

# **HRB 240 T100**

## **OPERATOR/SERVICE MANUAL**

**Harris Waste Management Group, Inc.**

**Baxley Operation**

340 Jekyll Road

Baxley, GA 31513

**800-447-3526**

[www.harrisequip.com](http://www.harrisequip.com)

**Part No. OSM105000**



# FOREWORD

This manual was prepared to enhance the utilization of Harris HRB 240 T100 2-Ram Baler. The intention is to provide clear, easy-to-use guidelines for the safe operation of the machine.

In order for this manual to be effective, the operator must read and understand all of the information. Extra attention must be given to the safety precautions before attempting to operate or service the baler.

Each Harris baler is pre-assembled and factory-tested to ensure it operates and performs to its design standards.

If the customer or operator should encounter any problems with this machine, or if any questions arise regarding balers operation or capabilities, please contact Harris Service Department Baxley, GA. 800-447-3526.

Using nonstandard parts may adversely affect the operation, performance, and safety of your Harris machine and may void the warranty. To protect your investment and ensure safe operation, insist on genuine Harris replacement parts and components for your Harris equipment.



**If You Cannot Do  
It Safely,  
DON'T DO IT**

The information contained herein refers to U.S. OSHA and ANSI standards. Please use applicable codes, standards, and directives specific to your country.



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# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **IMPORTANT SERVICE INFORMATION**

Balers are tailored to meet specific requirements, thus each baler installation is unique. The following information is important to ensure correct information is received regarding a particular baler installation:

### **HRB 240 T100 Baler**

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

These drawings should be readily accessible, they will be used for reference information throughout this manual:

Foundation No. \_\_\_\_\_

General Layout No. \_\_\_\_\_

Hydraulic Circuit No. \_\_\_\_\_

Electric Circuit No. \_\_\_\_\_

## **NOTES**

To service, maintain, or repair other auxiliary equipment (when applicable) refer to that manufacturers service/owners manual.



Regular service and proper repair is essential for the reliable and safe operation of all mechanical equipment.

Service procedures and repair practices described in this manual are effective methods of performing service.

Deviation from the prescribed procedures may cause damage to the baler, render it

unsafe, or endanger the safety of the operator or service personnel. These procedures are not all inclusive due to the variations in baler installations. It is impossible for Harris to know, evaluate and advise service personnel of all possible methods in which service may be performed, or of every possible hazard and the consequences of each method. Anyone who uses a service or repair procedure which is not recommended by Harris must: be completely satisfied that neither maintenance personnel nor the operator's safety will be jeopardized by the method selected, and take sole responsibility for the action and results.



**NEVER PERFORM ANY MAINTENANCE OR SERVICE UNLESS THE MACHINE HAS BEEN PROPERLY LOCKED OUT/TAGGED OUT IN ACCORDANCE WITH OSHA STANDARDS.**

This manual is intended to provide operators and service personnel with the necessary information to correctly operate and service Harris Balers. **SAFETY** is of the utmost importance to Harris. All service personnel **MUST KNOW ALL** of the **SAFETY** requirements and practices to safely operate the machine, as outlined in this **MANUAL**, before attempting to work on the machine. The Service and Repair procedures in this manual describe detailed steps to follow using the safest known methods. If any questions arise regarding instructions or safety precautions, contact the Service Department at Harris, 340 Jekyll Road, Baxley, GA. 31513, 800-447-3526, **BEFORE** attempting service procedures.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **OWNER/EMPLOYER RESPONSIBILITIES**

Owner/employer safety responsibilities are contained in ANSI Z245.5 standard for Baling Equipment - Safety requirements for Installation, Maintenance and Operation. Section 7 and 8. ***It is very important for the safety of employees that the owner/employer complies with these requirements.*** A copy of ANSI Z245.5 is appended to this manual for reference.

Owner/employer responsibilities are also contained in 29 CFR 1910 Occupational Safety and Health Standards. These standards include but are not limited to:

### General Requirements

Section 5 (a)(1) of the OSHA act, often referred to as the General Duty Clause, requires employers to “furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees”. Section 5 (a)(2) requires employers to “comply with occupational safety and health standards promulgated under this Act”.

### Hazard Assessment

1910.132(d)(1) The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:

1910.132(d)(1)(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

1910.132(d)(1)(ii) Communicate selection decisions to each affected employee; and,

1910.132(d)(1)(iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazards assessment.

1910.132(d)(2) The employer shall verify that the required workplace hazards assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

### Working at Elevated Heights

**The owner/employer is responsible for providing an OSHA compliant working surface for clearing material jams in the hopper. Never use feed conveyors to access the hopper. Always use an OSHA compliant work surface or platform to access the hopper.**

1910 Subpart D, Walking-working surfaces warning terms

1910.23, Guarding floor and wall openings and holes

1910 Subpart F, Powered platforms, manlifts, and vehicle-mounted work platforms

1910.66 Powered platforms for building maintenance

Appendix A, Guidelines (Advisory)

Appendix C, Personal fall arrest system (Section I - Mandatory; Sections II and III - Non-mandatory)

### Lockout/Tagout (LOTO)

1910.147 - The control of hazardous energy (lockout/tagout (LOTO))

1910.147 App A - Typical minimal lockout procedures

### Confined Space Entry

1910.146 - Permit-required confined spaces

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

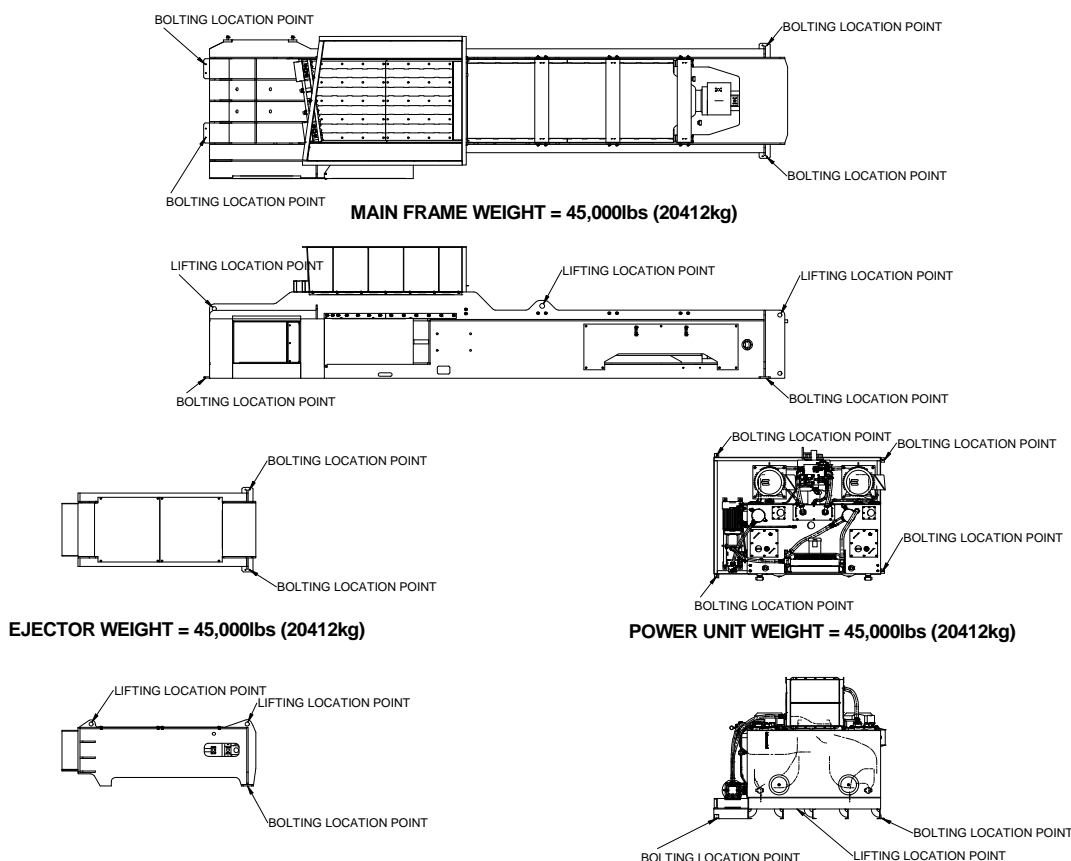
## **INTRODUCTION**

Before operating the HRB 240 T100 Baler, it is the operator's responsibility to have a clear understanding of how the machine functions and to be aware of all the necessary precautions for its safe operation. If there are any questions regarding operating procedures or safety precautions, contact HARRIS WASTE MANAGEMENT GROUP, INC., referenced as Harris throughout this manual, Service Department Baxley GA, (800)-447-3526 to ensure that all precautions are taken before proceeding. Harris balers are capable of compressing, baling, non-ferrous metals. The baler operator must know and observe the capacities and limitations of this machine. Operators must be alert at all times and watch for conditions that could affect normal machine performance or create an unsafe condition in the work area. If necessary, shut the machine down following the prescribed shutdown procedures. In the event of an emergency, use the emergency stop button and notify the proper authorities immediately. Corrective measures, service or repair must only be performed by trained, authorized personnel who are thoroughly familiar with the equipment, safety features, precautions, and instructions. If, at any time, there is a question regarding safety, you should consult this manual or Harris Service Department Baxley, GA, (800)-447-3526 to ensure all precautions are taken before proceeding.

## **GENERAL**

The HRB 240 T100 Baler is capable of compressing and baling a variety of non-ferrous materials, including scrap aluminum and copper, as well as paper and solid waste. The baler is not intended for baling ferrous metals, concrete or other large high-density materials. However, as with any industrial machinery capable of applying extreme force through hydraulic pressure, the baler can cause serious injury or death, if used in an unsafe manner. It is very important to keep an alert, conscientious attitude and observe safe operating practices to prevent accidents.

### **LIFTING POINT AND MACHINE TO GROUND BOLTING LOCATION**



# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **WARNING TERMS**

The terms **DANGER**, **WARNING**, **CAUTION**, and **NOTE** appear throughout this manual and on the safety warning signs. They denote the following:



The word **DANGER** precedes information pertaining to specific immediate hazards which, if disregarded, **WILL RESULT** in **SEVERE INJURY or DEATH** to the user or others.



The word **WARNING** precedes information pertaining to hazards or unsafe practices which **COULD RESULT** in **PERSONAL INJURY or DEATH**.



The word **CAUTION** precedes information pertaining to potential hazards or unsafe practices which, if disregarded, **MAY RESULT** in **PERSONAL INJURY or DAMAGE to the equipment**.

## **NOTE**

The word **NOTE** precedes information which is vital to the proper operation or maintenance of the equipment.

Ensure all warning decals are obeyed at all times.

Make certain all warning decals are in place and legible at all times. A warning decal location chart is provided on page 1-9 in this manual to assist in checking for warning decals.

Report any damaged or missing warning decals to the proper authorities immediately.

Replacement warning decals can be ordered free of charge from Harris, 340 Jekyll Road, Baxley, GA 31513.



Ensure that the power source is isolated and the machine is locked-out and tagged out in accordance with OSHA 29 CFR 1910.147 and ANSI/ASEE Z244.1-2003 regulations before entering the machine to attempt any service or maintenance, including clearing material blockages and jams.



Never place any part of the body in a potential pinch point. Do not enter the baler at any point to perform service work (including clearing major and/or minor jams), unless the baler is shut down and locked-out/tagged out in accordance with OSHA standards.



Never perform any operation unless all guards are in place and safety interlock devices are fully functional.



When clearing material jams, always perform lockout/tagout (LOTO) procedures. Always access the baler or its hopper in accordance with OSHA requirements.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**



Follow employers unjamming procedures should a material jam occur. Always use an OSHA compliant work surface or platform to access the hopper.



Severe injury or death can result from ignoring these safety precautions.

## **NOTE**

**Only trained, authorized personnel familiar with safe operating and maintenance procedures are allowed to inspect, operate, or service the baler.**

## **SAFTEY PRECAUTIONS**

- Obey all warning decals.
- Never allow anyone to enter or ride on any conveyor.
- Always wear proper hand and eye protection equipment.
- Be certain all safety guards and access doors are maintained and secured in place while the machine is in operation.
- Make certain all warning signals and interlock devices are working, before operating the machine.
- Be alert and aware of all persons working in the vicinity of the baler.
- Be alert and aware of operating conditions that can adversely affect the operation of the baler.
- Know emergency shutdown procedures and where to get help in the event of an emergency.
- Never attempt to operate any equipment, or perform service or maintenance without the proper training.
- Never operate the baler while under the influence of intoxicants, narcotics, or drugs that impair judgement. Working under the influence of intoxicants or narcotics presents a major hazard to the operator and others in the work area.
- Never operate the baler while wearing jewelry or loose clothing which may catch on moving parts or controls.
- Always wear proper safety equipment as specified by the employer. Harris strongly recommends head, eye, and foot protection and, in noisy installations, hearing protection.
- Do not attempt to start or operate equipment which has a malfunction.
- Never remove covers on any electrical component, unless the main electrical power supply is off and secured with a padlock. Make sure the machine is locked-out/tagged-out in accordance with OSHA regulations before any service or maintenance is attempted.
- Know the location and function of all emergency stop buttons, control switches, instruments, gauges, and protection devices.
- Know the location of all fire extinguishers and make sure they are fully charged and maintained, and workers are trained to use them.
- Make certain all persons are clear of the baler, conveyors, and other related components before starting the equipment.

Publication of these safety precautions does not imply, or in any way represent an all inclusive list. It is the operator's responsibility to be familiar with all safety requirements and ensure that the operation of the unit is in accordance with safety requirements and codes, including all applicable Occupational Safety and Health Act (OSHA) and American National Standards Institute (ANSI) regulations, as well as other state and local codes. These regulations and codes change, thus it is strongly recommended that current applicable OSHA and ANSI standards be available to the operators at all times.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **HYDRAULIC SYSTEM**



Any service or maintenance to the hydraulic system must only be performed by trained, authorized personnel and only after the machine is locked-out/tagged-out in accordance with OSHA regulations.



Never use hands to check for hydraulic fluid leaks. Hydraulic fluids escaping under high pressure may cause severe injury. In the event of an injury, seek medical treatment immediately.

## **ELECTRICAL SYSTEM**



Any service or maintenance to the electrical system must only be performed by trained, authorized personnel and only after the machine is locked-out/tagged-out in accordance with OSHA regulations.

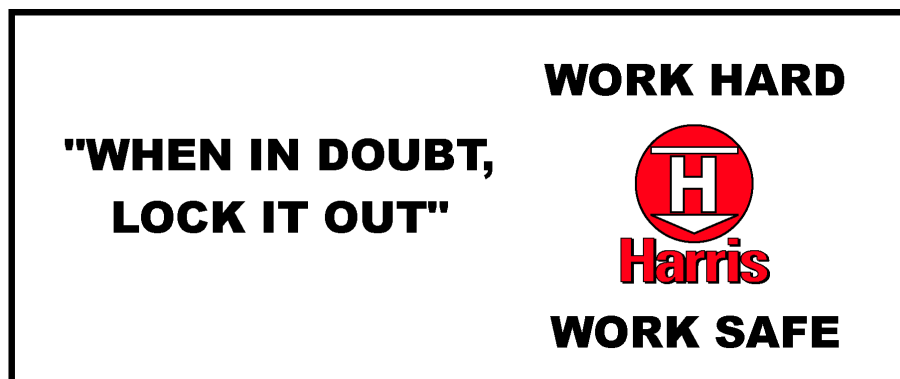
- Harris balers require a high voltage external power supply. Each unit has three electrical circuits: a main power circuit, a 120-volt circuit and a 24-volt DC power supply that converts the 120 volt AC to 24 volt DC for analog control system pressure transducers, temperature transducers, position transducers. The high voltage circuit supplies power to operate the motors, while a transformer converts the high voltage to 120 volts to operate the control power circuit, programmable logic controller (PLC), and operator's control panel.
- For the main power circuit, high voltage enters the main electrical control panel and goes directly to the drive motors.
- For the control power circuit, high voltage enters the main electrical control panel and goes to a transformer where the electrical power is converted to 120 volts. The control power circuit consists of control buttons on the operator's control panel, proximity switches, pressure switches, relays, timers, and solenoid valves. These switches and valves control the baler.
- The PLC and operator's control panel are powered by 120 volts supplied from the transformer in the main electrical panel.

For the electrical system to function properly, electrical components must be kept clean and dry, (i.e., free from dirt and moisture).

In order for the baler to operate properly, all switches and sensors must be properly adjusted and free from foreign materials. This will prevent the switches and sensors from giving false signals to the control circuit.

## **PROPER LOCKOUT/TAGOUT (LOTO)**

According the OSHA 29 CFR 1910.147, all personnel are to be instructed to perform proper lockout/tagout (LOTO) procedures on the machines they operate. Please thoroughly review Appendix A of this manual for this procedure.



# SECTION 1 - SAFETY & EQUIPMENT INFORMATION

## WARNING DECALS

1. Danger - Crush Hazard. Keep all body parts out of machine during operation.
2. Danger - Hazardous Voltage. Contact will cause electric shock or burn.
3. Danger - High Voltage. Risk of electrical shock.
4. Warning - Hazardous Voltage. Contact may cause electric shock or burn.
5. ANSI - Built according to ANSI Z245.5.
6. Danger - Equipment Starts Automatically. Keep all body parts out of machine during operation.
7. Warning - Hazardous Voltage - Single Phase.
8. Warning - Electrical Shock Hazard. 115 Volts.
9. Warning - Hazardous Voltage - Three Phase.
10. Warning - Electrical Shock Hazard. 460 Volts.
11. Warning - Read and understand all operator/service manual instructions before operating or servicing this machine. Follow lockout/tagout procedure before servicing machine.
12. Warning - Crush Hazard. Bale ejection area. Keep all body parts clear.
13. Danger - Avoid Serious Injury. Follow confined space entry procedures before entering.
14. Warning - Avoid Serious Injury. Never use conveyor to access baler hopper. Use OSHA compliant work platforms and fall protection when clearing material in the hopper.
15. Small Harris Logo
16. Large HRB Logo.
17. Warning - Do not remove access cover except for servicing. Follow lockout/tagout procedures.
18. Made in America
19. Caution - Laser Radiation. Visible and invisible radiation. Do not stare into beam. Class 2 laser product.
20. Large Harris Logo (not shown below)
21. Danger - crush hazard. Keep all body parts out of machine during operation.

Ensure all warnings are obeyed at all times.

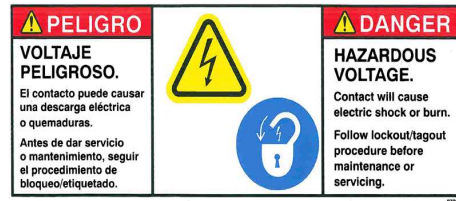
Make certain all warning signs are in place and readable at all times. A warning sign location chart is provided in this manual to assist in checking for warning signs.

Report any damaged or missing warning signs to the proper authorities immediately.

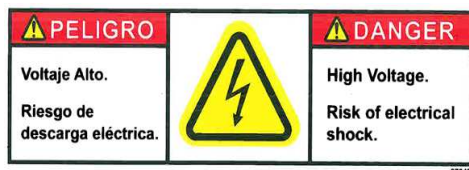
Replacement warning signs can be ordered free of charge from Harris or local distributors.



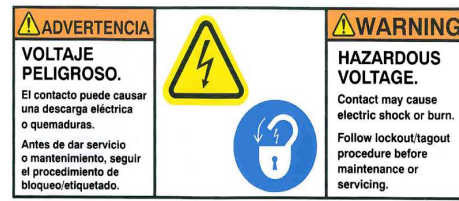
1. Part No. 870689



2. Part No. 870255



3. Part No 870494



4. Part No. 870256



5. Part No 860794



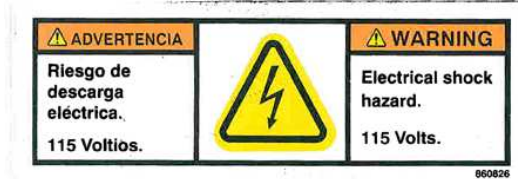
6. Part No. 870132



# SECTION 1 - SAFETY & EQUIPMENT INFORMATION



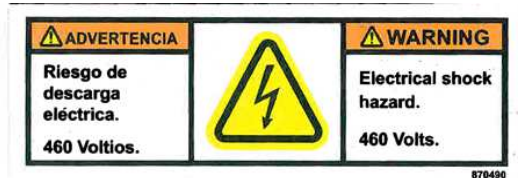
7. Part No.870482



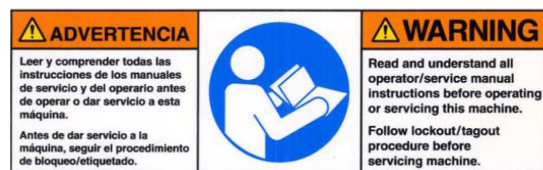
8. Part No 870486



9. Part No 870478



10. Part No 870490



11. Part No



12. Part No 870135



13. Located on Console



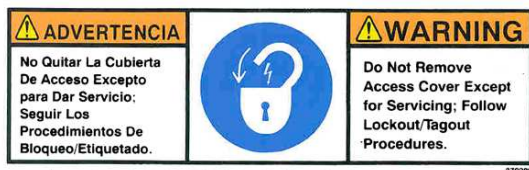
14. Part No. 870135



15. Part No 870138



16. Part No 870



17. Part No 870289



18. Part No 860795



19. Part No.

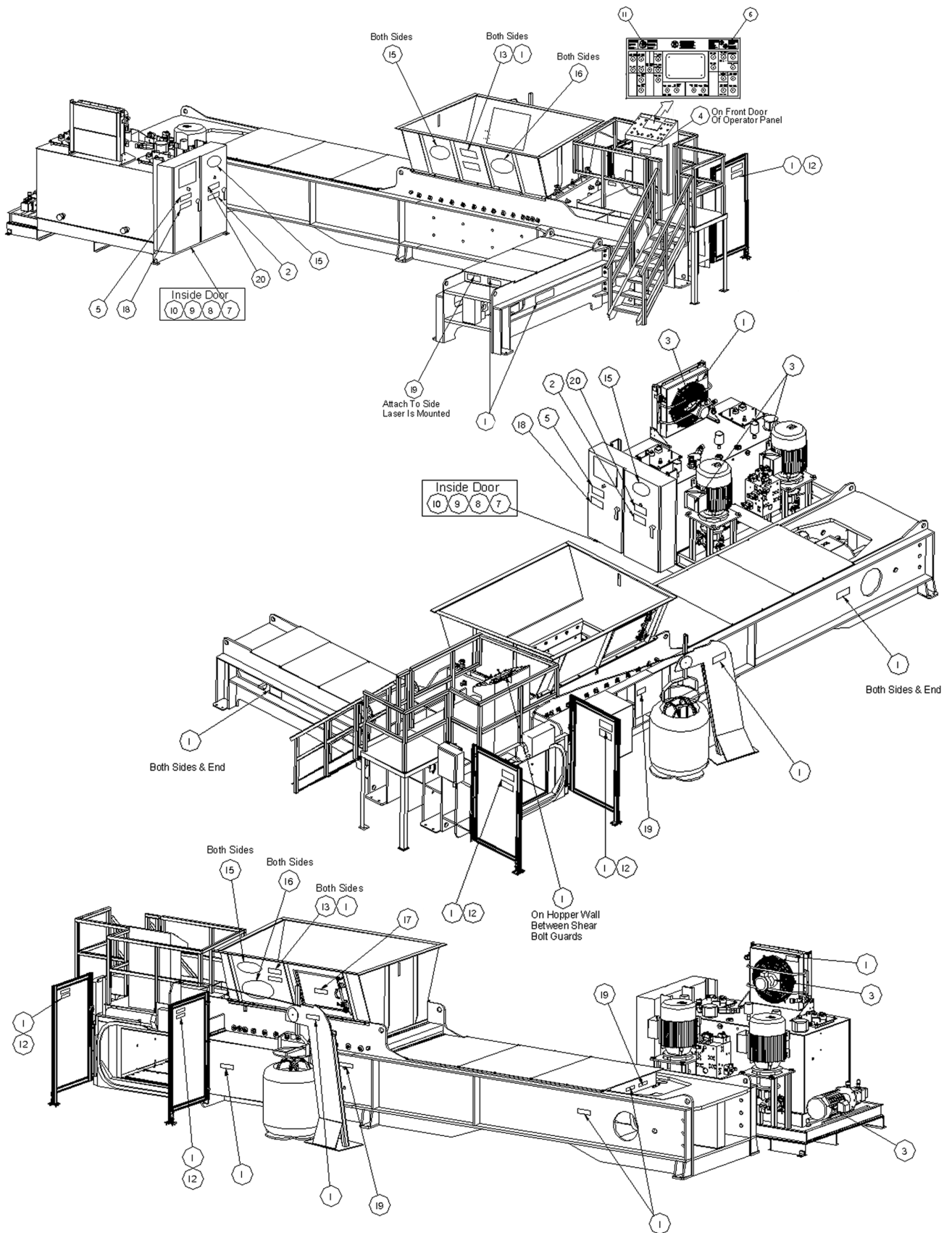


20. Part No. 870689



# SECTION 1 - SAFETY & EQUIPMENT INFORMATION

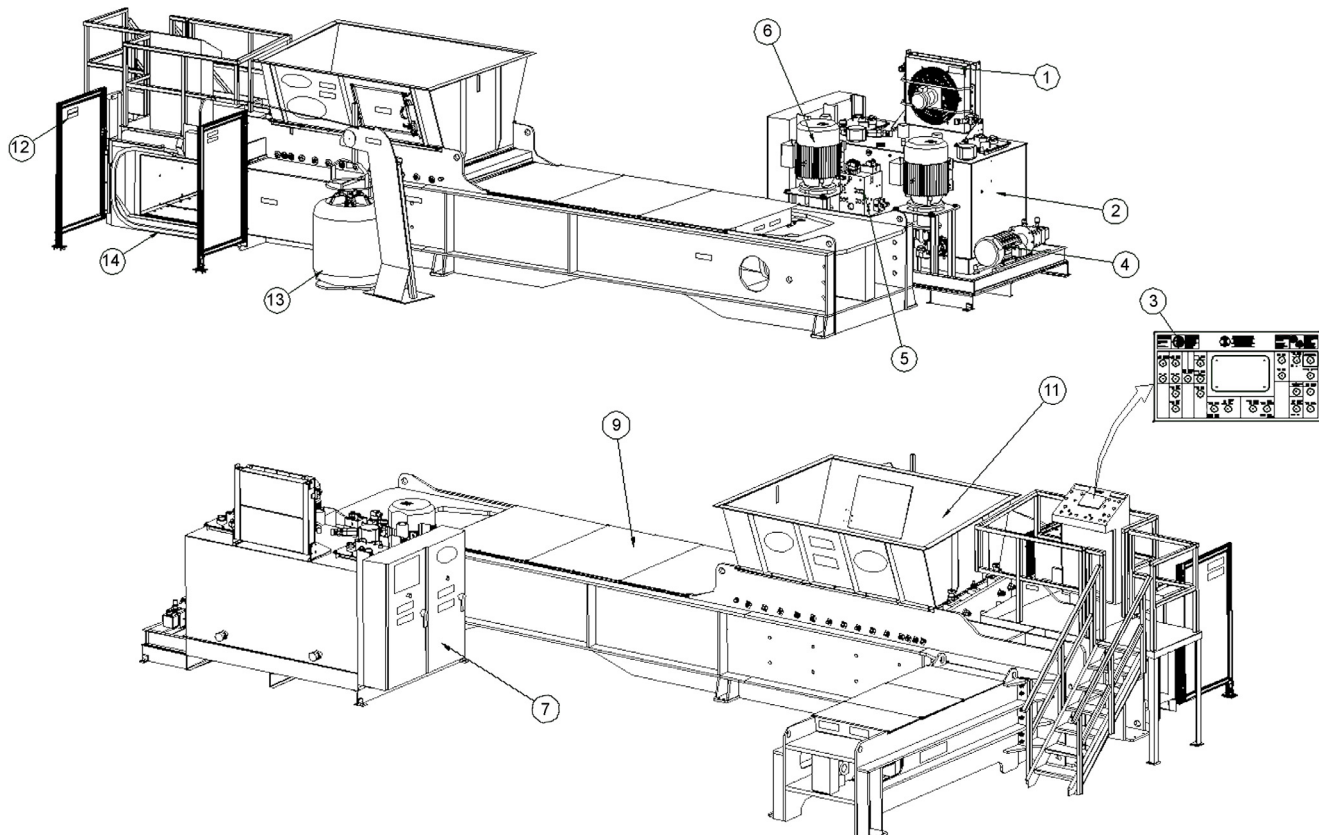
## DECAL LOCATION CHART



# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **LOCATION OF MAJOR COMPONENTS**

1. Oil Cooler
2. Hydraulic Tank
3. Operator's Control Panel
4. Hydraulic Pumps
5. Valve Block Assembly
6. Electric Motor
7. Main Control Panel (MCP)
8. Main Ram (Platen) (Not Shown)
9. Main Ram (Platen) Deck
10. Photoeyes (Not Shown)
11. Charge Box
12. Bale Chamber
13. Strapper Guard
14. Strapper Wire Pay Off
15. Strapper
16. Lasers (Not Shown)



# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **DESCRIPTION OF COMPONENTS**

### **MAIN RAM (PLATEN) CYLINDER**

The standard main ram (platen) cylinder has a 10-inch bore (some machines are equipped with an optional 11-inch prefill cylinder). The main ram (platen) cylinder is controlled by solenoid-operated cartridge valves through a microprocessor controller, which places the main ram (platen) into the appropriate operating mode. These modes are: retract, retract slow, extend slow, extend fast, and extend regeneration.

### **MAIN RAM DECK**

This deck covers the main compression ram (platen) and main ram (platen) cylinder and related components, providing protection from damage and debris contamination. It also adds a safety element by preventing anyone from getting on or behind the main compression ram (platen) during operation.



**The baler should never be operated with the main ram deck, side ram deck or any safety guard removed.**

### **CHARGE BOX**

The charge box holds the amount of material necessary for one main compression ram (platen) cycle.

### **MAIN CONTROL PANEL (MCP)**

The MCP contains electric motor contactors, control relays, main power circuit breakers, and the control transformers. The electric motor contactors control the incoming power to the electric motors for the baler, cooler fan, and optional conveyors etc. The MCP is normally located on the side of the hydraulic tank.

### **HYDRAULIC PUMPS**

Hydraulic piston pumps are mounted on the electric motor. The pump provides the oil flow and pressure required to operate the main and side ram cylinders and door options.

### **ELECTRIC MOTOR**

The electric motor is supplied with the appropriate voltage to drive the hydraulic pumps. The horsepower rating of the electric motor is dependent upon the power unit option chosen. The electric motor is mounted on the power unit.

### **VALVE BLOCK ASSEMBLY**

The valve block assembly consists of cartridge valves, solenoid operated pilot spool valves, and a variety of pressure control valves and pressure gauges. The cartridge valves control the modes of operation of the Main Ram. A large spool valve controls operation on power units of some models. The solenoid operated pilot spool valves control the opening and closing of the cartridge and large spool valves. The valve block assembly is mounted next to the hydraulic tank.

### **HYDRAULIC TANK**

The hydraulic tank is a welded steel tank. The volume of the tank depends upon the power unit. The tank is equipped with a sight gauge, a temperature gauge, and a hydraulic oil sampling port. The tank is also equipped with an electric heater, or heaters, used during initial start up to warm the hydraulic fluid to operating temperature. The low oil level switch prevents or disrupts machine operation if low oil levels are detected.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **OIL COOLER**

The standard oil cooler is an air to oil heat exchanger through which hydraulic fluid is pumped. Cooling is achieved by forcing air around the coils using the electric fan. The electric fan is temperature sensor activated and operates anytime the hydraulic fluid exceeds a certain temperature. Water cooling is optional with a tube and shell heat exchanger. Solenoid controls water supply valve would be the statically operated to control a customers water supply.

## **PHOTOEYES**

The photoeyes are part of the automatic baling control system. They are used to control the amount of material allowed in the baler for each main ram cycle.

## **BALE CHAMBER**

The bale chamber is the area in which material is compressed during the bale making process.

## **STRAPPER**

The Strapper has two different modes Manual or Automatic. When a bale is completed, the strapper wraps wire around the bale and ties a knot. There is a strap button on the Operator Console to allow you to put extra straps on bales.



**Keep hands out of the strapper track at all times. Never place any part of the body in a potential pinch point. Unless the machine is shut down and locked out/ tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

## **PLATENS**

The main ram and side ram platens are welded plate structures that are bolted to the main and side ram cylinders. The main ram platen travel extends through the charge box into the bale chamber. The bale is formed by pressure placed on it by the main ram platen. The main ram exerts a set amount of face pressure while forming a bale. The side ram platen forms one of the walls in the bale chamber. Once the bale is formed, the side ram pushes the bale out of the bale ejection chamber. The side ram exerts a set amount of face pressure in pushing out a bale. The main ram, side ram, and the bale chamber have replaceable hardened steel liner plates.

## **COMBO DOOR (Optional)**

The combo door is a bale separation door that provides oversize bale ejector capability.

# SECTION 1 - SAFETY & EQUIPMENT INFORMATION

## OPERATOR CONTROL PANEL



The Operator Interface Terminal (OIT) allows the operator the ability to toggle through various screens to select the following baling and information functions:

### IMPORTANT NOTICE

This information is to assist the operator in fully understanding what each control does and where it is located. The following descriptions are not to be used as operating instructions. The instructions for the various modes of Harris baler operations are provided later in this manual.

