"Equipping The World For A Better Environment"

OWNER/OPERATOR MANUAL

Vertical Baler

MODELS

TVB 78X-H
TVB 54
TVB 54-S
TVB 3624-S
TVB 48
TVB 60
TVB 72
TVB 48X-CAN-H
TVB 60X-CAN-H

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INTRODUCTION

Congratulations on the purchase of a *CRAM-A-LOT®* baler. This baler is designed to provide safe, trouble-free operation for many years. All *CRAM-A-LOT®* balers meet and exceed A.N.S.I. Z245.5 safety standards for baler machines.

This Owners Manual is presented to give the owner and/or operator the necessary information to properly and safely operate the baler. It also provides information for routine maintenance and trouble-shooting.

If, after thoroughly reading this manual, there are questions about the operation or repair of the baler, call *J.V. MANUFACTURING, INC.* at 1-800-754-4290. Ask to speak with one of our service staff and he/she will be glad to answer any questions. Our customer support hours are 7:00 a.m. - 5:30 p.m. CST Monday - Friday and 8:00 a.m. - 12:00 p.m. CST on Saturday. You can also address questions via e-mail to service@jv.com.

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BALER LOCKOUT TAGOUT PROCEDURE

This procedure establishes the minimum requirements for the lockout of a baler for service. It shall be used to ensure that the machine is isolated from all potentially hazardous energy, and locked out before employees perform any servicing or maintenance activities where the unexpected energization or start-up could cause serious injury or fatality due to electrocution or due to entrapment in moving parts. This procedure should be performed only by an authorized, qualified electrician.

(1) Before locking the baler out for service or repair, locate which breaker or disconnect applies to the baler being locked out. Notify all affected employees that a lockout system is going to be utilized and the reason therefore.

(2) If the machine or equipment is operating, shut it down by the normal stopping procedure.

(3) Lock out the disconnect or breaker that controls the baler. If locking out a breaker use a double-pole breaker lockout and lock.

(4) Lockout the energy isolating devices with assigned individual locks. If more than one person is servicing the baler, then a hasp with a lock for each service person shall be used.

(5) After ensuring that no personnel are exposed, and as a check on having closed the appropriate breaker or disconnect, operate the start button to make certain the baler will not operate, then push the stop button. The baler is now locked out.

(6) After the servicing and/or maintenance is complete and equipment is ready for normal production operations, check the area around the machines or equipment to ensure that no one is exposed.

(7) After all tools have been removed from the baler and employees are clear, remove the lockout device. Operate the start button to restore energy to the baler.

OPERATOR SAFETY: READ THIS BEFORE OPERATING THIS MACHINE

Publication of these safety precautions does not imply or represent an all inclusive list. It is the plant owner or manager's responsibility to be familiar with and insure that the Vertical Baler operation is in compliance with all applicable OSHA and ANSI standards, as well as all state and local regulations. The design of your machine should help you meet these requirements and promote a safe operation. These regulations do change and therefore it is not possible to give a reference which will remain current. In all instances, especially where the machine interfaces and is purchased as part of a larger system, or is purchased without controls or other required components, it is the responsibility of the purchaser to provide the necessary safety warning's interlocks and devices.

These machines are designed to operate with safety in mind. However, it is the owner and users responsibility to see that all safety devices are properly maintained, and that all equipment is operated by trained personnel for the purpose and under the conditions intended. You the operator, must know and observe the capacities and limitations of your machine. New personnel must be instructed in the operation of the machine with safety precautions stressed and potential dangers noted. Strict observance of safety precautions including, but not limited to those listed below will ensure the safe and profitable operation of this equipment.

1. Do not service the machine unless the electrical power is disconnected at the master disconnect switch. Each person working on the machine should put a separate lock on the switch and keep the key to eliminate the chance of the power being turned back on while others may be exposed to the danger of moving parts or electrical shock. The moving parts of this machine are backed by forces measured in tons and tens of tons. Guards and safety interlocks are provided to prevent inadvertent injury to people around the machine. Never work inside these guards trusting others to get the job done between cycles of the machine.

