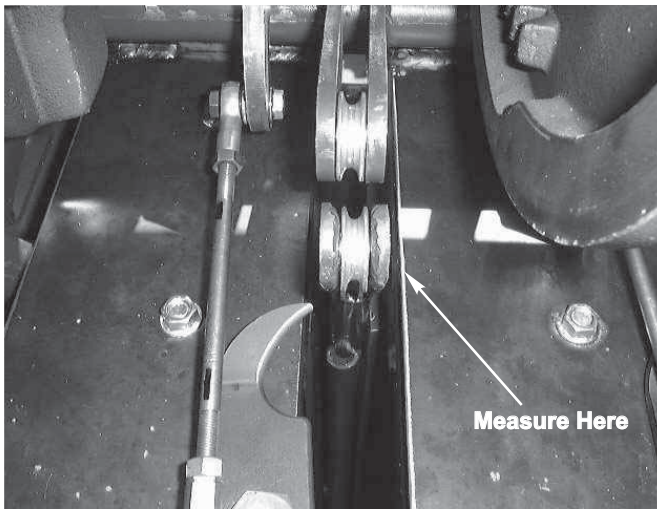


Figure 5-13. Needle Slot Clearance

Now continue to run the needles up, past top dead center, and down until the top needle roller is again even with the chamber top (see Figure 5-14).

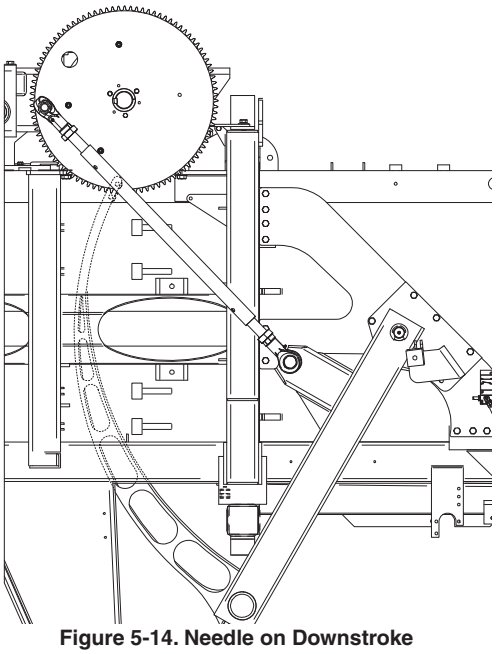


Figure 5-14. Needle on Downstroke

Measure the distance again from the side of the needle to the side of the needle slot, being sure to use the same needle and slot as before (see Figure 5-13). If the distance is within 1/16” of the first measurement taken, the drive sprockets are timed correctly. If the measurements are more than 1/16” different, the sprockets are out of time and should be corrected.

If the needle is to the left in the slot on the up stroke and to the right in the slot on the down stroke, the left hand sprocket is retarded and should be adjusted. Conversely, if the needle is to the right on the up stroke and to the left on the down stroke, the right hand sprocket is retarded and should be adjusted.

To adjust the sprocket, loosen the three bolts which attach the sprocket to the QD bushing.

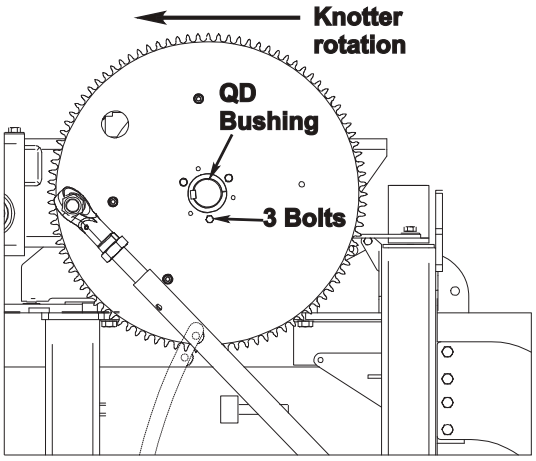


Figure 5-15. QD Bushing

Be careful not to slide the bushing on the shaft once the sprocket has broken loose or it will be necessary to align the sprocket with the motor. To advance the timing of a retarded sprocket, rotate the sprocket on the bushing in the normal direction of rotation (top toward the front). There is very little adjustment available or necessary. Essentially all that is allowed is to take up any space within the bolt holes. After rotating the sprocket, tighten the 3 bolts to 30 lb. ft. and re-check the needle clearance in the needle slots (see "7. Needle to Knotter Frame" page 5-5). Repeat the process until the drive sprockets are properly timed.

NOTE: The adjustment should always be made to advance the sprocket which is retarded. If it is not possible to advance the retarded sprocket any further, then it is acceptable to do the opposite adjustment (retard) the sprocket which is advanced.

SLIP CLUTCHES

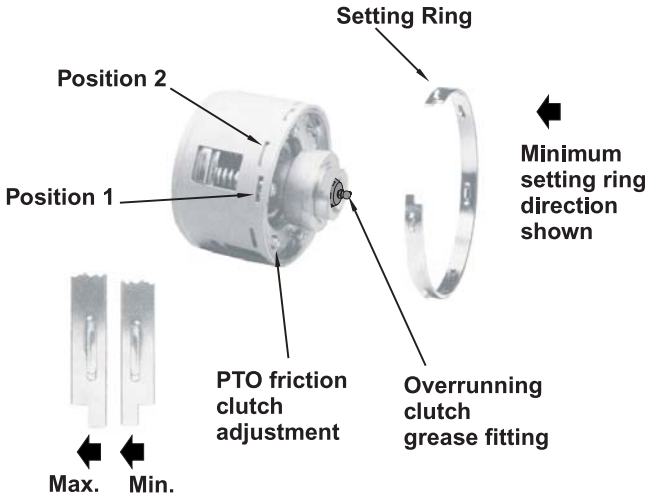


Figure 5-16. PTO Cultch

The 1592D driveline clutch has four torque settings that can be modified depending on the setting ring orientation and position in the locating slots.

The 1592D requires that the clutch be set to the maximum setting. The setting ring oriented to the maximum position and installed in the position number 2 (see Figure 5-15).

To change clutch setting:

1. Tighten all six nuts in an even sequence (do not use air impact tool). This will completely collapse all the springs in the spring pack removing all pressure of the spring pack against the setting ring.
2. Remove the setting ring using a flat blade screwdriver.
3. Orient the setting ring so the widest portion of the setting ring (MAX) is toward the spring pack.
4. Lock the setting ring tabs into the slots, and position number 2.
5. Loosen all six nuts tightened in step one to release all spring tension and apply it to the setting ring.

PICKUP CLUTCH

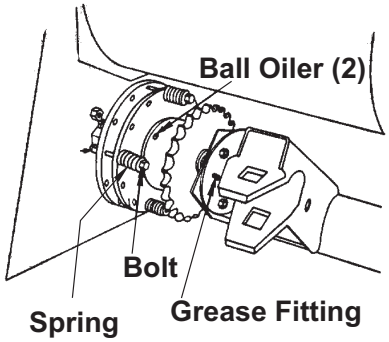


Figure 5-17. Pickup Clutch

Tighten the bolt to compress the springs until the coils are almost touching. See Figure 5-16.

DRIVE BELT ADJUSTMENT

NOTE: It is important to keep the drive and driven belt sheaves aligned.

Target Measurement:

A. Six belt configuration: Adjust to obtain a 3/8” deflection when a 15 to 19 lb. force is applied at the center of the span length (see Figure 5-17). Check each of the six drive belts separately.

B. Power band configuration (2 belt): Adjust to obtain 3/8" deflection when a 45-57 lb. force is applied at the center of the span length (see Figure 5-17). Check each power band separately.

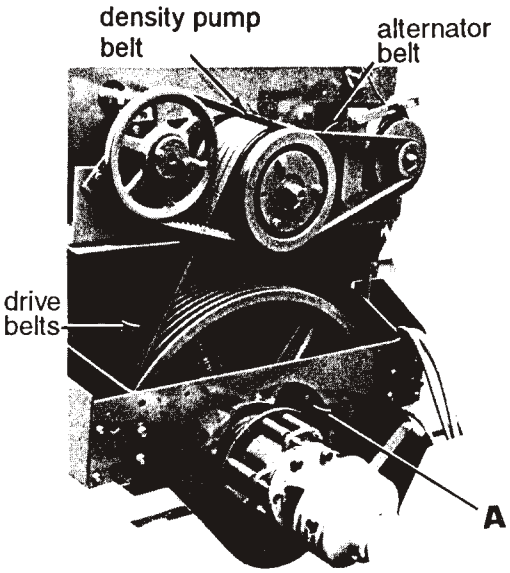


Figure 5-18. Mechanical Drive Unit

1. If adjustment is necessary, loosen clamp bolts (A) (front) and (B) (back) and pivot bolts (C) and (D) (see Figure 5-18, Figure 5-19, Figure 5-20).