### EMERGENCY STOP PUSHBUTTON

(located on operators control panel, and main control panel).

#### NOTE

**There may be remote EMERGENCY STOP pushbuttons located on the baler and feed conveyor components. The operator and all other personnel working in the area should know where each Emergency Stop Pushbutton is located.**

When pressed, this button will stop all operating functions and shut down the baler. It is also to be used in the event of an emergency.

### NORMAL SHUTDOWN

For normal shut down, press cycle stop pushbutton or turn baler selector switch to manual. Press all main motor stop pushbuttons and turn control power key switch to the "OFF" position.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **CONTROL POWER KEY SWITCH**

(located on operators control panel console) A 3 position key operated selector switch used to turn the control power to the baler (ON and OFF and HEAT).

In the “ON” position, the control power to the baler is on. In the “OFF” position, power is off. In the “HEAT” position, the control power to the baler is off, but the oil tank heater and circulation motor/pumps are operational.

The key can be removed with the switch in the OFF or HEAT position. With the switch off and the key removed, the baler cannot be started or operated.

## **CONTROLS ON PUSHBUTTON**

(located on operator’s control panel) When pushed, this button sounds a warning alarm for 15 seconds and activates the control power light. A light inside the button flashes during the alarm delay and remains ON indicating the control power is activated.

## **MAIN RAM EXTEND**

When pressed, this joystick moves the main ram forward, extending the cylinder. The ejector must be fully retracted. The ram movement stops when the joystick is released. When the baler is in the automatic baling mode, this joystick functions as a short stroke joystick. When pressed in AUTO, it stops main ram retraction and starts forward motion, reducing the amount of material going into the bale chamber.

## **MAIN RAM RETRACT**

When pressed, this joystick moves the main ram back, retracting the cylinder. This joystick functions in the manual mode only. The ram movement stops when the joystick is released.

## **EJECTOR EXTEND**

When pressed, this pushbutton moves the ejector forward, extending the cylinder. This pushbutton functions in the manual mode only. The ejector movement stops when the button is released.

## **EJECTOR RETRACT**

When pressed, this pushbutton moves the main ram back retracting the cylinder. This button functions in the manual mode only. The ram movement stops when the pushbutton is released.

## **BALE DOOR CLOSE**

When pressed, this pushbutton extends the bale door to the closed position. When the pushbutton is released, the movement of the bale door stops. A light inside the pushbutton illuminates when the door is closed.

## **BALE DOOR OPEN**

When pressed, this pushbutton retracts the bale door to the opened position. When the pushbutton is released, the movement of the bale door stops. A light inside the button illuminates when the door is open.

## **DOOR HOME POSITION**

This pushbutton may be used in manual baling mode only. When illuminated, a blue light indicates that the door is in the “HOME” position required for bale ejection or automatic operation without the door.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **BALER MAN/SEMI-AUTO/AUTO**

(located on operator's control panel) A 3-position selector switch which determines the operating mode of the baler. "AUTO" sets the unit so it will cycle in the correct sequence to produce bales automatically; when set in the "SEMI-AUTO" mode, the main ram will not extend until the Cycle Start button is pressed. Once Cycle Start is pressed, the baler then makes a bale, positions the ram & stops. A message appears on the display screen which states "To Eject a bale, press the Cycle Start PB." Once Cycle Start is pressed again, the baler will automatically Eject & Strap the bale, back all rams to their retracted positions and close the bale door. The cycle will not repeat until Cycle Start button is pressed again. When set on "MANUAL", the manually controlled pushbuttons and levers are operational.

## **MAIN RAM POSITION**

When pressed in the "MANUAL" mode, this pushbutton positions the main ram at the edge of the chamber so the bale may be ejected. When pressed in the "AUTO" mode, this pushbutton positions the main ram and ejects the bale in automatic.

The blue light in the button illuminates when the main ram is in position.

## **THROW STRAP**

Pushbutton that applies a tie wire to the bale. This button will function in both "AUTO" and "MANUAL" operating mode. The light in the button indicates there is wire in the wire tie mechanism and it is ready to apply a strap.

## **EQUIPMENT INFORMATION**

### **MATERIALS PROCESSED**

Baling materials should consist only of those specifically approved by **Harris** in writing. Other materials may damage the machine by point loading, severe abrasion, extreme impacting, etc. Processing materials which are not approved by Harris will be considered an abuse of the machine. Machine abuse **WILL VOID THE WARRANTY**.

### **ACCEPTABLE MATERIALS**

- Empty aluminum beverage cans.
- Empty tin cans, buckets or barrels, 55 gallons or less.
- High grade paper, if segregated and "delumped".
- Corrugated paper.
- Solid waste.
- Drywall.
- Wooden pallets.
- Empty PET bottles.
- "White goods" without motors and transmissions.
- Newsprint, if segregated and "delumped".
- Aluminum sheeting, less than 16-gauge thick.
- Round aluminum cable less than 1/2-inch diameter.
- Aluminum extrusions, less than 3/16-inch thick and less than 1/2 square inch in cross-section.
- Copper, less than 1/2 inch in cross-section.
- Radiators (automobile only, made of aluminum or brass).
- Steel cable, less than 1/2 inch in cross-section.
- Nonmagnetic, ferrous material with a thickness no greater than 1/16 inch nor greater than 1/4 square inch in cross-section.

# **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

- Ferrous material with a tensile strength of less than 50,000 lb/sq. inch, a thickness of no more than 1/16 inch and a cross-section of no more than 1/4 square inch.

## **UNACCEPTABLE MATERIALS**

- Large pieces of masonry, steel, or other such non-compressible materials.
- Ferrous metals greater than 1/16-inch thickness, 1/4-inch in diameter, or 1-4 square inch cross-section.
- Masonry and concrete greater than 1 square inch in cross section or 6 inches in length.
- Pressurized cylinders and cans of any description.

Glass, masonry, and other such abrasive non-compressible can cause excessive wear or damage and can interfere with baler functions, such as baling or the operation of the door.



## **SECTION 1 - SAFETY & EQUIPMENT INFORMATION**

## **SECTION 2 - OPERATING INSTRUCTIONS**

### **PRE-OPERATION INSPECTION**

A pre-operation inspection is essential for the safe and efficient operation of the HRB-240 baler. It should only be completed by trained personnel familiar with safe operating procedures. While items listed are standard, there may be other checks required for some baler installations.



**Before performing pre-operation inspections, ensure the baler has been shut down and locked out in accordance with OSHA standards.**

### **ITEMS TO INSPECT AND CHECK**

1. Working area around baler:
  - Keep clean.
  - Remove flammable materials.
  - Remove any oil or fluid spills.
2. Check behind platen for material build-up; clean out if necessary, before operating.
3. Check hydraulic lines, hoses, and fittings for fluid leaks.
4. Look for worn, broken and damaged parts such as:
  - Hydraulic hoses.
  - Broken or missing cap screws and pins.
  - Wear Strips.
  - Welds (broken or cracked).
  - Structural damage.

### **COMPACTING**

The platen compresses material in the baling chamber, excess material is cut by the shear blade as the material is compressed. Material type and density will determine the number of cycles necessary to form a bale.

### **EJECTING THE BALE**

The bale is ejected from the unit as the next bale is being formed

## **SECTION 2 - OPERATING INSTRUCTIONS**

### **OPERATOR CONTROL PANEL**



## **SECTION 2 - OPERATING INSTRUCTIONS**

### **TOUCH SCREEN PANEL VIEWS**



#### **Opening Screen**

Touch anywhere to continue.

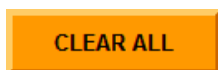
The following are common buttons used on various screens:



Touching this button will cause the limits of movement to be ignored. This is intended for service use only. Note that machine damage is possible. "SUPERVISOR" must be logged in for this button to be used.



Touching this button closes the current display and returns to either the main display or the previous display.

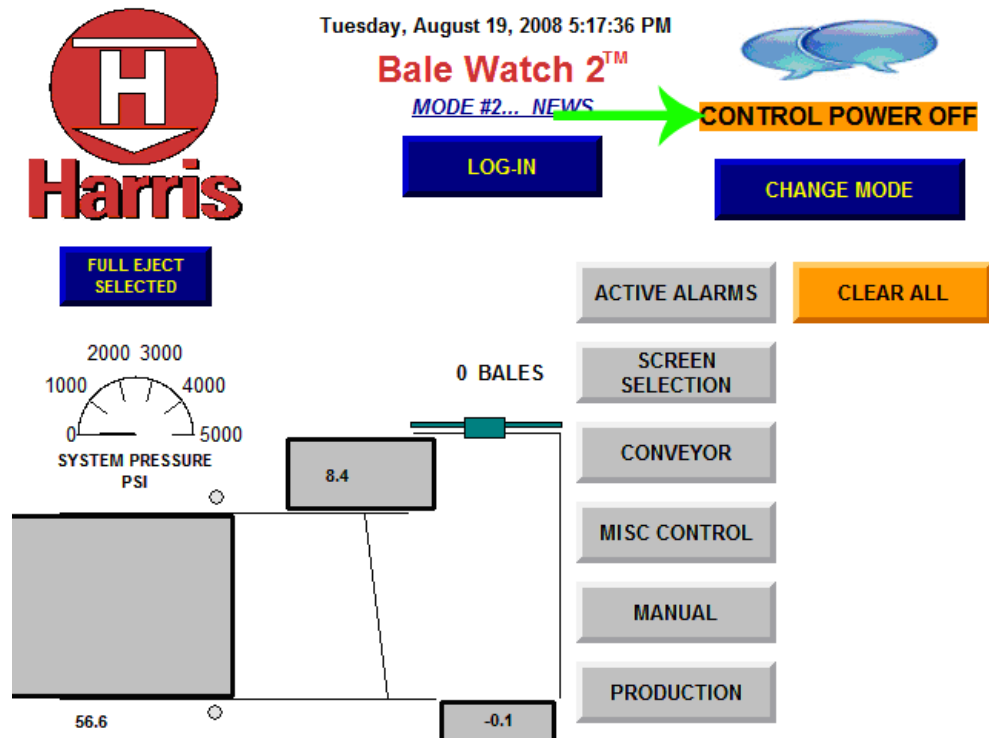


This button will clear any alarms that are currently active unless the condition(s) that caused the alarm are still present (e.g. low oil level).



Touching this button will toggle the language displayed on the screen.

## SECTION 2 - OPERATING INSTRUCTIONS



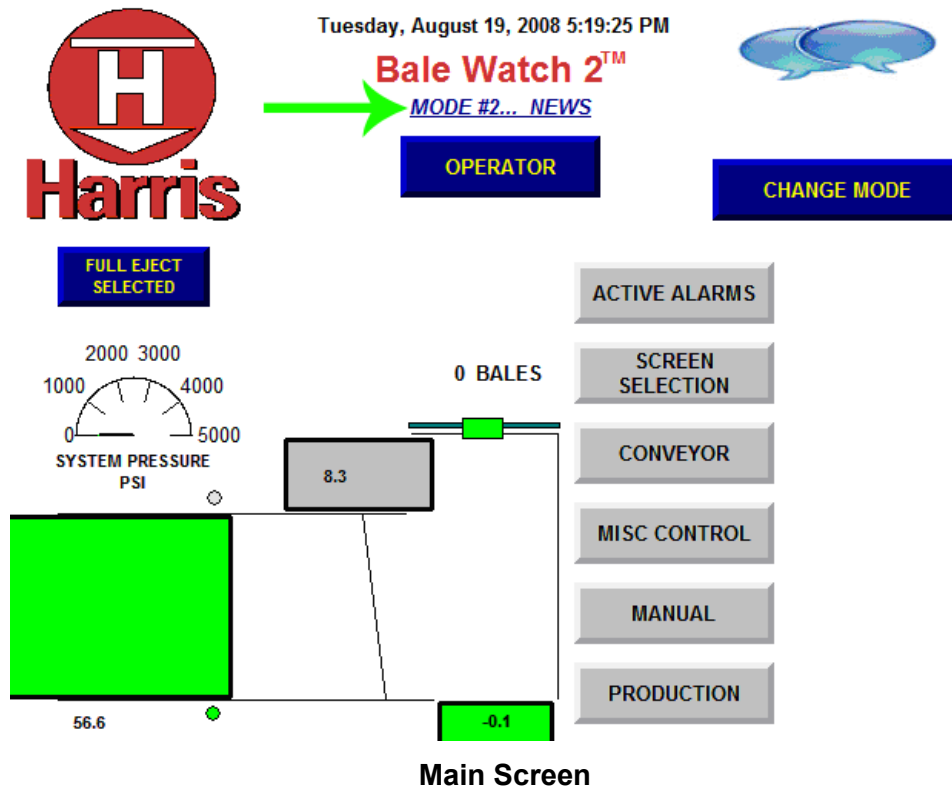
**Main Screen**

Shown above is the typical MAIN screen when the control power is off.

### **NOTE**

The green arrow above points to the "CONTROL POWER OFF" message. Press the Control Power Button to turn the control power on.

## SECTION 2 - OPERATING INSTRUCTIONS

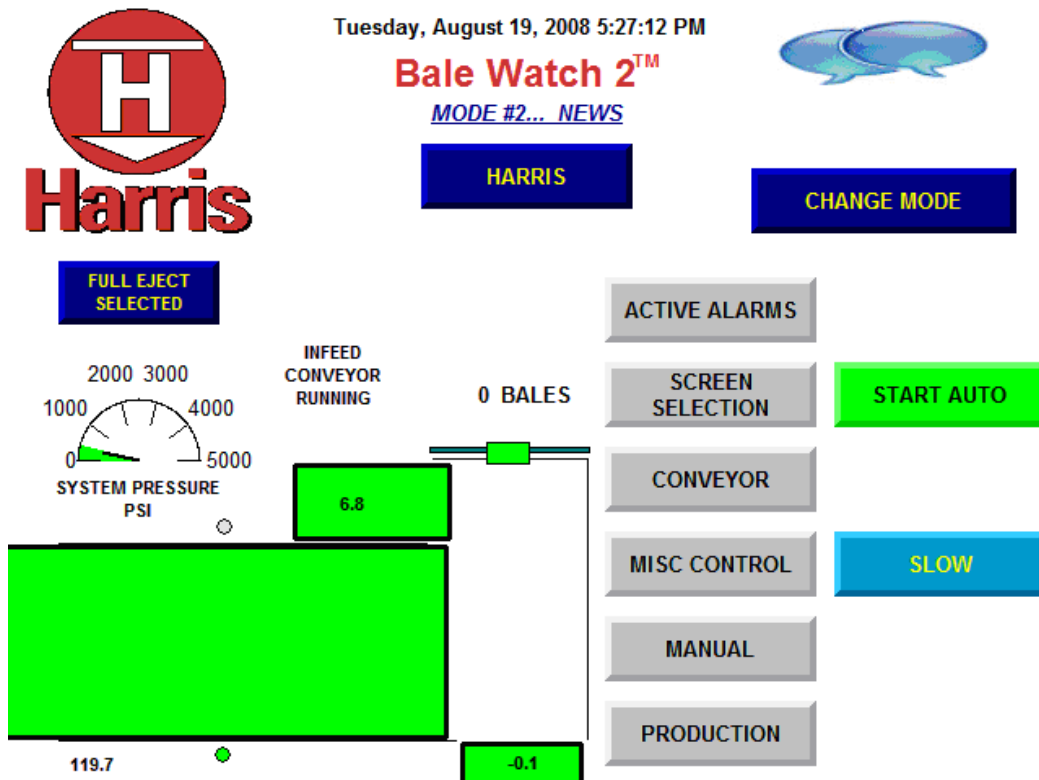


Above is the typical MAIN screen when the control power is on.

### **NOTE**

The six grey buttons are for direct access to other screens. The green arrow points to the material mode display. The message displays the mode number and name.

## SECTION 2 - OPERATING INSTRUCTIONS



The screen above shows the MAIN screen with the motor(s) operational. The SLOW button is used in conjunction with a joystick to force slow movement of a platen. The three platens are shown on a baler graphic; main platen, ejector platen, and door platen. The baler graphic displays the platens in relation to each other in proportional, actual dimensions. The ejector platen shows green when it is retracted and safely out of the path of the main platen. The main platen shows green when it is safely out of the path of the ejector. The position values are in inches of travel from the fully retracted position.

**FULL EJECT  
SELECTED**

The ejector can either move the bale out to the plug bale position or completely out of the chamber. Use this button to select between the two positions, fully ejected or plug bale position.

**SLOW**

Touching this button while using a joystick forces the platen to move slowly.

**LOG-IN**

For security of operation the controls include three users; DEFAULT, OPERATOR and SUPERVISOR. This button is used to open the log-in screen. The button displays the user which is properly logged in. The default user displays as LOG-IN. The initial password for OPERATOR is "mover" and for SUPERVISOR is "boss". OPERATOR user has more access than DEFAULT user and SUPERVISOR user has more access than OPERATOR. Once a user is properly logged-in the password may be changed, if desired, from the TOOLS screen.

## **SECTION 2 - OPERATING INSTRUCTIONS**

A blue rectangular button with the text "CHANGE MODE" in yellow capital letters.

Touching this button opens the mode selection screen.

A green rectangular button with the text "START AUTO" in black capital letters.

Touching this button will start the automatic baling cycle.

A red rectangular button with the text "STOP AUTO" in black capital letters.

Touching this button will stop the automatic baling cycle.

A blue rectangular button with the text "PAUSE AUTO" in yellow capital letters.

Touching this button will suspend the automatic baling cycle.

A blue rectangular button with the text "RESUME AUTO" in yellow capital letters.

Touching this button will resume a suspended automatic cycle from where it was paused.

A blue rectangular button with the text "FINISH BALE NOW" in yellow capital letters.

Touching this button will force a "bale made" decision and the bale will be finished and strapped at the end of the next stroke.

A blue rectangular button with the text "CANCEL FINISH BALE" in yellow capital letters.

Touching this button will cancel the previously selected FINISH BALE NOW if done before the end of the baling stroke.

A blue rectangular button with the text "GO; LAMINATE NOW" in yellow capital letters.

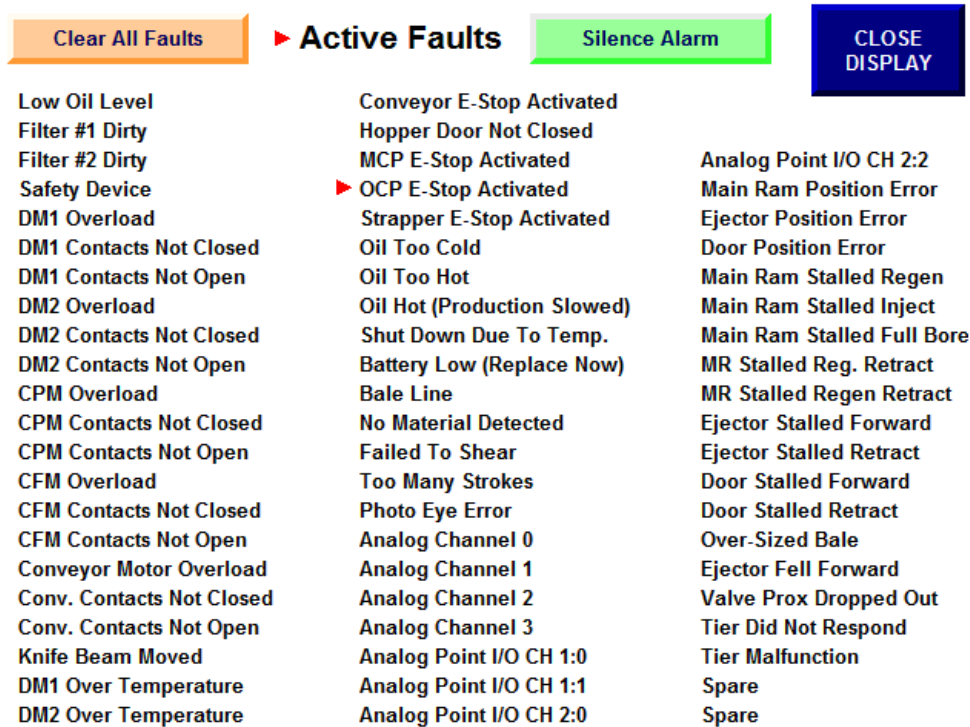
Touching this button will cause the platen to stroke when it is waiting for photoeyes to be blocked.

A blue rectangular button with the text "TIE-OFF BALE" in yellow capital letters.

This button is displayed when the "wait on operator to tie" selection is made and a bale is finished. Touching this button will allow the bale to be strapped and the automatic baling cycle to continue.



## **SECTION 2 - OPERATING INSTRUCTIONS**

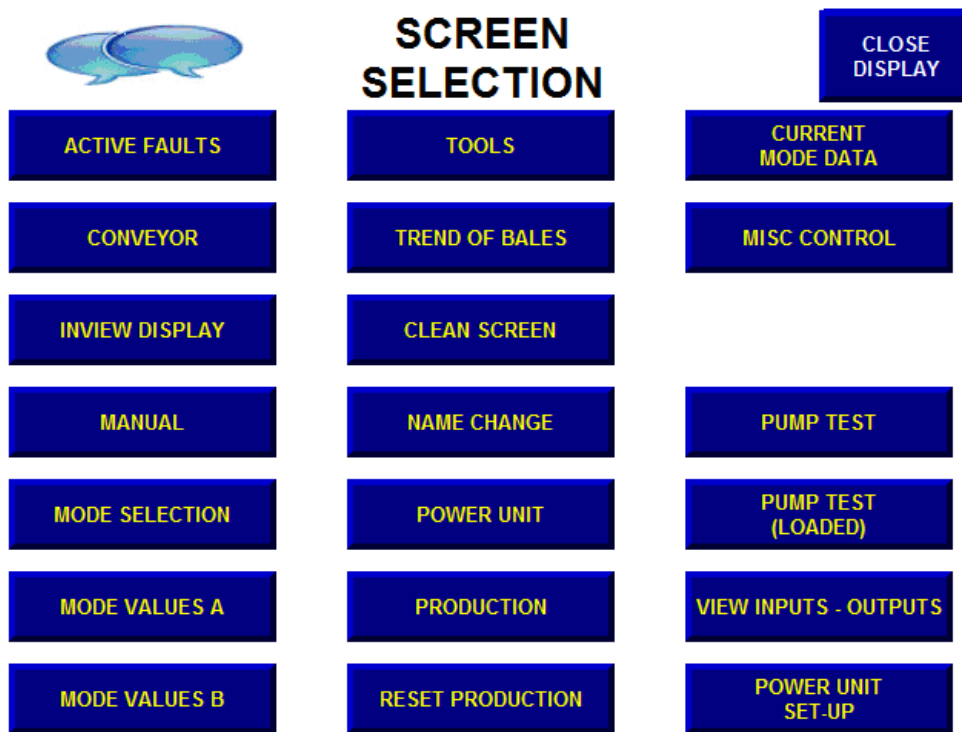


The screen shown above is the ACTIVE FAULTS screen.

### **NOTE**

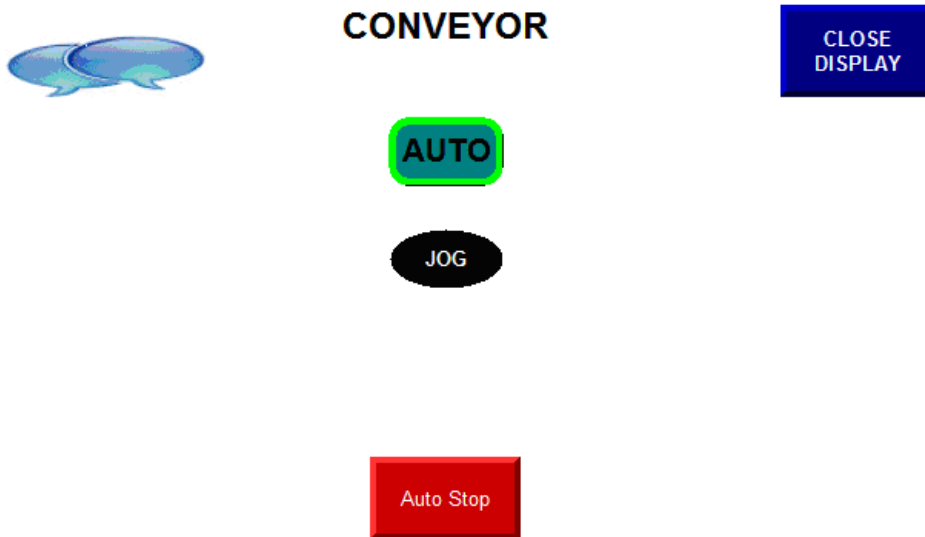
There is a small, red triangle that appears next to each active fault. Touching the "Silence Alarm" button will silence the audible alarm without clearing the fault.

## **SECTION 2 - OPERATING INSTRUCTIONS**



The screen shown above is the SCREEN SELECTION screen. The selections displayed in the sample above will vary based on the options installed and the security level of the logged-in user.

## SECTION 2 - OPERATING INSTRUCTIONS



The CONVEYOR screen above shows the conveyor in automatic mode.

## SECTION 2 - OPERATING INSTRUCTIONS

[MODE #2... NEWS](#)

CLOSE  
DISPLAY

Fast Index for Faster Strapping

Push Bale Only When Tier Ready

Use Energy Saver

Wait on Operator to Tie



### MISC CONTROL Screen

There are four selections on the MISC CONTROL screen:

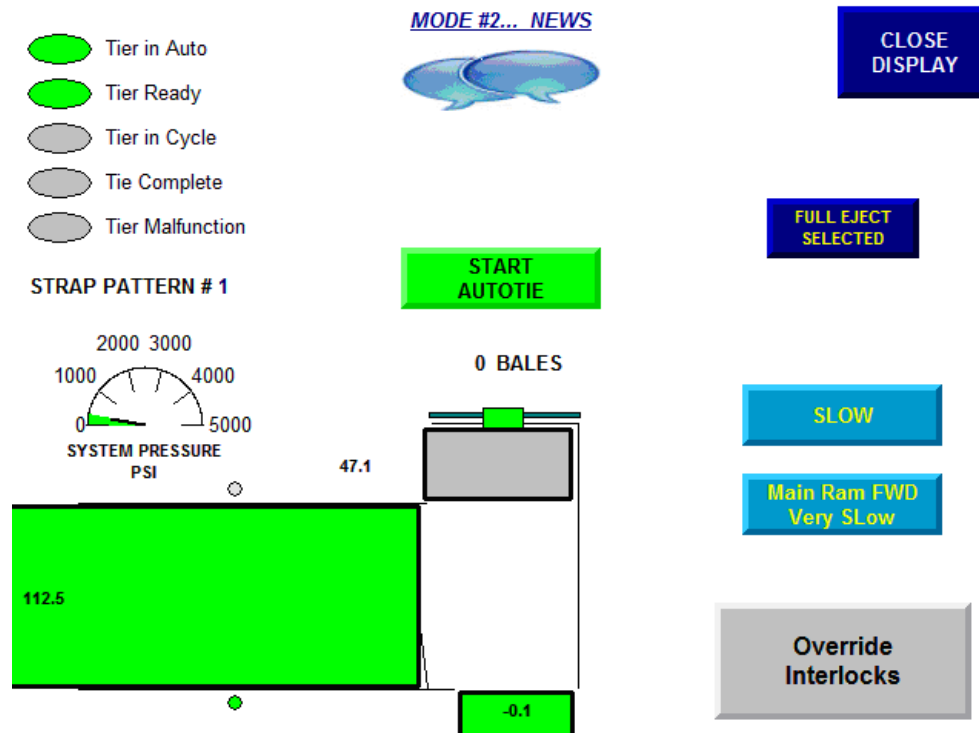
**Bale Index Speed** - The speed at which the bale is pushed out of the chamber through the tier can be fast or slow (depending on power unit installed). Fast indexing will provide a shorter cycle time. If the accuracy of placing straps on the bale is not adequate then a slower index speed may help.

**Tier Safety** - Normally the ejector starts to push the bale through the tier after the knot is dropped. If there is a problem created by this timing then the ejector can be made to wait until the tier ready signal is on before pushing.

**Energy Saver** - When this feature is actuated the main motors will stop when there is no material on the conveyor. If the baler is in automatic and the conveyor is in automatic and no material is seen by the photoeyes for five minutes then the main motor(s) power down. The baler remains in automatic and the conveyor continues to run. When material does finally fall in front of the photoeyes then the motor(s) restart and the baling continues.

**MRF Mode** - This feature was designed for material recovery facilities. When it is evident that the current material is about to run out then this feature can be activated. Then, when the bale is finished, the automatic strapping will not start until the operator pushes the button. This gives the operator the opportunity to manually add a little material to the bale if it will finish the material on the conveyor.

## SECTION 2 - OPERATING INSTRUCTIONS



**Manual Screen**

The MANUAL screen gives the operator access to the tier inputs and tier automatic control. There is also a button, Main Ram FWD Very Slow, which is used along with the joystick to make the main ram go forward slowly (this function is intended for maintenance purposes).

## SECTION 2 - OPERATING INSTRUCTIONS

### BALE PRODUCTION


<i>MODE</i>	<i># BALES</i>	<i>NAME</i>
1	0	OCC
2	0	NEWS
3	0	Office Paper
4	0	ONP
5	0	Plastic
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	
13	0	
14	0	
15	0	
16	0	
17	0	
18	0	
19	0	
20	0	
<i>TOTAL BALES...</i>	0	

CLOSE  
DISPLAY

TREND OF BALE  
PRODUCTION

RESET PRODUCTION  
NUMBERS

PRINT SCREEN

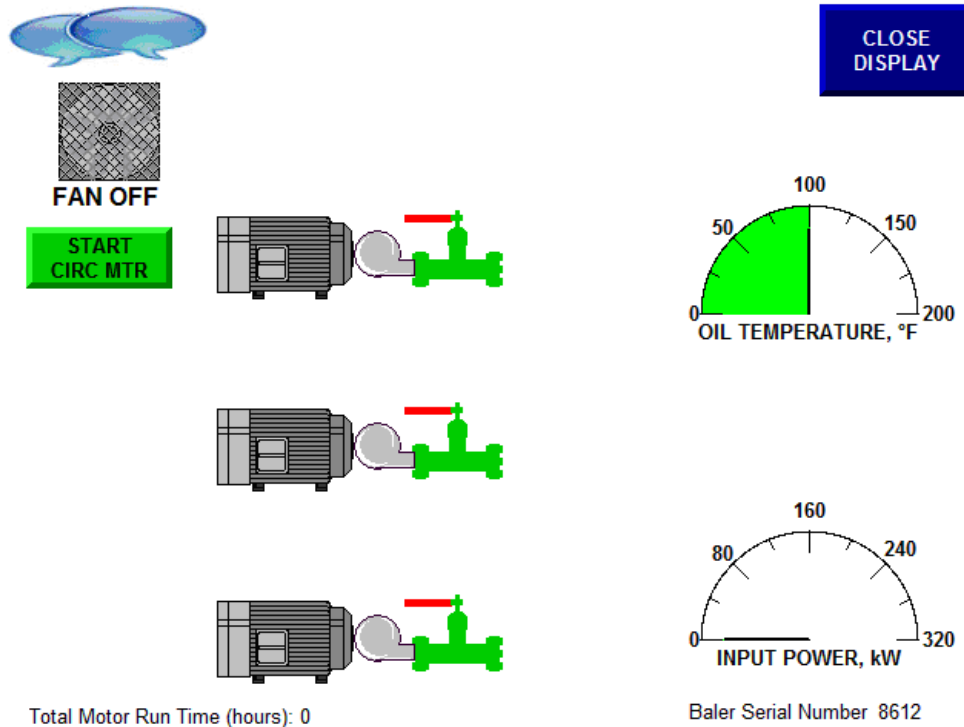


Tuesday, August 19, 2008 5:22:33 PM

#### Production Screen

The PRODUCTION screen tabulates the number of bales made since the last reset for each material mode and also provides a total. The production screen also provides access to the TREND screen. Use the reset button to reset values to zero. The print screen function is available from the production screen, however, the display must be configured to use a particular printer. Contact Harris Service for more information.

## **SECTION 2 - OPERATING INSTRUCTIONS**



### **Power Unit Screen**

The Power Unit screen is displayed above. The power gauge is displayed when the optional power monitor is installed. The motors are started from this screen. If conditions are right for starting the motors, the button will appear. Other messages will display when appropriate.