2. Hydraulic is the primary element of power transmission on this machine. Remember that hydraulic systems can remain pressurized even after the power is cut off. Slowly bleed off any pressure lines and use extreme caution when disconnecting flexible hoses and connections.

3. Oil is slippery and very hazardous when on the floor or other working surfaces. Do not postpone maintenance of leaks which may develop. Have on hand a generous supply of "oil dry" or equivalent whenever the hydraulic circuit is opened for service or repair.

4. Warning markings on the machine are intended to remind personnel of hazards and/or proper operation. They are under no circumstances to be removed, defaced or obstructed. Replace safety decals as needed.

5. Do not stand on the machine or in front of the chamber door when opening.

6. Never operate the machine while wearing jewelry or loose clothing which may catch on controls or moving parts.

7. Always wear safety equipment as specified by your employer.

8. Perform pre-operation checks as listed in the "Preventive Maintenance" schedule. Do not start the machine with malfunctions present.

9. Hydraulic fluid operates under high temperature and pressured. Avoid contact with piping, hoses and other related components to prevent the possibility of burns or injury due to fluid escaping under pressure.

10. STAY ALERT AT ALL TIMES.

Your Vertical Baler is completely prewired, prepiped and factory tested. However, the oil level in the reservoir should be checked before operation, fill if necessary. Also, the hydraulic connections may have loosened during shipment, they should be checked for tightness.

Baler can be shipped standing in an upright position. The cylinder will be lowered into the chamber and supported with a platform under the platen.

1. Stand machine upright on a reasonably level, solid surface.

2. (Optional) Once the machine is in place, it is advisable to anchor it to the floor with anchor bolts. Bolt-on-tabs are provided for this purpose. Anchoring the machine to the floor will stabilize the machine, protecting it from accidental movement due to vibrations, uneven flooring, forklifts, etc.

3. If the baler is equipped with a chain eject system, the ejection hook, located on the back of the baler, must be placed in its cradle.

4. The non-vented hydraulic tank shipping cap must be replaced with a vented hydraulic tank cap before starting the machine. The vented cap is shipped in the electrical box.

5. Connect the pigtail provided with the machine to three phase, four wire power supply. Refer to the voltage/amperage chart below for the required amperage. The power supply must correspond with the voltage marked on the control panel. Also, check to make sure the control transformer and motor are wired for the voltage being used.

Voltage/Amperage Chart

HP	208V	230V	480V
5	17.5 amps	15.2 amps	7.6 amps
10	32.0 amps	29.0 amps	14.0 amps
15	48.0 amps	42.0 amps	21.0 amps
20	62.0 amps	54.0 amps	27.0 amps

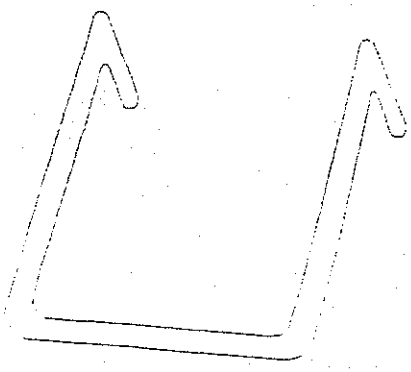
Required Wire Size (copper)

HP	208V	230V	480V
5	10 GA THHN	12 GA THHN	12 GA THHN
10	8 GA THHN	8 GA THHN	12 GA THHN
15	6 GA THHN	6 GA THHN	10 GA THHN
20	4 GA THHN	4 GA THHN	8 GA THHN

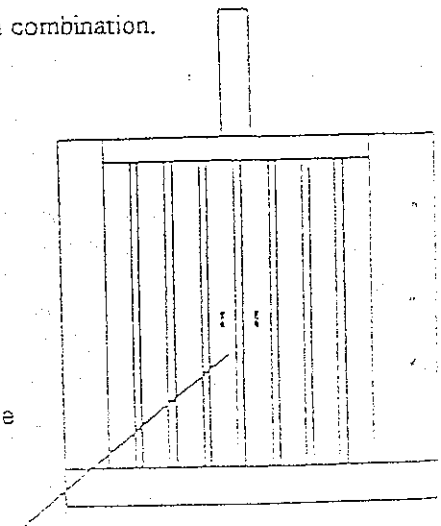
6. From the back end, check motor rotation for direction, it should turn clockwise. If motor is rotating counterclockwise, a reversal of any two power leads will correct the rotation.