   NOTE: The rear end of the drive unit belt take up may be slightly tipped downward in comparison to the front end.

2. Tighten take up bolt until the rear end of the drive unit belt take up has moved down approximately 1/4" (see Figure 5-19).
3. Tighten clamp bolt (B) (see Figure 5-19).

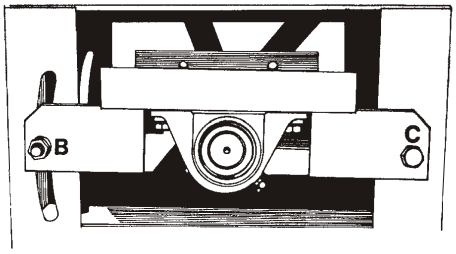


Figure 5-19. Take-up Plate

4. Keep tightening take up bolt until the drive and driven sheaves are aligned to within 1/32".

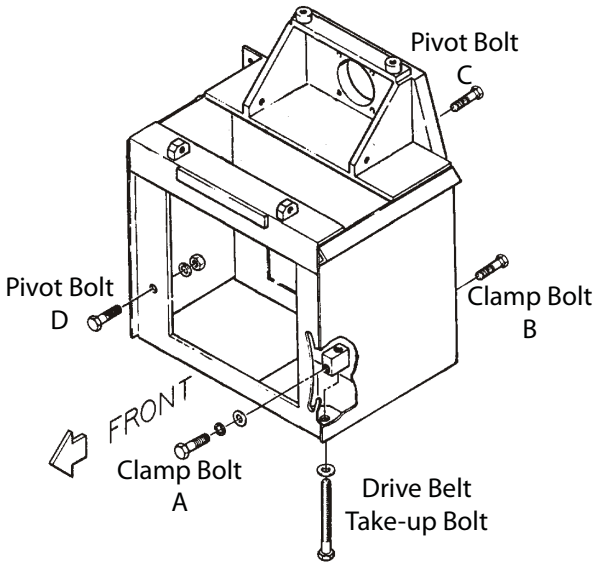


Figure 5-20. Take-up Plate

5. Check belts as in step 1. If too loose, repeat Steps 1 through 5.
6. Tighten clamp bolts (A) and (B) and pivot bolts (C) and (D) (see Figure 5-20).

ALTERNATOR BELT

Adjust to obtain a 3/16” deflection when a 2 to 3 lb. force is applied at the center of the span length.

TENSION PUMP BELTS

Adjust to obtain a 3/16” deflection when a 3 to 4 lb. force is applied at the center of the span length.

MAIN PUMP COUPLER

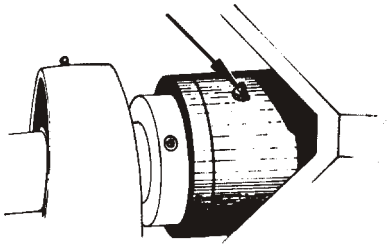


Figure 5-21. Main Pump Coupler

Grease specifications:

(For the main pump coupler)

1. N. L. G. I rating #2 Lithium base.
2. Base oil viscosity 900 to 2,150 SUS at 100° F (200- 470 CST at 40° C)
3. Minimum dropping point 374° F (190° C).
4. Maximum thickener content 2%.
5. Minimum Timken rating 40 lbs. (Approximately. 18.8 kg.).
6. Recommended additives:
   A. Extreme pressure (E.P.)
   B. Anti-oxidation
   C. Anti-rust
7. Should have good resistance to centrifugal oil separation.

NOTE: Zerk fitting not included.

To grease coupler, remove plugs (2) from coupler and add 1-3/8 zerk fitting. Pump grease into coupler until grease protrudes out of hole that is 180° from zerk fitting. When finished, remove zerk and return set screw plugs.

PLUNGER KNIFE ADJUSTMENT

The knives are used to shear the hay and should be kept sharp and in good condition for maximum performance. Dull, broken or missing knives will reduce capacity and cause a ragged appearance on the bottom of the bale. There are a total of nine knives on the baler, seven adjustable plunger knives and two stationary knives.

⚠ WARNING

WARNING: Knife area is extremely hazardous. All care must be taken to prevent serious injury from occurring. Watch out for sharp knives.

Clearance of the plunger knives and stationary knives should be maintained between 0.080" to 0.100". Adjustment is made on the plunger knives only. To adjust plunger knives, move the plunger with the diagnostic controller until the cutting edges of the plunger knives are even or overlapping the stationary knives. Shim the knives to achieve the correct clearance (see Figure 5-22). Clearance from knife segment to knife segment may vary, therefore individual adjustments may be required.

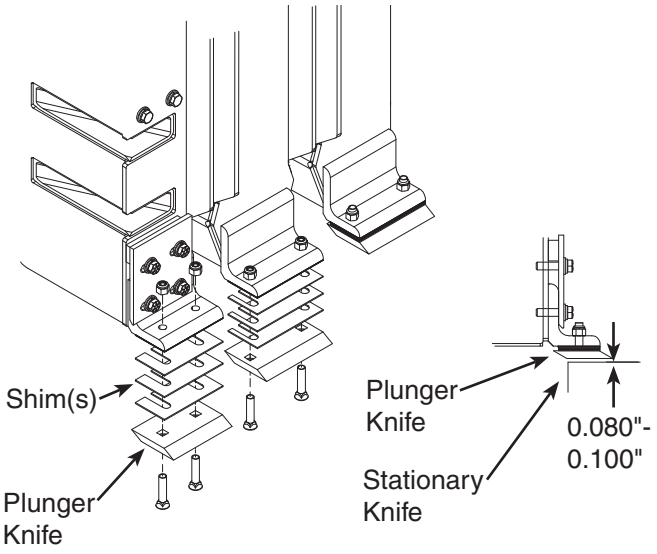


Figure 5-22. Plunger Knife Adjustment

OPERATING TEMPERATURE

The hydraulic oil temperature and oil level in the reservoir are monitored by the ICM. The baling system shuts down if the oil level drops below the sensor, or the oil temperature rises above 220°F. If one or both of these situations occur (error), all ICM controlled functions on the baler will cease. The plunger and knotter will be in the last position before the ICM controlled functions were disabled.

The baler should not be operated when temperature is lower than 20° F (-6° C). If it is necessary to operate the baler at these temperatures, consult the factory for oil recommendations. At oil temperatures of 20° to 32° F (-6° to 0° C), operate baler at 500 PTO RPM in automatic mode. Once oil temperature reaches 32° F (0° C), run the baler at 1,000 PTO RPM.

If, when baling the hydraulic oil reaches 220° (over temperature) or the hydraulic oil level drops below a safe operating level, the error messages in Reference #4 - 6 on page 2-14 displays on the tractor mounted control box.

At this time, the needle and plunger functions controlled by the ICM are allowed to travel to the home position and further operations are cancelled. The hydraulic oil cooling fan continues to cycle cooling the hydraulic oil. The feeder/pickup is also allowed to operate but only manually. This circulates oil through the heat exchanger. The ICM checks the temperature and level sensors every ten milliseconds or 100 times a second. When the oil temperature drops to a safe temperature or the oil level raises, the baler will require the user to activate the "GO" function to begin baling (see page 2-13). If the baler shuts down and restarts in 10 seconds, and stops and restarts again in ten seconds, the hydraulic oil level maybe approaching an unsafe level. The normal agitation of the oil in the reservoir is signaling the ICM that the oil is low. If filling the oil to the recommended level (see page 5-15) does not solve this issue, see Possible Causes for Hydraulic Oil Over Heating below.

NOTE: Feeder and pickup will continue to run as they are independent of electrical control.