OIL IS TOO COLD; TARGET IS \_\_\_\_

OIL IS WARMING; TARGET IS \_\_\_\_

PREFILL SHUT-OFF VALVE MUST BEFULLY OPEN TO START PUMPS

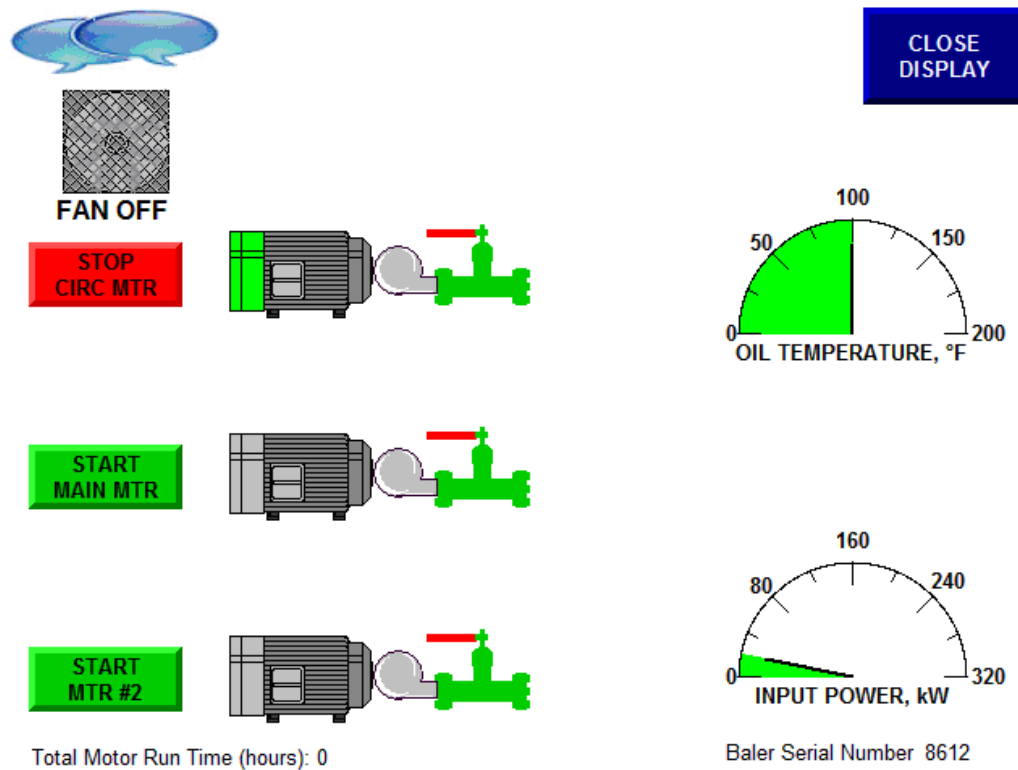
OIL TOO HOT; REGENERATION SUSPENDED. TARGET IS \_\_\_\_

INLET VALVE NOT FULLY OPEN!

ENERGY SAVER ACTIVE

The “\_\_\_\_” in the above text represent oil temperature in degrees Fahrenheit. The particular values displayed will depend on the grade of oil used.

## **SECTION 2 - OPERATING INSTRUCTIONS**



### **Power Unit Screen**

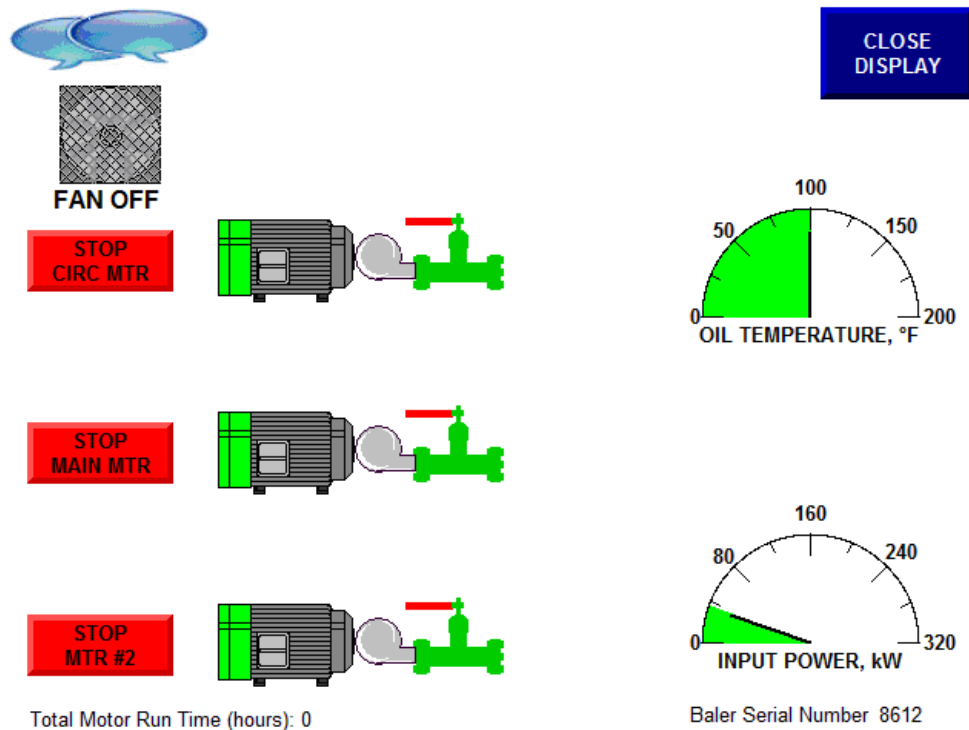
The power unit screen above is shown with the circulation pump started.

#### **NOTE**

The main motor buttons are now displayed.



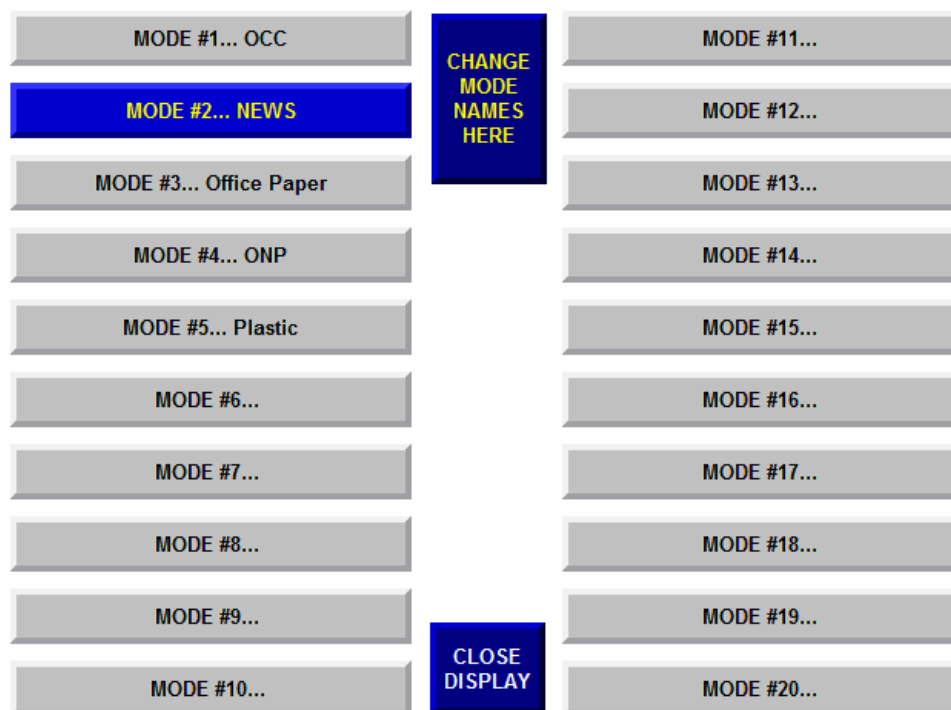
## SECTION 2 - OPERATING INSTRUCTIONS



### Power Unit Screen

The POWER UNIT screen is shown above with all motors running. Using the **STOP CIRC MOTOR** button to turn all motors off is the preferred method. When using the **STOP CIRC MOTOR** button to stop all of the motors, the motors will turn off in a timed sequence.

## **SECTION 2 - OPERATING INSTRUCTIONS**



### **Mode Selection Screen**

The MODE SELECTION screen is shown above. The current mode is highlighted. Touch the desired material mode to toggle between modes. Use the CHANGE MODE NAMES HERE button to make changes to the displayed mode names.

## **SECTION 2 - OPERATING INSTRUCTIONS**



**TOUCH NAME TO CHANGE**

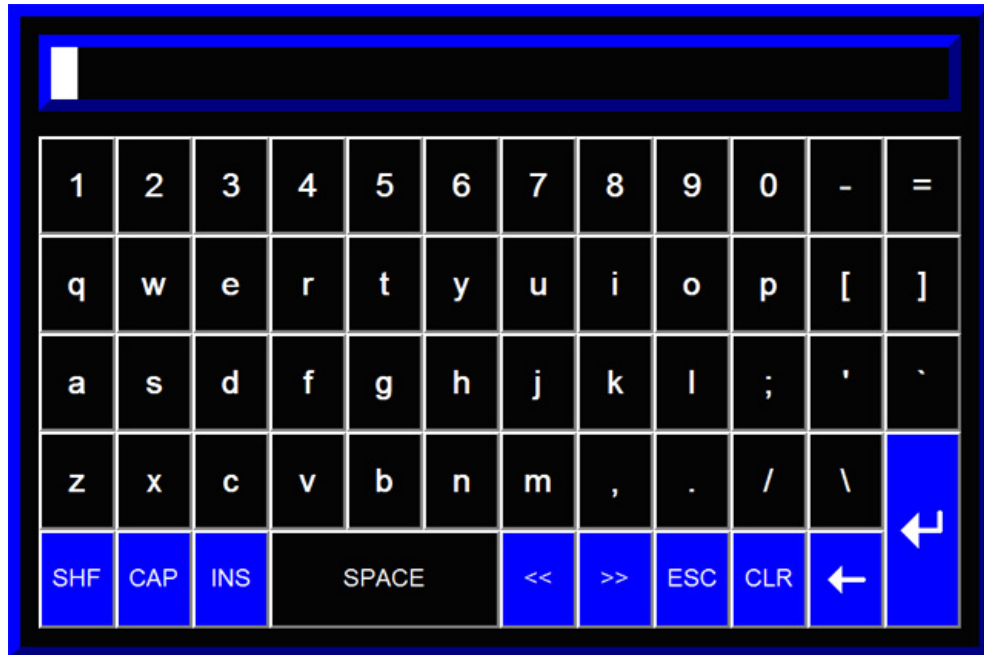
**CLOSE  
DISPLAY**

<b>MODE #1... OCC</b>	<b>MODE #11...</b>
<b>MODE #2... NEWS</b>	<b>MODE #12...</b>
<b>MODE #3... Office Paper</b>	<b>MODE #13...</b>
<b>MODE #4... ONP</b>	<b>MODE #14...</b>
<b>MODE #5... Plastic</b>	<b>MODE #15...</b>
<b>MODE #6...</b>	<b>MODE #16...</b>
<b>MODE #7...</b>	<b>MODE #17...</b>
<b>MODE #8...</b>	<b>MODE #18...</b>
<b>MODE #9...</b>	<b>MODE #19...</b>
<b>MODE #10...</b>	<b>MODE #20...</b>

### **Name Change Screen**

The NAME CHANGE screen is shown above. Touch the material mode which needs to be renamed.

## SECTION 2 - OPERATING INSTRUCTIONS

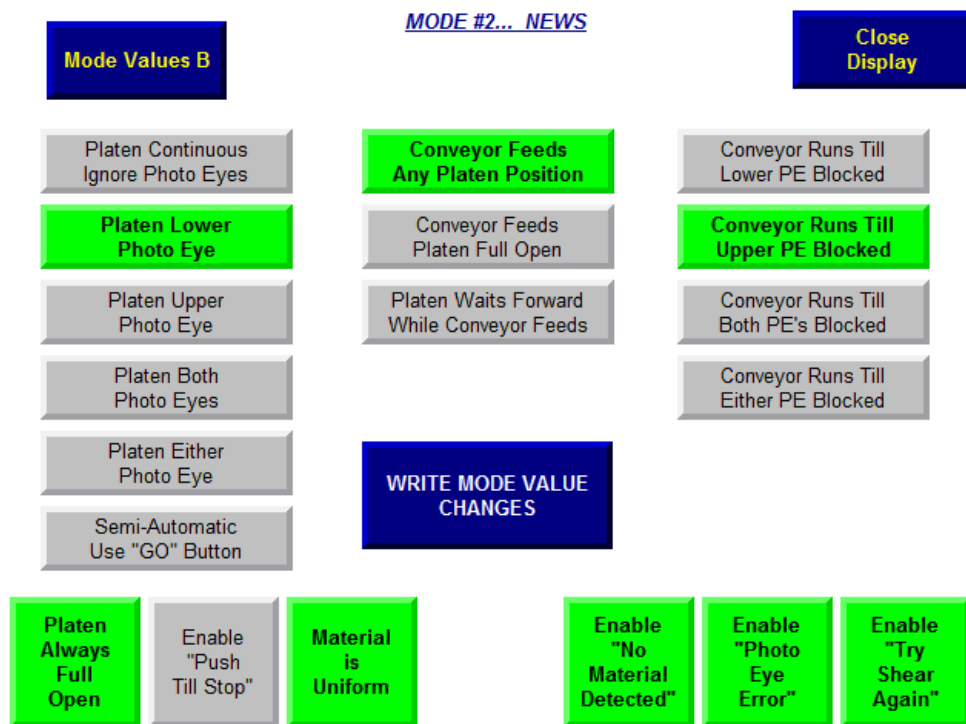


### **Name Change Text Screen**

The NAME CHANGE text entry screen is shown above. Type the new name and touch the enter key when finished. Use the ESC key to return without changes.



## SECTION 2 - OPERATING INSTRUCTIONS



### Mode Values Screen A

The MODE VALUES A screen is shown above. Some of the mode values for the current material mode (which is indicated at the top of the screen) are displayed. Mode values control the behavior of the baler when in automatic operation. A button is located in the top left of the screen to switch to the MODE VALUES B screen where the rest of the material-specific values are shown. There are three vertical groups of buttons. In each group only one button may be selected at time. As soon as a new mode is selected, the previously highlighted mode goes grey and the newly selected mode gets highlighted. Any changes made here take effect immediately (for the indicated current bale mode). If the desired changes are meant to be permanent, the WRITE MODE VALUE CHANGES button must be pressed (for this to take effect, the logged in user must be SUPERVISOR). The three vertical groups control the platen and conveyor operation. The function of the other buttons are as follows:



Use this button to control whether the platen uses a final short stroke to finish the bale or always uses a full stroke.



When this feature is enabled, the platen does not stop when the desired baling pressure is reached. Instead, the platen continues to push against the bale until it almost stops.

## **SECTION 2 - OPERATING INSTRUCTIONS**

**Material  
is  
Uniform**

When this control is enabled, the bales are more uniform in size. However, if the incoming material is not uniform or there is a problem with over-sized bales, this feature should be disabled.

**Enable  
"No  
Material  
Detected"**

The controls can detect whether there is no material gathered by the platen and an alarm is activated. This alarm can be disabled here.

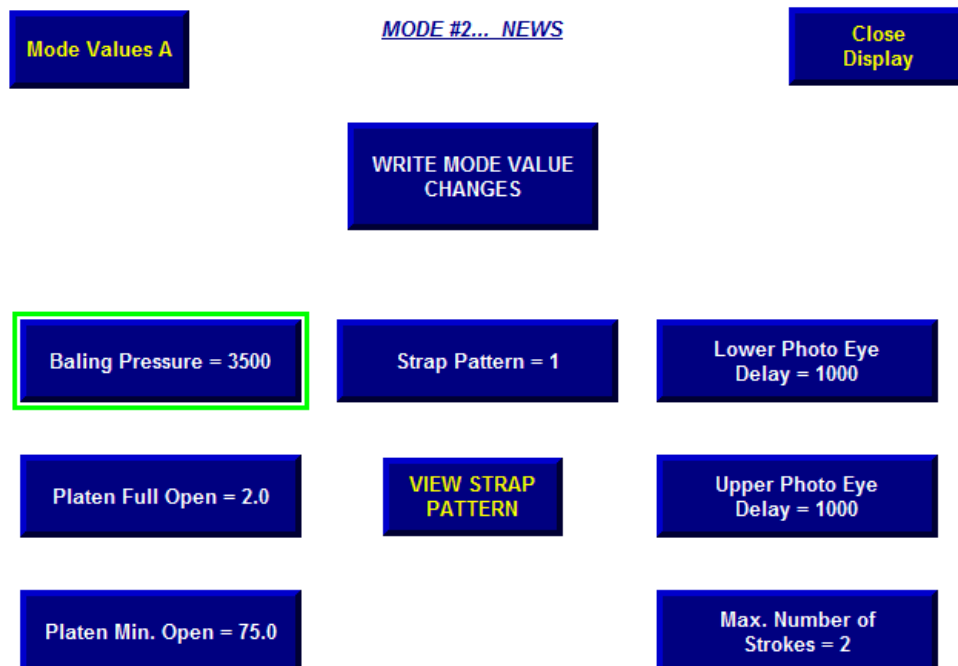
**Enable  
"Photo  
Eye  
Error"**

The controls detect can detect a problem with the photoeyes. This alarm can be disabled here.

**Enable  
"Try  
Shear  
Again"**

Normally, if the platen cannot shear the material at the knife, it will back up and try again. This feature can be disabled here.

## SECTION 2 - OPERATING INSTRUCTIONS



The MODE VALUES B screen is shown above. Some of the mode values for the current material mode (which is indicated at the top of the screen) are displayed. Mode values control the behavior of the baler when in automatic operation. A button is located in the top left of the screen to switch to the MODE VALUES A screen where the rest of the material-specific values are shown. Any changes made here take effect immediately (for the indicated current bale mode). If the desired changes are meant to be permanent, the WRITE MODE VALUE CHANGES button must be pressed (for this to take effect, the logged in user must be SUPERVISOR). To change any of the values shown, just touch and a keyboard will pop up to allow entry of a new value.

**Baling Pressure = 3500**

When the platen is going forward to laminate the material against the bale it stops when reaching this pressure.

**Platen Full Open = 2.0**

Each time the platen goes back for a full “bite” of material, it stops at this position. If desired, this full open position may be changed.

## **SECTION 2 - OPERATING INSTRUCTIONS**

**Platen Min. Open = 75.0**

When short stroke is enabled, the final platen movement into the hopper to gather the material to finish the bale is restricted by this value. Depending on the material being baled, the platen must move a certain distance into the hopper in order for material to fall in front of the platen. This minimum open position is what is shown here. If this value is too far forward then no material will be gathered and the platen will waste strokes. If this value is larger than necessary, then the bales will be less uniform in weight than otherwise possible. One method of determining this value initially would be to close the hopper (position the platen past the knife) and fill material on top of the platen up to the photoeye which is selected to control the conveyor. Then, retract the platen (use SLOW button) until the material falls in front of the platen. Use this platen position to set this value. If, during operation the platen fails to gather material on the final stroke, then decrease this value (for a larger opening) and try again.

**Strap Pattern = 1**

There are twenty strap patterns provided; ten for use with plug bale operation and ten for full eject operation. Enter a value here between one and ten.

**Lower Photo Eye  
Delay = 1000**

The lower photoeye has a built-in delay timer. Material must be present in front of the eye for this amount of time before the material is recognized by the controls. A value of 1000 is equal to one second.

**Upper Photo Eye  
Delay = 1000**

The upper photoeye has a built-in delay timer. Material must be present in front of the eye for this amount of time before the material is recognized by the controls. A value of 1000 is equal to one second.

**Max. Number of  
Strokes = 2**

If the platen reaches this number of strokes before a bale is completed, then an alarm is activated. Set this value well above the expected number of strokes for the material in question. For example, if it takes between 10 – 13 strokes to make a cardboard bale, set this value to 20. If there is a problem with the photoeyes and the feed is light, this alarm will detect it by the number of strokes. To disable this alarm set the value to 999.

**VIEW STRAP  
PATTERN**

Use this button to access the currently selected strap pattern.



## SECTION 2 - OPERATING INSTRUCTIONS

DISPLAY OF STRAP PATTERN # 1

SAVE PATTERN CHANGES    FULL EJECT SELECTED    LEARN PATTERN    CLOSE DISPLAY

Pos. #	No. Straps	Pos. Value	Pos. #	No. Straps	Pos. Value	Pos. #	No. Straps	Pos. Value
1	1	40.0	8	1	100			
2	1	50.0	9	1	100	15	1	100
3	1	60.0	10	1	100	16	1	100
4	1	100	11	1	100	17	1	100
5	1	100	12	1	100	18	1	100
6	1	100	13	1	100	19	1	100
7	1	100	14	1	100	20	1	100

### Strap Pattern Screen

The STRAP PATTERN screen is shown above. Note that there are twenty possible positions which can be defined. Each position can have between one and nine straps. The positions must be defined in order; 1, 2, 3, etc. For the unused positions leave the strap count at one and the position value at 100. The position value is the position of the ejector when the strap(s) is applied. Note that in the upper left of the screen the current strap pattern number is displayed.

SAVE PATTERN CHANGES

Any changes made here take effect immediately (for the indicated current strap pattern number). If the changes are desired to be permanent then this button must be pressed (user is SUPERVISOR).

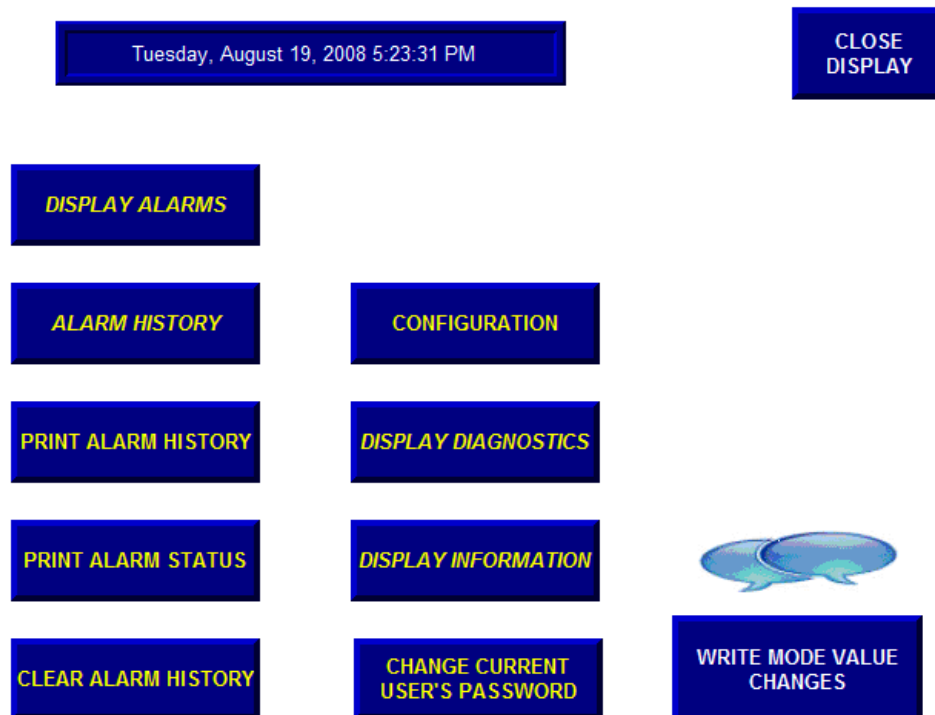
FULL EJECT SELECTED

Use this button to toggle between FULL EJECT and PLUG BALE in order to display the desired strap pattern.

LEARN PATTERN

Pressing this button starts the "learn strap pattern" routine. Before starting this routine, have only one main motor running so that the ejector will not move too fast. Have the bale finished and the main platen and door ready for bale ejection. Once the button is pressed the value fields will be set to default values. The ejector can be operated from the control panel or the tier panel as desired. Move the bale out and strap as desired (single or multiple straps per position). The position values and strap counts will be filled in as the bale is tied. When finished (and bale pattern is as desired) use the Save Pattern Changes button to save the values. Just touch any values which you desire to adjust before saving.

## SECTION 2 - OPERATING INSTRUCTIONS



### **DISPLAY ALARMS**

Touch this button to display a list of current alarms.

### **ALARM HISTORY**

Touch this button to display a list of events and times.

### **PRINT ALARM HISTORY**

If a printer is properly installed, touching this button will print the list of events and times.

### **CLEAR ALARM HISTORY**

Touching this button will result in resetting the history list.

### **CONFIGURATION**

Touching this button will close the Panel View project and open the screen configuration menu. The machine control will end.

## **SECTION 2 - OPERATING INSTRUCTIONS**




***DISPLAY DIAGNOSTICS***

Touching this button opens a display used for troubleshooting the screen.



***DISPLAY INFORMATION***

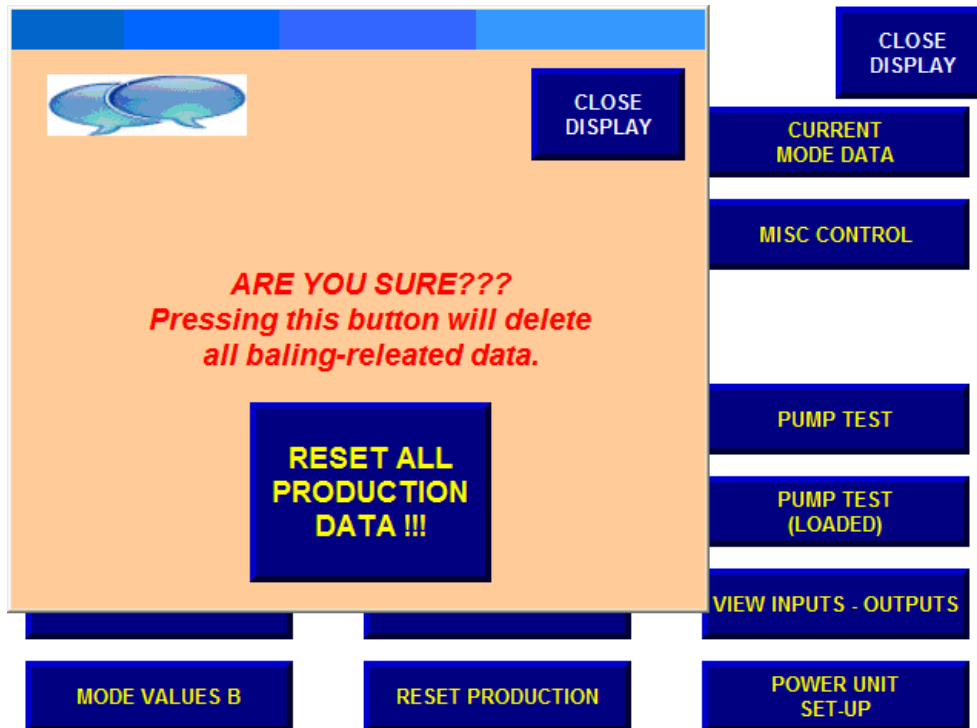
Touching this button opens a display used for troubleshooting the screen.



**CHANGE CURRENT  
USER'S PASSWORD**


Touching this button opens a display used to change the password of the user currently logged in.

## SECTION 2 - OPERATING INSTRUCTIONS



When the RESET PRODUCTION button is touched the display changes as shown above. This screen warns that the reset is non-reversible and data will be lost. Use the CLOSE DISPLAY button to back out without resetting data. Use the RESET button to continue and erase the data.

## SECTION 2 - OPERATING INSTRUCTIONS



MODE #2... NEWS

Stored Data

# Bales	0
# Strokes	2
kW-h	2.4
Motor(s) run time, h	0.1
Automatic active, h	0.0
Waiting on material, h	0.0
Infeed conveyor, h	0.0
# Shear tries	0

Derived Values

Avg. Bales per Hour Auto Runtime	0.0
Avg. Bales per hour Auto Runtime less Wait time	0.0

**CLOSE DISPLAY**

**PRINT DISPLAY**

### **Current Mode Data Screen**

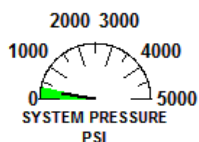
The CURRENT MODE DATA screen is shown above. The data shown is for the material displayed at the top center of the screen. The numbers displayed represent data gathered since the last reset. The number of shear tries is included as evidence of a problem with shearing. If this number is high, perhaps the mode setup should be changed to allow easier baling conditions. The “average bales per hour of automatic runtime less wait time” can be very useful. It gives the potential production rate if the feeding of the conveyor was more efficient.

## SECTION 2 - OPERATING INSTRUCTIONS

### PUMP TEST CONTROL (Unloaded)



CLOSE  
DISPLAY



Platen Position.... 112.9

**START FLOW TEST  
OF PUMP #2**  
(CAUTION: platen will move  
forward during test; retract  
platen first, chamber  
must be clear)

<u>Pump #1 (gpm)</u>		<u>Pump #2 (gpm)</u>	
Originally...	90.1	Originally...	90.1
Last test.....	90.1	Last test.....	90.1

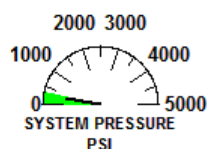
### **Pump Test Screen**

The PUMP TEST screen is shown above. Only one pump may be running, the main platen must be fully retracted, and the hopper must be empty. Touch the button to start the test. The platen will slowly move forward through the hopper. When it stops, a new flow rate value will appear in the appropriate spot labeled "Last test...". This test may be useful in diagnosing problems.

## SECTION 2 - OPERATING INSTRUCTIONS

### PUMP TEST CONTROL (Loaded)

CLOSE  
DISPLAY



Platen Position.... 112.8



**START FLOW TEST  
OF PUMP #2**  
(CAUTION: platen will move  
forward during test; retract  
platen first, chamber  
must be clear)

<u>Pump #1 (gpm)</u>		<u>Pump #2 (gpm)</u>	
Originally...	78.4	Originally...	76.2
Last test.....	78.4	Last test.....	75.5

### **PUMP TEST LOADED SCREEN**

The PUMP TEST (LOADED) screen is shown above. Only one pump may be running, the main platen must be fully retracted, and the hopper must be empty. Touch the button to start the test. The platen will move forward slowly through the hopper. When it stops, a new flow rate value will appear in the appropriate spot labeled "Last test...". This test may be useful in diagnosing problems.

# SECTION 2 - OPERATING INSTRUCTIONS



TOUCH DESIRED SELECTION

CLOSE  
DISPLAY

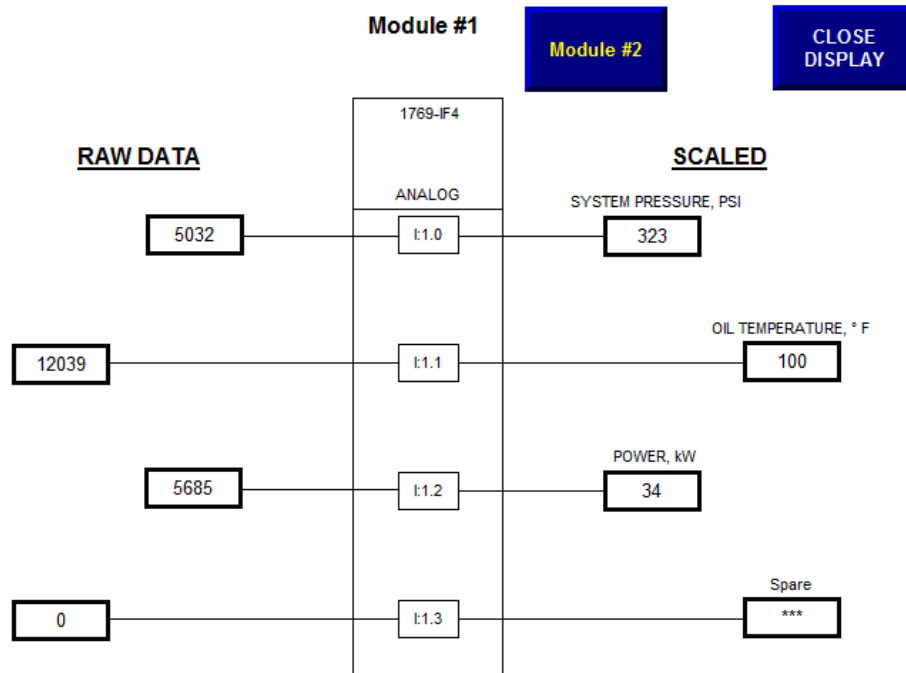
CPU	Power Supply	MODULE 1 ANALOG	MODULE 2 DC INPUT	MODULE 3 DC INPUT	MODULE 4 RELAY	MODULE 5 RELAY

POINT I/O

The VIEW INPUTS – OUTPUTS screen is shown above. The inputs and outputs controlled by the processor are accessible by these screens. Just touch the desired card to open the related screen. Use the POINT I/O button to access the point I/O modules.