7. Once the machine is running, the cylinder can now be raised to its correct position. The cylinder can be raised under the baler's own power. Follow the directions for manually lowering the platen. This will extend the rod, lifting the cylinder up into its mounting position. Once the cylinder is securely bolted to the frame, the baler is ready for operation.

NOTE: Use caution to provide enough support for the weight of the cylinder and platen combination.



Eject Hook Cradle for Chain Eject System



Back view of the baler indicating the mounting slots for the cradle.

INITIAL START-UP OF THE HYDRAULIC POWER UNIT

1. Before starting the electric motor on the power unit, for any reason, the following should be done:

   A. *Initial Hydraulic Check*
      1) Check reservoir oil level with cylinder in the retracted position. Be sure the reservoir is filled to the proper level. All units are shipped from the factory with the proper amount and type of fluid.
      2) check the pump/motor coupling for alignment and to insure that the coupling is secured to the shaft.
      3) Check that all fittings and hoses are properly secured and not worn.
      4) Clean any hydraulic oil spills.
      5) Check that the reservoir is clean of materials, dust, oil, lint, etc. Any foreign material will act as an insulator and cause excessive heat build up.

   B. *Initial Electrical Check*
      1) Check all limit switches for secure mounting, and inspect all arms or operators for proper alignment and possible damage.
      2) Check all wire housing covers on the solenoid valves, limit switches, pressure switch, etc., to ensure that they are in place and secured.
      3) Check for frayed conduit or exposed wires.
      4) All enclosure mounted components, i.e. starters, relays and terminal strip, should be checked for loose connections, then tightened if loose.
      5) Check all panels for proper closing and latching.

   C. *Initial Mechanical Check*
      1) Check that cotter pins are in place and the cylinder pin is in the collar securely.
      2) Check all cylinder piston rods for nicks or scratches.
      3) Check all screws and bolts, especially those related to guards and shields. Tighten or replace if necessary.
      4) Check welds for cracks.

2. Connect the motor to the proper electrical source. Check the motor nameplate for proper wiring of tri-volt motors. Jog the motor to check rotation. Polyphase motors are bi-directional and proper rotation can be established by reversing any two power leads.

3. Jog the electric motor several times to establish prime on the pumps. The use of open center valving allows the pump on initial start-up to clear itself of air and draw an oil prime quickly.

4. After the pump is primed, the machine is ready to be test cycled. All pressure adjustments have been set at the factory.

5. Air trapped in a hydraulic system will cause spongy operation. After the pump has been running for a short period of time, the machine should be cycled several times to purge air from the system. It may be necessary to bleed air at the pump.

6. After the hydraulic system has been running under actual operating conditions for at least one day, the following checks should be made and subsequent corrections made if necessary:
   A. Check all pipe and tubing joints and system components for external leakage.
   B. Check the oil level in the reservoir.
   C. Check the system for spongy operation and bleed air if necessary.
   D. Should unusual or excessive noise arise, determine the source.

BALEABLE MATERIAL

Our standard Vertical Balers are designed to produce bales of salvageable paper based products such as cardboard cartons, boxboard cuttings, coated paper and foreign and domestic packaging; light plastics such as milk cartons, soft drink bottles, and soap containers; light aluminum cans and packages.

Material other than the before mentioned items may damage the baler's structure and hydraulic and electrical components. Any attempt to bale material other than the before mentioned items may void the warranty. If you have any concerns about the material you will be baling or will be using a specialty baler designed to bale hard-to-bale material, contact the factory for more information.

All persons operating the baler must be informed of the material the baler is capable of baling and the proper procedure for loading the material into the baler.