Possible Causes for Hydraulic Oil Over Heating;

1. Heat exchanger or grill screen plugged with chaff and debris. Clean with compressed air thoroughly, blowing debris back out of the heat exchanger from the rear to front.
2. Cooling fan motor not rotating fast enough, low air flow through the heat exchanger. Check amp draw on motor. When running, the cooling fan electrical motor should draw approximately 30 amps. Amp draw exceeding this indicates that the motor is turning at less than the recommended RPM of 1650.
3. Fan blade incorrectly positioned in relation to the shroud. The fan blade should split the shroud, so half of the fan is inside of the shroud.
4. Constant relief valve operation. All components on the baler are protected by relief valves. When a relief valve opens to protect a component, the pressure it displaces creates heat. Over feeding, or excessive plunger pressure, will cause a relief valve to open creating heat. If a component is stalling or sluggish to respond, it indicates a low relief valve setting, which also allows the relief valve to open creating heat.
5. Missing or damaged seals on hydraulic valves. The baler uses several different styles of cartridge style hydraulic valves. There are counter balance valves, logic valves, flow control valves, check valves, and relief valves. One of the things that all these valves have in common is O-ring and backup ring seals. These seals will fail over a period of time.

   A. From expanding and contracting due to heat and pressure, seals will become brittle and decompose into very small particles which creates an internal leak, which in turn creates heat.

   B. The pressure and the oil temperature that the baler is operated at determines the life of the O-ring seals. The higher baling pressure creates more heat and shortens the life of the O-ring seals.

   C. Customers who bale in the area of 6000 PSI report these seals should be inspected yearly. Customers who bale at pressures around 4000 PSI, generally can go 3 to 4 years between seal changes. Seal kits are relatively inexpensive and are easily changed. Refer to your parts manual.

See above for operating temperature.

- If hydraulic fluid temperature is 20° to 32°F (-7° to 0°C), warm the fluid up at 500 PTO rpm until it reaches 32°F (0°C). Then increase PTO speed to 1000 rpm.
- The baler will not operate if the fluid temperature goes above 220°F (104°C); it will automatically shutdown. Cool by allowing the fans to run, and running the PTO at 500 rpm. Determine and correct the cause of over heating.

OIL LEVEL

Oil Reservoir Capacity.....90 Gallons (340 Liters)

If the oil is low, turn off baler, wait for all moving parts to stop and fill oil reservoir while watching the oil site gauge (see Figure 5-23).

The oil level will be 7-3/4" below the FULL mark on the site gauge when the low oil switch is activated. The oil reservoir will require approximately 33 gallons to raise the level back up to the FULL mark on the gauge (See Lubrication / Maintenance schedule on page 6-1 for recommended lubricant).

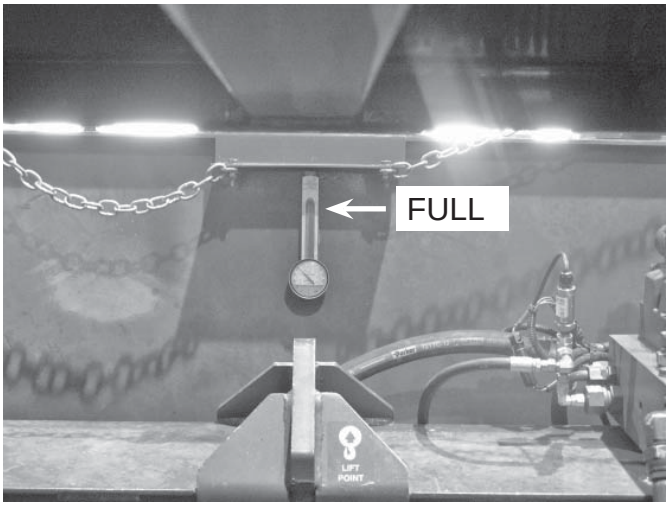


Figure 5-23. Oil Level and Temperature gauge. Gauge is found on the front or rear of the oil tank, depending on your baler.

OIL FILTER REPLACEMENT

Annually replace the main system filter elements located in the hydraulic tank. The filter is accessible through the access cover in the back of the right hand twine box. The hydraulic tank does not require draining in order to change the elements, however, you will need a container to catch the oil contained in the filter elements and housing. A check valve at the inside end of the housing will prevent oil draining from the tank. A ball valve is provided just below the filter housing to allow for draining the tank while changing the hydraulic fluid.

The charge system filter is a spin-on canister located on top of the main pump housing. It is not necessary to drain the main tank in order to replace this filter, however, some hydraulic fluid will be able to escape from the system while the filter is removed.

COOLING FAN OPERATION

The fan operates as follows whenever the power switch is "ON" and the oil temperature reaches 180° F (82.2° C).

1. The fan draws air through the heat exchanger for approximately 5-1/2 minutes.
2. The fan shuts down for approximately 10 seconds to allow the motor to stop.
3. The fan runs in reverse for approximately 10 seconds to clear chaff and dust from the oil cooler grill screens.
4. The fan shuts down once again for approximately 10 seconds to allow the motor to stop.
5. The fan will repeat the above sequence.

HYDRAULIC SYSTEM ADJUSTMENT

1. Engage the tractor PTO and run the baler at 700 rpm.
2. While on the Baling screen in the control monitor, press F2 to Clear Plunger. This will extend the plunger until it stalls.
3. Read the plunger pressure gauge on the left side of the front gauge panel of the baler (see Figure 5-24). It should read approximately 6,500 psi.
4. Disengage the tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

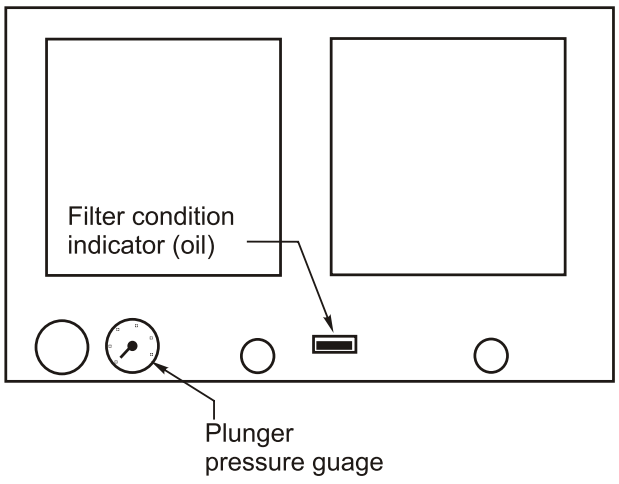


Figure 5-24. Front Panel

PLUNGER RETRACT PRESSURE

1. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
2. Remove the 1/4" JIC cap on the plunger retract pressure port, the retract pressure port is labeled with a stamped “B” on the front of the manifold (see Figure 5-25). Connect a 5,000 psi gauge to the retract pressure gauge port.
3. Enter the Plunger Settings screen from Functions/ F4/Plunger. Select F3 and set the Plunger Stop Override to Cushions to read Cushion Stop Override.
4. Use the OK button to select the Plunger function as displayed in the upper right-hand corner. Using the down arrow, run the plunger slowly to the fully retracted position until the plunger stalls.
5. Read the pressure on the gauge. It should read 2,500 psi.
6. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
7. Adjust the Plunger Retract Relief Valve market "3" (see Figure 5-25) following "RELIEF VALVE ADJUSTMENT" on page 5-19.

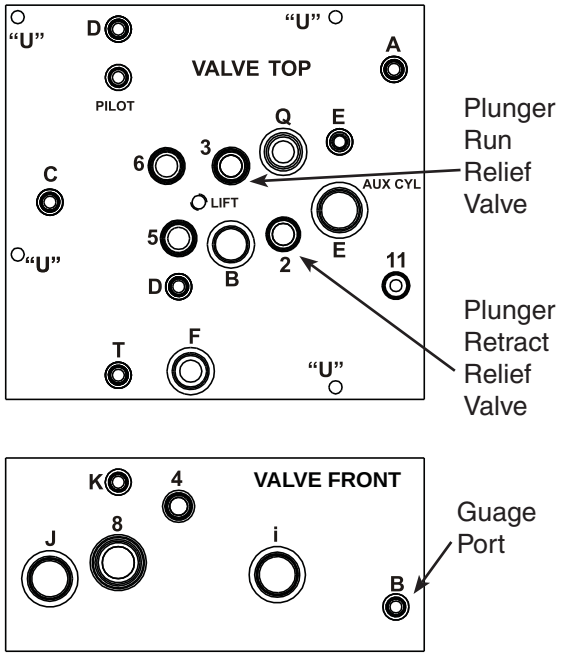


Figure 5-25. Main Valve

CHARGE PRESSURE

1. Ensure the oil is at least 140° F. before starting this procedure.
2. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
3. Remove the 1/4" JIC cap on gauge port (A) (see Figure 5-26).
4. Connect a 600 psi gauge onto port (A).
5. Engage the tractor PTO and run the baler at 700 PTO RPM.
6. Read the pressure on the 600 psi gauge. It should read 400 psi.