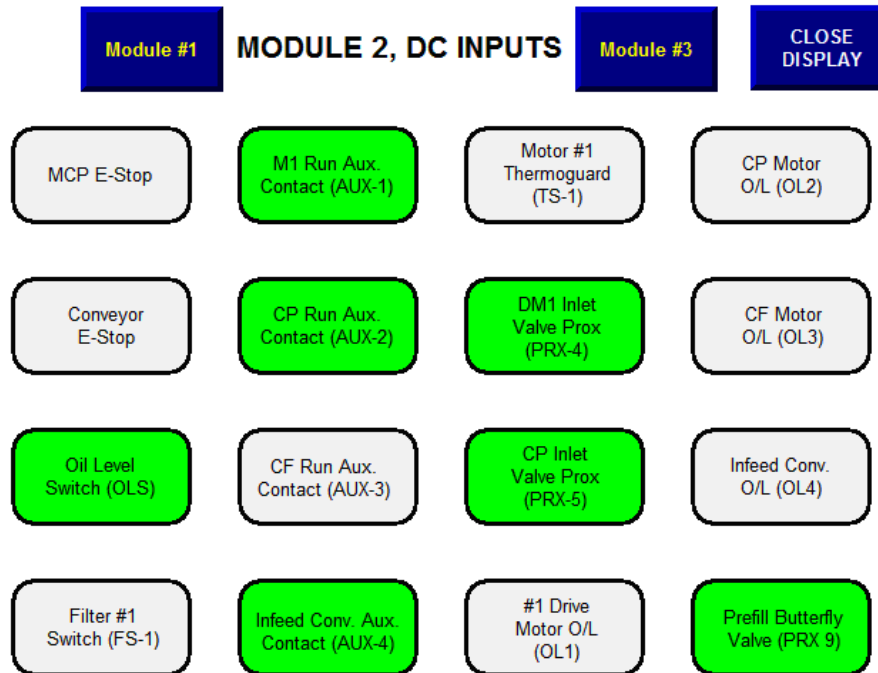


## SECTION 2 - OPERATING INSTRUCTIONS



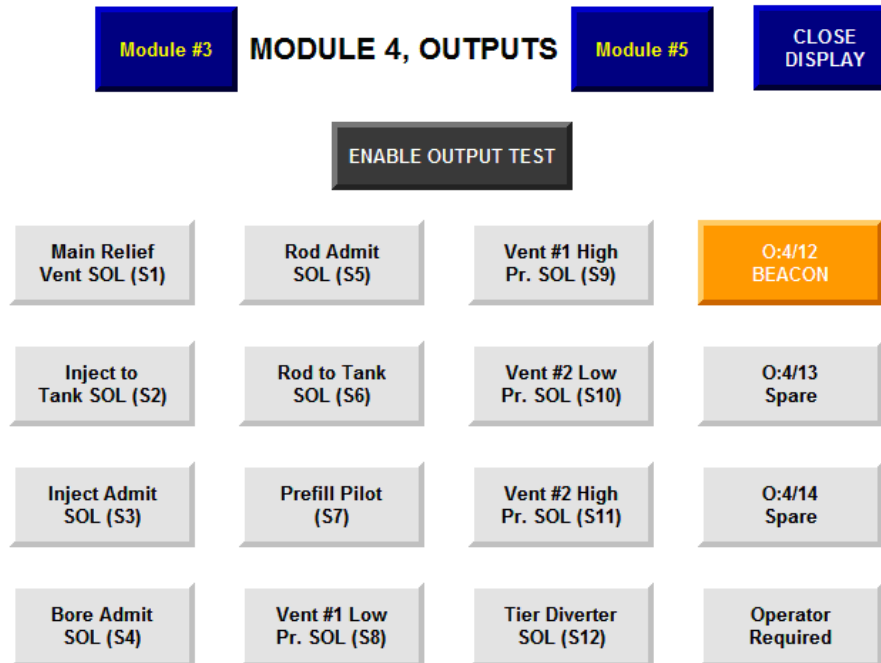
The above is a sample of an analog card. Note that on the left the “raw data” for each channel is displayed and on the right the scaled result is displayed. At the top of the screen is a button offering quick access to the next card, MODULE 2.

## SECTION 2 - OPERATING INSTRUCTIONS



Above is a sample of an input card. Note that the inputs that are “ON” are colored green.

## SECTION 2 - OPERATING INSTRUCTIONS



Above is a sample output card screen. Note that outputs which are “ON” are colored orange. The outputs may be individually tested by first touching the ENABLE OUPUT TEST button. Then, temporarily energize the desired output by touching the labeled button.

# SECTION 2 - OPERATING INSTRUCTIONS



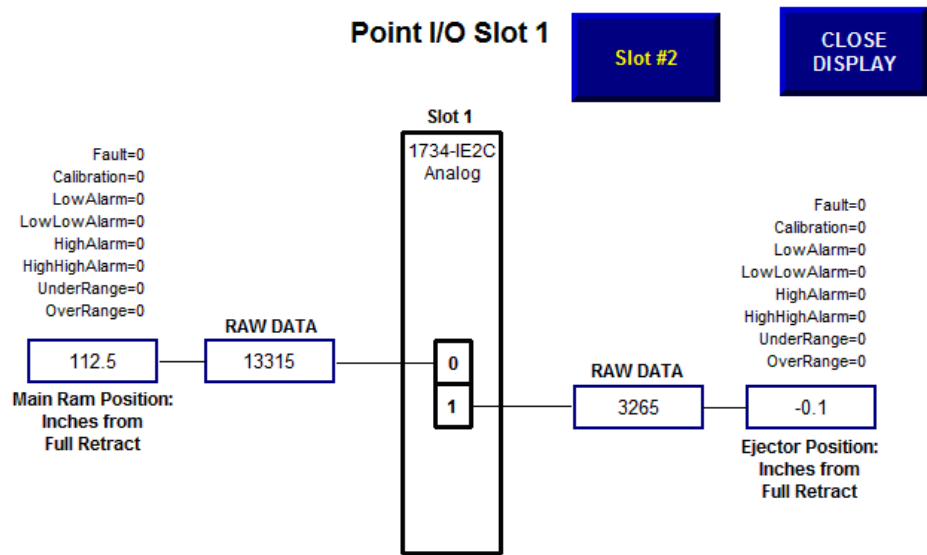
TOUCH DESIRED SELECTION

CLOSE  
DISPLAY

1734-AENT	1734-IE2C Analog	1734-IE2C Analog	1734-IB8 DC Input	1734-IB8 DC Input	1734-IB8 DC Input	1734-OW4 Relay	1734-OW4 Relay

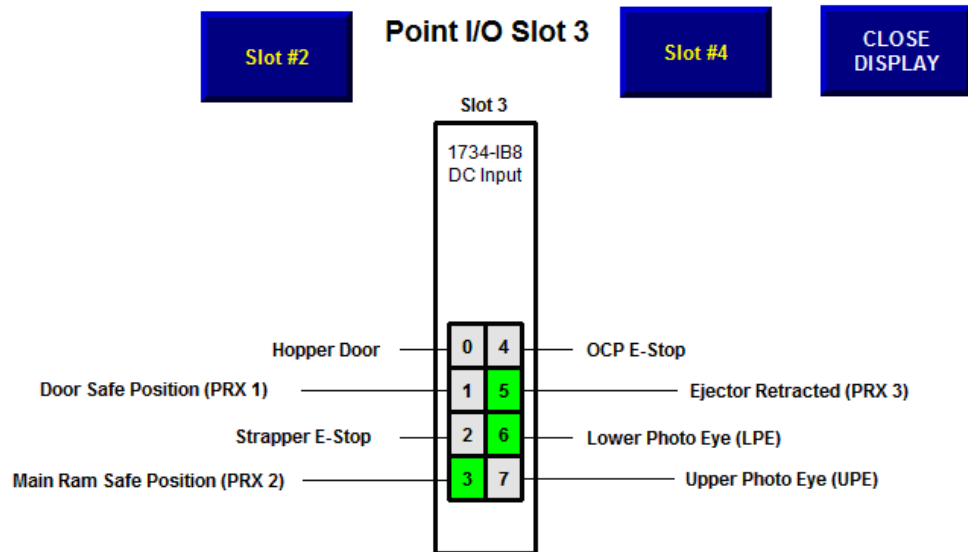
Above is the POINT I/O screen. Touch the desired module to access.

## SECTION 2 - OPERATING INSTRUCTIONS



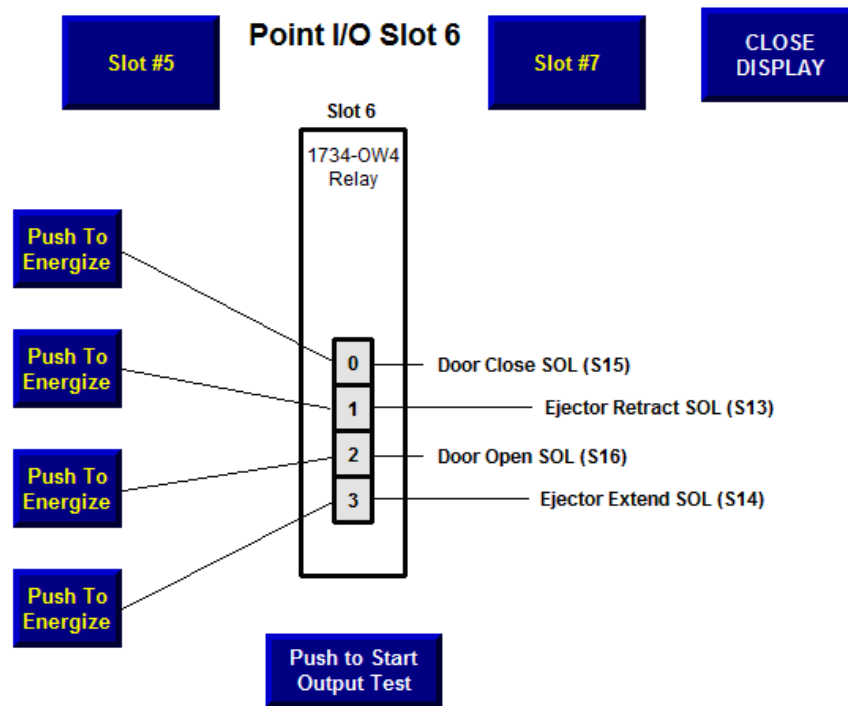
Above is a sample analog module for the point I/O. Note that both the raw data and scaled values are given. Also, the fault bits for each channel are displayed.

## SECTION 2 - OPERATING INSTRUCTIONS



Above is a sample input card for the point I/O. Note that the active inputs show green.

## SECTION 2 - OPERATING INSTRUCTIONS



Above is a sample output card for the point I/O. Energized outputs show green. Touch the Push to Start Output Test button to enable the test buttons. Hold the Push to Energize button to temporarily energize the desired output.

# SECTION 2 - OPERATING INSTRUCTIONS

## MACHINE START

1. Perform the pre-operation inspection and walk around to ensure workers are clear of the machine.
2. Insert the control power key and turn the switch to the ON position. After a short delay, the startup screen will be displayed.
3. Log in as instructed by supervisor.
4. Press the Controls on button.
5. Select the power unit screen and start the motor(s) as desired.
6. Select the material mode as required.
7. Place the material conditioner in place if required (optional equipment).
8. Start the conveyor.
9. Press the START AUTO button on the main screen to bale automatically.

## MACHINE SHUTDOWN

10. Turn off the conveyor system.
11. Cancel the automatic cycle.
12. Turn off the motor(s).
13. Turn the key switch to the OFF or HEAT position. The key may be removed in either position.

## MACHINE JAM PREVENTION

### INTRODUCTION

This Harris baler is built to bale a wide variety of materials. However, over its long operational service life, the operator may experience a few material jams at the knife or bridging in the hopper. The frequency and severity of these material jams is greatly influenced by inattention of the operator, composition of material, or other operational irregularities. The best ways to prevent the machine from jamming include precise operator judgement, proper maintenance, and attention to the flow of material into the hopper.

### JAM PREVENTIVE MEASURES

- Pre-sort material, removing questionable materials and foreign objects in the material.
- Ensure that the maximum size of material is LESS than the dimensions of the baler charge box opening.
- Make certain the material has the same general composition.

- Regulate the flow of material into the hopper. Keep the flow even and not too fast.
- Make certain the baler is in the correct mode selection for the material being baled.
- The operator/loader must remain alert and pay full attention to baler operation.
- Performance of regularly scheduled maintenance and proper adjustment of the baler components can decrease the chance of a material jam.

### NOTE

**ANSI Z245.5 requires that owner/ employer “provide instructions for addressing abnormal situation (e.g. bridging of the loading chamber or feeding chute, jam of materials)”.**

## UNJAMMING PROCEDURES IN THE HOPPER

14. Determine a material jam exists.
15. Shutdown baler and baler feeding system; then **LOCKOUT/TAGOUT (LOTO)**.
16. Always use OSHA compliant elevated working surface or platform for clearing material jams in the extension hopper. Use approved fall protection when working from elevated working surfaces or platforms. Serious injury or death WILL occur if you fall into the hopper.
17. Dislodge material that is causing the jam in accordance with employers procedure/ instructions.



**Always perform Lockout/Tagout (LOTO) procedures when clearing material jams. Always access the baler or its hopper in accordance with OSHA requirements.**



**Follow employers unjamming procedures should a material jam occur. DO NOT ENTER HOPPER until familiar with unjamming procedures. Never attempt to access the baler for any reason by climbing up the feed conveyor. Always use an OSHA compliant work surface or platform**



## **SECTION 2 - OPERATING INSTRUCTIONS**

to access the extension hopper to clear material jams.

Serious injury or death will occur if you ignore these safety precautions.

### **NOTE**

Only authorized personnel trained in safe operation and maintenance procedures should be allowed to operate, service or maintain the machine. This includes the clearing of material jams.

### **JAM AT THE SHEAR KNIFE AND CORRECTIVE MEASURES**

The high pressure alarm will notify the operator when an unusually large amount of material, foreign objects, or combination of both may prevent the shear knife from cutting the material and allow the platen to enter the bale chamber.

1. Stop the feed conveyor or material feed process immediately.
2. Select the Baler Manual screen.
3. Retract the platen halfway, observe the material in the hopper to see if it falls away from the shear knife.
4. Cycle the platen forward to see if the jam clears and the platen enters the bale chamber.
5. If the jam fails to clear:
  - a. Retract the platen approximately halfway.
  - b. Shut the machine down and **lockout/tagout (LOTO)** in accordance with OSHA and ANSI requirements.
  - c. Remove obstruction.



- **Serious injury or Death WILL occur if the baler is started and operated while someone is inside the machine. To prevent serious injury or death, follow OSHA requirements regarding Lockout/Tagout (LOTO) procedures.**
- **Never allow anyone to place any part of their body in the machine unless all shutdown and Lockout/Tagout (LOTO) procedures have been followed precisely.**

- **If any questions arise regarding the procedures for machine Lockout/Tagout (LOTO), check with supervisors before entering or allowing anyone else to enter the machine.**

### **PROPER SHUTDOWN PROCEDURES**

1. Turn off material feed system.
2. Stop power unit motors.
3. Turn console key switch to the off position.
4. Lock the main disconnect in the off position.
5. Turn main power supply off and lock out baler.
6. If entering the baler is planned, move the power interlock key from the Main Control Panel to the hopper and remove the personal key. Keep the personal in your possession at all times when it is not in the interlock device.

## **SECTION 3 - PREVENTIVE MAINTENANCE**

### **GENERAL**

Careful attention to proper preventive maintenance will ensure and extend trouble free operation of the unit. Particular attention and care given to the hydraulic system will extend the service life of the baler. The main objective of a preventive maintenance program is to anticipate and prevent operational malfunctions before they require extended shutdown for major repairs.

### **MAINTENANCE RECORDS**

Prepare and adhere to a regular maintenance schedule. Keep accurate records of all maintenance performed. A regular review of all maintenance records may provide an indication of potential problems. This manual contains a sample maintenance record chart for your convenience.

### **HYDRAULIC FLUID RECOMMENDATION**

#### **HYDRAULIC OIL**

To serve its purpose and provide long and satisfactory service, the hydraulic oil must possess desirable physical and chemical characteristics. Since stability under agitation and a wide range of temperature are very important, the crude from which the finished product has been processed should be of such a nature as to inherently possess these desirable characteristics. Premium hydraulic oils should be used in these hydraulic systems, and in addition to the above characteristics, be further fortified by application of selected additives to provide additional resistance to wear, corrosion, oxidation, decomposition, and foaming. All additive treatment should be done by the lubricant supplier with additives that are compatible with each other as well as the base oil into which they are blended.

#### **VISCOSITY INDEX**

This factor is very important. Oils having low Viscosity Index values tend to be sluggish at lower temperatures and thin out rapidly as operating temperatures increase. This change in viscosity to such a degree, results from the use of oils having Viscosity Index below that recommended. The result of using low Viscosity Index oils is unsatisfactory lubrication at operating temperature. It is recommended that oils used in these systems have a minimum Viscosity Index of 95. If polymers are used that act as Viscosity Index

improvers, the oils should have a permanent base Viscosity Index of 90.

### **LOW TEMPERATURE**

It is recommended that oils to be used in these hydraulic systems have a maximum viscosity of 4000 SUS at 50°F. Also, the ambient temperature of the power unit should be maintained at a minimum of 60°F when the system is to be operated.

### **NEUTRALIZATION NUMBER**

This characteristic is used in conjunction with other factors to determine the chemical and physical changes occurring within the oil charge as a result of extended use and service. The neutralization number of the new oil when applied should be given by the supplier and this information put on record by the operator. The change and rate of change occurring in the neutralization value is of utmost importance and it is this rate of change which is most important rather than the actual neutralization number of the new oil. Some additives are given a higher neutralization number than others and it is therefore recommended that the lubricant supplier assume responsibility for periodic sampling of the oil in the system, after which laboratory analysis should be made by the supplier and the results interpreted to the operator, advising as to whether or not the oil in use is safe and satisfactory for continued service. Most reputable oil companies maintain laboratories and technical staffs which are entirely capable of analyzing hydraulic oil samples and accurately advising the user as to the condition of (the oil charge. Most such oil suppliers render this service on a no-charge basis to the customer. We recommend the use of commercial laboratory services for analysis of routine oil samples taken on a regularly scheduled basis. The cost per sample may vary depending on laboratory service. The most important analysis are particle count, Spectro-chemical analysis, water content, and viscosity.

## **SECTION 3 - PREVENTIVE MAINTENANCE**

### **CONTAMINATION**

It has been estimated that as much as 70% of all hydraulic problems may be traced directly to the fluid. It is of utmost importance that all foreign matter be kept from the hydraulic oil. Invisible quantities of abrasive type contamination may cause serious pump wear, malfunctioning of pumps and valves, and sludge accumulations within the system in relatively short periods of time. Since the recommended hydraulic oils for these machines are fortified with various additives, it is essential that moisture and water be kept from the hydraulic oils and system. Additive treated oils have a definite affinity for water and therefore water contamination is far more critical than was true in years past when only straight mineral oils were available. We recommend that the oil to be used in the hydraulic system of these machines be an anti-wear hydraulic oil of ISO Viscosity Grade 46, and have the following

characteristics. Adequate evidence of ability of the oil to prevent undue pump wear may be shown by tests conducted as per ASTM D-2882 with a total weight loss of 50 mg. maximum. Other vane pump tests with varying size of pump and/or length of time will be considered on the basis of the evidence submitted. The base oil and its compounding should provide a finished oil that will not shrink or abnormally swell commercial nitrile elastomer compounds normally used in hydraulic sealing elements. A reputable lubricant supplier backed up by a reputable oil company is great assurance of obtaining high quality products, and generally speaking, higher quality is worth the higher initial cost.

VISCOSITY @ 104 DEG. F. SUS	284/346
VISCOSITY INDEX, MIN.	90
FLASH POINT, DEG F. MIN.	300
CORROSION COPPER STRIP (ASTM D 130)	1B
EMULSION TEST (ASTM D 1401)	PASS
RUST TEST (ASTM D-665 PROCEDURE A)	PASS
OXIDATION, HRS. (ASTM D-943)	1000 HRS
WATER, % (D-95)	NIL
FOAM TEST, ASTM D892, I, II, III, ML/ML, MAX	50/0
B.S. AND WATER (D-96)	NONE
ISO CLEANLINESS CODE	16/14
ADDITIVE DISTRIBUTION	COMPLETELY HOMOGENEOUS

## **SECTION 3 - PREVENTIVE MAINTENANCE**

### **HYDRAULIC FLUID TESTING**

Hydraulic fluid samples should be taken periodically for laboratory analysis. The actual sampling method is critical. It should be done based on ANSI Standard B93.19M(R1980). This standard is available from the National Fluid Power Association, 3333 N. Mayfair Road, Milwaukee, WI 53222.

Samples should be placed in a clean, dry, glass bottle with a non-shedding, screw-on cap, and labeled with the date, type of fluid, and model and serial number of the machine.

Two identical samples should be taken. One for laboratory analysis and one for your own preliminary analysis while you are waiting for the lab report. After your sample has been allowed to stand for 20 or 30 minutes to allow all air bubbles to dissipate, visually inspect by holding the bottle up to the light to check for debris in the oil and for whether the oil is clear or cloudy.

Any debris is an indication of a severe solid contamination problem, the source of which must be located and corrected immediately. Common sources of this kind of contamination may be component wear, unsealed reservoir covers, or dirty air breather filters.

If the sample is the least bit 'cloudy' it is an indication of water contamination, the source of which must be found and eliminated immediately. Common sources are inadequate outdoor storage, unsealed reservoir covers, damaged, leaking heat exchangers, or condensation.

A "BLOTTER SPOT TEST" may also be performed to test for OXIDATION. Place a drop of oil on a piece of white blotter paper. Wait 20 to 30 minutes for oil to disperse on paper.

### **NOTE**

**The Blotter Test will provide an indication that a more complete test is necessary.**

**A. If the blotter remains colorless or develops only a light yellow ring, oxidation is under control.**

**B. If color develops but is uniform throughout, the oil is still serviceable but should be checked for correct additive content.**

**C. If the sample shows distinct rings the fluid should be changed.**

**D. If a distinct dark spot remains in the middle, but a lighter colored oil migrates outward in the blotter paper, the oil is about to dump (or already has) sludge or other by products into the system. The time for replacement of this fluid has already passed.**

**Kits are available from your fluid supplier to test for acid content in much the same way you would test the condition of swimming pool water. A shift in acid content may indicate a breakdown in the fluid.**

### **NOTE**

**Keep accurate, dated records of all information gained from these tests.**

## **SECTION 3 - PREVENTIVE MAINTENANCE**

### **LUBRICANT**

The lubricant recommended for all lubrication points on the baler should have the characteristics of Wearmaster 45 or equal with viscosity range dependent upon the ambient temperature as shown,

<b>Operating Temperature</b>	<b>Recommended Grease</b>
32 Deg. F. and above	KG451-2
0 - 32 Deg. F.	KG451-1
Below 0 Deg. F.	KG451-0

Typical specifications of this lubricant are as follows:

<b>INSPECTIONS</b>	<b>TYPICAL SPEC.</b>
Base Soap	Lithium 12-hydroxy
Penetration, worked	290 - 320
Dropping Point	360 Deg. F.
Texture	Smooth-Slight Tac
Color	Red
Water Resistance	Excellent
Oxidation	Excellent
Shear Stability	Excellent
Low Temp. Performance	Excellent
Viscosity SUS, @ 100 Deg. F.	1200
Rust Test, D-1743	1,1,1
Timken OK load, # min	45

### **LINER INSPECTION AND REPLACEMENT INFORMATION**

The main ram bottom liners should be replaced when the base liner and strip liners are reduced to 1/4" thickness. As a general rule, the main ram liners will be replaced two or three times before it becomes necessary to replace the floor strip liners and bale chamber liners. The side wall liners will last approximately two to three times longer than the floor strip liners.



### **DAILY SCHEDULED MAINTENANCE**

1. Check Hydraulic Oil tank level and add oil if necessary.
2. Check hydraulic hose connections for oil leaks. Inspect hoses for damage.
  - a. Pump to valve block.
  - b. Oil Cooler.
  - c. Combo door cylinder.
  - d. Strapper.
3. Check all pipe flange connections for oil leaks. Tighten bolts, replace O-ring seal, tighten drain plug.
  - a. Valve block.
  - b. Main ram cylinder.
  - c. Side ram cylinder.
  - d. Tubing connection between tubes.
  - e. Hydraulic pumps.
  - f. Pressure relief valves.
  - g. Check valves.

## **SECTION 3 - PREVENTIVE MAINTENANCE**



4. Check cylinder rod seal for leakage.
  - a. Main Ram.
  - b. Side Ram.
  - c. Combo Door.
5. In cold weather operation, check oil temperature to make sure oil heaters maintain the minimum oil temperature of 60°F.
6. With power unit running, check filter element condition. If the filter pressure is more than 20 PSI, replace the oil filter elements.
7. Check for loose or broken bolts. Tighten or replace if necessary.
  - a. Cylinder mounts.
  - b. Main Ram cylinder rod bolting flange and mounting stud.
  - c. Side ram cylinder rod bolting flange and mounting stud.
  - d. Pipe clamps.
  - e. Safety covers.
  - f. Combo Door Levis pins and retainers.
  - g. Shear blade adjustment.
  - h. Shear blade adjustment bolts.
  - i. Hopper bolts.
  - j. Main ram hold down bars, bolts.
8. Check for structural damage, stress cracks or broken welds.
9. Check all access door safety interlock switches for correct function.
10. Clean out and remove any foreign material that has accumulated behind the Main Ram, Side Ram or Combo Door.



**Do not attempt to defeat any interlock switches, or allow a machine with overridden switches to be operated. Doing so could result in severe personal injury or death.**

11. Clean photoeye and laser lenses with glass cleaner and a soft clean cloth. Make sure photoeyes and lasers are working.

### **MECHANICAL CHECKS**

1. Check for loose or broken bolts. Tighten or replace if necessary.
  - a. Cylinder mounts.
  - b. Ram bolting flanges or pin retainers.
  - c. Pipe clamps.
  - d. Safety covers.
  - e. Knife bolts.
  - f. Pin retainers on cylinder rod ends.
  - g. Bolt and pin retainers on hopper.
  - h. Inspection covers on oil tank. (man hole).
2. Check proximity switches, linear transducers and laser for loose bolts or jam nuts.
3. Remove any foreign material that has accumulated:
  - a. Around the shear.
  - b. Behind the main ram/eject ram/combo door.
  - c. Under the sides.
  - d. In the follower guides (when applicable).
  - e. Around the proximity switches, linear transducers and laser.
4. Check bottom of clamp for excessive wear on each side.

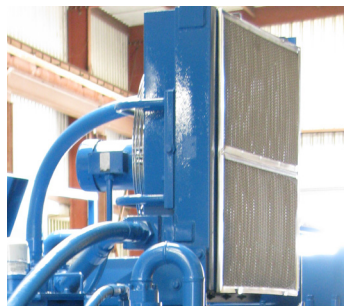
### **WEEKLY SCHEDULED MAINTENANCE**

1. Perform all daily maintenance.
2. Inspect hydraulic tank breather element and replace if necessary.

## **SECTION 3 - PREVENTIVE MAINTENANCE**



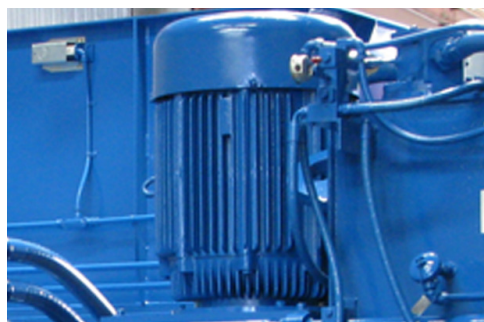
3. Use forced air to clean out oil cooler fins.



4. Check shear blade condition and adjustment. Adjust or rotate blades if necessary. (Refer to service and repair section for proper procedure.)

### **MONTHLY SCHEDULED MAINTENANCE**

1. Perform all daily and weekly maintenance.
2. Use forced air to clean electric motor air vents.



3. Check proximity switch adjustment.
  - a. Main Ram.
  - b. Side Ram.
  - c. Combo Door.



4. Inspect Main Ram Bottom Slider Shoe for excessive wear.
5. Inspect bale chamber liners for gouging and excessive wear.
6. Inspect Combo Door guide bars for excessive wear.



## **SECTION 3 - PREVENTIVE MAINTENANCE**

### **ANNUALLY SCHEDULED MAINTENANCE**

1. Perform all daily, weekly and monthly maintenance,
2. Drain hydraulic oil from tank with all cylinders retracted.



**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work, unless the baler is shut down and locked-out/tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**



**Do not enter hydraulic tank without proper ventilation and personal protection equipment per hydraulic oil manufacturer's recommendations and OSHA regulations.**

Remove access cover. Completely clean the inside of the reservoir with non-flammable compatible cleaning solvent. Make certain all surfaces are clean and dry. Inspect the inside of the tank for cleaning materials left behind. Install new seals on cover and replace cover.

3. Clean tank magnets.

### **NOTE**

**If reusing existing oil, it should be checked by a laboratory to make certain it meets the hydraulic fluid specifications required.**

If existing oil is reusable, it should be filtered through a minimum of a 5 micron filter before being put back into the hydraulic reservoir.

4. 4. Lubricate all electric motor bearings as recommended by motor manufacturer (It is recommended this only be done by a qualified electrician or electric motor technician).



## **SECTION 3 - PREVENTIVE MAINTENANCE**

# **SECTION 4 - SERVICE & REPAIR**

## **INTRODUCTION**

This section provides service personnel with the necessary information to correctly service the Baler. SAFETY is of the utmost importance to HARRIS. All service personnel **MUST KNOW ALL** of the SAFETY requirements and practices to safely operate the baler before attempting to work on the machine. The Service and repair guidelines in this manual not only describe what to do, but also give the safest known method. If you have questions regarding these instructions or safety precautions, contact HARRIS 340 Jekyll Road, Baxley, GA. 31513 (800) 447-3526 **BEFORE** starting the procedure.



**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work unless the baler is shut down and locked-out/tagged-out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

### **NOTE**

**Regular service and proper repair is essential for the reliable and safe operation of all mechanical equipment.**

Service guidelines and repair practices described in this manual are effective methods of performing service.

Deviation from the prescribed guidelines could cause damage to the baler, render it unsafe, or endanger the safety of the operator or service personnel. However, remember that these guidelines are not all inclusive because of all the variations in baler installations. It is impossible for HARRIS to know, evaluate and advise service personnel of all possible methods in which service could be done, or of every possible hazard and the consequences of each method. Anyone who uses a service or repair guideline which is not recommended by HARRIS must be completely satisfied that neither maintenance personnel nor the operator's safety will be jeopardized by the method selected, and take full responsibility for the action or consequence that the action may create.

## **PRIOR TO PERFORMING ANY SERVICE OR REPAIR**



**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work unless the baler is shut down and locked-out/tagged-out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

1. Make certain lifting devices, chains, hooks and slings meet the capacity requirements needed to perform the lift.
2. Whenever disassembling any hydraulic line, valve or cylinder:
  - a. Be sure to collect the hydraulic fluid which will drain from the loosened connection.
  - b. Make certain there is no pressure on the fluid in the location of the work.
  - c. Break siphon by removing plug to prevent tank drainage.
  - d. Cover openings to prevent contamination or damage.



**Hydraulic Fluid may be hot. Could cause burn if gets in contact with skin.**

## **PREPARATION FOR SERVICE**

Preparation is a very important factor for efficient and safe service and repair work. Cleaning the work area before starting to work will make it easier to perform the necessary service and will reduce the possibility of misplacing parts and tools.

Harris recommends the entire baler surface in the area to be serviced and the surrounding work space be cleaned before starting. Very often cleaning will uncover potential trouble sources. A check for correct tools and required replacement parts should be made before the work is started to reduce downtime for the service procedure.

Protect investments and ensure maximum reliability. Insist on genuine Harris parts.

## **SECTION 4 - SERVICE & REPAIR**

### **DURING SERVICE AND REPAIR**

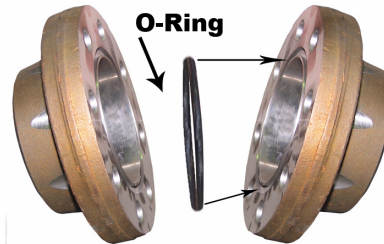
1. Always wear safety glasses and use proper safety shields, clothing, etc.
2. Never place any part of the body in a potential pinch point when lifting, adjusting, or removing parts.
3. Always stand clear when a lifting device is used.

### **DURING REMOVAL, DISASSEMBLY AND REPAIR**

1. Cleanliness is very important. Dirt is the number one cause of wear in bearings, bushings, and hydraulic components.
2. Inspect hydraulic components for leaks before cleaning. Dirt build-up on components can aid in tracing oil leaks.
3. Clean hydraulic connections before removal to prevent dirt from entering components.
4. Loosen hydraulic fittings slowly to release pressure.
5. Cap hydraulic fittings immediately after removal to prevent dirt from entering component or line and to prevent fluid from leaking.
6. Clean component in non-flammable, compatible solvent before disassembly.
7. Inspect component after cleaning for signs of wear or external damage.
8. When disassembling a component, note the position of each part as it is removed to aid in reassembly.
9. During disassembly, note the condition of each part as it is removed to aid in diagnosing problems and to help prevent them in the future.
10. Clean and inspect disassembled parts for wear, cracks, dirt, etc.
11. After cleaning and inspection, reusable hydraulic parts should be immediately coated with clean, fresh hydraulic fluid to prevent rust formation. If these parts are not going to be reinstalled immediately, they should be wrapped in a clean, lint-free cloth or paper to prevent nicks or scratches.
12. When re-packing a cylinder, or resealing a valve, replace all seals and O-rings that are disturbed during the repair. The price of a few seals is very little, compared to a return repair job.

### **DURING REASSEMBLY AND INSTALLATION**

1. Assemble parts in same position as removed.
2. Align parts accurately before mating.
3. Inspect O-Ring and seal grooves for sharp edges, nicks or burrs before installing new sealing parts.



4. Lubricate all new sealing parts with clean, fresh hydraulic fluid before installation.
5. Use care not to damage new sealing parts on reassembly.
6. Use correct torque values when re-assembling and installing components. See Capscrew Tensioning Chart and Torque Values Chart in this manual (Section 3 page 3-22).
7. Always check hydraulic fluid level in the hydraulic fluid tank after performing any service or repair of the hydraulic system.
8. Always lubricate components with grease fittings after they have been repaired and reinstalled.
9. Use only genuine Harris replacement parts.

### **LIFTING INSTRUCTIONS**

Because of the size and weight of many baler components, it is necessary to use a suitable lifting device for removal. Make certain that the lifting device, slings, chain, and hardware have the rated capacity to make the required lift. Stand clear of any component being lifted. Use a guideline as necessary for control during the lift.

### **NOTE**

**If you are unsure about lifting capacities or if exact weights of baler components are required, please contact:**

**Harris Service Dept  
Baxley, GA 800-447-3526**

## **SECTION 4 - SERVICE & REPAIR**

### **ELECTRICAL TESTING**

The electrical system used on this baler consists of various lights switches and wiring. Testing the components and wiring can be accomplished by checking for continuity.