RECOMMENDED OPERATING PROCEDURE: PRODUCING A BALE

This Vertical Baler is designed to provide long and continuous service. It will make full size, proper weight bales and eject them when the operating instructions are followed accurately.

WARNING: To prevent personal injury, always remove the key when the Vertical Baler is not in use.

1. With the bale chamber door open, place one large piece of cardboard above the ejector plate to provide good support for the bale ties.

CAUTION: Never enter or reach into the baler.

2. Close the chamber door, then turn the wheel turnbuckle door lock clockwise until the door is tightened securely against the frame.

CAUTION: Never attempt to operate the machine unless the compaction chamber door is completely closed and secured. If the baler is equipped with a chain eject system, be sure the bale ejector chain is outside of baling chamber. (Ejector hook should automatically reset itself on the first cycle down after dumping a bale. After platen has started down, visually check to make sure hook has disengaged itself.) When baling, the hook must be stored on the retainer bracket.

3. Automatic Operation: Set the Auto/Manual Selector Switch in the "Auto" position; the power light will be on.

4. With the platen and the Loading Chamber Gate in the up position, fill the Loading Chamber with material to be baled. Distribute the material into the chamber evenly, especially in the sides and corners. Pull the Loading Chamber Safety Gate down against the Chamber Door. The baler will not start until the gate is closed and will shut off automatically if the gate is opened during operation. If an obstruction prevents the Loading chamber Safety Gate from closing, the baler will not start in automatic mode.

5. Press the Start Button, hold for approximately one second, then release.

CAUTION: Keep clear of the loading area while the baler is running.

6. The bale size indicators allow the operator to determine the proper size bale. Observe the colored indicators through the Safety Gate. If the platen reverses when the indicators are aligned, the bale is the proper height.

RECOMMENDED OPERATING PROCEDURE: TYING A BALE

1. When the bale is the correct height, place a large piece of cardboard on the top of the completed bale.

2. Place the Automatic/Manual Selector switch in the "MAN" position. Turn the Manual-Down/Manual-Up to the "MAN DN" position and hold. Press the Start button, hold for one second, then release. The platen will move downward and compress the bale. When the platen stops moving down, release the Manual-Down/Manual-Up selector switch, then press the Stop button to shut the baler off.

WARNING: Clear all personnel from the front of the baler when opening the bale chamber door. Pressure from compacted material may push the door open with force when it is unlocked.

3. Turn the wheel-lock counterclockwise to unlock the bale chamber door. Open both the bale chamber door and the loading chamber safety gate.

4. Push the pointed ends of the bale ties through the slots in the chamber floor until only the loop end of the tie remains at the front of the bale.

5. From the rear of the baler, push the pointed end of the ties back through the slots in the platen at the top of the bale until the excess tie protrudes from the top front of the bale. Run the pointed end of the bale tie through its looped end, pull it snug, then wrap the pointed end around the tie atleast five times to secure the wire. Use four to seven ties depending on the baler model, spaced evenly across the bale.

NOTE: Do not cross the bale ties.

OPTIONAL FRONT BALE WIRE FEED SYSTEM

1. If the baler is equipped with an optional Front Bale Wire Feed system, follow the directions for typing a bale as indicated above from 1 through 4. The wires will automatically be guided back to the top front of the bale.

2. Run the pointed end of the bale tie through its looped end, pull it snug, then wrap the pointed end around the tie at least five times to secure the wire. Use four to seven ties, depending on the baler model, spaced evenly across the bale.

RECOMMENDED OPERATING PROCEDURE: EJECTING A BALE

HYDRAULIC EJECT SYSTEM

CAUTION: The bale chamber door and loading chamber safety gate must be completely open, and the platen must be retracted to the full up position so the bale does not hit the door, retainer dogs or gate when the bale is ejected. All personnel must be cleared from the front of the baler to avoid injury when the bale is ejected.