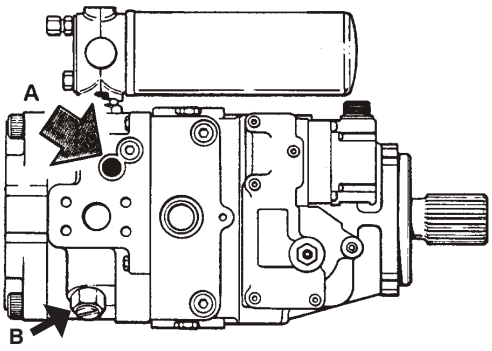


Figure 5-26. Gauge Port

7. On the baling screen, use the Baling Monitor to select the plunger function by selecting the OK button. Using the UP/DOWN buttons advance the plunger forward and backwards and read the pressure on the 600 psi gauge. It should read a minimum of 350 psi while the plunger is moving.
8. Adjust the Charge Pressure Relief Valve marked "B" (see Figure 5-26) following "RELIEF VALVE ADJUSTMENT" on page 5-19.

FEEDER PRESSURE

1. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
2. Remove the 1/4" JIC cap from Feeder manifold gauge port (see Figure 5-27).

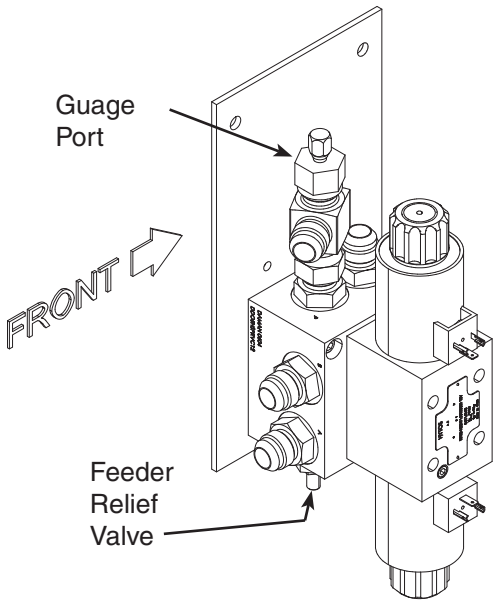


Figure 5-27. Feeder Manifold

3. Connect a 5,000 psi gauge onto port.
4. To prevent the Feeder from moving, secure the Feeder to the frame with a 3/8” chain (see Figure 5-31).

   NOTE: Ensure that the 3/8” chain is in the middle of the Feed Fork; this will prevent bending of the Feed Fork Tine Assy.
5. Engage the tractor PTO, run baler at 700 rpm.
6. On the baling screen, use the Baling Monitor to select the feeder function by selecting the OK button. Using the UP button, advance the feeder forward.

   NOTE: Feeder will attempt to move but will be stalled by the 3/8" chain.
7. Read the pressure on the 5000 psi hand held gauge. It should read 3,200 psi.
8. Adjust the Feeder Pressure Relief Valve (see Figure 5-27) following "RELIEF VALVE ADJUSTMENT" on page 5-19

KNOTTER AND FEED FORK MANIFOLD FORWARD

1. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
2. Remove the 1/4” JIC cap from gauge port (A) (see Figure 5-28).
3. Connect a 5,000 psi gauge to port (A).
4. To prevent the Feed Fork from moving forward, secure the Feed Fork to the frame with a 3/8” chain (see Figure 5-31).

   NOTE: Ensure that the 3/8” chain is in the middle of the Feed Fork; this will prevent bending of the Feed Fork Tine Assy.
5. While on the main baling screen of the Monitor, use the OK button to select the Feed Fork function.
6. Engage the tractor PTO and run the baler at 700 PTO RPM.
7. Using the UP button on the Baling Monitor move the Feed Fork in the forward direction and read the pressure on the 5,000 psi gauge. It should read 3,500 psi.
8. Adjust the Knotter & Feed Fork Forward Pressure Relief Valve marked (see Figure 5-29) following "RELIEF VALVE ADJUSTMENT" on page 5-19.

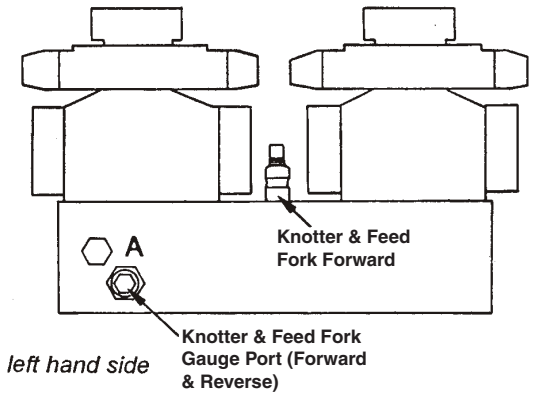


Figure 5-28. Knotter and Feed Fork Manifold

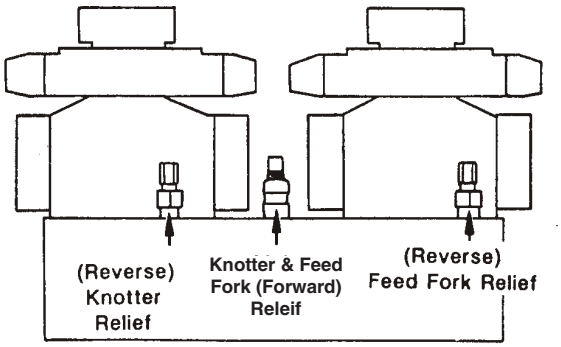


Figure 5-29. Knotter and Feed Fork Manifold

FEED FORK PRESSURE (REVERSE)

1. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
2. Remove the 1/4" JIC cap from gauge port (A) (see Figure 5-28).
3. Connect a 5,000 psi gauge to port (A).
4. To prevent the Feed Fork crank shaft from moving, secure the Feed Fork to the frame with a 3/8" chain (see Figure 5-31).

   NOTE: Ensure that the 3/8" chain is in the middle of the Feed Fork; this will prevent bending of the Feed Fork Tine Assy.

5. While on the main baling screen of the Monitor, use the OK button to select the Feed Fork function.
6. Engage the tractor PTO and run the baler at 700 PTO RPM.
7. Slowly reverse the Feed Fork using the arrow Input Button on the monitor until the chain becomes taut.

   NOTE: The feeder will stall.

8. Use the DOWN button on the Bale Monitor to run the Feed Fork in the reverse direction and read the pressure on the 5,000 psi gauge. It should read 2,000 psi.
9. Adjust the Feed Fork (Reverse) Relief Valve (see Figure 5-29) following "RELIEF VALVE ADJUSTMENT" on page 5-19.

KNOTTER PRESSURE (REVERSE)

1. Engage the tractor PTO and run the baler at or below 500 PTO RPM.
2. Using the Bale Monitor, use the back arrow button to move to the Functions screen. Use the OK button to select the Knotter function.
3. Using the DOWN button, drive the needle yoke until they are at mid-stroke (see Figure 5-30).

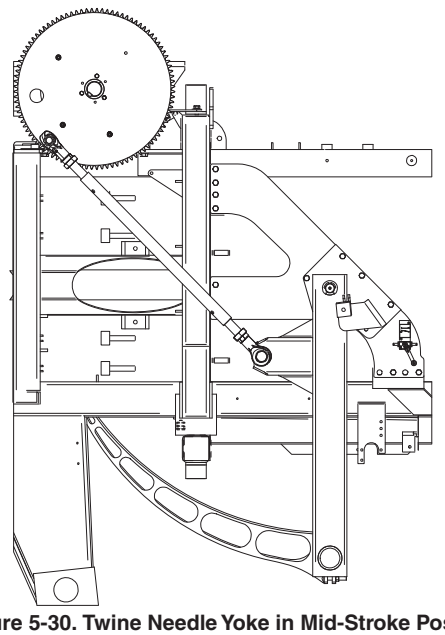


Figure 5-30. Twine Needle Yoke in Mid-Stroke Position

4. Disengage the tractor PTO, shut off the tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.
5. Remove the 1/4" JIC cap from gauge port (A) (see Figure 5-28).