### **CHECKING CONTINUITY**

A continuity tester is used to check the ability of a conductor to allow current to pass through it. A continuity tester uses a self-contained power source, and should never be used on a live circuit. Connect the clip to one side of the component to be tested and touch the probe to the other side. If the component has the potential to pass current (has continuity), the light will be on... if the component is not able to pass current, there is no continuity and the light will be off.



Some balers are equipped with programmable controllers which have input and output LED indicator lights. These indicate power flow. Each function has an address slot, and location. Example: Slot 1, location 4 (1-4). Refer to electrical schematic for function locations.

### **REPLACING AND ADJUSTING PROXIMITY SWITCHES**

The following procedure should be used to replace and/or adjust proximity switches used on the travel rods for the baler. These adjustments may become necessary when a switch fails and must be replaced, or when a switch becomes erratic because of age.



A proximity switch works by sensing a metal surface within a prescribed distance from the face of the switch. This range varies based on the type of switch being used. Over time, this range can weaken so that the switch does not sense quite as far as it did when it was new. When this happens, adjust the switch so that it is closer to the sensing surface.

Proximity switches come in two styles, normally open (NO) and normally closed (NC). A normally open switch is active, or sending a signal, only when the switch is sensing a metal object close to the face of the switch. A normally closed switch is active, or sending a signal when there is no metal object close to the face of the switch. The switch used in a particular position (NO or NC) is determined by its function, and should be replaced only with the same type switch.

These switches normally have an LED light in the end of the switch where the wire enters the switch. This light will come on when the switch is active and sending the signal to the PLC or computer.



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The easiest way to check for a faulty proximity switch is to remove the switch mount plate. This produces the ability to test the switch by placing a metal object against the face of the switch, to check for a change of State.

1. With the electrical connections still in place and the PLC on and supplying power to the switch, place a metal object, such as a flat screwdriver, against the switch and look for the LED light in the wire exit end of the switch to either go on or off. If this can

## SECTION 4 - SERVICE & REPAIR

be seen, proceed to the next step. If there is no change on the LED status, replace the switch.

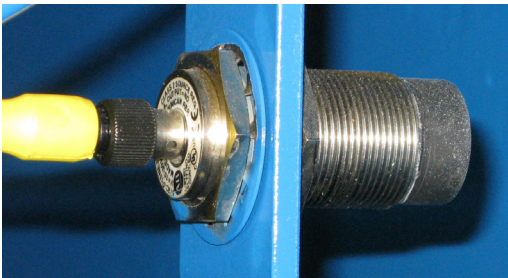
2. When the switch is working as outlined above, proceed to the PLC and check the input LED on the processor to verify that the signal is reaching it. To do this, find out which input line the proximity switch is connected to. This can be found by locating the wire number that carries the signal to the PLC, either by tracing the wires back from the switch itself, or by looking up the corresponding number on the electrical schematic. Once the input number is known, have someone place a screwdriver on and off the face of the switch and verify that the input light at the PLC comes on and off. If the light on the processor reacts to the change of state, the switch and connections are good. If there is no change, electrical connection from the switch to the PLC needs to be checked for loose or broken wires.

### REPLACING THE PROXIMITY SWITCH



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1. Remove the proximity switch. Be sure to turn off power to the machine. A lockout should be placed on the main power disconnect.



2. Remove the proximity switch from the mount plate by removing the lock nut that is on the underside of the mount plate.
3. Unscrew the quick-disconnect on the top of the proximity switch and remove the switch.
4. Replace with a new switch. The quick-disconnect cable and proximity switch are keyed to prevent incorrect installation.

5. Test the switch by turning on power to the PLC and checking for the state change as outlined in the troubleshooting section.
6. Reassemble the switch and mount plate and proceed to the adjustment section to complete the replacement procedure.

### ADJUSTING THE PROXIMITY SWITCH

1. With proximity switch mounted and in place, loosen the exposed locking nut on each side of the bracket to allow enough clearance to move the switch into the desired position.
2. Adjust the switch so the recommended distance between the switch and the mount plate (1/4" - 3/8") is achieved.
3. While holding the switch in place, tighten the lock nuts in place.
4. Check clearance to ensure no changes occurred while tightening the lock nuts in place.

### LASER DISTANCE SENSOR

The following procedure should be used to set or adjust the laser. These adjustments may be necessary if the laser is misaligned or foreign objects interfere with its operation. For proper adjusting and additional information, locate the laser from the list below. Ensure that the laser on the machine correctly corresponds to the procedures and descriptions provided.



**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work, unless the baler is shut down and locked out/tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service or operational personnel.**



**Visible and Invisible laser radiation. Do not stare into beam, Use of controls or, adjustments, or performance of procedures other than those provided in this manual may result in hazardous radiation exposure.**



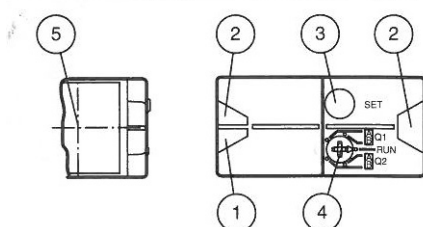
## SECTION 4 - SERVICE & REPAIR

### P & F LASER SET UP AND ALIGNMENT (If Applicable)

With the machine in manual operation. Fully retract the ram, turn the selector to Q2-A, push the teach button. Fully extend the ram, turn the selector to Q2-B, push the teach button. Turn the selector to run.



**Visible and Invisible laser radiation. Do not stare into beam, Use of controls or, adjustments, or performance of procedures other than those provided in this manual may result in hazardous radiation exposure.**



1	Operating display	green
2	Signal display	yellow
3	TEACH-IN button	
4	Mode rotary switch	
5	Laser output, Class 2 Laser	

### SENSOPART LASER SETUP AND ALIGNMENT (If Applicable)

#### Analog Setup

Position reflector at desired 0% point (4 mA). Press **T** several times until the menu LEDs QaS1 and QbS1 light up, then press the **S** until LEDs flash briefly. If no object is within the measuring range, or if the object cannot be detected, QaS1 and QbS1 flash Press **T** for the next setting or leave the menu with **S** and **T**.

Position reflector at desired 100% point (20 mA). Press **T** several times until the menu LEDs QaS2 and QbS2 light up, then press **S** until LEDs flash briefly. Press **T** for the next setting or leave the menu with **S** and **T**.

#### Fast / Slow Setup

Press **T** several times until LED SLOW (orange) flashes.

Press **S** and keep pressed until red LEDs stop flashing (approx. 3 s).

If LED SLOW is flashing slowly >>SLOW - mode

If LED SLOW is flashing quickly >>FAST - mode

Slow mode: Higher reproducibility, reduced switching frequency.

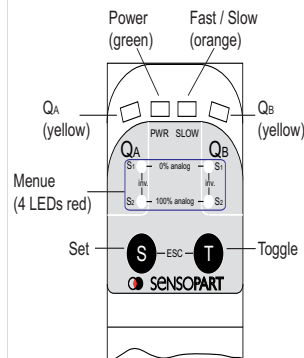
## NOTE

**For detailed information regarding lasers, please reference the electrical schematic.**

#### Top Face of "Sensopart" Laser

Anzeigen und Bedienung  
Signal indicators and buttons  
Affichages et touches

155-01362



## SECTION 4 - SERVICE & REPAIR

### SHEAR BLADE CONDITION/CLEAR- ANCE

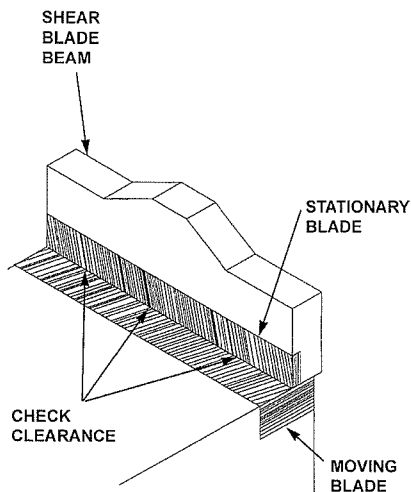
To check the blade wear or cutting edge condition use Gauges. Place the gauge on the blade edge. If the gauge has a gap or will rock on the cutting edge, the blade is in usable condition. If there is no gap and the gauge will meet on both surfaces, the shear blades need to be rotated or replaced.

#### NOTE

**Rotate or replace shear before adjusting blade clearance.**

The correct shear blade clearance is from .002 to .020. The maximum clearance of .040 is allowable depending on the material being cut. To check the blade clearance, position the moving blade on the main ram directly under the stationary blade.

Measure the space between the blade edges in three places; each end and the center. If the space exceeds the .020 limit, it will be necessary to adjust the blades when necessary.



### SHEAR BLADE ADJUSTMENT

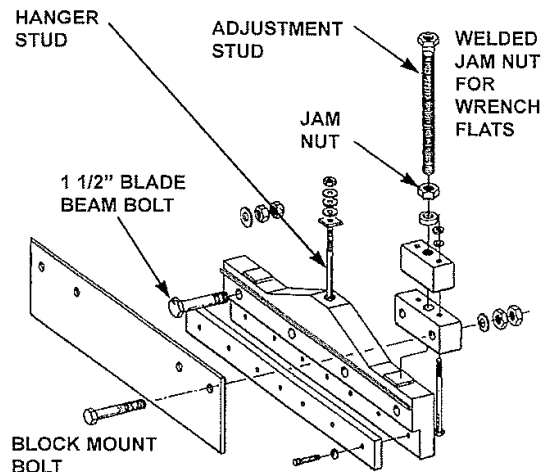
The shear blades are adjusted by raising and lowering the stationary blade on the baler frame.

1. Position the moving blade on the main ram directly under the stationary blade and shut the machine down.
  - 1.1. If present, remove the section of floor plate behind the knife beam.



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2. Loosen the four 1 1/2" blade beam bolts which bolt the blade beam to the support plate on the baler frame. If operator station is over press box, remove cover plate to access blade beam bolts.
3. Loosen the hanger lock nut so the hanger stud will not be preloaded during adjustment. Loosen the 1 1/2" jam nuts on both blade beam adjustment studs
4. Turn the adjusting studs clockwise to lower the blade. Rotate both adjusting studs the same amount and check shear blade clearance until the correct clearance ranging between .002 and .020 is achieved.
5. Tighten the jam nuts on both studs and the four blade beam bolts. Tighten the lock nut on the middle hanger stud. Torque the four blade beam bolts to 2350 ft.lb. (3186 Nm).
6. Recheck blade clearance to make sure blade did not move while the bolts were being tightened.
7. Start the baler and manually extend and retract the main ram to be sure the shear blades are correctly adjusted.



## SECTION 4 - SERVICE & REPAIR

### NOTE

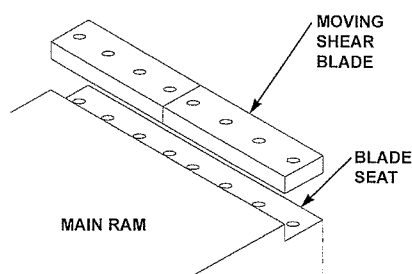
As the main ram and floor liners wear, it will be necessary to lower the fixed shear blade to keep the shear blades properly adjusted. As the fixed blade is adjusted down, a lip is formed between the back of the blade beam and the top of the bale chamber which may cause a hang-up problem when retracting the main ram.

The blade beam hanger stud will limit how far the blade can be adjusted down, however the lip should never exceed 1/4". When some hang-up is experienced or the lip reaches the 1/4" space, it will be necessary to replace the shoes on the bottom of the main ram.

### NOTE

Each time the shear blades are adjusted, the main ram hold down bars must be adjusted.

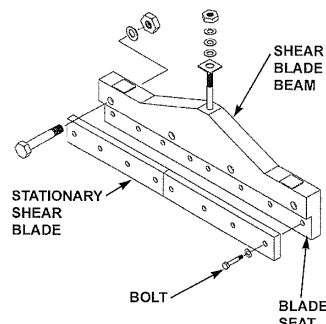
1. Clear the hopper and bale chamber. Fully eject the bale.
2. With the baler in the manual mode, position the main ram at about half stroke in the charging box.



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3. Sweep out the hopper and clean the area around both shear blades.
4. Loosen and remove the eight bolts which hold the shear blades on the main ram and carefully remove the blades.

5. Clean the blade seat, check for damage on the main ram, blade seat, and threaded bolt holes.
6. Rotate the shear blades or replace the blades if all cutting edges are worn. Position the shear blades on the main ram.
7. Replace any worn or damaged bolts. Apply lubricant to the blade mounting bolts. Insert the bolts and hand-tighten.
8. Tighten the eight mounting bolts to a torque value of 1200ft.-lbs.
9. Loosen the eight bolts which hold the stationary shear blades to the blade beam approximately half way. If the shear blades do not loosen from the beam, tap on the blades with a brass hammer. The shear blade should come away from the blade seat on the beam.
10. Place a hydraulic jack and blocking material under the center of each shear blade to support the blade. Remove the bolts and slowly lower the shear blades away from the beam.



11. Clean the blade seat, threaded holes and bolt threads.
12. Rotate or replace the shear blade. Using the hydraulic jack, block material and position the shear blades in the seat on the blade beam.
13. Replace any worn or damaged bolts. Apply lubricant to the mounting bolts, insert the bolts and hand tighten.
14. Torque the eight mounting bolts to 280 ft. lbs.
15. Remove all tools and start the baler. Check and adjust shear blade clearance.



## SECTION 4 - SERVICE & REPAIR

### HOLD DOWN BAR ADJUSTMENT NOTE

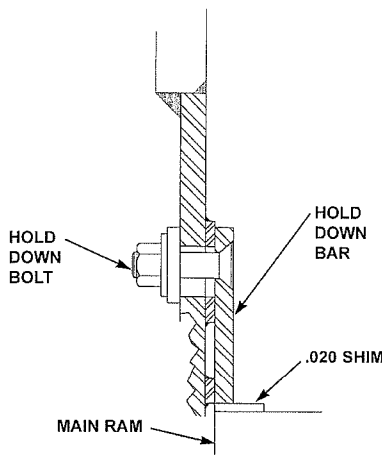
**Should be Performed following blade adjustment.**

1. Set the baler in the manual mode and position the main ram so the shear blades meet. Shut the baler down.



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2. Place a temporary shim of thickness less than blade clearance between the hold down bar and the top of the main ram at the front and back of the main ram.
3. Loosen the hold down bar bolts and push the hold down bar down onto the temporary shims.
4. Tighten and torque the bolts to 800 FT-LBS the proper torque value.
5. Repeat the process on the opposite side hold down bar.



### MAIN RAM BOTTOM LINER REPLACEMENT

1. Remove all material from the bale chamber and feed hopper. Sweep out the floor and bale chamber
2. Set the baler in the manual mode and position the main ram so there is a 4" to 6" space between the shear blades.



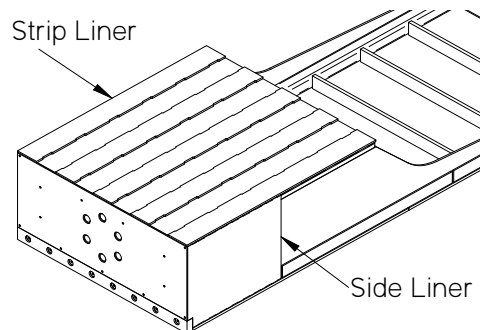
**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work, unless the baler is shut down and locked-out/tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

3. Remove the hold down bars from both sides of the machine.
4. Remove the ram from the baler. (See page 4-9)
5. Side liners will need to be removed before removing floor liners.



**Take all fire safety precautions, including having fire extinguishers easily accessible at all times.**

6. Use a grinder, cutting torch, or air arc to remove the welds on the front and back edge of the ram.



7. There are slots in the bottom of the ram with fillet welds which hold the liner to the ram. These must be removed.
8. Remove the liners from under the ram after they are cut free.

## **SECTION 4 - SERVICE & REPAIR**

Use caution when cutting so the baler structure is not damaged, causing major problems for the liner replacement process.

9. Check all surfaces for cutting scars, and remaining weld. It may be necessary for damaged area, make certain all surfaces are smooth, clean and dry.
10. Replace liner strips under the main ram. Lower the main ram onto the liner strips.
11. Weld the liners to the ram on both ends and in the plug hole slots.
12. Replace the hold down bars and adjust them to the correct clearance. (Refer to the adjustment procedure).
13. Adjust the shear blade clearance. (Refer to the adjustment procedure).

3. Use a grinder, cutting torch, or air arc to remove the plug welds on the base liner. Use caution when cutting so the baler structure is not damaged, causing major problems for the liner replacement process.
4. Remove the base liner from the baler floor.
5. Check all surfaces for cutting scars, imperfections, and remaining weld. It may be necessary to build up any damaged area. Make certain all surfaces are smooth, clean and dry.
6. Slide replacement liner into position. Starting at one end, weld the end of the liner and each plug hole working down the length of the liner to make sure the liner tightens down to the baler floor correctly.

### **NOTE**

**It is important to make sure the liner mates the baler surface correctly. It will be necessary to strike the hot weld area with a heavy hammer to properly seat the liner at the welded point.**

### **FLOOR LINER REPLACEMENT**



1. Remove all material from the bale chamber and feed hopper. Sweep out the floor and inside of the baler.
2. Set the baler in the manual mode, position the main ram in the fully retracted position and shut the machine down.



- **Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work, unless the baler is shut down and locked-out/tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**
- **Take all fire safety precautions, including having fire extinguishers easily accessible at all times.**

7. Weld the rest of the strip liners in place on the baler floor.
8. Grind all welds smooth so the main ram bottom liner has a smooth surface to run on.
9. Remove all service equipment and tools from inside the baler,
10. Loosen the main ram hold down bar bolts. Run the main ram forward until the shear blades meet. Adjust the main ram hold down bars. (Refer to the adjustment section).
11. Adjust the shear blade clearance. (Refer to the adjustment section).

### **MAIN RAM REMOVAL**

1. Remove all material from the bale chamber and feed hopper. Sweep out the floor and inside of the baler.
2. Place the baler in manual mode. Position the main ram in the fully extended position and shut the machine down.



**Never place any part of the body in a potential pinch point. Never enter the baler at any point to perform service work, unless the baler is shut down and locked out/tagged out in accordance with**

## **SECTION 4 - SERVICE & REPAIR**

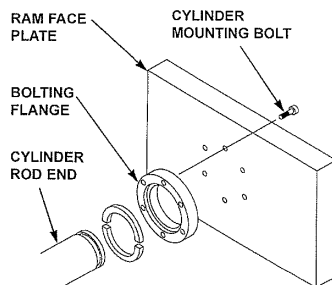
**OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

3. Remove the six bolts which connect the main ram to the cylinder rod end.

### **NOTE**

**Whenever disassembling any hydraulic line, valve or cylinder:**

- a. Be sure to collect the hydraulic fluid which will drain from the loosened connection.
  - b. Make certain there is no pressure on the fluid in the location of the work.
  - c. Break siphon by removing the plug to prevent tank drainage.
  - d. Cover both sides of the open coupling to prevent contamination or damage.
4. Set the baler in the manual mode and slowly retract the cylinder leaving the main ram fully extended. Shut down the machine.
  5. Unbolt and remove the main ram cover plate to gain access.
  6. Allow the oil to cool and remove the hydraulic connections to the cylinder.



7. Support the rear end of the cylinder and remove the rear cylinder pin.
8. Use a lifting device to remove the cylinder from the baler.
9. Pull the main ram back until it can be removed.
10. Remove the main ram.
11. Reassemble the baler in the reverse order of disassembly.

### **COMBO DOOR**

The combo door is held in place with abrasive resistant guide bars. The guide bars ride in grooves on the baler

frame. The guides can be replaced by removing bolts and the door can be removed from the baler by removing the cylinder connection and guides.

With the door removed, liners are easily replaced. The front liner can be replaced without removing the door.



## **SECTION 4 - SERVICE & REPAIR**

### **SIDE RAM REMOVAL**

1. Remove all material from the bale chamber and feed hopper. Sweep out the floor and inside of the baler.
2. Set the baler in the manual mode. Position the side ram in the fully extended position and shut the machine down.
4. Tighten rod end bolts to 280 FT-LBS.
5. Start the machine. Ensure that the travel rods or lasers work properly.



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3. Use a jack or blocking material to support the front of the side ram cylinder.
4. Remove the four bolts which hold the ram to the cylinder rod end, along with washers and spacer tubes.
5. Retract the cylinder rod and shut the baler down.



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6. Use a short length of chain and the bolt holes to form a loop to connect a chain or cable to the face of the ram.
7. Use blocking material to keep the ram from dropping and damaging the strapper during ram removal.
8. Use a fork lift to pull the side ram from the baler.

### **SIDE RAM INSTALLATION**

1. Use a fork lift to slide the side ram into the baler.
2. Bolt the side ram to the cylinder rod end.
3. Remove the blocking material from the front of the cylinder.

## SECTION 4 - SERVICE & REPAIR

### TEST FOR INTERNAL LEAKAGE OF CYLINDER

#### NOTE

This test applies to all HARRIS cylinders, the method used in blocking the rod will be different.

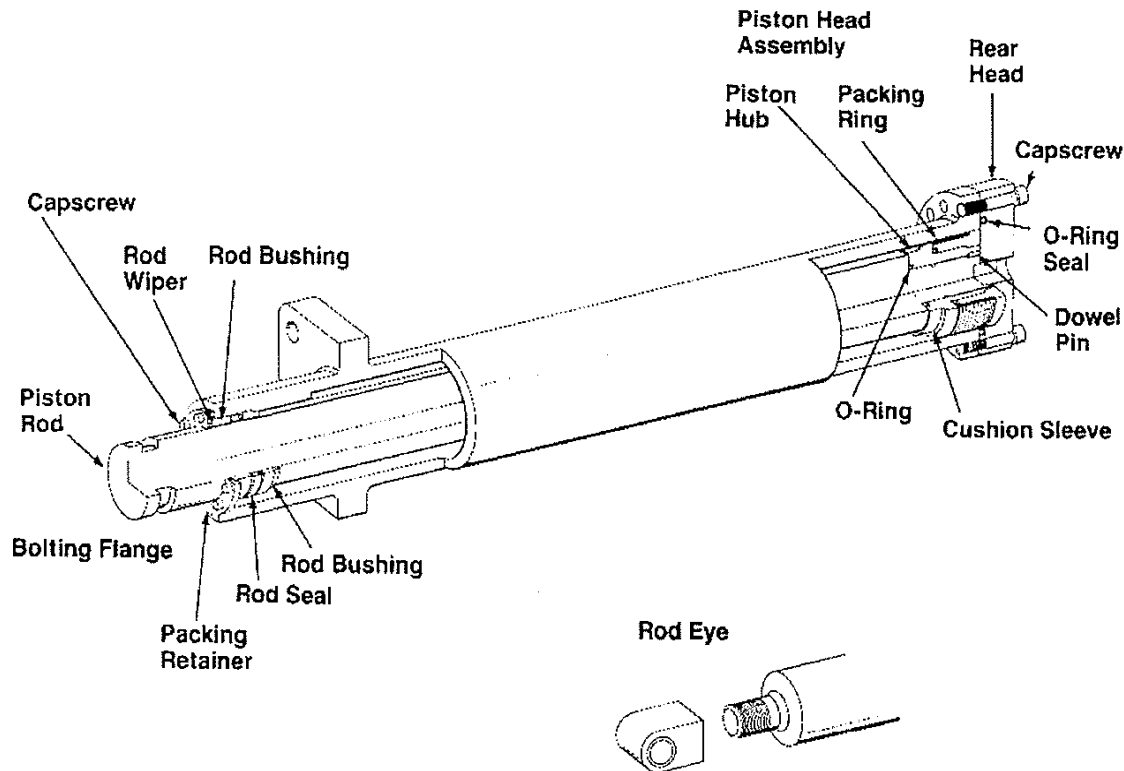
1. Set machine on manual mode.
2. Using only one pump, extend the piston rod to approximately 1/2 of the rod travel distance and shut machine down.
3. Block the piston rod to prevent it from moving forward.
4. Start the machine using only one pump.



Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.

5. Move the control lever to the forward position and hold. If the pressure gauge reading is considerably less than the specified operating pressure of the machine, internal cylinder leakage is possible.
6. If the pressure reading was low and the cylinder has internal leakage, there will be a rushing, or spraying sound (like a water fall) caused by oil escaping past the packing ring (or piston seals on smaller cylinders).

#### TERMS YOU NEED TO KNOW



## **SECTION 4 - SERVICE & REPAIR**

### **CYLINDER PACKING RING REPLACEMENT**

<b>Parts Required</b>	Packing Ring
	O-Ring, Piston Hub
	O-Ring, Rear Head
	Dowel Pin
	O-Ring, Pipe Coupling Flange

#### **NOTE**

**Most cylinders may be repaired while in the machine.**

1. Set machine on manual mode.
2. Position the ram so the rod eye or bolting flange is accessible for removal.
3. Shut down machine, secure machine and work area.



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

4. Remove rod eye or bolting flange.
5. Restart the machine using proper start-up procedure and fully retract the cylinder rod.

#### **NOTE**

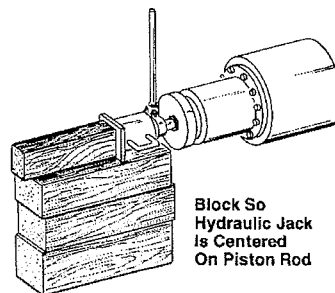
**Whenever disassembling any hydraulic line, valve or cylinder:**

- a. Be sure to collect the hydraulic fluid which will drain from the loosened connection.
  - b. Make certain there is no pressure on the fluid in the location of the work.
  - c. Break siphon by removing plug in return line on top of tank to prevent tank drainage
  - d. Cover the flange ends of both the piping and the cylinder to prevent contamination or damage.
6. Shut machine down, disconnect and remove the piping on the rear head of the cylinder by unbolting the piping flange



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

7. Match mark rear head and tube so it can be correctly replaced later, remove capscrews on the rear head and remove the rear head of the cylinder using a sling and suitable lifting device.
8. Secure ram to prevent forward movement.
9. Block a jack against the ram cylinder rod to the piston end of the cylinder tube.

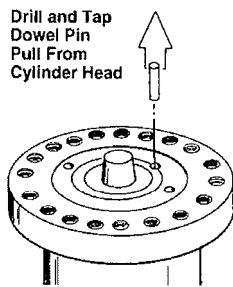


10. Locate and grind weld from dowel pin with disc grinder.
11. Drill & tap the dowel pin for a 3/16" bolt. Pull the dowel pin from the cylinder head.

## SECTION 4 - SERVICE & REPAIR

### NOTE

Smaller dowel pins can be drilled out.



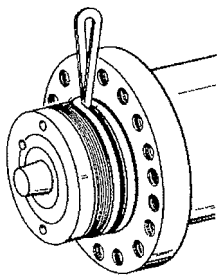
### NOTE

It may be necessary to secure the piston rod so it cannot rotate while working on piston head.

12. Push the cylinder rod far enough so most of the packing ring clears the cylinder tube end. Support the cylinder rod and packing ring so it will not move damaging the piston rod and push the piston rod until the packing ring has cleared the cylinder tube.

### NOTE

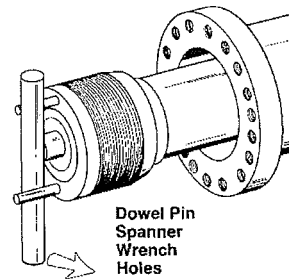
Support Piston Head to prevent damage when removing.



13. Insert a dowel pin in each spanner wrench hole and, using a pry bar, rotate the packing ring counterclockwise, slowly until it is removed.

### NOTE

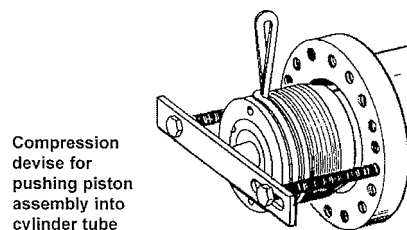
Use pry bar to rotate packing ring.



### NOTE

Larger diameter cylinders may contain 2 or 4 tapped holes (3/4" x 10 threads).

14. Clean all threads and exposed piston hub thoroughly with compressed air.
15. Install a new O-ring seal on the piston hub.
16. Install the new Teflon packing ring by rotating it slowly clockwise on the piston hub. When the packing ring is snug against the piston hub, use the dowel pins and pry bar to tighten securely.
17. On horizontal mounted cylinders remove the jack and blocking from the piston rod end. On vertical mounted cylinders the jack must be released slowly as the piston is being installed in cylinder tube.
18. Align the piston head with the cylinder case tube. A lifting device may be necessary to support the piston head during alignment.



19. The piston head assembly should be pushed into the cylinder tube slowly and carefully to prevent damage to the Teflon packing ring during the assembly procedure until it is flush with the cylinder tube end.



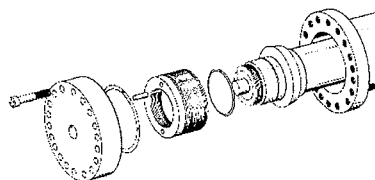
## SECTION 4 - SERVICE & REPAIR

20. Drill a new hole and insert a new dowel pin.

### NOTE

**Top of dowel pin should be recessed 1/2 the diameter of the dowel pin from piston head surface.**

21. Weld dowel pin in place using a E-Cu-Sn-C 1/8 welding rod and grind surface smooth. (welding should be done by a certified welder).
22. Push the piston head assembly in so the cushion piston is flush with the cylinder tube end.
23. Install a new rear head O-ring seal and bolt the rear head to the cylinder case tube.



### NOTE

**When tightening bolts refer to the bolt tensioning chart to obtain the correct bolt pre-load.**

24. Reconnect hydraulic line, install a new O-ring in tube flange and bolt together.
25. Replace siphon break plug in return line on top of oil tank.
26. Before operating the machine check hydraulic fluid level, add fluid if necessary.
27. Start machine using proper start-up procedure.
28. Set selector switch on manual or hand mode, slowly push control lever to (RETRACT) to fill the cylinder tube with oil.
29. Check hydraulic fluid level, add fluid if necessary.
30. With selector switch on manual or hand mode, slowly push control lever to (FORWARD).
31. Align piston rod to insert pin or attach bolting flange.
32. Shut down machine, secure machine and work area.



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

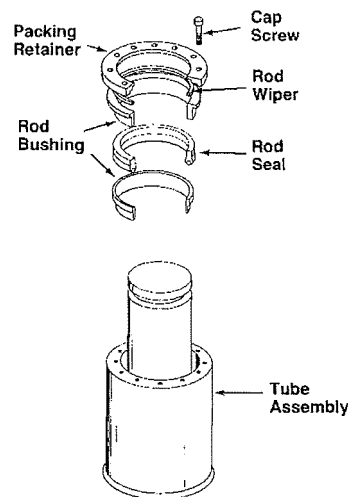
33. Insert rod end pin or attach bolting flange secure with locking bolts.
34. Release secured machine part to allow movement.

## CYLINDER ROD PACKING REPLACEMENT (POLY SEAL)

<b>Parts Required</b>	Rod Seal
	Rod Wiper
	Rod Bushings (if necessary)

### NOTE

**In most cases the seal may be replaced without removing the cylinder from the machine.**



1. Set machine on manual mode
2. Position ram for rod eye or bolting flange removal. (location may vary with different model HARRIS machines).
3. Shut down machine, secure machine and work area.



## SECTION 4 - SERVICE & REPAIR

### WARNING

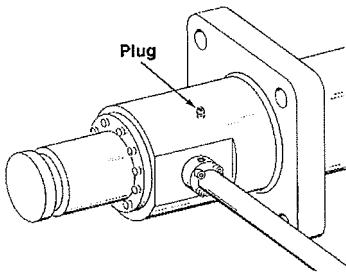
Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.

4. Remove rod eye or bolting flange.
5. Restart the machine using proper start-up procedure and completely retract the piston rod
6. Shut down machine, secure machine and work area.

### WARNING

Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.

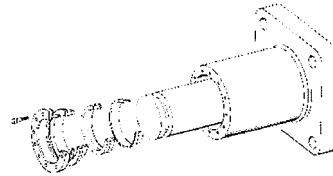
7. Make certain there is no pressure on the fluid in the location of the work by removing the pipe plug in the piping flange on the cylinder tube as shown in the illustration. (Use caution when removing plug) Contain the oil draining from the plug hole.
8. Break siphon by removing plug in return line on top of tank to prevent tank drainage.



9. Support the piston rod, unbolt and remove the packing retainer and rod bushing. Remove piston rod seal. **(NOTE: Insert capscrews into tapped holes provided in rod bushing for removal)** Contain the oil that will drain from the cylinder tube.
10. Inspect the cylinder tube, rod bushings, packing retainer, and piston rod for nicks, burrs or scratches. Sand any marks or scratches with 280

grit wet or dry sandpaper. If rod bushings show excessive wear they should also be replaced.

11. Oil the cylinder tube and new seal with clean hydraulic fluid or STP. Powdered graphite may be mixed with the oil for easier installation. For cold weather installation soften the seal by immersing it in hot water approximately 5 minutes then wipe dry before oiling.
12. Place the new seal and bushing on the piston rod, support the piston rod with a jack so it is centered in the cylinder tube. Make sure the seal is not put in backwards. (see illustration)



13. Slide the seal only into the cylinder tube. Using a 1" square x 6" wood block, wood hammer handle or rubber mallet, begin at the top and work around the seal alternating from one side to the other tap the seal into position in the cylinder tube.
14. After the seal is seated insert the rod bushing, it may be necessary to adjust the piston rod to position the rod bushing, tap the bushing into place using the same procedure used on the seal.
15. Insert a new rod wiper in the packing retainer, remove the jack and install the packing retainer.