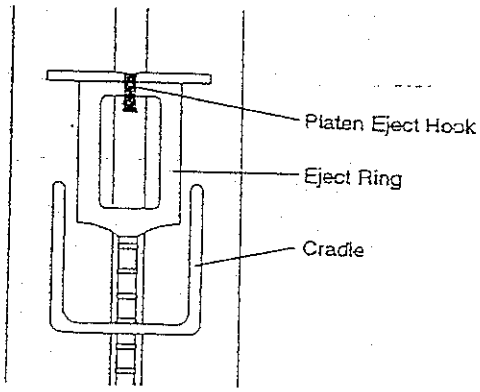
1. If desired, place a pallet or cart in front of the baler to facilitate moving the bale after it is ejected onto the pallet or cart.
2. With the automatic/manual switch in the "MAN" position, run the platen to the "FULL UP" position before ejecting the bale. Return the Automatic/Manual Switch to the "AUTO" position for the next cycle.
3. Turn and hold the Bale Eject switch in the "Eject" position until the bale is ejected, then release the switch.
4. To produce another bale, repeat the entire procedure beginning with "Producing a Bale" step 1.

CHAIN EJECT SYSTEM

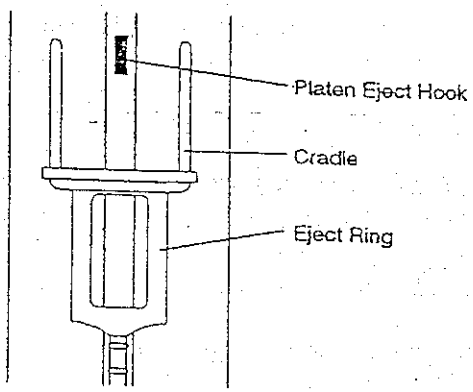
NOTE: The Eject Ring Cradle that is provided for the Chain Eject system must be inserted into the Cradle Slots on the back of the baler as indicated in the installation instructions on page 6. The cradle is designed to catch the Eject Ring and disengage it from the platen eject hook on the down stroke of the platen after the bale is ejected.

CAUTION: The Bale Chamber Door must be completely open, so the bale does not hit the chamber door or retainer dogs when the bale is ejected. All personnel must be cleared from the front of the baler to avoid injury when the bale is ejected.

1. If desired, place a pallet or cart in front of the baler to facilitate moving the bale after it is ejected onto the pallet or cart.
2. With the Automatic/Manual Switch in the "MAN DOWN" position, run the platen as far down as possible before ejecting the bale.
3. At the back of the baler, place the eject ring on the platen eject hook.
4. Press and hold the Start Button, and turn and hold the automatic/manual switch to the "MAN UP" Position. The platen will move up and stop at the top of its stroke. During this movement, the bale will be ejected onto the floor, cart, or pallet in front of the baler.
5. Close and lock the Bale Chamber Door and Loading Chamber Safety Gate.
6. Turn the Automatic/Manual Switch to the "AUTO" position, then press the start button to run one complete cycle. During this cycle the Eject Ring will detach from the Platen Eject Hood onto the cradle.
7. To produce another bale, repeat the entire procedure beginning with "Producing a Bale" step 1.



Eject Ring placed over the Platen Eject Hook



Eject Ring in Cradle for normal operation.

TROUBLE SHOOTING

*** IF MOTOR FAILS TO START**

1. Check that the power disconnect is in the "ON" position.
2. The On/Off switch must be in the "ON" position and the start button must be pushed
3. Check the 2 amp fuse located on the circuit board or control panel.
4. Check for proper line voltage entering the control box.
5. Check for proper line voltages going into and out of the transformer.
6. check for "kicked-out" overloads on the motor starter.
7. Call the factory or an electrician if 1 through 6 check out, but the motor still fails to start.

*** MOTOR STARTS, BUT PLATEN FAILS TO MOVE**

1. Check the level of hydraulic fluid in the reservoir. If it is low, add hydraulic fluid until it reaches the proper operating level.
2. Check the rotation of the motor. The shaft must rotate in the direction as shown on the decal mounted on the motor housing.
3. Check the motor and pump coupling. The motor coupling must be in contact with and turning the pump coupling.
4. The Directional Control Valve may be stuck in neutral position or the valve solenoid may be defective. To dislodge the control valve, insert a small rod into the end of the solenoid housing and push in while the motor is running; the platen should go up or down. If it does not go up or down, the spool may be inoperative.
5. Check whether or not the pump is building pressure. If not, it may be defective.
6. If there is no pressure, the relief valve spring may be broken. In order to check the spring, unscrew the pressure setting screw until the spring is exposed. If the spring is broken, replace it.
7. If 1 through 6 fail to resolve this problem, the cylinder may be defective. Contact the factory for further information.