6. Connect a 5,000 psi gauge to port (A).
7. To prevent the knotter from moving in reverse, strap a 3/8” chain around the middle of the needle yoke to the frame (see Figure 5-31).

   NOTE: Ensure that the 3/8” chain is in the middle of the needle yoke, this will prevent bending of the needle yoke.

8. Engage tractor PTO and run the baler at 700 PTO RPM.
9. Slowly reverse the knotter using the DOWN button on the monitor until the chain is taut.

   NOTE: The knotter and needle yoke will stall.

10. Using the DOWN button run the knotter in reverse and read the pressure on the 5,000 psi gauge. It should read 2,000 psi.
11. Adjust the Knotter (Reverse) Relief Valve (see Figure 5-29) following "RELIEF VALVE ADJUSTMENT" on page 5-19.

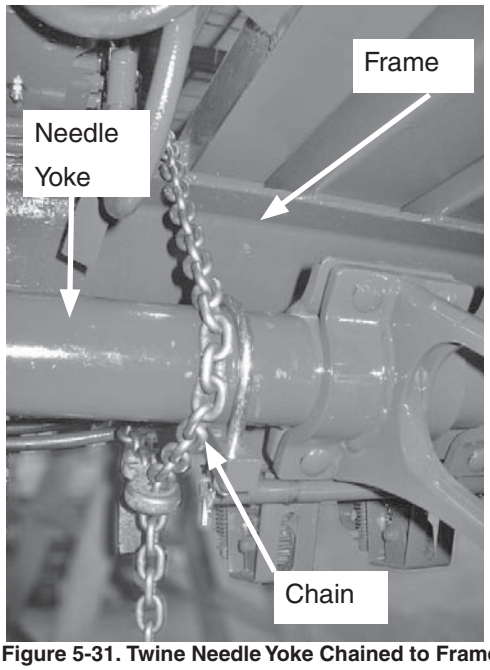


Figure 5-31. Twine Needle Yoke Chained to Frame. Similar for Feeder and Feed Fork.

RELIEF VALVE ADJUSTMENT

1. Using a 9/16" wrench, remove the cap that covers the adjustment screw.
2. Loosen the lock nut.
3. Using a 5/32" Allen wrench, turn the adjustment screw clockwise to increase the pressure, counter clockwise to decrease the pressure.
4. When the desired setting is reached, hold the adjustment screw while tightening the lock nut.
5. Replace the cap.

CHECKING INTERNAL SEALS ON PLUNGER CYLINDER VALVE ASSEMBLY

1. Remove Pilot Close Check and Logic Valve Cartridges (see Figure 5-32).
2. Pressurize drain hole D at 120 PSI (see Figure 5-33).
3. Check for air leakage on any part of the valve. Air usually leaks around E (see Figure 5-33). Repeat process on the other 2 cartridges.
4. Replace cartridge if any leaks are found.

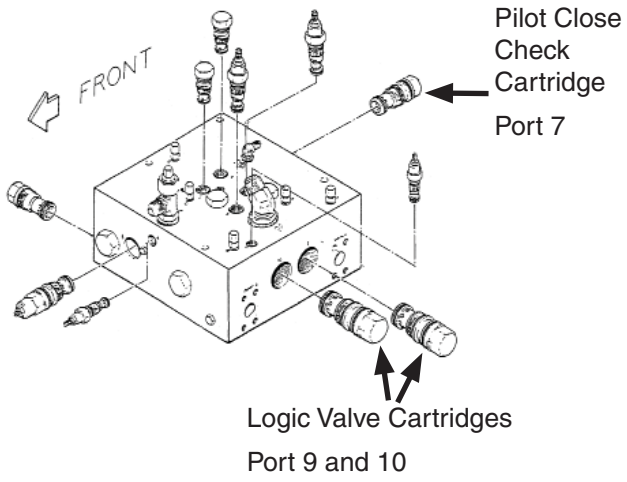


Figure 5-32. Plunger Cylinder Valve Assembly

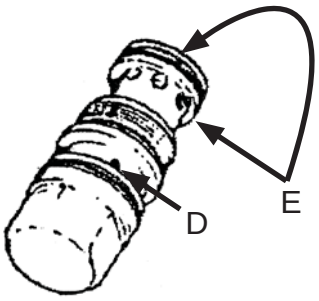


Figure 5-33. Cartridge Valve

SWITCH ADJUSTMENTS

See page 5-23 for switch location.

S-25 KNOTTER TOOTH COUNT

Function:

Counts the number of sprocket teeth on the right-hand knotter sprocket and calculates the position of the knotter and is used to trigger the slowdown flow valve.

S-11 KNOTTER STOP/HOME SENSOR

Function:

Triggers the stopping position of the knotter.

Adjustment objective:

The knotter is at its true home position when the knife arm roller is on the highest point of the cam and the knife arm is fully extended (see Figure 5-34).

Adjustment:

Please refer to the 1592 Baler Operating System Manual in the Double Knotter screen for the proper procedure regarding the setup of these sensors.

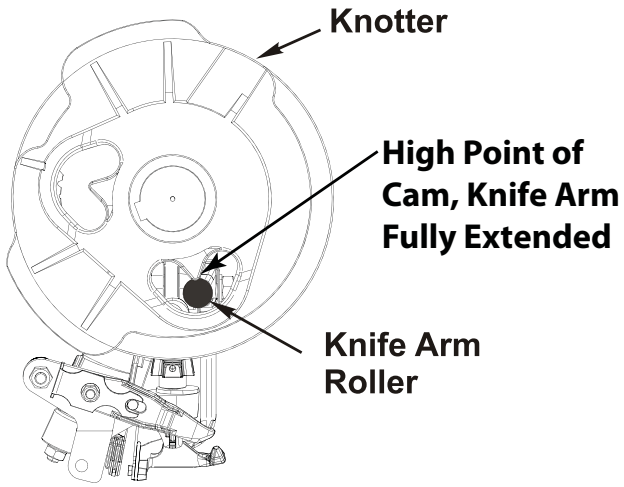


Figure 5-34. Knife Arm Roller Centered on Knoll

S-3 FULL CHARGE SWITCH

Function:

S-3 signals the control circuit that the feed chamber has been filled by the Feed Fork, thus causing the plunger to activate when the Feed Fork has stopped at the Feed Fork Stop Sensor which will be near the highest point for the Feed Forks..

Adjustment objective:

S-3 should be activated by the paddle in about the first two inches of upward travel of the paddle.

Adjustment:

1. Adjust the sensor so that it is between 1/8" to 1/4" away from the target.
2. Adjust the sensor so that it is at the bottom of the slot on the adjustment bracket.

S-21 PLUNGER POSITION SENSOR

Function:

This positional sensor is used to measure the position of the plunger.

Adjustment:

This sensor should only need to be adjusted in special circumstances. When adjusted position sensor should have approximately 1 inch of additional travel at each end of the sensor when the cylinder is fully extended and fully retracted.

S-12 NEEDLE HOME SENSOR

Function:

S-12 senses if the needles are in the home position.

Adjustment:

Adjusts sensor so that it clears the Needle Yoke by 1/8” to 1/4" of an inch.

S-2 FEED FORK STOP

Function:

S-2 Feed Fork Stop sensor determines the stopping point of the Feed Forks when the plunger extends into the chamber.

Adjustment Objective:

The Feed Fork Stop Cam should be adjusted so that it is 1/8" to 1/4" away from the Feed Fork Stop Pad. The Feed Fork Stop Cam should be adjusted so that the tips of the Feed Forks are higher than the bottom of the inside of the chamber when the Feed Forks stop.

Adjustment:

Please refer to the Freeman 1592 baler Operating System Manual under the section Feed Forks for the adjustment procedure.

S-27 FEED FORK POSITION TOOTH COUNT

Function:

The Feed Fork Position Tooth Count records the number of sprocket teeth on the Feed Fork driven sprocket (where 72 teeth equals one revolution). The position is recalibrated each time the Feed Fork Stop sensor is activated. However, the sensor does not take into account Feed Fork drift when stopped.

Adjustment Objective:

The sensor must be adjusted close enough to read the individual teeth.