### NOTE

**When tightening bolts refer to the bolt tensioning chart to obtain the correct bolt pre-load. (see page 4-22)**

16. Before operating the machine check hydraulic fluid level, add fluid if necessary.
17. Replace piping plug in the cylinder piping flange and in the siphon break in return line pipe on top of tank.
18. Start machine using proper start-up procedure.
19. Set selector switch on manual or hand mode, slowly push control lever to (RETRACT) to fill the cylinder tube with oil. Check hydraulic fluid level, add fluid if necessary.
20. Selector switch on manual or hand mode, slowly push control lever to (FORWARD) and position cylinder rod.

## **SECTION 4 - SERVICE & REPAIR**

21. Shut down machine, secure machine and work area.



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

22. Install rod eye and pin or bolting flange and secure.
23. Start machine using proper start-up procedure. Cycle the machine several times and check for leakage.

### **CYLINDER REMOVAL**

1. Set machine on manual mode.
2. Position the ram so the rod eye or bolting flange is accessible.
3. Shut down machine, secure machine and work area.



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

4. Remove the cylinder rod pin or bolting flange from the ram.
5. Restart the machine using proper start-up procedures and completely retract the cylinder rod into the cylinder.
6. Shut down machine, secure machine and work area.



**Never perform any maintenance or service unless the machine has been properly Locked out/Tagged out in accordance with the proper OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

### **NOTE**

**Whenever disassembling any hydraulic line, valve or cylinder.**

- a. **Be sure to collect the hydraulic fluid which will drain from the loosened connection.**
  - b. **Make certain there is no pressure on the fluid in the location of the work**
  - c. **Break siphon by removing plug to prevent tank drainage.**
  - d. **Cover openings to prevent contamination or damage.**
7. Remove the hydraulic piping from both ends of the cylinder.
  8. Secure the cylinder with a suitable lifting device.
  9. Remove cylinder mounting bolts and carefully remove the cylinder from the machine

### **NOTE**

**The cylinder port position for proper reinstallation.**

10. Perform any necessary repairs and replace the cylinder in the reverse order of disassembly.

# SECTION 4 - SERVICE & REPAIR

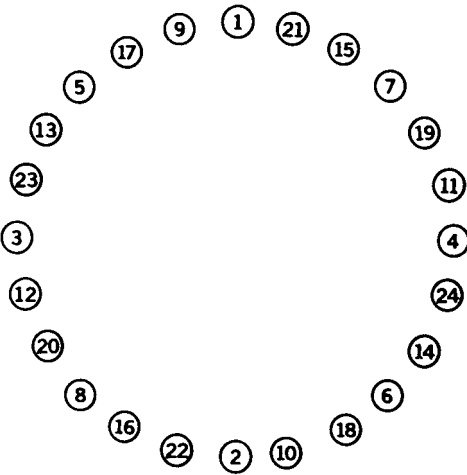
## PROCEDURE FOR TIGHTENING SCREWS

The following method should be used in tightening screws in order to obtain maximum clamping force, maximum preload, maximum fatigue resistance, minimum added stress from external loading, and an infinite number of cyclic loadings.

## RECTANGULAR PATTERN SEQUENCE








## ROUND PATTERN SEQUENCE



## SECTION 4 - SERVICE & REPAIR

### CAPSCREW TENSIONING CHART

	Usage Common	Common	Under 2"	Large Sizes Only
<b>Minimum Tensile Strength</b>	60,000 PSI	105,000 PSI	150,000 PSI	125,000 PSI
<b>Calculate Pre-Load Stress</b>	27,000 PSI	61,000 PSI	98,000 PSI	30,000 PSI
<b>Grade or Type</b>	SAE GR-2	SAE GR-5	SAE GR-8/Hex Head Socket	HARIS HEAD
<b>Capscrew Head Markings or Head Type</b>			 	
SIZE (INCHES)	TORQUE FT-LB (Kg m)	TORQUE FT-LB (Kg m)	TORQUE FT-LB (Kg m)	TORQUE FT-LB (Kg m)
1/4	3 (0.41)	8 (1.11)	12 (1.66)	-
5/16	7 (0.97)	16 (2.21)	26 (3.60)	-
3/8	13 (1.80)	29 (4.01)	46 (6.36)	-
7/16	20 (2.77)	44 (6.09)	71 (9.82)	-
1/2	31 (4.29)	69 (9.54)	110 (15.3)	-
9/16	43 (5.95)	96 (13.3)	154 (21.3)	-
5/8	60 (8.30)	135 (18.7)	217 (30.0)	-
3/4	106 (14.7)	239 (33.1)	383 (53.0)	-
7/8	170 (23.5)	383 (53.0)	615 (85.1)	-
1	254 (35.1)	571 (79.0)	920 (127)	-
1-1/4	505 (69.8)	1140 (158)	1820 (252)	-
1-1/2	860 (119)	1940 (268)	3110 (430)	930 (129)
1-3/4	-	-	-	1649 (228)
2	-	-	-	2530 (350)
2-1/2	-	-	-	5070 (701)
3	-	-	-	8890 (1230)
3-1/2	-	-	-	14270 (1974)
4	-	-	-	21470 (2969)
5	-	-	-	42300 (5850)
NOTE: Torque values are based on coefficient of friction of .15 with the calculated pre-load stress in the root of the thread on all bolts.				

## **SECTION 4 - SERVICE & REPAIR**

# SECTION 5 - TROUBLESHOOTING

## GENERAL

This section contains an outline for assisting service personnel in tracking down the cause when a baler develops a problem. The problem is listed along with a list of possible causes. A brief corrective action is given to assist in correcting the situation.



**Before attempting to take any corrective action, make sure all safety precautions are taken. Never attempt to enter the baler or make an adjustment unless the baler is shut down and locked-out/tagged out in accordance with OSHA standards. Not taking this precaution could cause death or bodily injury to service personnel.**

In the event that all checks are made and the problem cannot be corrected, contact the Harris Service Department at Cordele Ga. 800-710-4994 or Baxley GA. 800-447-3526.

## ELECTRIC SOLENOID VALVE

To manually energize the solenoid valve, use a welding rod or small screwdriver and depress the pin located on the end of the solenoid, as shown.

### NOTE

**Solenoid valves have different shapes but they all have a pin located in the end of the solenoid.**



## SAFETY DOOR SWITCHES

1. Locate the two switch actuators that are not hard wired to the machine. These switches should be located with the spare parts.

2. Using the small, socket head screws, attach one of the switch actuators (not wired to the machine) to the large mounting bracket previously installed on the guard.
3. Attach the actuator switch so that the magnetic strip (the surface opposite the predrilled holes) faces in towards the machine.
4. Locate the other half of the switch (the half wired to the machine).
5. Run the wire for the switch behind the strapper, control boxes and out of the way of all moving components.
6. Using the small, socket head screws, mount the wired switch to the small mounting bracket on the guard frame. Ensure that the magnetic portions of both switches align (see below).
7. Repeat this process for both guards.



## **SECTION 5 - TROUBLESHOOTING**

### **DIAGNOSTIC DISPLAY**

<b>MESSAGE</b>	<b>PROBLEM</b>	<b>CAUSE/SOLUTION</b>
CONTROL POWER OFF.	Baler will not run.	A. Rotate key to control power "ON".
STRAPPER E-STOP.	Machine will not run.	A. Strapper Emergency Stop Button depressed/activate.
CONVEYOR E-STOP.	Machine will not run.	A. Conveyor Emergency Stop Button depressed/activated.
HOPPER DOOR E-STOP.	Machine will not run.	A. Hopper door open. B. Safety switch out of adjustment.
MCP DOOR E-STOP.	Machine will not run.	A. Main control panel Emergency Stop Button depressed/activated.
OPERATOR E-STOP.	Machine will not run.	A. Operator console Emergency Stop button depressed/activated.
STRAPPER NO RESPONSE.	Strap not applied in eject cycle.	A. Strapper Auto/Off/Manual not in auto position. B. Strapper not properly set to apply straps. C. No wire in track, twister out of position.
STRAP CYCLE TOO LONG.	Strapper will not apply strap.	A. Wire tensioned out of track. B. Wire jumped track during wire feed cycle.
STRAPPER MALFUNCTION.	Strapper will not apply strap.	A. Wire in track/knot did not clear head. B. Wire did not feed correctly/improper tension. C. Refer to strapper operation manual.
LOW HYDRAULIC OIL	Pumps will not start or run.	A. Check oil level. B. Determine cause of low oil. C. Perform continuity check on switch.
RAM JAMMED AT SHEAR.	Main Ram will not shear material.	A. Too much material to shear. B. Bale too close to being complete. C. Knives need adjustment. D. Low system pressure.
MAIN RAM OVER CHARGE.	Main Ram will not go to bale eject position.	A. Too much material in bale chamber. B. Retract main ram approximately one foot eject bale manually.

# SECTION 5 - TROUBLESHOOTING

## DIAGNOSTIC DISPLAY - Continued

MESSAGE	PROBLEM	CAUSE/SOLUTION
BALE COMPLETE.	Will not eject bale in manual position.	Strapper Auto/Manual Selector on operator console.
STAR WHEEL FAULT.	Will not apply straps in auto mode.	A. Star wheel not making contact with bale. B. Proximity switch out of adjustment. C. Proximity switch malfunction.
SOLENOID FAULT (Requires qualified electrician)	Machine will not run in automatic mode.	A. Solenoid burned out on poppet block. B. Solenoid current relay malfunction in main electrical control panel. C. Output fuse blown in main electrical control panel.

### NOTE

The solenoids are numbered 1 through 20. The numbers are stamped on the poppet block for easy identification.

#1 PUMP STARTER FLT (Requires qualified electrician).	Pump motor number one will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
#2 PUMP STARTER FLT (Requires qualified electrician).	Pump motor number one will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
COOL PUMP STARTER FLT (Requires qualified electrician).	Cooling pump motor will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
#1 FAN STARTER FLT (Requires qualified electrician).	Fan motor number one will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
#2 FAN STARTER FLT (Requires qualified electrician).	Fan motor number two will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
STRAPPER STARTER FLT (Requires qualified electrician).	Strapper motor will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
CONVEYOR STARTER FLT (Requires qualified electrician).	Conveyor motor will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.



## **SECTION 5 - TROUBLESHOOTING**

### **DIAGNOSTIC DISPLAY - Continued**

<b>MESSAGE</b>	<b>PROBLEM</b>	<b>CAUSE/SOLUTION</b>
CONDIT'R STARTER FLT (Requires qualified electrician).	Conditioner motor will not run.	A. Motor starter coil burned out. B. Blown output fuse in main control panel.
#1 PUMP MOTOR O.L. (Requires qualified electrician).	Motor pump number one will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
#2 PUMP MOTOR O.L. (Requires qualified electrician).	Motor pump number two will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
COOLING PMP MOTOR O.L. (Requires qualified electrician).	Cooling pump motor will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
#1 FAN MOTOR O.L. (Requires qualified electrician).	Cooling fan motor number one will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
#2 FAN MOTOR O.L. (Requires qualified electrician).	Cooling fan motor number two will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
STRAPPER PUMP O.L. (Requires qualified electrician).	Strapper pump motor will not run	A. Motor overload tripped/reset. B. Check current load (AMPS).
CONVEYOR MOTOR O.L. (Requires qualified electrician).	Conveyor pump motor will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
CONDITIONER MOTOR O.L. (Requires qualified electrician).	Conditioner motor will not run.	A. Motor overload tripped/reset. B. Check current load (AMPS).
CHANGE RETURN FILTER.	Return filter needs to be replaced.	A. Replace filter. B. Filter switch malfunction.
DOOR OPENING FAULT.	The door took longer to open than the time allowed.	A. Verify that PLC output is energized. B. Verify that the solenoid is energized. If not, perform continuity check on circuit.
DOOR CLOSING FAULT.	The door took longer to close than the time allowed.	A. Verify that PLC output is energized. B. Verify that the solenoid is energized. If not, perform continuity check on circuit.
STRAPPER LOW HYD OIL.	Strapper pump will not start or run.	A. Check oil level. B. Determine cause of low oil. C. Perform continuity check on switch.

## **SECTION 5 - TROUBLESHOOTING**

### **DIAGNOSTIC DISPLAY - Continued**

<b>MESSAGE</b>	<b>PROBLEM</b>	<b>CAUSE/SOLUTION</b>
HI OIL TEMP SHUTDOWN.	Main pump motor will not run.	A. The main tank oil temperature exceeded the maximum allowed (150 degree). B. Verify that the cooling system is on. The pump can be started at 140 degree.
TEMP REDUCED OPERATE.	The machine cycle slowed down.	A. When the main tank temperature exceeds 135 degree. the machine cycle slows down to decrease heat input to the oil tank.
HI STRAPPER OIL TEMP.	Strapper pump will not start or run.	A. The strapper tank oil temperature exceeded the maximum allowed (150 degree). B. The strapper pump can be started at 140 degree.
MAIN TANK RTD FAULT.	The main tank RTD reading is below the acceptable range.	A. Perform continuity check on circuit.
STRAP TANK RTD FAULT.	The strapper tank RTD reading is below the acceptable range.	A. Perform continuity check on circuit.

## SECTION 5 - TROUBLESHOOTING

### L.E.D. INDICATOR LIGHTS

These lights are used to troubleshoot the Electrical Control System. Each light is identified by a slot position and row number (Example: slot 2, number 4 or 2-4).

Input lights indicate electrical power from sensing devices on the machine, such as Limit Switches, Pressure Switches, etc. to the controller.

Output lights indicate electrical power from the controller to activating or indicating devices, such as Solenoid Valves, Indicator Lights, etc.

When a light is illuminated, there is power to the function described. If the light is not on, there is no power flow.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
NO CONTROL POWER.	A. No incoming power.	<ol style="list-style-type: none"> <li>1. Check main power switch.</li> <li>2. Check transformer fuses (Requires qualified electrician).</li> <li>3. Processor faulted (Requires qualified electrician).</li> </ol>
PUMP NOISE.	A. Oil level low in reservoir. B. Air leakage in oil intake. C. Worn pump.	<ol style="list-style-type: none"> <li>1. Check oil fluid level, add if necessary.</li> <li>1. Check suction tube for broken seat.</li> <li>2. Pump shaft seal.</li> <li>1. Repair or replace pump.</li> </ol>
MAXIMUM HYDRAULIC PRESSURE NOT OBTAINED.	A. Pressure relief set too low or defective. B. Cylinder bypass C. Worn pump. D. Solenoid valve leaking.	<ol style="list-style-type: none"> <li>1. Check relief valve for pressure setting (3500 P51).</li> <li>2. Reset pressure if necessary.</li> <li>3. Replace relief valve, if necessary.</li> <li>1. Check for internal cylinder leakage.</li> <li>1. Repair or replace pump.</li> <li>1. Repair or replace.</li> </ol>
MAIN RAM WILL NOT MOVE FORWARD.	A. Ejector not back B. solenoid Valve malfunction. C. Electrical circuit malfunction. D. cylinder bypass.	<ol style="list-style-type: none"> <li>1. Ejector ram is off PRX2 limit switch 1.4.0/1.</li> <li>2. Perform continuity check on limit switch if ejector is back, but input 1:40/1 is not on.</li> <li>1. Pull solenoids out, check for debris in solenoids, clean them, and put them back in.</li> <li>1. Check SLC outputs and output fuses.</li> <li>2. Perform electrical continuity check through solenoids.</li> <li>1. Check for internal leakage.</li> </ol>
MAIN RAM WILL NOT RETRACT.	A. Solenoid valve malfunction. B. Electrical circuit malfunction. C. Cylinder bypass.	<ol style="list-style-type: none"> <li>1. Pull solenoids out, check for debris, clean them and put them back in.</li> <li>1. Perform electrical circuit continuity check through solenoids.</li> <li>1. Check for internal leakage.</li> </ol>
EJECTOR WILL NOT MOVE FORWARD.	A. Main Ram not in proper position. B. Electrical circuit malfunction. C. Cylinder bypass. D. Bale Door open.	<ol style="list-style-type: none"> <li>1. Check SLC input 1:4.0/13. It should be on if ram is in position.</li> <li>1. Perform electrical circuit continuity check.</li> <li>1. Check for internal leakage.</li> <li>1. Check 5LC input 1:4.0/2. It should be on if door is in position.</li> </ol>

## **SECTION 5 - TROUBLESHOOTING**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
EJECTOR WILL NOT RETRACT.	A. Electrical circuit malfunction. B. Cylinder bypass.	1. Perform electrical circuit continuity check. 1. Check for internal leakage. <b>NOTE: Set baler on manual mode. (Manually shift solenoid as a starting point to locate malfunction) If the manually shifted solenoid activates the function, the problems should be in solenoid or the electrical circuit.</b>
BALE DOOR WILL NOT CLOSE.	A. Solenoid valve malfunction.  B. Electrical circuit malfunction. C. Cylinder bypass.	1. Valve spool not moving. 2. Insufficient pilot pressure. 1. Perform electrical circuit continuity check. 1. Check for internal leakage.

## **SECTION 5 - TROUBLESHOOTING**

## APPENDIX A

OSHA - 1910.147 App A  
Regulations (Standards - 29 CFR)

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked-out/tagged-out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked-out/tagged-out to perform servicing or maintenance shall not attempt to start, energize, or use that machine or equipment.

Type of compliance enforcement to be taken for violation of the above: decided by employer.

- 1. Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked-out/tagged-out to perform the servicing or maintenance.**

**Table 1: Name(s)/Job Title(s) of affected employees and how to notify**

Name	Job Title	How to Notify

2. The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.

**Table 2: Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.**

Type and Magnitude	Hazards	Methods to Control
Electricity, 480V Power Circuit	Electric shock	Disconnect main power source

3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).

**Table 3: Type(s) and location(s) of machine or equipment operating controls.**

Type of Controls	Location of Controls
Pushbutton and switches	Operator control panel

4. Deactivate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

**Table 4: Type(s) and location(s) of energy isolating devices**

Types of Energy Isolating Devices	Locations of Energy Isolating Devices
Control power key switch	Operator control panel
Main power disconnect switch	Main power panel

5. Lockout the energy isolating device(s) with assigned individual lock(s).

## **SECTION 6**

6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

**Table 5: Type(s) of stored energy - methods to dissipate or restrain.**

<b>Type of Stored Energy</b>	<b>Method to dissipate or restrain</b>
Residual hydraulic system pressure	Vent hydraulic fluid to tank (only required when servicing hydraulic system)

7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the pushbutton or other normal operating control(s) or by testing to make certain the equipment will not operate.

Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

**Table 6: Method of verifying the isolation of the equipment.**

<b>Method of verifying the isolation of the equipment</b>
Attempt to start baler by following start up procedure.
If baler fails to start up, the baler has been successfully isolated.

8. The machine or equipment is now locked out.



## **RESTORING EQUIPMENT TO SERVICE**

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.

- 1. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.**
- 2. Check the work area to ensure that all employees have been safely positioned or removed from the area.**
- 3. Verify that the controls are in neutral.**
- 4. Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.**
- 5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for used.**

[54 FR 36687, Sept. 1, 1989 as amended at 54 FR 42498, Oct. 17, 1989; 55 FR 38685, Sept. 20, 1990; 61 FR 5507, Feb. 13, 1996]

## PRE-OPERATION INSPECTION

**Model:** \_\_\_\_\_

**Serial:** \_\_\_\_\_

**Month:** \_\_\_\_\_

**Year:** \_\_\_\_\_

[illegible]

**Model:** \_\_\_\_\_ **Serial:** \_\_\_\_\_

**Month:** \_\_\_\_\_ **Year:** \_\_\_\_\_

[illegible]

**PAGE 2**

**Month:** \_\_\_\_\_ **Year:** \_\_\_\_\_

[illegible]

# MONTHLY MAINTENANCE RECORD

**Model:** \_\_\_\_\_ **Serial:** \_\_\_\_\_ **Month:** \_\_\_\_\_ **Year:** \_\_\_\_\_

**In addition to the Daily and Weekly Maintenance Record tasks, perform the tasks below on a monthly basis.**

[illegible]

# ANNUAL MAINTENANCE RECORD

**Model:** \_\_\_\_\_ **Serial:** \_\_\_\_\_ **Month:** \_\_\_\_\_ **Year:** \_\_\_\_\_

**In addition to the Daily and Weekly Maintenance Record tasks, perform the tasks below on a yearly basis.**

[illegible]

# American National Standard

ANSI Z245.5-2008



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## ENVIRONMENTAL INDUSTRY ASSOCIATIONS

*for Equipment Technology and  
Operations for Wastes and  
Recyclable Materials –  
**Baling Equipment – Safety Requirements***



WASTE EQUIPMENT TECHNOLOGY ASSOCIATION  
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ENVIRONMENTAL INDUSTRY ASSOCIATIONS

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**American National Standard**  
for Equipment Technology and Operations  
for Wastes and Recyclable Materials

Baling Equipment —  
Safety Requirements for  
Installation, Maintenance and Operation

Secretariat  
**Environmental Industry Associations**

Approved February 27, 2008  
**American National Standards Institute, Inc.**



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Published by

**Waste Equipment Technology Association  
(Part of Environmental Industry Associations)  
4301 Connecticut Ave., N. W., Washington, D.C. 20008**

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Printed in the United States of America

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**FOREWORD** (This foreword is not part of American National Standard Z245.5 -2008)

This American National Standard is applicable to the safety requirements for the installation, maintenance and operation of commercial baling equipment. A companion standard, ANSI Z245.51 – 2008 establishes safety requirements for the design and construction of commercial baling equipment commonly used in recycling, solid waste disposal and raw materials handling. Both these standards taken together revise and replace ANSI Z245.5 – 1997.

The effective date of this standard shall be 12 months after the approval date of this standard by the American National Standards Institute, Inc. For all baling equipment manufactured prior to 12 months after the approval date of this standard, please refer to the previous editions of the ANSI Z245.5 standard.

Inquiries, requests for interpretation and suggestions for the improvement of this standard should be directed to the Secretary, Accredited Standards Committee Z245, c/o Environmental Industry Associations, 4301 Connecticut Ave., NW, Suite 300, Washington, D.C. 20008.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z245 on Equipment, Technology and Operations for Wastes and Recyclable Materials. Committee approval of this standard does not necessarily imply that all members of the committee voted for its approval. At the time it approved this standard, the Z245 Committee had the following members:

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American National Standard  
for Equipment Technology and Operations  
for Wastes and Recyclable Materials —

**Balers —  
Safety Requirements for  
Installation, Maintenance and Operation**

**0 Introduction**

This standard was developed by American National Standards Institute Accredited Standards Committee Z245 Subcommittee 5 on Balers and approved by Accredited Standards Committee Z245.

This standard revises the baling equipment safety requirements found in ANSI Z245.5-1997 by providing specific requirements for installation, maintenance, repair and operation necessary to ensure the safe operation of the baler.

This standard complements ANSI Z245.51-2008, which details the safety requirements for design and construction of balers.

The requirements contained in this standard pertain to new balers as produced by the manufacturer. New requirements and revisions are not intended to be retroactive for balers manufactured to comply with earlier revisions of this standard. Refer to the approved edition of ANSI Z245.5 in effect at the time of manufacture for those requirements.

The requirements contained in this standard are not intended to apply to other components of end-use applications where a baler is part of a designed system.

Exceptions and notes contained in the standard apply to the clause or sub-clause in which they are contained or to which they reference. Exceptions pertain to normative requirements. Notes are informative and provide guidance for the evaluation of a normative requirement.

The units of distance measurement used in this standard are in the inch-pound system. When a value for measurement is followed by a value in other units in parentheses, the second value is only approximate. The first value is the requirement.

## 1 Scope

This standard revises safety requirements with respect to the installation, operation, maintenance, service, repair, modification, and reconstruction (where applicable) of baling equipment covered by ANSI Z245.5 - 1997, *Baling Equipment – Safety Requirements*.

**1.2** The requirements of this standard apply to balers rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer's installation, operation, and maintenance instructions and procedures.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI A1264.1-1995 (R2002), *Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems*.

ANSI Z245.51-2008, *Baling Equipment — Safety Requirements*

The following regulations contain provisions which, through reference in this text, constitute provisions of this American National Standard.

OSHA 29 CFR Part 1910.146, *Permit Required Confined Spaces* <sup>1</sup>  
OSHA 29 CFR Part 1910.147, *Lockout/Tagout of Energy Sources* <sup>2</sup>

## 3 Definitions

For the purposes of this American National Standard, the definitions below apply to terms used throughout this standard, unless the context clearly indicates otherwise.

**3.1 access cover or door:** A panel covering an opening that is designed to permit access to the interior of the baler.

**3.2 access gate:** A moveable barrier/guard that swings on hinges or moves in/on a track and is distinguished from a door by having openwork.

**3.3 affected employee:** An employee whose job functions place them in proximity to potential hazards related to work being performed by authorized employees.

**3.4 authorized employee:** A person who, on the basis of their specific experience and training, is permitted to perform certain designated duties.

**3.5 automatic bale tying device:** A device which installs wires or bands around a bale to maintain the bale's compressed state.

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<sup>1</sup> Available online at <http://www.gpo.gov/nara/cfr/index.html>.

<sup>2</sup> Available online at <http://www.gpo.gov/nara/cfr/index.html>.

**3.6 automatic start/cycling control:** A control that uses an automatic actuator or sensor to initiate the operation of the baler on demand, when refuse is loaded into the loading chamber.

**3.7 bale:** A mass of material compressed, with or without binding, to a density or form that supports handling and transportation as a material unit.

**3.8 bale chamber:** The area of the baler where compression takes place and the bale is formed.

**3.9 bale chamber door(s):** The portion of the baling chamber that is opened to permit ejection of the bale.

**3.10 bale ejector system:** The mechanism used to assist in the removal of a finished bale from the baling chamber.

**3.11 bale restraint device:** A device that exerts pressure on the bale to increase the density during formation in horizontal extrusion type balers.

**3.12 bale tie slot:** A space or area provided for insertion of bale ties to tie or secure the finished bale.

**3.13 baler:** A machine used to compress solid waste, primary materials, or recoverable materials, with or without binding, to a dense form that will support handling and transportation as a material unit. This specifically excludes stationary compaction equipment that may be used to compact materials into a container. (see Figures 1 through 7 for illustrations of types of baling equipment.)

**3.14 baler loading hopper:** An extension of the loading chamber on balers that provides for accumulation of material during the ram full cycle.

**3.15 baler types:** Balers are generally either single-stage balers or multiple-stage balers. Several types of balers are covered by this standard. They are classified as follows:

- a) **single-stage baler:** A baler with one ram mechanism.
  - i) **vertical downstroke baler:** A single-stage baler in which the ram travels in a vertical direction, initially downward (compression stroke), then returns to its rest position (retract stroke).
  - ii) **vertical upstroke baler:** A single-stage baler in which the ram travels in a vertical direction, initially upward (compression stroke), then returns to its rest position (retract stroke).
  - iii) **horizontal closed-chamber baler:** A single-stage baler in which the ram movement is horizontal and the end of the bale chamber is fixed by a bale chamber door.
  - iv) **horizontal extrusion baler:** A single-stage baler in which the ram movement is horizontal, the end of the bale chamber is open, and a bale restraint device is provided.
- b) **multiple-stage balers:** Balers with two or more separate ram mechanisms.
  - i) **two-stage horizontal/vertical (continuous) extrusion baler:** A multiple-stage baler in which the first-stage ram operates with a vertical downstroke compression stroke perpendicular to the line of action of the second-stage ram.
  - ii) **two-stage horizontal baler:** A multiple-stage baler in which the first-stage ram operates with a horizontal compression stroke perpendicular to the line of action of the second-stage ram.
  - iii) **three (or more)-stage baler:** A multiple-stage baler in which each compression stroke operates perpendicular to the line of action of the preceding stroke.



**3.16 cart:** A wheeled container that receives, holds and stores loose refuse. Carts are generally classified by their size and application as either residential or commercial/industrial, in the following manner:

- a) **residential:** A two-wheeled container that receives, holds and stores loose refuse. It is typically used in collection of residential, commercial and industrial waste that utilizes mechanical lift systems for unloading. Residential carts typically range in size from 45 to 100-gallon capacity.
- b) **commercial/industrial:** A three- or four-wheeled container that receives, holds and stores loose refuse. It is typically used for the collection of commercial and industrial waste that utilizes manual lifting or mechanized lift systems for unloading. Commercial/industrial carts typically range in size from one-half (1/2) cubic yard to four (4) cubic yards in capacity.

**3.17 chute:** An enclosure connected to the baler and to an adjacent structure that funnels material into the loading chamber.

**3.18 commercial waste:** Waste produced by stores, offices, restaurants, warehouses, and other non-manufacturing operations.

**3.19 component:** A part or assembly which complies with specified requirements and is used in the construction of the baler.

**3.20 confined space:** An area within the baler that has adequate size or configuration for personnel entry, has limited means of access or egress, and is not designed for continuous employee occupancy.

**3.21 container:** A receptacle (also referred to as a bin) that receives, holds and stores loose or compacted refuse for lifting, unloading and/or transportation by mechanical means. Containers are specially designed for use with certain types of equipment. Containers used with rear-loading baling equipment will incorporate features that differ from containers used with front-loading baling equipment. Containers used in conjunction with tilt-frame, roll-off, hook-lift and hoist-type equipment will incorporate features that differ between types of compatible lifting mechanisms utilized, and are designed to be picked up, transported, unloaded, and set off by that equipment. Containers typically range in size from one (1) cubic yard to seventy (70) cubic yards in capacity.

**3.22 container/cart-lifting systems:** Component mechanisms, such as (but not limited to) lifting arms, forks, and hydraulic cylinders, cables, winches and reeving cylinders mounted to a foundation or stationary equipment that are used to complete a lift and dump cycle of containers and/or carts into the loading chamber of the baler.

**3.23 continuously operating balers:** Balers where the main motor remains in continuous operation, or can start automatically while unattended.

**3.24 contract laborer:** An employee of a person or company that provides labor (work) for a specified fee to another employer. A contract laborer may be used to supplement the employer's regular workforce and usually performs the same or similar duties as regular full-time employees.

**3.25 contractor:** A person (or company) who contracts to supply certain materials or provide a specific service (work) for a stipulated fee and/or a specified period such as baler equipment maintenance services. The work or service provided may be outside the scope of materials supplied or services provided by the employer or operator's workforce.

**3.26 control of hazardous energy sources (lockout/tagout):** A program which utilizes procedures for affixing appropriate lockout or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energizing, start-up, or release of stored energy in order to prevent injury to persons in or near the machines.

**3.27 conveyor:** A horizontal, incline, or vertical device for moving or transporting material in a path predetermined by the design of the device, and having fixed or selective points of loading and discharge.

**3.28 cycle:** The operation of a mechanism to perform one complete operation having a definite beginning and end.

**3.29 dock ramp:** A structural platform for walking on or driving a vehicle on that provides access from an adjacent structure or area to the baler.

**3.30 electrical enclosure:** That portion of a product that renders inaccessible any part that presents a risk of electrical shock.

**3.31 electrical power disconnect:** A device that breaks the circuit supplying all electrical power to the baler, and can be locked in the off position.

**3.32 emergency stop (E-stop):** A stop arising from a sudden and unexpected need, and not as part of normal operation. The device that can be actuated in an emergency situation to stop a machine's process or cycle.

**3.33 employee:** An individual hired by an employer to work for compensation.

**3.34 employer:** A person, company, or entity who hires one or more individuals, companies or entities to work for compensation.

**3.35 energy sources:** Sources of energy that include, but are not limited to, electrical, mechanical, hydraulic, pneumatic, chemical, thermal and potential energy sources (e.g. gravity, kinetic, etc.).

**3.36 guarding:** The use of a device or mechanism designed and constructed to prevent the operator of baler and others from coming into physical contact with the point of operation or a hazard.

**3.37 hazard:** A condition of such a nature that it may precipitate an accident or injury.

**3.38 industrial waste:** Waste produced as a result of manufacturing, industrial processes, or demolition operations.

**3.39 informative:** Refers to the portions of this standard provided only for purposes of clarification, illustration and general information. The portions of this standard considered informative do not contain mandatory requirements. The Foreword, Notes and Annexes are considered informative.

**3.40 installer:** A company or person responsible for putting a baler in place, activating it, and performing initial checks.

**3.41 integrated power unit:** Power unit that is contained within the body/framework of the baler.

**3.42 interlock:** A device or mechanism used to connect individual components together so that the action of one part of the baler is constrained by, or dependent upon, another.

**3.43 loader:** An individual, 16 years old or older, who is trained and authorized by the employer to place materials into the loading chamber of a baler, but who is not authorized to operate the baler.

**3.44 loading chamber:** The opening within the structural configuration of the baler in which the material is loaded prior to compression by the ram.

**3.45 loading height:** The vertical distance between loading sill and working surface.

**3.46 loading hopper:** An enclosure mounted on the baler that serves to direct the flow of material into the loading chamber.

**3.47 loading sill:** The ledge over which material is deposited into the baler.

**3.48 lockable device:** A device that, once locked, will prevent opening or removal of the access door or cover it is protecting, and requires a key-like device to unlock. Device can also be used to prevent unauthorized operation of the baler.

**3.49 main control panel:** The panel that contains the motor starting controls and relays.

**3.50 maintenance personnel:** Employees who are trained and authorized by the employer to service, inspect, clean, repair, or maintain balers.

**3.51 maintenance testing:** Functional and operational checks that may be performed on balers and systems by authorized employees before, during, or after maintenance and before placing the baler back in regular service.