*** THE MACHINE RUNS MOMENTARILY, THEN SHUTS OFF**

1. Check that the incoming voltage is +/- 10% of the motor nameplate.
2. Check that one phase of incoming power is not lost (3 phase only).
3. Check the overloads for correct sizing.
4. Check for hydraulic pump failure.
5. Check for viscosity problems with the hydraulic oil.

* MACHINE RUNS SLUGGISH AND SLOW

1. Check that the incoming voltage is +/- 10% of the motor nameplate.
2. Check that the hydraulic oil is not bypassing due to a problem in the hydraulic pump, relief valve, cylinder or lines.
3. Check hydraulic oil level and fill if necessary.
4. Check that the wrong hydraulic fluid has not been added.
5. Check the hydraulic fluid for contamination.

* CONTROL PANEL BUTTONS DON'T FUNCTION AS THEY SHOULD

1. Check the push-button contact blocks and/or wiring on the contact blocks.
2. Check for loose wires inside the control panel.
3. Check the relays. they may be loose or faulty.
4. Check that the limit switch arm is adjusted properly.

* CONTROL PANEL HAS A CHATTERING OR CLICKING SOUND WITH THE "START" BUTTON IS PRESSED

1. Check that the supply voltage is the same as the wired voltage.
2. Check that the control panel components have not failed.
3. Check the wiring connections on the controls.

* MACHINE DOES NOT SHUT OFF WHEN PLATEN RETURNS TO THE TOP

1. Check that the stop limit switch operating arm is not broken or jammed.
2. Check that the stop limit switch is in adjustment.
3. Check that the stop limit switch is not faulty.
4. Check that the wiring to the stop limit switch is correct.

* PLATEN DESCENDS, BUT DOES NOT RETURN TO THE UP POSITION

1. Check motor rotation.
2. Check relief valve for proper setting or malfunction.
3. Check the pressure switch for proper setting or malfunction.
4. Check hydraulic cylinder for defective seals.
5. Check hydraulic valve solenoids.

HYDRAULIC SYSTEM TROUBLE SHOOTING GUIDE

Incorrect Flow

No Flow

Pump not receiving fluid Remedy: A
Pump drive motor not operating Remedy: E
Pump to drive coupling sheared Remedy: C
Pump drive motor turning in wrong direction Remedy: G
Directional control set in wrong position Remedy: F
Entire Flow passing over relief valve Remedy D
Damaged pump Remedy: C
Improperly assembled pump Remedy: E

Low Flow

Flow control set too low Remedy: D
Relief or unloading valve set too low Remedy: D
Flow by-passing through partially open valve Remedy: E or F
External leak in system Remedy: B
Pump not receiving fluid Remedy: A
RPM of pump drive motor incorrect Remedy: H
Worn pump, valve, motor cylinder or other component Remedy: E