Adjustment:

Adjust the sensor to within 1/8 to 1/16 inch of the sprocket teeth.

S-19 BALE LENGTH POTENTIOMETER

Function:

S-19 Bale Length Potentiometer measures the rotations of the star wheel and is used to calculate the length of the bale in the chamber.

Adjustment Objective:

This sensor should rarely be adjusted except for special circumstances.

Adjustment:

1. Make sure there is no pre-load of the rubber hose on the body of the potentiometer after the potentiometer and sensor shaft have been connected and the housing secured.
2. Refer to the Freeman 1592 Baler Operating System Manual under Bale Length Setup 1 and Bale Length Setup 2 for additional setup information.

S-33 PICKUP CLUTCH SPEED SENSOR

Function:

This sensor is used to measure the relative speed of the clutch on the pickup. This is used to measure any decrease in the relative speed of the pickup which is used to indicate slipping of the clutch and therefore possible plugging of the pickup.

Adjustment Objective:

The sensor should be adjusted to be within 3/16" to 1/4" inch of the sensor target. (See Figure 5-35)

Adjustment:

1. Adjust the sensor so that it is centered on the target and within range.
2. Refer to the Freeman 1592 Baler Operating System Manual under Feeder Settings 2 for additional setup information.

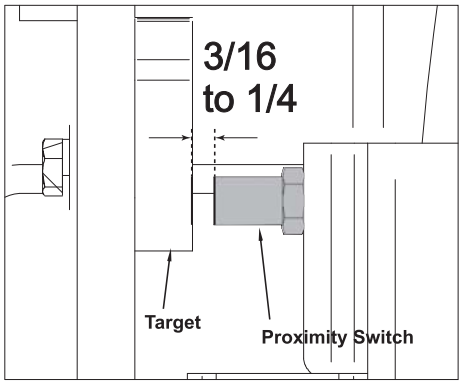


Figure 5-35. Proximity Switch Settings

STORING THE BALER

At the close of the season, remove all material from the bale chamber and clean the baler with compressed air. Pressure washing or steam cleaning is not advised. Moisture can create problems with electrical components by promoting corrosion. Any hay, chaff or dust on the baler will collect moisture and cause unnecessary corrosion.

Check the baler for any worn or damaged parts. Replace or repair as required.

Coat the bale chamber lightly with grease to prevent rusting.

Inspect, lubricate and adjust chains.

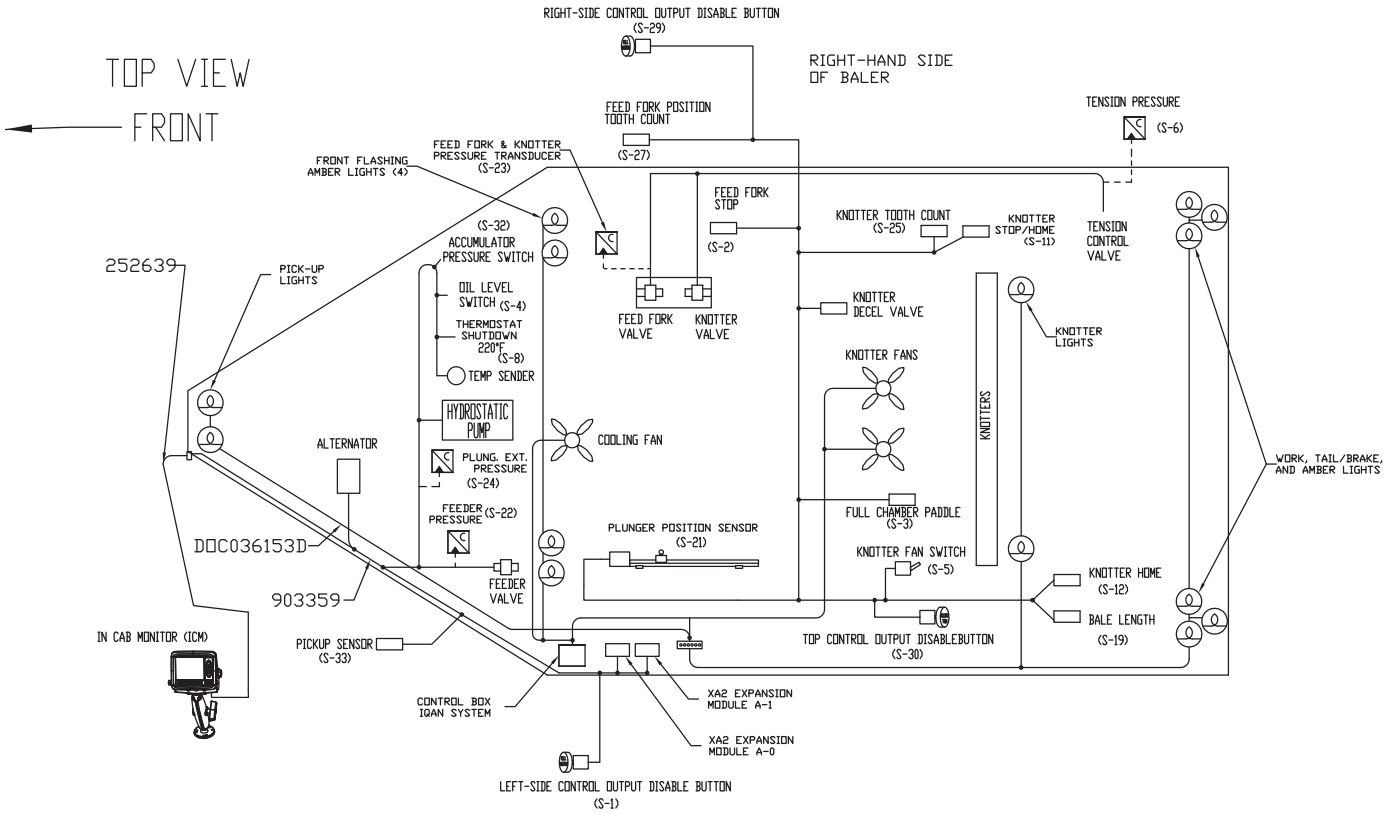
Check and lubricate all grease fittings.

Provide adequate protection from the weather.

To increase tire life during storage, place the baler on blocks to remove the load from the tires.

Disconnect the battery.

It is good practice to have the baler inspected at the end of the season and the entire machine placed in good serviceable condition prior to the next baling season.



NAME	FUNCTION	EQUIVALENT LS NUMBER (Reference Only)
S-11	Knotter Stop/ Home	LS-1
S-2	Feed Fork Stop	LS-2
S-3	Full Chamber Paddle	LS-3
S-27	Feed Fork Position Tooth Count	None
S-12	Needle Home	LS-13
S-32	Accumulator Pressure Switch	None
S-33	Pickup Speed Sensor	None
S-25	Knotter Tooth Count	LS-12
S-4	Oil Level Switch	None
S-8	220° F Shut-down Tempera-ture Switch	None
S-1	Left-Side Output Disable Button	None

NAME	FUNCTION	EQUIVALENT LS NUMBER (Reference Only)
S-21	Plunger Position Sensor	LS-10,9,8,6,5,4
S-6	Tension Pres-sure	None
S-23	Feed Fork/ Knotter Pressure	None
S-22	Feeder Pressure	None
S-24	Plunger Extend Pressure	None
S-19	Bale Length Potentiometer	None
S-30	Top Control Output Disable Button	None
S-29	Right Side Control Output Disable Button	None
S-5	Knotter Fan Switch	None
S-26	Oil Temp	None

Figure 5-36. Sensor Locations and Chart

LUBRICATION/SERVICE SCHEDULE

Through timely service, maintenance, and the proper adjustments, you can realize the optimum performance and long life expected from this equipment. Follow the recommended service checks at their suggested intervals to maximize the baler's performance and service life.

MAIN SYSTEM HYDRAULIC OIL: Chevron AW-46 or equivalent

Use NEW oil when refilling oil tank. Fill to the full mark on the oil tank site gauge located on the oil tank. Oil must be filtered 10 micron or less before entering the tank. Clean around the fill area with compressed air before opening the fill port.

GREASE FITTINGS: Multi-purpose Lithium grease

AUTOMATIC AUTO LUBER: SAE 80 GL5 gear oil

PUMP DRIVE COUPLING LUBRICANT:

NGLI Rating #2 Lithium base lubricant. Base oil viscosity 900-2,150 SUS at 100° F. (200-470 CST at 38°C). Minimum dropping point 374°F (190°C). Maximum thickener content 11 percent. Minimum Timken rating 40 lbs. (18 kg).