**3.52 manufacturer:** The term manufacturer includes any intermediate or final-stage manufacturer prior to the baler being offered for sale.

**3.53 maximum system pressure:** The maximum operating pressure in the hydraulic system corresponding to the pressure relief valve setting for the system.

**3.54 mechanical enclosure:** A portion of the product that prevents unintentional contact with internal mechanical parts that involve risk of injury.

**3.55 modification:** Any change, alteration, addition to or removal from the original equipment or component, made in such a manner that the changed or altered portions or function of the equipment or component are different than the manufacturer's original design, specification, or use.

**3.56 normative:** Refers to the portions of this standard containing the mandatory requirements (shall). The body of this standard is considered normative.

**3.57 operating controls:** The controls for operating the baler. They can be mounted on the main control panel, the baler frame or located remotely at a control station.

**3.58 operator:** An individual, 18 years old or older, who is trained and authorized by the employer to operate a baler.

**3.59 owner:** An individual, corporation, partnership, legal entity, employer, or business that holds legal ownership papers, title, or lien, on or to, the baler equipment, unit, or system.

**3.60 permit required confined space:** A confined space within the baler that contains or has the potential to contain a hazardous atmosphere, material which may engulf a worker, converging walls or other configurations which could trap a worker, or has any serious safety or health hazards.

**3.61 person:** An individual, corporation, partnership, legal entity, or business.

**3.62 pinch point:** A point at which it is possible for a person to be caught between moving parts, or between moving and stationary parts, of the baler.

**3.63 pit:** A cavity in the ground, floor, or a sunken or depressed area that is adjacent to a floor area. A pit may be used to store materials to be fed into the baler.

**3.64 platen:** see ram.

**3.65 point of operation:** The area of the equipment where work is performed upon the material.

**3.66 ram (also known as platen):** The powered component of a baler that moves the refuse from the loading chamber to where it is compacted. (See figures 1 - 6.)

**3.67 rated component pressure:** The rated working pressure as provided by the component manufacturer.

**3.68 reconstruction:** The disassembly and re-assembly of equipment, beyond normal repair and servicing, generally for the purpose of placing the equipment back into full operation and substantially extending the service life contemplated at the time of original manufacture.

**3.69 recyclable materials:** Materials that because of their physical properties, characteristics or other intrinsic value can be reused, reprocessed, or converted for other uses or products after their original design use has been completed, and which have been diverted, removed or recovered from commercial, industrial, or residential wastes.

**3.70 recycling:** A series of operations or processes by which wastes or other materials are collected, separated, processed and returned to use as other products.

**3.71 refuse:** Any type of solid waste (except human wastes), including garbage, rubbish, ashes, incinerator residues, street cleanings, plant trimmings, and residential, commercial, and industrial solid wastes, including recyclable materials.

**3.72 repair:** Any replacement, substitution, or overhaul of the original baler or components made in such a manner that the baler and functions of the repaired portions retain minimum design specifications established by the original manufacturer (not a modification).

**3.73 residential waste:** Waste produced by single and multi-family residences.

**3.74 safety signs:** Signs meeting the Occupational Safety & Health Administration (OSHA) requirements used to depict three levels of hazards:

- a) "DANGER" — indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations,
- b) "WARNING" — indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury, and
- c) "CAUTION" — indicates a potentially hazardous situation, which if not avoided, may result in minor to moderate injury. It may also be used to alert against unsafe practices.

**3.75 service opening:** A protected opening into the interior of the baler that is designed to permit access to the interior for the purpose of service, repair, or maintenance, but not of a size to permit a person to pass through.

**3.76 shall:** Use of this word in this standard denotes a mandatory requirement.

**3.77 should:** Use of this word in this standard denotes a recommendation that is a sound safety practice; it does not denote a mandatory requirement.

**3.78 start-up alarm:** An audible and visible alarm distinctive and recognizable as a signal to provide warning that the baler will begin to operate.

**3.79 sustained manual pressure control:** A control that requires continuous pressure by the operator to allow the baler to operate.

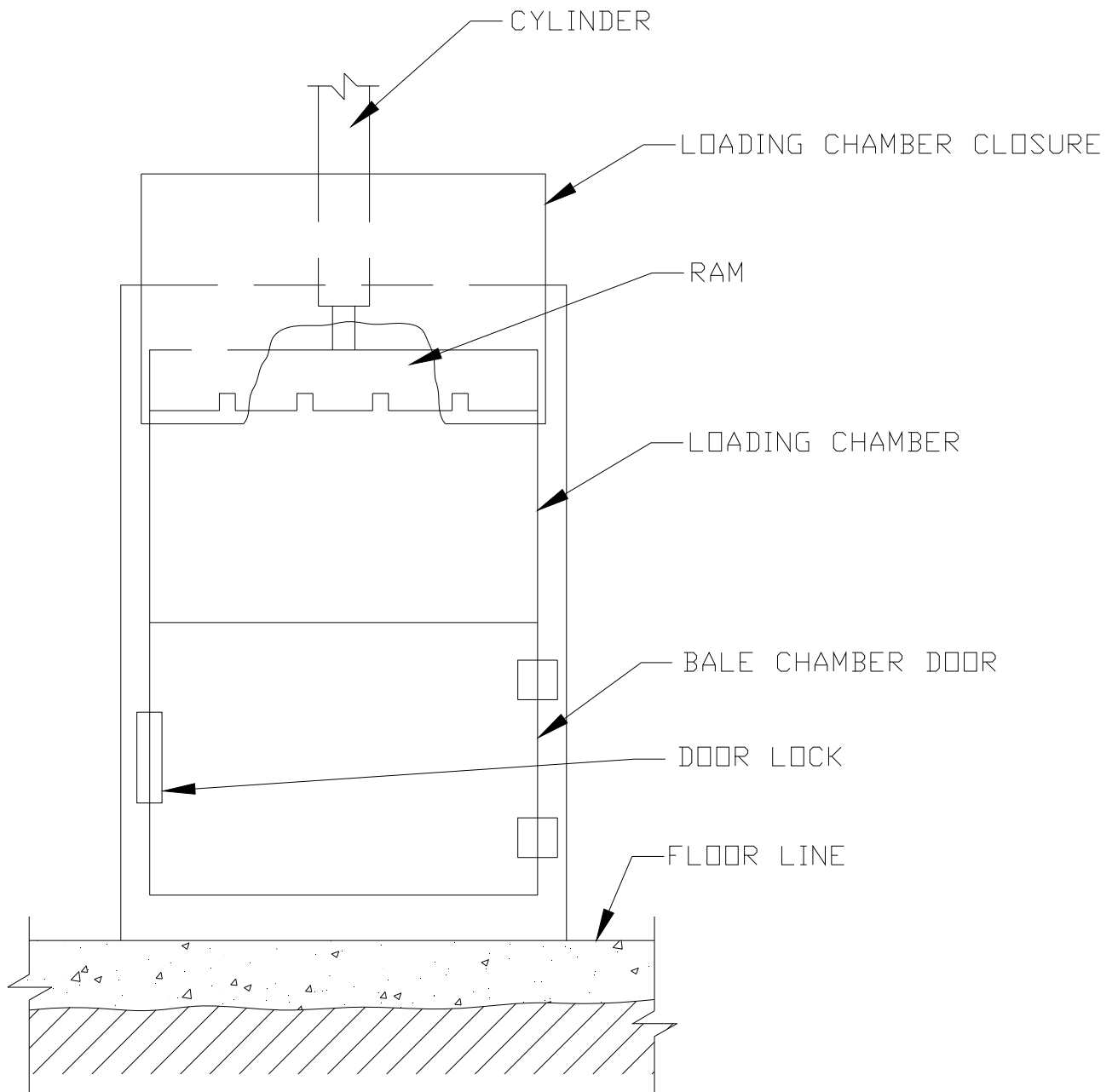
**3.80 system:** The combined use of several technologies, normally stand-alone, in an integrated fashion for the simultaneous or sequential processing of materials (such as, shredders, trommels, conveyors, etc ).

**3.81 system pressure:** The range of operating pressures ranging between normal and maximum operating pressure in the hydraulic system as stated by the manufacturer.

**3.82 unattended baler with automatic startup:** Baling equipment where the main motor will start and the baler will cycle automatically while unattended when activated by a signal from a sensor or a sequencing program or device.

**3.83 waste:** Any type of solid wastes (except human wastes) such as garbage, trash, rubbish, ashes, incineration residue, street cleanings, plant trimmings, solids, semi-solids, liquids or gases, or the like which are generated and discarded by commercial, industrial, and residential activities. Excluded are solid or dissolved materials such as domestic sewage and solid or dissolved materials in irrigation return flows or industrial discharges. This definition does include material diverted from the waste stream for the purpose of recycling.

**3.84 working surface:** Any surface on which employees perform job duties or upon which employees are required to work while performing assigned tasks.



**Figure 1 – Vertical Downstroke Baler**

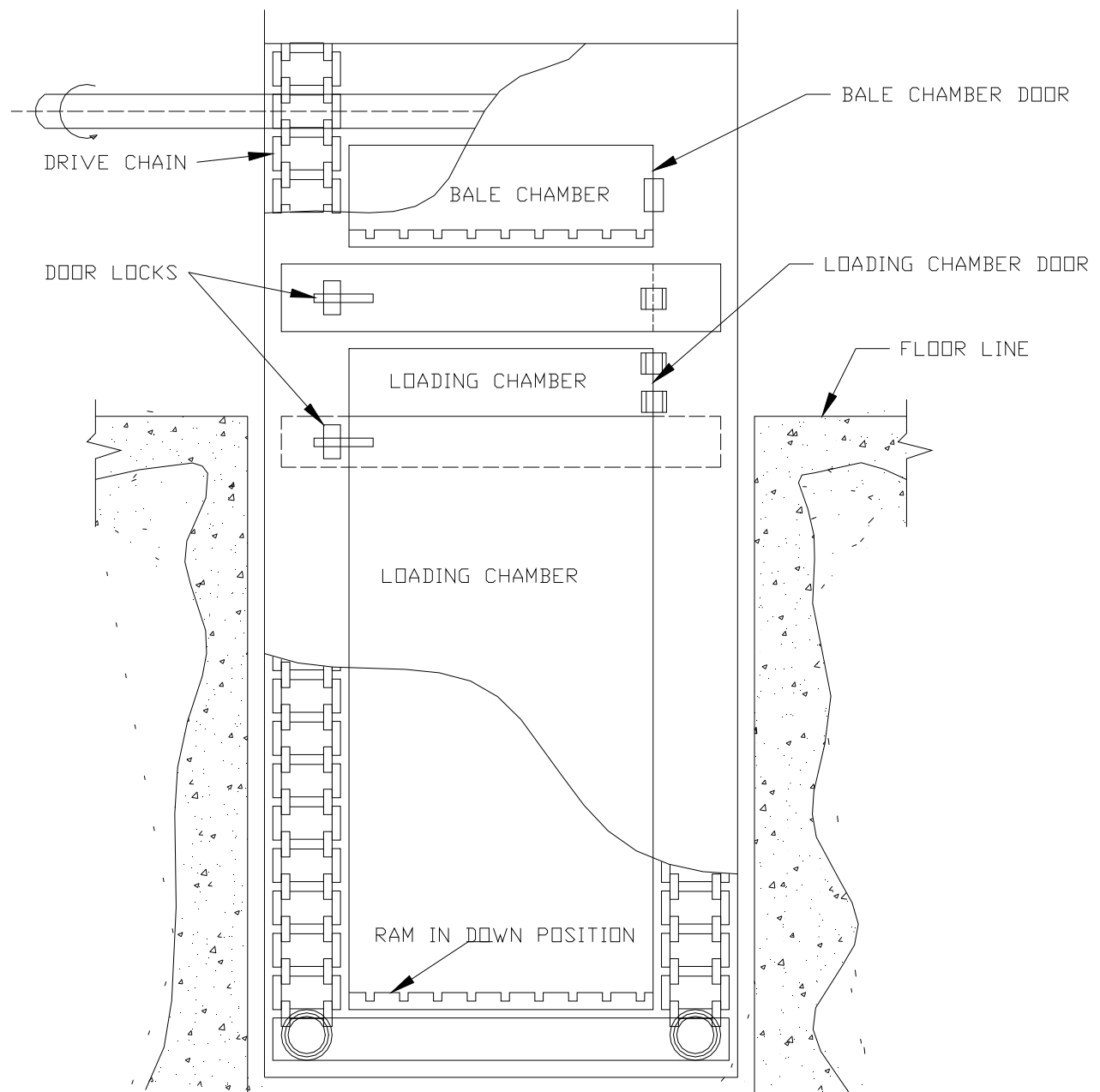
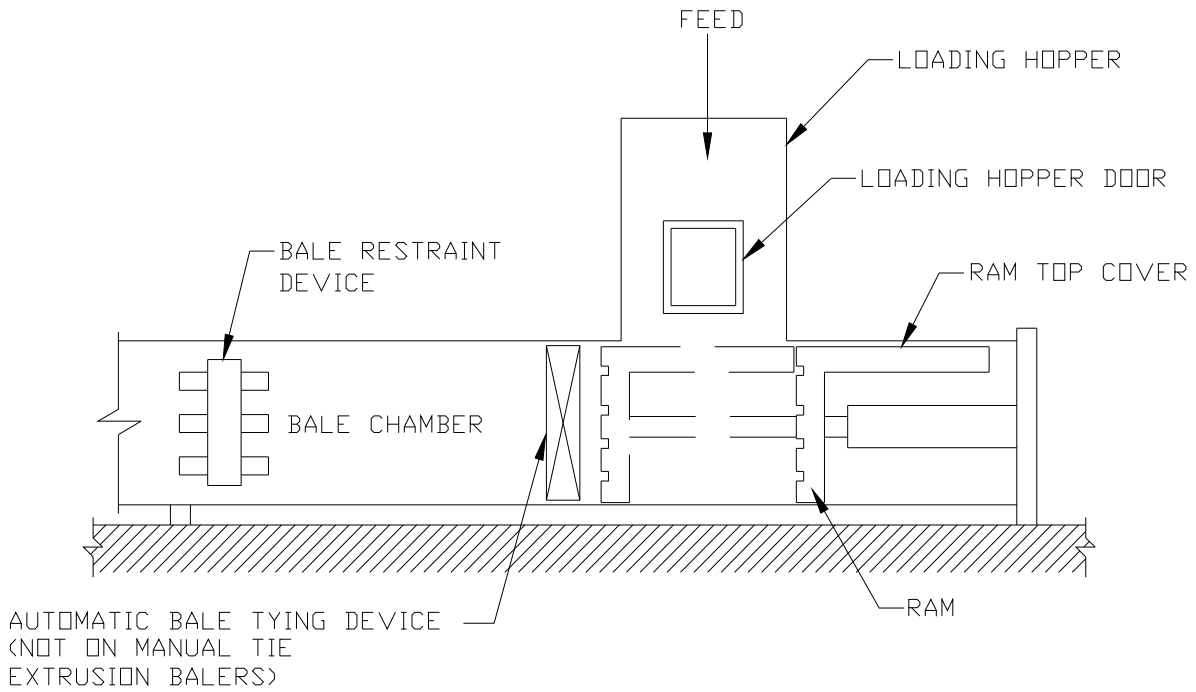
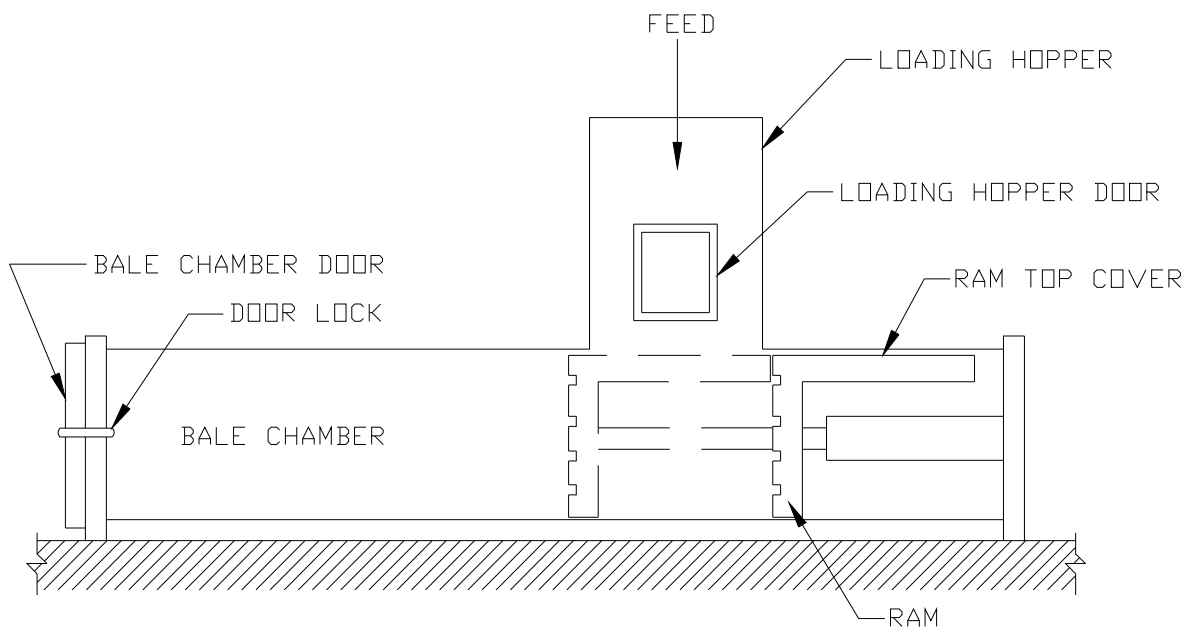


Figure 2 – Vertical Upstroke Baler (Chain Driven)

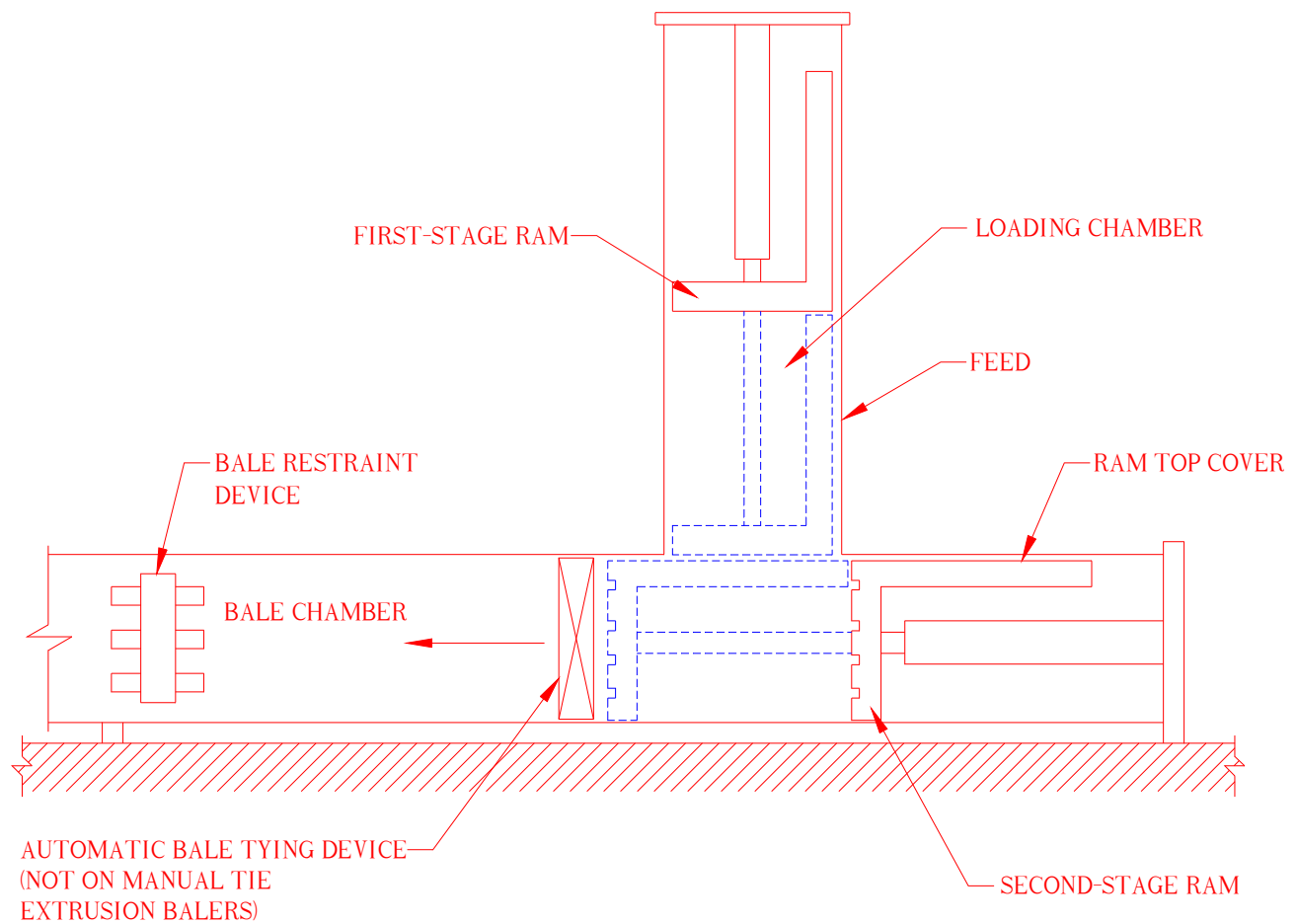


**Figure 3 – Horizontal Extrusion Baler**



**Figure 4 – Horizontal Closed-Chamber Baler**





**Figure 5 – Two-Stage Vertical-Horizontal (Continuous) Extrusion Baler**

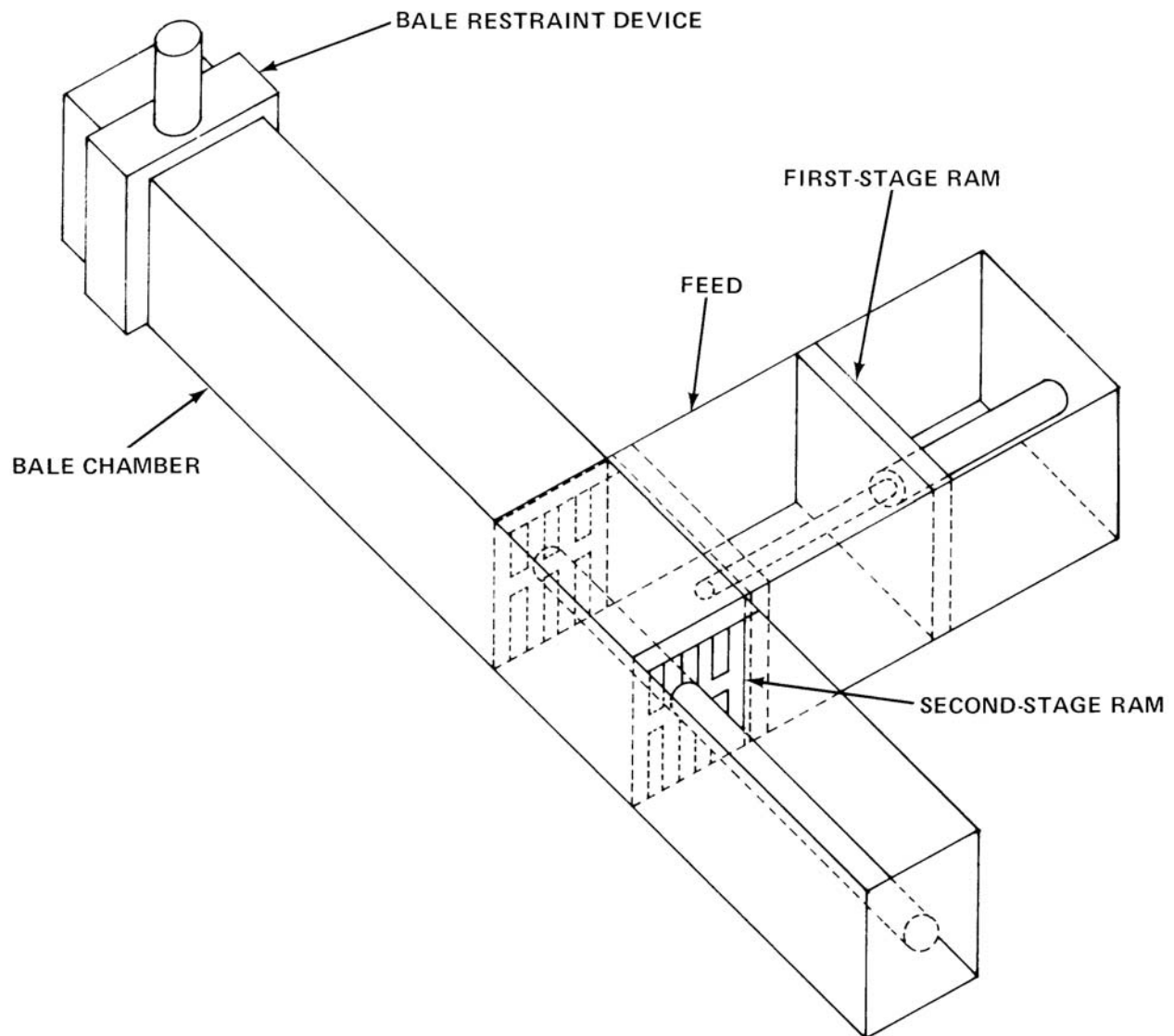
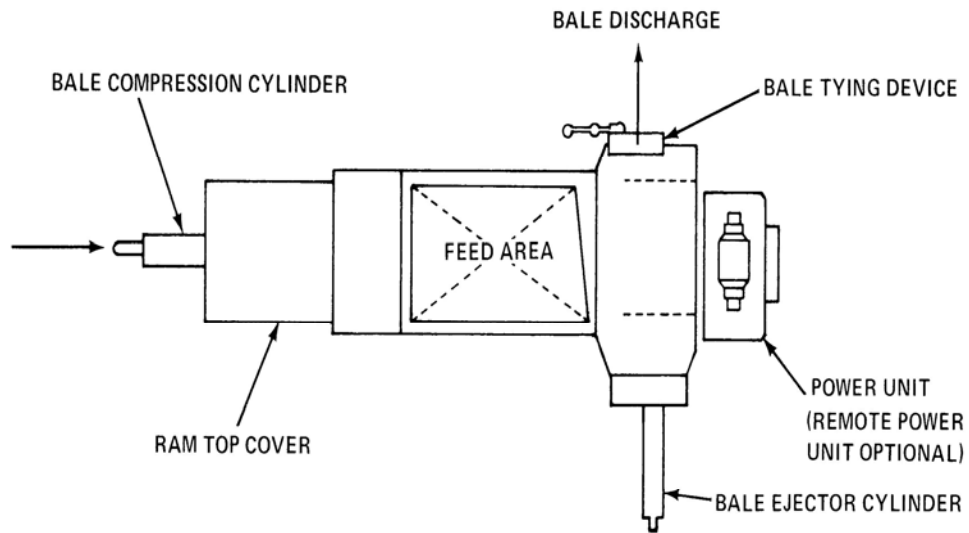
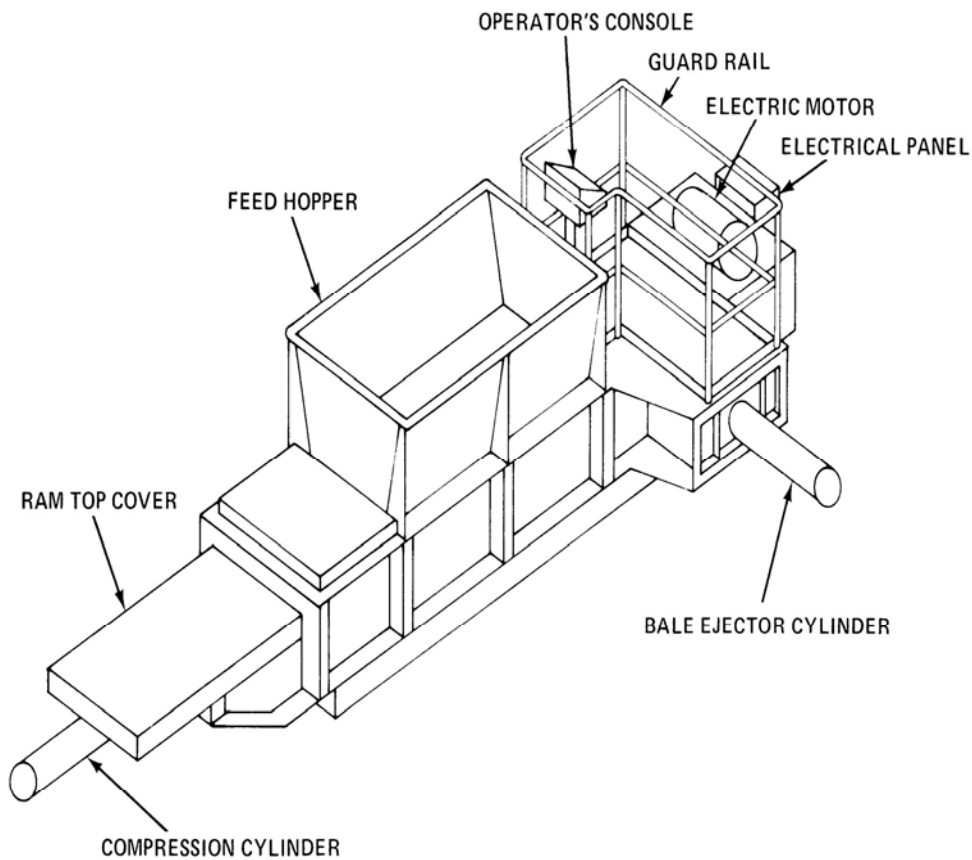


Figure 6 – Two-Stage Horizontal Baler (Two Compression Strokes)



(a)  
Top View



(b)  
Isometric View

**Figure 7 – Two-Stage Horizontal Baler With Single-Compression Cylinder**

## **4 Installation requirements**

### **4.1 General requirements**

**4.1.1** The installer of balers shall do so in accordance with the appropriate sections of this American National Standard and ANSI Z245.51, applicable codes, local ordinances and the manufacturer's recommendations, and shall affix to such equipment the date of installation, installer's name and a statement attesting to compliance with this standard.

### **4.2 Power disconnect**

**4.2.1** Installation shall include a power disconnecting means that can be locked in the "off" position.

### **4.3 Emergency controls**

**4.3.1** Emergency stop controls shall be readily accessible to the operator or shall be located within 3 ft (91.4 cm) of the point of operation, the material feed area, or if chute fed, within 3 ft (91.4 cm) of the access door.

**4.3.2** An electrical power disconnect shall be located within sight of, and no more than 50 ft (15 m) away from the main control panel.

## **5 Safeguards and features**

### **5.1 Access covers**

**5.1.1** Access covers shall be interlocked, secured by a lockable device, or be removable by the use of hand tools only.

### **5.2 Service openings**

**5.2.1** Removable covers shall protect service openings that expose pinch points. The covers shall be interlocked, secured by a lockable device or removed by the use of hand tools only.

### **5.3 Controls**

**5.3.1** Each control shall be clearly and conspicuously labeled as to its function.

**5.3.2** Operating controls, such as start buttons, shall be designed and located to prevent unintentional activation.

**5.3.3** Stop buttons, including emergency stop buttons, shall be red, distinguishable from all other controls by size and color, and shall not be recessed.

### **5.4 Operating switches and sensors**

**5.4.1** When the unintentional operation of a switch results in a risk of injury to persons, the actuator of the switch shall be located or guarded so that unintended operation is unlikely.

**5.4.2** When guarding is utilized for the actuator of the switch, it shall be by recessing, ribs, barriers, or the like.

**5.4.3** The actuator of an interlock switch shall be located so that unintentional operation is unlikely.

**5.4.4** A device that starts a baler automatically, such as a timer, an automatically reset overload-protective device, or the like, shall not be employed unless it utilizes a startup alarm.

## **5.5 Security switch**

**5.5.1** A key-lock on-off switch, or similarly functioning security switch, shall be provided by the manufacturer as a means to disconnect power to the operating controls and lock these controls in the "off" position.

## **5.6 Emergency controls**

**5.6.1** For emergencies, a safety retract feature shall be provided such that whenever the unit is shut off and started again, the ram will always retract to its rear position, or a means of stopping and controlling the movement of the ram at any point shall be provided.

NOTE: Emergency stop controls are to be readily accessible to the operator or are to be located within 3 ft (91.4 cm) of the point of operation or the material feed area. If chute fed, the emergency stop controls are to be within 3 ft (91.4 cm) of the access door.

NOTE: An electrical power disconnect is to be located within sight of, and no more than 50 ft (15 m) away from, the main control panel.

## **5.7 Interlocks**

**5.7.1** Access door(s) of loading chambers shall have an interlock system that prevents cycling motion while the access door(s) is open.

**5.7.2** An interlock shall not be readily defeated without intentional purpose, such as by:

- a) Damaging of the interlock;
- b) Making wiring connections or alterations; or
- c) The use of tools or other materials (such as magnets and wedging devices)

**5.7.3** An interlock shall not be capable of being defeated by materials such as wood, metal chips or debris that could accumulate in normal use.