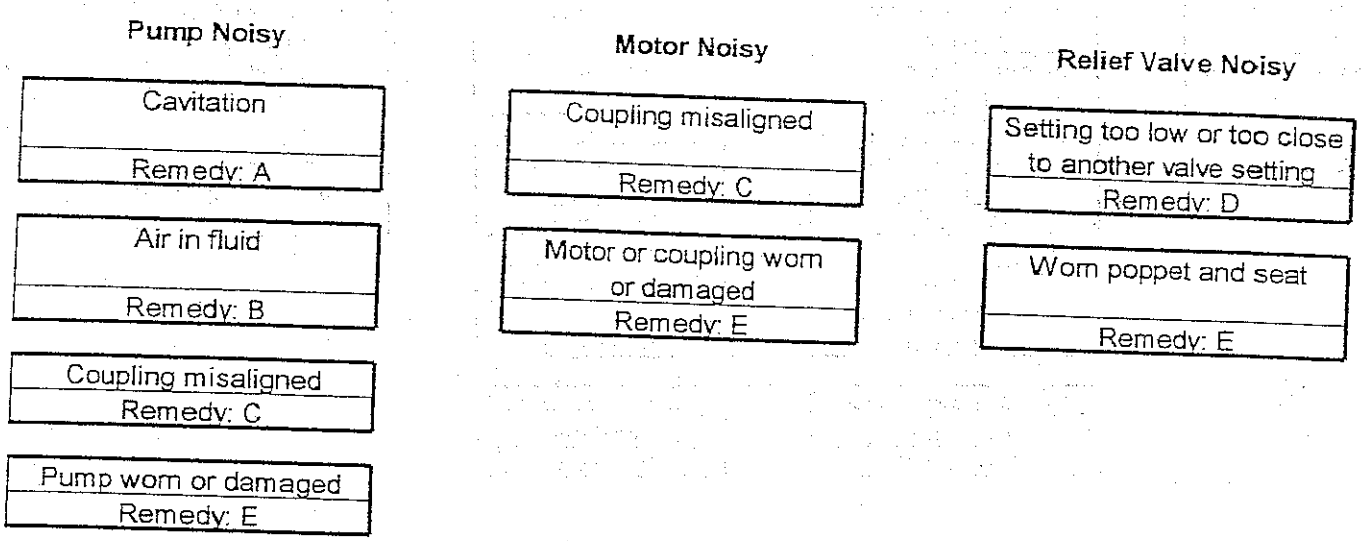
Excessive Flow

Flow control set too high Remedy: D
RPM of pump drive motor incorrect Remedy: H
Improper size pump used for replacement Remedy: H

REMEDIES

- **A.** Any or all of the following: Replace or clean dirty filters. Clean clogged inlet lines. Clean reservoir breather vent. Fill reservoir to proper level. Overhaul or replace pump.
- **B.** Tighten leaky connections, bleed air from system.
- **C.** Check for damaged pump or pump drive. Replace and align coupling.
- **D.** Adjust
- **E.** Overhaul or replace
- **F.** Check position of manually operated controls. Check electrical circuit on solenoid operated controls.
- **G.** Reverse rotation.
- **H.** Replace with correct unit.

EXCESSIVE NOISE



REMEDIES

A. Any or all of the following: Replace dirty filters. Wash strainers in solvent compatible with system fluid. Clean clogged inlet line. Clean reservoir breather vent. Change system fluid. Change to proper pump drive motor speed. Overhaul or replace supercharge pump. Fluid may be too cold.