CHECK/ SERVICE EVERY 4 HOURS:

- Lube PTO shaft, u-joints and covers (1,2,3,4)
- Lube feed fork link bearings (6)
- Lube feed fork bearings (27)

CHECK/ SERVICE AT 8 HOURS:

- Pickup Drive Chain (both sides) (28)
- Chain (feeder shaft/pickup clutch) (29)
- Chain (Feeder Motor/Feeder drive) (30)
- Feed Fork Chain (31)
- Knotter Drive Chains (right and left) (32)
- Chain (knotter shaft/lubrication shaft) (33)

CHECK/ SERVICE EVERY 20 HOURS:

- Lube bearings upper flywheel drive shaft (14)
- Lube bearings lower (primary) drive shaft (15)

CHECK / SERVICE DAILY:

- Lube PTO overrunning clutch (4)
- Lube needle yoke pivot bearings (8)
- Lube needle yoke drive connecting rod ends (9)
- Lube bale chute bearings (26)
- Check oil level in knotter luber tank (7)
- Blow baler clean with compressed air
  (NOTE: Do not steam clean)
- Lube ball hitch (11)
- Check hydraulic tank level (24)
- Check oil condition indicator) (5)

LUBRICATION/SERVICE SCHEDULE

CHECK/ SERVICE WEEKLY:

- Lube pickup overrunning clutch (4)
- Knotter Shaft Bearings (25)

CHECK / SERVICE EVERY 80 HOURS:

- Lube main pump drive coupler (13) (See page 5-8)
- Check belts (Check new belts at 8 hours) (16)
- Check battery water (Electrolyte) (17)
- Check tire inflation (18) see page 1-2
- Check wheel fasteners (19) see page 1-2
- Check chains (18) see page 1-2

NOTE: New Chains should be checked after first 8 hours

CHECK / SERVICE EVERY 250 HOURS:

- Change pump filter (21) (Freeman FIL0164056 Located on top of main Sunstrand pump)
- Check knotter brake adjustment (20)
- Check / clean battery terminals (17)

CHECK / SERVICE ANNUALLY:

- Lube feeder crank journals (22) (Lube until grease is visible at breather)
- Change system hydraulic oil
- Change oil tank filters (or as indicated by filter condition indicator) (5)
- Lube needle yoke crank shaft bearings (8)
- Repack wheel bearings (23)
- Repack plunger bearings (contact Freeman service department 503-625-2560)
- Check Valve Cartridges for leaks (see Page 5-15)

CHECK / SERVICE - END OF SEASON:

- Check chains and drive/accessory belts tension and condition
- Check hydraulic accumulator (150 psi nitrogen charge) Contact Freeman Service Department for Instructions 503-625-2560.
- Prepare equipment for off season storage (see page 5-17).

LUBRICATION/SERVICE SCHEDULE

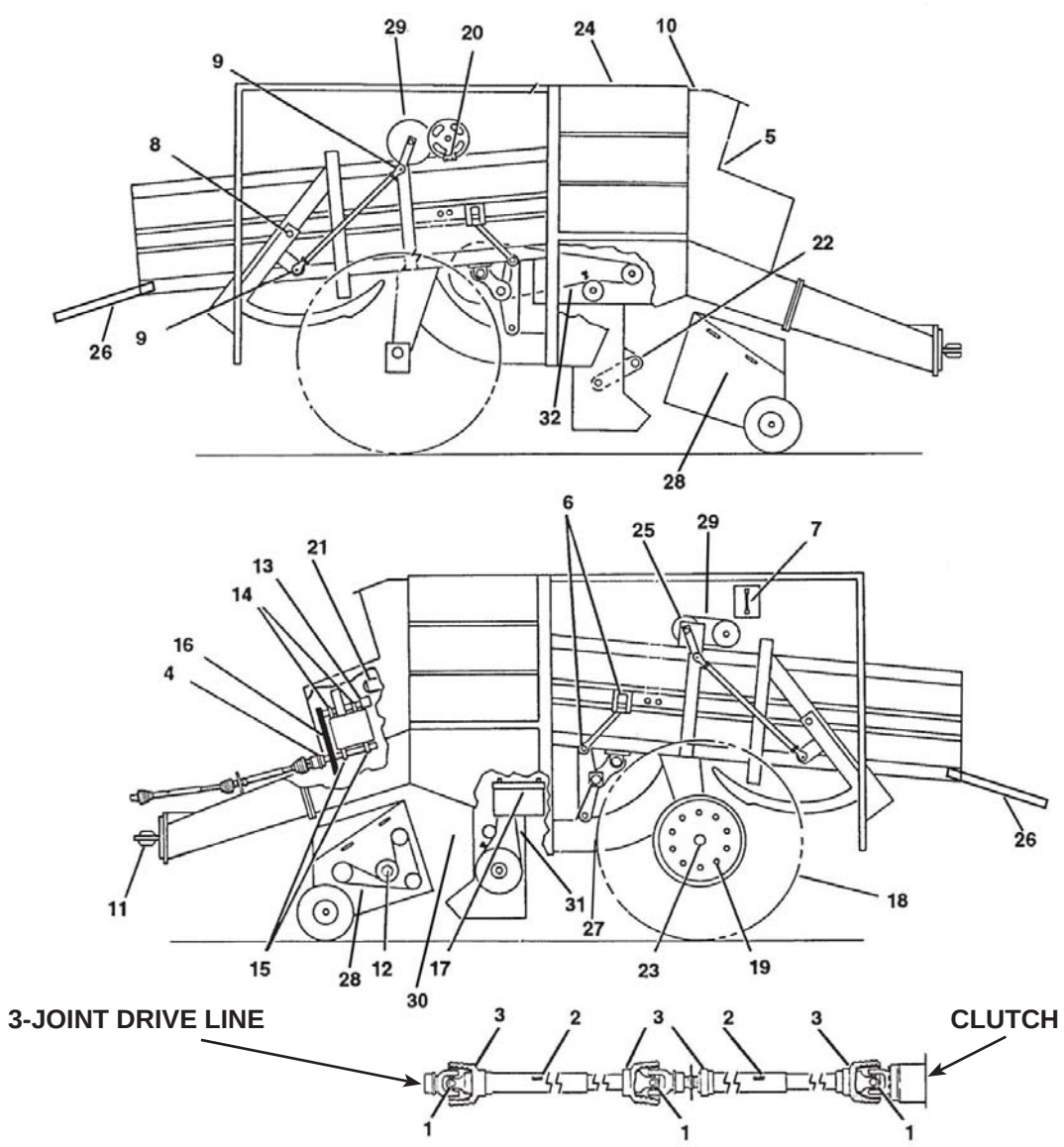


Figure 6-1 Grease Points

1. PTO universal joints	12. Pickup overrunning clutch	23. Wheel bearings
2. PTO sliding spline	13. Main pump drive coupler	24. Hydraulic oil level (90 gallon)
3. PTO covers	14. Upper drive shaft bearings	25. Knotter Shaft Bearings
4. PTO overrunning clutch	15. Lower drive shaft bearings	26. Bale Chute Bearings
5. Filter condition Indicator	16. Drive belts	27. Feed Fork Bearings
6. Feed fork link bearings	17. Battery (terminal/electrolyte)	28. Pickup Drive chains (right and left)
7. Knotter oil tank level	18. Tires (inflation) see page 1-2	29. Chain (knotter shaft/lubrication tank)
8. Needle yoke pivot bearings	19. Wheel fasteners (torque) see page 1-2	30. Chain (Feeder Motor/Feeder drive)
9. Needle yoke rod ends	20. Knotter brake adjuster	31. Feed Fork Chain
10. Hydraulic oil tank filter	21. Main pump (charge) filter	32. Knotter drive chains (right and left)
11. Ball hitch	22. Feeder crank journal bearings	

KNOTTER TROUBLESHOOTING

When troubleshooting knotter problems, it is important to determine which knot (first or second) and which twine (top or bottom) is suffering from the problem. The “first knot” is the first knot tied in the knotter cycle (with the needle in the knotter); this is the knot that finishes off a bale that has just been formed. The “second knot” is the second knot tied in the knotter cycle (after needle leaves the knotter); this is the knot that ties the twines together at the start of the bale formation. The “top twine” is the twine which runs from the twine tucker along the top of the bale while it is being formed. The “bottom twine” is the twine which runs from the needle along the bottom of the bale while it is being formed. Using different color twines for the top and bottom makes identifying twines in a knot very easy.