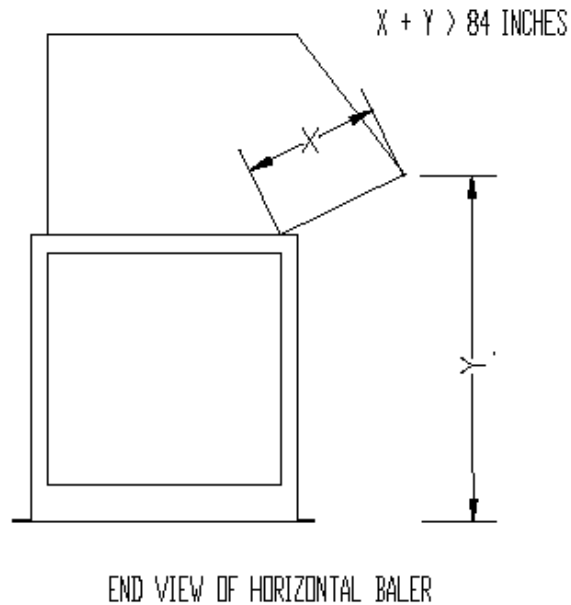
**5.7.4** When movement of a guard actuates an interlock, the arrangement shall be such that the guard is in place when the interlock is in the position that permits operation of the parts being guarded.

## **5.8 Guarding**

**5.8.1** Protection of personnel from contacting moving parts at the point of operation shall be provided by one of the following methods or by other means as effective as the following means:

- a) The installation of a guard or loading hopper with a minimum loading height above the working surface of 42 inches (106.7 cm) (dimension "Y"), and the sum of dimensions "X" and "Y" equaling 84 inches (213.4 cm) or greater (see figure 8), that shall prevent any person from contacting moving parts at the point of operation; or
- b) The installation of an access gate or door that is interlocked in such a manner as to prevent the movement of parts at the point of operation when the gate or door is open; or

- c) Sustained-manual-pressure controls located in such a way that the operator cannot reach the point of operation and within an area fully visible to the operator of the complete point-of-operation area when a guard is not used.



**Figure 8 – Guard or loading hopper - minimum loading height for balers**

## 5.9 Container/cart lifting systems

### 5.9.1 General

**5.9.1.1** Container/cart lifting systems for balers shall be installed in accordance with the manufacturer's instructions.

**5.9.1.2** Controls for container/cart lifting systems, except for those stated in 5.9.3, shall be of the sustained-manual-pressure type, and located outside the area of operation of the lifting system and container, such that the operator can not activate the controls while standing under a raised container, and in direct line of sight of the lifting operation.

**5.9.1.3** Safety check valves in the hydraulic system or mechanical lock systems shall be provided to hold the lift in its position should a failure occur with a lifting system hydraulic hose.

### 5.9.2 Container/cart lifters

**5.9.2.1** Lifters for containers/ carts provided with balers, or marketed separately and recommended by the manufacturer for use with the baler, shall conform to the following requirements:

- a) The lifter must be compatible with the type(s) of containers/carts it is to cycle;

NOTE: If an operator attempts to use a lifter to cycle containers/carts for which it was not designed, this may result in an unsafe condition or damage to the cart.

- b) A minimum cycle time for the lifter shall be specified and the lifter cycle time shall be capable of being adjusted only by the use of a tool;
- c) Upon release of pressure on the operating device by the operator, the lifter shall stop and hold at its current position in the cycle;
- d) The control shall be capable of reversing the direction of motion of the lifter at any point in the cycle;
- e) Controls shall be located so as to prevent inadvertent operation of the lifter.

NOTE: There may be more than one set of controls.

- f) The normal position for an operator using the controls shall not place the operator underneath a raised container or cart;
- g) Control levers shall be designed such that they are pulled to raise, and pushed to lower and shall be marked to indicate function;
- h) Push button controls shall be arranged with the “raise” button higher than the “lower” button and shall be marked to indicate function; and
- i) The lifter shall be equipped with a device to secure the container/cart to the lifter during the lifting cycle.

### **5.9.3 Automatic container/cart lifting systems**

**5.9.3.1** Automatic container/cart lifting systems shall have the point of operation and area through which the container moves completely enclosed by guards, a cage, or other similar devices with interlocked access that prevent entry or operation when not in place.

**5.9.3.2** Automatic container/cart lifting systems shall have an emergency stop control. (see Note in 5.6)

## **5.10 Start-up alarms**

### **5.10.1 Audible and visual alarms**

**5.10.1.1** Any audible alarm shall be a pulsing or intermittent signal and shall be adjustable to at least 10 dBA above the ambient noise level. An automatically adjustable audible signal shall be capable of producing at least 10 dBA above the ambient noise level.

**5.10.1.2** Any visible alarm shall be a flashing or pulsating type.

### **5.10.2 Initial start-up cycle alarms**

**5.10.2.1** Balers shall have a minimum 20-second audible and visual start-up alarm sequence before the main motor/motors can start. The start-up alarm sequence shall include a minimum of 5 seconds of audible and visual alarms followed by a minimum of 15 seconds of the visual alarm.

*Exception: Vertical balers that are fully enclosed such that 1) no body part can come in contact with any moving part, 2) the ram/rams only cycle one time, and 3) the cycle is initiated by a manual control by the operator do not require an initial start start-up alarm*

### **5.10.3 Continuous/automatic start-up alarm for automatic balers**

**5.10.3.1** A horizontal baler with an automatic starting control circuit shall have a start-up alarm that is activated when the baler is started or when the automatic starting control circuit is activated.

**5.10.3.2** The start-up sequence shall be completed before the ram(s) move, in either the automatic or manual mode.

**5.10.3.3** If the automatic starting control circuit becomes interrupted, the circuit shall not reactivate until a new start-up sequence has been completed.

#### **5.10.4 Start-up time delay**

**5.10.4.1** Continuously operating balers and unattended balers with automatic startup shall have a minimum time delay of 20 seconds from the time the switch controlling the automatic starting control is initiated until the automatic starting control circuit is energized.

**5.10.4.1.1** The switch shall be maintained in the actuating position for the entire 20-second delay in order to energize the automatic starting control circuit.

**5.10.4.1.2** If the switch controlling the automatic starting control circuit is released before the end of the 20-second delay period, the automatic starting control shall not be energized.

#### **5.10.5 Warning alarm**

**5.10.5.1** Continuously operating balers and unattended balers with automatic startup shall have a visible warning alarm that is activated as long as the automatic starting control system is energized.

NOTE: The warning alarm may be the same alarm used for the start-up alarm in 5.10.1.

#### **5.10.6 Emergency stop controls, interlock interrupts and automatic starting control circuits**

**5.10.6.1** When actuated, emergency stop controls shall stop the baler motor and disable any automatic starting control circuit.

**5.10.6.2** For balers with automatic starting control circuits, the baler shall not automatically restart when the emergency stop control is reset. The baler shall not restart until the automatic starting control circuit has been manually reset (energized) to initiate a normal startup sequence with startup alarm and startup time delay.

**5.10.6.3** For balers with automatic starting control circuits, the baler shall not automatically restart when the access door or gate is closed (interlock re-engaged). The baler shall not restart until the automatic starting control circuit has been manually reset (energized) to initiate a normal startup sequence with startup alarm and startup time delay.

**5.10.6.4** For balers with automatic bale tying devices, an emergency stop button shall be provided at the tying device.

#### **5.10.7 Automatic starting control circuit**

**5.10.7.3** The automatic control circuit shall be de-energized when power is removed from the baler.

**5.10.7.4** For balers with automatic starting control circuits, the baler shall not restart automatically when electrical power is supplied until the automatic starting control circuit has been manually reset (energized).



**5.11 Vertical downstroke balers – additional safety features****5.11.1 Bale chamber door(s)**

**5.11.1.1** The ram shall not move unless the bale chamber door(s) is fully closed and latched, except when operated with a sustained-manual-pressure control.

**5.11.2 Loading chamber closure**

**5.11.2.1** A loading chamber closure shall be provided.

**5.11.2.2** The loading chamber closure shall completely cover the loading chamber before the ram can be activated into its compression stroke. The loading chamber closure must remain in place until the completion of the compression stroke, or will open with the raising of the ram, but not as to allow any pinch points or hazards to be exposed.

**5.11.2.3** If the loading chamber closure does not have an automatic opening feature, then the ram shall stop or return to its rest position if the loading chamber closure is opened more than ½ inch (13 mm) at any time during the compression stroke. Unless otherwise designed to eliminate the pinch point, or equipped with a sustained-manual-pressure control, balers shall be equipped with a mechanical or electrical interlock to prevent the closure from being opened faster than the baler ram, so as to prevent operator access to the top of the ram during its upward motion.

**5.11.2.4** If the loading chamber closure does have an automatic opening feature at the completion of the compression stroke, then the baler shall have a mechanical or electrical interlock to prevent the closure from being raised faster than the baler ram motion to prevent operator access to the top of the baler ram during its upward motion, or be otherwise designed to eliminate the pinch point.

**5.11.3 Bale chamber door locking mechanism**

**5.11.3.1** Locking mechanisms for bale chamber door(s) shall be designed to allow for controlled relief of pressure as the door(s) is opened.

**5.12 Vertical upstroke balers – additional safety features****5.12.1 Ram compression stroke interlock**

**5.12.1.1** An interlock shall be provided to keep all doors closed during the ram compression stroke.

**5.12.2 Ram guard**

**5.12.2.1** A guard for the ram shall be provided between the ram and the floor line of the baler pit in an upstroke baler. (See figure 2.)

**5.12.3 Baler chamber door locking mechanisms**

**5.12.3.1** Locking mechanisms for bale chamber door(s) shall be designed to allow for controlled relief of pressure as the door(s) is opened.

### **5.13 Horizontal balers – additional safety features**

#### **5.13.1 Baler loading hopper access doors**

**5.13.1.1** Baler loading hopper access door(s) shall be equipped with a control circuit interrupt, which must reset the baler start-up cycle, to prevent baler operation with the door open.

#### **5.13.2 Bale chamber door closure**

**5.13.2.1** An interlock shall be provided on all closed-chamber horizontal balers to ensure return of the baling ram face into the loading chamber area before the manually operated bale chamber door opening mechanism is activated, or the door opening mechanism shall be designed to allow for controlled relief of the pressure against the door as it is manually opened.

#### **5.13.3 Baler loading chamber closure**

**5.13.3.1** On horizontal balers not equipped with a loading hopper, the loading chamber closure shall completely cover the loading chamber before the ram can be activated in its compression stroke. The closure shall remain in place until completion of the compression stroke. If during the compression stroke the closure is moved from its fully closed position, the ram shall stop.

#### **5.13.4 Ram top cover**

**5.13.4.1** The top of the ram on all horizontal balers shall be covered to prevent access to the backside of the ram face as it extends into the loading chamber. When the ram is fully extended, the ram cover shall cover the full length and width of the loading chamber opening.

### **5.14 Caution, warning and danger markings**

**5.14.1** Baling equipment or a separately packaged attachment having a hidden or unexpected risk of injury to persons shall be marked to inform the user of the risk.

**5.14.2** All cautionary, warning, danger, and operator markings shall be located on or immediately adjacent to each automatic sensing device and at the point of operation.

**5.14.3** A caution, warning, or danger marking shall be permanent and legible and shall be located on a permanent part of the baler.

**5.14.4** A cautionary marking intended to instruct the operator shall be legible and visible from the position normally assumed by the operator when starting the baler or from the position normally assumed for the specific operation involved. Other such markings for servicing or making settings and adjustments shall be legible and visible to the individual when such work is being accomplished.

**5.14.5** A marking intended to inform the user of a risk of injury to persons shall be prefixed by a signal word "CAUTION," "WARNING," or "DANGER." The marking shall be in letters not less than 0.672 inches (17.07 mm) high. The signal word shall be more prominent than any other required marking on the baling equipment.

**5.14.6** Markings shall be color coded as follows:

"DANGER" - Red, or predominantly red, with lettering or symbols in a contrasting color.

"WARNING" - Orange, or predominantly orange, with lettering or symbols in a contrasting color.

"CAUTION" - Yellow, or predominantly yellow, with lettering or symbols in a contrasting color.

NOTE: Additional guidance for markings can be found in ANSI Z535.4-2002.

**5.14.7** A baler having a part of an enclosure that is removable without the use of a tool (to attach, to make an operating adjustment, or for other reasons) shall be marked to indicate that such servicing is to be done with the equipment disconnected from the supply circuit.

**5.14.8** A baler having provisions for two or more separate connections to a branch circuit or other power-supply source shall be permanently marked with the word "**CAUTION**" and the following or the equivalent: "**This baler has more than one connection to the source of supply. To reduce the risk of electrical shock, disconnect all such connections before servicing.**" The marking shall be located at each point of connection, and shall be readily visible after installation of the baler.

**5.14.9** All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard.

**5.14.10** A sign shall be located on or immediately next to each automatic sensing device, and at the point of operation, such as:

**"WARNING — THIS BALER STARTS AUTOMATICALLY"**

**5.14.11** Where voltage exceeds 120 volts, a sign shall be located on each control panel and power unit, such as:

**"DANGER — HIGH VOLTAGE"** (or appropriate voltage)

**5.14.12** A sign shall be located on each access cover, such as:

**"WARNING — DO NOT REMOVE ACCESS COVER EXCEPT FOR SERVICING;  
FOLLOW LOCKOUT/TAGOUT PROCEDURES"**

**5.14.13** A sign shall be located on each access gate that prohibits access to the loading chamber from a walk-on ramp, such as:

**"WARNING — GATE MUST BE CLOSED BEFORE OPERATING BALER"**

**5.14.14** A sign shall be located on any inside face in the loading hopper, which is visible from a loading position, such as:

**"DANGER — DO NOT ENTER"**

**5.14.15** A sign shall be located on each outside face of the loading hopper, such as:

**"DANGER — DO NOT ENTER"**

**5.14.16** On commercial/industrial balers without a loading hopper, a sign shall be located at the loading sill(s) such as:

**"DANGER — DO NOT ENTER"**

This sign shall be visible from both sides of the baler.

#### **5.14.17 Container/cart lifting systems**

**5.14.17.1** A sign shall be located in the vicinity of the lifting system controls, such as:

**"WARNING — BEFORE OPERATING LIFTER, CLEAR AREA OF ALL INDIVIDUALS"**

A sign shall be located in clear view of the dumper system and container, such as:

**"DANGER — STAY CLEAR OF LIFTER AND LIFTING AREA"**

#### **5.14.18 Balers containing one or more confined spaces meeting the criteria of " confined space"**

**5.14.18.1** A sign shall be located at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as:

**"WARNING – FOLLOW LOCKOUT/TAGOUT PROCEDURES BEFORE ENTERING"**

**5.14.18.2** A sign shall be located at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as:

**"DANGER — CONFINED SPACE"**

### **6 Reconstruction and modification**

**6.1** Reconstruction or modification of any baler (including power units and controls) shall be in accordance with requirements of ANSI Z245.51.

**6.2** Reconstructed or modified balers shall be permanently identified with the name of the manufacturer or person conducting the reconstruction or modification and the date of reconstruction or modification.

**6.3** Reconstructed or modified balers evaluated and determined to conform to the requirements of ANSI Z245.51 shall be identified on the baler by a statement attesting to compliance with the ANSI Z245.51 standard or shall have an approved listing mark.

### **7 Operational requirements**

**7.1 Owner/employer responsibilities for balers.** The owner/employer shall provide properly maintained balers that meet all applicable regulatory safety requirements and the requirements of this standard, and shall be responsible for all of the following:

- a) Ensuring that the installation of the baler conforms to local codes, ordinances, and manufacturer's recommendations. If installing into a system, examine prevailing safety standards of associated equipment;
- b) Providing to employees instruction and training in safe work methods before assigning them to operate, clean, service, maintain, modify, or repair the baler. Such instruction and training shall include procedures provided by the manufacturer. The employer will maintain records as to the names of employees and the dates of training;
- c) Providing instructions for addressing abnormal situations (e.g., bridging of the loading chamber or feeding chute, jam of materials);

- d) Assigning only trained employees to work on (which includes operating, loading, cleaning, servicing, maintaining, or repairing) the baler;
- e) Monitoring the employee's operation of the baler and taking appropriate action to ensure proper use, including adherence to safe practices and the employee requirements of this standard and monitoring the employee's operation of balers and taking appropriate action to ensure proper use of equipment, including adherence to safe practice;
- f) Repairing, prior to placing the baler into service, any mechanical malfunctions or breakdowns that affect the safe operations of the baler;
- g) Establishing and following a program of periodic and regular inspections of all balers to ensure that all parts, component equipment, and safeguards are in safe operating condition, and adjusted, in accordance with the manufacturer's recommended procedures. This shall include keeping all malfunction reports and records of inspections and maintenance work performed;
- h) Implementing a program for the maintenance of the baler which will incorporate the following elements:
  - 1) Requirements for trained, competent maintenance employees or contractors to perform inspection and repair work;
  - 2) Providing for the cleaning, inspection and repair of the baler in accordance with the manufacturer's recommendations, including periodic maintenance;
  - 3) Ensuring that all required safety features are operational and functioning, and repairing, prior to placing into service, any reported malfunction or defect that affects the safe operation of the baler; and
  - 4) Ensuring that all caution, warning and danger markings required by 5.14 are installed and legible, or are replaced if damaged, defaced or missing.
- i) Utilizing the manufacturer's recommended procedures for the control of hazardous energy sources (lockout/tagout) in a program complying with Part 1910.147 of Title 29 of the *Code of Federal Regulations* (OSHA) (see 7.3);
- j) Utilizing the manufacturer's recommended procedures for access control for permit-required confined spaces as part of the employer's program (see 7.4);
- k) Protecting any person by one of the methods in 5.8.1, or by other means as effective as those means of protection.
- l) For balers fed by means of a loading pit conveyor, reciprocating floor, or push pit that is flush with or below the facility floor, providing:
  - 1) Protection for employees by means of:
    - i) Limiting access within 6 feet (183 cm) of the edge of the pit to authorized employees;
    - ii) Training authorized employees to recognize and avoid the hazards associated with the pit area;

- iii) Requiring that others whose employees use the pit area provide assurance of such training; and
- iv) Limiting access by unauthorized persons by installing signs, such as:

**"RESTRICTED AREA — AUTHORIZED EMPLOYEES ONLY"**

- 2) Providing a device to the extent practicable, which prevents trucks or other motor vehicles that unload directly into the loading pit from rolling into the pit;
- m) When balers equipped with automatic start/cycling controls are provided, allowing their use only in locations where a startup alarm is utilized or it is demonstrated that automatic starting does not result in a risk of injury to persons;

NOTE: Achieving acceptably low risk of injury would include demonstrating that lockout procedures are strictly adhered to when bridging in feed chutes occurs or jammed material must be cleared from the loading chamber

- n) Providing guard railings for dock ramps that meet U.S. Occupational Safety and Health Administration requirements. These shall be located around the loading chamber opening if walk-on ramps are used to deposit refuse into the loading chamber. Guard railings and toe boards shall be provided on the sides of docks and ramps;
- o) Providing for an adequate work area around the baler for safe maintenance, servicing, and cleaning procedures;
- p) Keeping all surrounding walking areas and floors free from obstructions, and accumulations of waste matter, grease, oil, and water (slipping and tripping hazards);
- q) Maintaining records or employee reports of malfunctions;
- r) Specifically inspecting safety interlocks, switches, and other protective devices to ensure that these devices are not disabled or bypassed, and not to permit the baler to be operated unless these devices are fully functional. These inspections shall be in accordance with (g);
- s) Ensuring that containers supplied are capable of withstanding the maximum forces generated by the baling system;
- t) Ensuring that loaders are aware of hazards and safety requirements;
- u) Ensuring that only authorized employees (18 years old or older) operate, inspect, or maintain balers;
- v) Ensuring that only authorized employees (16 years old or older) load, but do not operate balers; and
- w) Incorporating balers into the employer's safety program (see Section 8).

**7.2 Operator and employee responsibilities.** Operators who work on and around the baler shall be responsible for the items listed below:

- a) Using all applicable safety features provided on the baler;
- b) Using the baler only after receiving instruction;

- c) Reporting any damage to, or malfunction of, the baler by submitting a report to the employer or responsible authority when the damage or malfunction occurs;
- d) Ensuring that access doors and service opening covers are in place, secure, and/or locked before operations begin;
- e) Ensuring that the area of operation around container/cart lifting systems and the container will be clear of persons during all phases of the lifting operation prior to energizing the dumping system;
- f) Ensuring that all persons are clear of the baler point of operation before actuating any compaction cycle controls or container/cart lifting system controls and being prepared to stop the compaction cycle or container dumping operation if necessary;
- g) Ensuring that all persons are clear of the tailgate (on baler-container combinations so equipped) before the tailgate is opened or shut. The operator shall warn all persons not to cross behind or under an open tailgate;
- h) Using the baler in accordance the manufacturer's instructions, including ensuring the proper position of all locks, doors, guards, etc.;
- i) Ensuring that no one disables or bypasses safety interlocks, switches, or other protective devices and that the baler is not operated unless these devices are fully functional;
- j) Locking out the unit when inspecting malfunctions, jams, or other problems arising from daily operations; servicing; or performing maintenance (except maintenance testing). The affected employee shall identify the type and magnitude of the energy that the baler uses, shall understand the hazards, and know the methods to control the energy (see 7.3);
- k) Coupling and securing a compatible container to a baler frame as specified by the baler and container manufacturer(s);
- l) Operating, inspecting, and maintaining the baler only if 18 years old or older and after being properly instructed and trained; and
- m) Loading, but not operating, the baler only if 16 years old or older.

### **7.3 Procedures for the control of hazardous energy sources (lockout/tagout)**

**7.3.1** The owner/employer shall have a hazardous energy control (lockout/tagout) procedure to follow when performing servicing and maintenance on balers where the unexpected energization or start up of equipment, or release of stored energy could cause injury to employees.

**7.3.2** The owner/employer shall utilize the instructions provided by the manufacturer for the control of hazardous energy sources. The lockout/tagout procedure shall isolate and render safe all energy sources, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other potential energy sources (e.g., gravity, kinetic, etc.). It shall be used to ensure that the baler is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the baler or release of stored energy could cause injury.

**7.3.3** The lockout/tagout procedure shall include but is not limited to the following:

- a) Shutting down all power sources;

- b) Removing keys or other devices that enable the baler;
- c) Using a lock to secure the power supply or, if that is not feasible, installing a tag on an appropriate location, using a non-reusable fastener, or installing a similar warning device;
- d) Placing operating components in such a position so as not to be subject to possible free fall and/or installation of additional blocking devices to prevent such free fall of any raised or elevated component; and
- e) Relieving stored hydraulic or pneumatic pressure, after blocking devices are installed, if maintenance is to be done to the hydraulic or pneumatic system.

**7.3.4** The procedure shall address the following:

- a) Sequence of lockout for the baler:
  - 1) Notify all affected employees that servicing or maintenance is required on a baler and that the baler must be shut down and locked out to perform the servicing or maintenance.
  - 2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the baler utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
  - 3) If the baler is operating, it must be shut down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).
  - 4) De-activate the energy isolating device(s) so that baler is isolated from the energy source(s).
  - 5) Lock out the energy isolating device(s) with assigned individual lock(s).
  - 6) Stored or residual energy must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
  - 7) Ensure that the baler is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

**Caution:** Return operating control(s) to neutral or “off” position only after verifying the isolation of the equipment.

**NOTE:** The machine or equipment is now locked out.

- b) Restoring the baler to service. When the servicing or maintenance is completed and the baler is ready to return to normal operating condition, the following steps shall be taken:
  - 1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
  - 2) Check the work area to ensure that all employees have been safely positioned or removed from the area.
  - 3) Verify that the controls are in neutral.



- 4) Remove the lockout devices and reenergize the machine or equipment.

NOTE: The removal of some forms of blocking may require re-energizing of the machine before safe removal.

- 5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

## 7.4 Procedures for work in confined spaces

**7.4.1** The owner/employer shall have a written procedure for work in confined spaces meeting the criteria of "permit required confined spaces," such as integrated power units. The procedure shall utilize the manufacturer's instructions for the hazardous energy control (lockout / tagout) procedure which shall isolate and render safe all energy sources, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other potential energy sources (e.g., gravity, kinetic, etc.). which may create a hazard during entry into each of those confined spaces.

- a) These instructions shall include the requirement to affix a sign to the baler, at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as, **"Warning — Follow lockout/tagout procedures before entering."**

- b) These instructions shall include the requirement to affix a sign to the baler, at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as, **"Danger — Confined Space."**

## 8 Safety and training program

### 8.1 General

**8.1.1** Employers shall evaluate and manage safety issues related to the operation of baling equipment as part of their safety program.

### 8.2 Safety program

**8.2.1** The employer's program shall include at a minimum the following elements:

- a) A hazard assessment in which the employer conducts a review of the various types of baling equipment that the employer utilizes and the hazards associated with them and, review and assess the capabilities, qualifications and training of any person who may potentially encounter these hazards.
- b) An evaluation of the means and methods of controlling the hazards identified in the hazard assessment, including information such as industry and regulatory requirements; instructions for the operation, inspection, and maintenance of balers, and other information appropriate to the hazards that are identified
- c) A written program, based upon the hazard assessment and evaluation, to include procedures for the operation, inspection, and maintenance of balers, prohibited practices, record keeping, training requirements, and normative references to documents, such as operating manuals, that are relied upon and may be required as part of that program;
- d) A program, conforming to 8.3, for the implementation of the written program; and

- e) Periodic review and program revisions as necessary to ensure the effectiveness of the safety program.

### **8.3 General training**

**8.3.1** Employers shall ensure all employees, including supervisors, contract laborers, and all other persons engaged in the operation, cleaning, maintenance, service or repair of baling equipment are properly trained appropriate for their assigned jobs and tasks. Contractors who may be engaged to operate or maintain the employer's balers shall be advised of the unique hazards related to the equipment that may affect the activities in which the contractor's employees will engage.

#### **8.3.2 Training frequency**

**8.3.2.1** Training shall be provided upon initial assignment to a job or task, with periodic refresher training to maintain the required level of competence. Retraining shall be provided for employees whenever their job assignments change, or an equipment change occurs that presents a new hazard. Additional retraining shall be provided whenever the employer has reason to believe, or periodic inspections reveal, that employee deviations from procedures have occurred, or inadequacies in the employee's knowledge of procedures become evident.

#### **8.3.3 Instructional information**

**8.3.3.1** Employers are required to refer employees to, and have readily available, the manufacturer's instructions to ensure correct operating and maintenance procedures and work practices are understood and followed. Employers are required to ensure employees possess knowledge and skills to safely operate the baler.

#### **8.3.4 Contract labor**

**8.3.4.1** Employers shall ensure for each job or task performed that training is provided either by the contract laborer's parent employer or by the employer.

#### **8.3.5 Training records**

**8.3.5.1** Employers are required to maintain training records to include the date(s) of the training and the type of training received. Records are required to be maintained as required by applicable regulations. Contractors and contract laborers are required to provide the employer with appropriate training records upon demand.

#### **8.3.6 Equipment-specific training**

**8.3.6.1** Training shall be tailored for individual operations and the type of equipment utilized including detailed, equipment-specific training for machine operators, as well as maintenance personnel and supervisors who must operate equipment as part of their job duties. Training shall include practical demonstration of equipment operation knowledge and skills by the employee, as appropriate to the requirements of the employee's job duties.

### **8.4 Training requirements**

**8.4.1** Training is required to include at a minimum:

- a) The necessary training as identified in the hazard assessment [see 8.2.1 a)];

- b) The training required by laws and regulations, such as those of federal and state Occupational Safety and Health Administrations, the Departments of Transportation, and other applicable regulatory agencies; and
- c) Operational instruction on each specific type of equipment used by the employee, including the instructions provided with the equipment.

**Annex A**  
(informative)

**Bibliography**

**A.1 American National Standards**

ANSI A1264.1-1995 (R2002), *Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems*.

ANSI/NFPA 79-2002, *Electrical Standard for Industrial Machinery*

ANSI/NFPA 82-1998, *Incinerators and Waste and Linen Handling Systems and Equipment*

ANSI Z245.51-2008, *Baling Equipment — Safety Requirements*<sup>1</sup>

ANSI Z535.1-2002, *Safety Color Code*

ANSI Z535.2-2002, *Environmental and Facility Safety Signs*

ANSI Z535.3-2002, *Criteria for Safety Symbols*

ANSI Z535.4-2002, *Product Safety Signs and Labels*

ANSI Z535.5-2002, *Accident Prevention Tags*

**A.2 U.S. Government Health & Safety Regulations**<sup>2,3</sup>

OSHA 29 CFR Part 1910.23, *Guarding of Floor and Wall Openings and Holes*

OSHA 29 CFR Part 1910.132, *General Requirements for Personal Protection Equipment*

OSHA 29 CFR Part 1910.146, *Permit-Required Confined Spaces*

OSHA 29 CFR Part 1910.147, *Lockout/Tagout of Energy Sources*

OSHA 29 CFR Part 1910.212, *Machine Guarding*

**A.3 Industry Standards**

ASME B15.1-2000, *Mechanical Power Transmission Equipment*<sup>4</sup>

ASME B20.1-1996, *Conveyors and Related Equipment*

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<sup>1</sup> Available from Environmental Industry Associations

<sup>2</sup> Available from U.S. Government Printing Office, Washington, DC

<sup>3</sup> Available over the Internet from [www.osha.gov](http://www.osha.gov)

<sup>4</sup> Available from American Society of Mechanical Engineers

# Harris Waste Management Group, Inc.

## One (1) Year Limited Warranty

This Limited Warranty only applies to Vertical, Horizontal and 2-Ram balers hereafter, the EQUIPMENT, manufactured by Harris Waste Management Group, Inc. hereafter, the COMPANY.

Subject to the terms and conditions herein, the COMPANY warrants to the original PURCHASER that the EQUIPMENT listed hereto will be free from manufacturing defects in materials and workmanship performed by the COMPANY, for a period commencing the date the EQUIPMENT is placed in service or thirty (30) days after shipment of the EQUIPMENT whichever occurs first, or thirty (30) days after the date it could have been shipped in case shipping is delayed by factors or conditions which are not the responsibility of the COMPANY, and extending for a period of one (1) year, or two thousand (2,000) hours use of the EQUIPMENT whichever occurs first. Specifically EXCLUDED from this warranty are normal wear and maintenance items (including but not limited to: liners, filters, fuses, wear strips, o-rings and routine adjustments).

Subject to the terms and conditions herein, for EQUIPMENT and/or components that are manufactured for and/or by a third party that the COMPANY'S warranty to the original PURCHASER shall be limited to the terms, conditions, limitations and exclusions as set forth by the third party manufacturer of said EQUIPMENT or component.

The COMPANY will provide labor for repairs or replacement of defective part or component for a period of the first ninety (90) days or the first five hundred (500) hours, whichever occurs first, of the warranty period to the original PURCHASER. Labor during the remainder of the warranty period described above will be provided at the standard rates charged by the COMPANY for service work, contingent upon prior written authorization, to perform the warranty work by the COMPANY to the PURCHASER.

The foregoing notwithstanding, the following conditions shall void the warranty: (1) The EQUIPMENT, or any part thereof, has been subjected to accident, negligence, improper operation or maintenance, alteration, modification, abuse or misuse, or to damage caused by unauthorized or improper repairs, or failure to read, view or follow prescribed or reasonable operation, safety and maintenance instructions, or failure to replace worn parts in a timely manner; (2) the EQUIPMENT has been subjected to operating conditions beyond that for which it was designed; (3) the EQUIPMENT has processed materials for which it was not specifically designed to process; (4) the PURCHASER fails to notify the COMPANY promptly in writing of any alleged defects within the aforementioned warranty period; or (5) in the event the EQUIPMENT is not: (a) operated by fully-trained, competent personnel; (b) maintained in good operating condition using approved components and service techniques and instructions applied by competent maintenance personnel; or (c) marked with all warnings, decals and/or instructions attached to the EQUIPMENT.

The COMPANY and the PURCHASER expressly agree that the COMPANY'S obligations are limited solely to the COMPANY'S choice of repair or replacement (F.O.B. point of manufacture) of any defective part, component or workmanship, or alternatively, refund of the purchase price of any part or component. Any such refunded or replaced parts shall be promptly returned by the PURCHASER to the COMPANY, (F.O.B. PURCHASER'S site) if so requested by the COMPANY. Any labor to replace a defective part or component is not included under the terms of this limited warranty. It is expressly agreed that the remedies provided in this Limited Warranty are the exclusive remedies for the PURCHASER or third parties without the advance written authorization by the COMPANY.

It is expressly agreed by the parties signing this agreement that: (1) The COMPANY makes no guarantees or warranties of any nature except as stated in this agreement; (2) **THAT ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTIES ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR USAGE OF TRADE, ARE HEREBY EXCLUDED AND NEGATED;** (3) that the COMPANY'S liability is expressly limited to and the PURCHASER'S sole exclusive remedies are those stated in this agreement; and (4) that the COMPANY shall never be liable for incidental, indirect, or consequential damages of any nature, including without limitation, loss of production, loss of product, loss of operating supplies, or loss of revenues, profits or income in connection with the purchases, operation or use of the EQUIPMENT.

\*Harris equipment has been provided with a modem (exception is Verticals) to enable remote connection by our service department to diagnose and resolve problems with Purchaser's equipment as quickly and cost effectively as possible. Harris encourages Purchaser to benefit from this service by providing a phone or ethernet line to the equipment. If Purchaser of the equipment elects not to provide the remote connection (which prevents Harris from diagnosing and solving equipment problems remotely) the Purchaser will be charged for expenses incurred to have an authorized Harris service technician to visit Purchaser's site. "

In the event of any deviation from this specific written warranty, such deviation shall not alter any other terms of the warranty. The COMPANY reserves the right to make improvements and changes in the design and/or specification for its EQUIPMENT without notification and without incorporating the changes in the EQUIPMENT on order or delivered.

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