When a missed knot occurs the operator must determine:

1. Is the problem on the first knot or second knot?

2. Is the problem on the top twine or bottom twine?

3. Are the twine ends torn and frayed or cut and square?

4. Is there damage to the twine away from the knot?

5. Are any long (2” or more) scraps of twine in or around the knotter?

6. Is twine tangled in the knotter?

All the suggestions in the following table are related to knotter components and assume that twine is being delivered properly to the knotters. Often times a knot tying problem isn’t related to the knotter itself, but is the result of a problem with the twine delivery. For example, a knot connecting balls of twine could come untied, become tangled, or hang up in the tensioner rollers. Also, it is possible the twine is being cut or frayed by a burr or sharp edge on a twine guide, needle or twine finger, etc. Before making any adjustments to the knotter components, be sure the twine is routed properly from the twine box (see Twine Routing section page 1-8) and that all twine handling components are in good condition.

The Freeman big baler makes knotter troubleshooting easy because the hydraulic drive allows the operator to run the knotter cycle very slowly while observing the knotters in action.

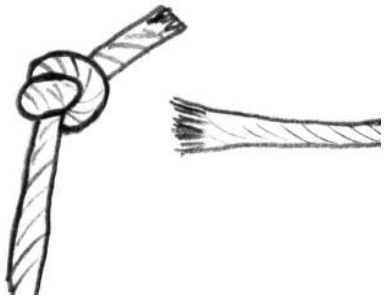
KNOTTER TROUBLESHOOTING

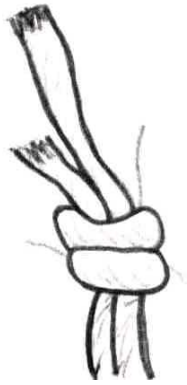
PROBLEM	POSSIBLE CAUSE	REMEDY
No knot in either twine, one knotter only. First or second knot.  **Figure 7-1 No Knot**	Twine finger missing twine.	Adjust needle to twine finger as described.
	Twine finger not extending properly.	Adjust twine finger as described (see Twine Finger Section page 5-2).
	Bill hook trigger too loose.	Tighten nut at bill hook cam.
	Bill hook trigger damaged or missing.	Replace bill hook trigger.
	Bill hook roll pin sheared.	Replace roll pin.
	Twine is cut at holder or tears off between holder and bill hook.	Loosen twine holder spring as described(see Twine Finger Section page 5-2). Check for rough or sharp edges on holder and twine disc.
No knot in either twine, all knotters. First or second knot.	Twine fingers not operating	Check for free movement of twine finger drive shaft, drive rods, and twine fingers. Replace broken twine finger shear bolt. Replace missing roller on twine finger shear lever.
Second knot has no knot in either twine, first knot tied but twines are cut or badly frayed 4 to 6 inches from knot.	Twine finger spring not pulling twine fingers clear away from needle slot.	Check for free movement of twine finger drive shaft, drive rods, and twine fingers. Replace broken twine finger spring.

KNOTTER TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Knot hanging on bill hook. Typically only noticeable on the second knot. If it happens on the first knot the result is usually a large tangle of twine on the bill hook as both knots wrap together. NOTE: it is normal for the tails of the second knot to remain in the bill hook trigger for 3-4 plunger strokes	Knot is too loosely wrapped on bill hook when knife arm wipes across. Tails of knot too long, form a bow and get caught in trigger. Tails of knot gripped too firmly by bill hook trigger. Knife arm does not wipe bill hook firmly enough. Knife arm does not travel far enough beyond tip of bill hook.	Increase twine holder force. Tighten bottom tensioner. See “Bow Knot” Loosen nut on bill hook cam spring. Adjust knife arm for firm pressure across bill hook. Replace knife arm roller or knife arm itself if bent. Check cam lobe in cam gear for wear. Adjust LS-1 to correct knotter stopping point. (2nd knot only).
First knot: Knot in top twine only. Second knot okay.  **Figure 7-2 Knot in Top Twine Only**	Twine finger not extending properly or retracting clear of needle slot. Knife arm is bent, allowing twine to slip around end of bill hook.	Adjust twine finger as described. Check for free movement of twine finger drive shaft, drive rods, and twine fingers. Replace knife arm.

KNOTTER TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
First knot: Knot in bottom twine only Second knot okay. (Exceedingly rare)	Knife arm is bent, allowing twine to slip around end of bill hook.	Replace knife arm.
Second knot: Knot in top twine only. First knot okay.  **Figure 7- 3 Knot in Top Twine Only**	Top slack puller not keeping twine tight. Twine tucker not holding twine down for twine finger.	Tighten top tensioner. Check for free movement of slack puller. Replace broken/missing slack puller spring or roller. Replace missing twine tucker roller. Replace missing roller on twine tucker cam follower. Check for missing clamp bolt in tucker cam lever.
Knots in bottom twines only. Top twine isn't cut and covers two or more bales.	Needle misses top twine from the tucker. Twine gets on left side of needle.	Adjust twine tucker and needle alignment.
Twine wrapped around bill hook shaft, first and second knots connected.	Needle misses top twine from the tucker. Twine gets on right side of needle. Twine misses notch in twine disc.	Adjust twine tucker and needle alignment. Retard twine disc timing. Adjust counter-clockwise.
Twine wrapped around bill hook, first knot.	Needle misses top twine from tucker. Twine gets on right side of needle. Loop of twine gets around bill hook trigger roller. Twine misses notch in twine disc.	Adjust twine tucker and needle alignment. Advance twine disc timing. Adjust clockwise. Retard twine disc timing. Adjust counter-clockwise.

PROBLEM	POSSIBLE CAUSE	REMEDY
Twine wrapped around bill hook. First knot okay.	Loop of twine gets around bill hook trigger roller.	Check for proper slack puller operation. Replace broken or missing parts. Tighten twine tensioners. Advance twine disc timing. Adjust clockwise.
Twine ends uneven (more than ½") on same knot.  **Figure 7-4 Twine Uneven**	Twine holder letting twine slip instead of being cut. Twine knife pulling twine from holder instead of cutting it.	Increase twine holder spring force. Replace twine knife.
Frayed knot  **Figure 7-5 Frayed Knot**	Twine damaged as bill hook rotates.	Reduce twine holder spring force. Reduce twine tensioner force at top or bottom tensioner. Check for rough surface on bill hook, twine finger, holder or twine disc.

KNOTTER TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Good knot, frayed ends.  **Figure 7-6 Frayed Ends**	Knife isn't cutting twine cleanly.	Replace dull or chipped knife.
Bow knot, one or both twines.  **Figure 7-7 Bow Knot**	Tails of knot too long, form a bow and get caught in trigger. Bill hook trigger too loose. Knife arm does not travel far enough beyond tip of bill hook.	Increase twine holder spring force. Replace dull twine knife. Adjust twine disc timing (counter clockwise). Increase spring force on bill hook cam. Replace knife arm roller or knife arm itself if bent. Check cam lobe in cam gear for wear. Adjust LS-1 to correct knotter stopping point. (2nd knot only).

PROBLEM	POSSIBLE CAUSE	REMEDY
End of one twine doubled back into knot..  **Figure 7-8 Doubled Back Knot**	Bill hook trigger closes on top of twine instead of completely capturing it.	Adjust twine disc timing. Model knife arm to guide twine farther to the right across bill hook trigger. Replace bent bill hook trigger.
Short tails on knot. Knot may pull apart. Usually second knot.  **Figure 7-9 Short Tail**	Twine holder too tight. Twine tension too loose. Bill hook trigger grips twine too loosely, lets twine slip around bill hook.	Loosen twine holder spring. Tighten twine tensioners. Tighten bill hook cam spring nut.
Knot looks strong but one twine broken at entry to knot. Usually second knot.  **Figure 7-10 One Twine Broke**	Classic “Tension break”. This type of failure is not a knotter malfunction. Bale tightness has exceeded limit of twine strength. This knot usually breaks at the rear of the bale just as bale exits the chamber. Broken twine will almost always be the bottom one.	Reduce bale tension pressure. Use stronger twine.

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