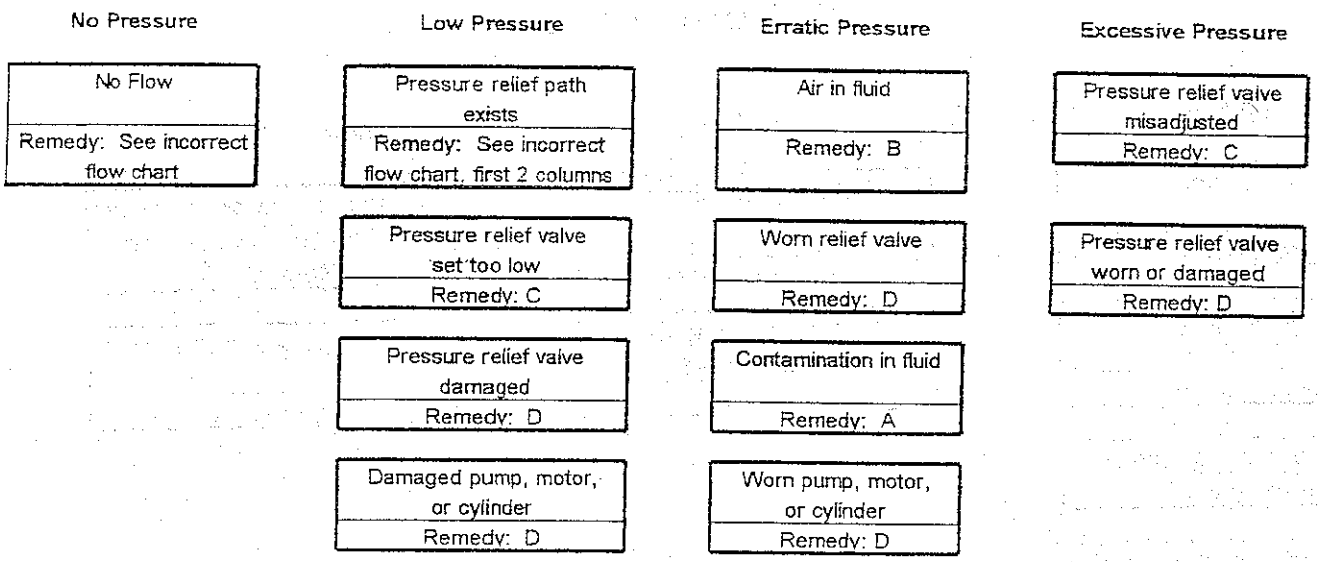
B. Any or all of the following: Tighten leaky inlet connections. Fill reservoir to proper level (with rare exception all return lines should be below fluid level in reservoir). Bleed air from system. Replace pump shaft seal (and shaft if worn at seal journal).

C. Align unit and check condition of seals, bearings and coupling.

D. Install pressure gauge and adjust to correct pressure.

E. Overhaul or replace.

Incorrect Pressure



REMEDIES

A. Replace or clean dirty filters and system fluid
B. Tighten leaky connections (fill reservoir to proper level and bleed air from system).
C. Adjust
D. Overhaul or replace.

FAULTY OPERATION

No Movement

No flow or pressure
Remedy: See incorrect flow chart

Limit switch device (mechanical, electrical, or hydraulic) inoperative or misadjusted
Remedy: D

Mechanical bind
Remedy: B

Pump not receiving fluid
Remedy: C

Worn or damaged cylinder or motor
Remedy: D

Slow Movement

Low flow
Remedy: See incorrect flow chart

Incorrect fluid viscosity
Remedy: A

Insufficient control pressure for valves
Remedy: See incorrect pressure chart

Worn or damaged cylinder or motor
Remedy: D

Erratic Movement

Erratic pressure
Remedy: See incorrect pressure chart

Air in fluid
Remedy: See excessive noise chart

Pump not receiving fluid Remedy: C Erratic command signal
Remedy: E

Incorrect fluid viscosity
Remedy: A

Worn or damaged cylinder or motor
Remedy: D

REMEDIES

A. Fluid should be changed to clean fluid of correct viscosity.
B. Locate bind and repair.
C. Clean and adjust or replace. Check condition of system fluid and filters.
D. Overhaul or replace.
E. Repair command console or interconnecting wires.

ELECTRIC MOTOR TROUBLE SHOOTING GUIDE

WARNING: Have qualified personnel perform trouble shooting and maintenance work. Read and follow the instructions below under Safety Precautions.

The purpose of this guide is to help you recognize troubles, make the corrections and avoid motor failures. Consequently, the guide defines various "Symptoms," lists "Possible Causes," and recommends specific "Corrections."

It is absolutely necessary to get and deal with the actual facts and not prejudiced opinions. When dealing with specifics, the information must be correct and complete i.e. volts and amps must be read with accurate meters in all three phases. Speed and time readings must be taken accurately. All information should be firsthand and not hearsay.

With the proper understanding of this Trouble shooting Guide and the full cooperation of the user/customer, many of these troubles can be resolved and answered in-house. This can save time, expense and further trouble for everybody involved.

IF MOTOR FAILS TO START

WARNING: The high voltage and rotating parts associated with motor applications can cause serious injury. It is important to observe and follow safety precautions to protect personnel from such injury. Personnel should be instructed to:

1. Have all installation, maintenance and repair work performed only by qualified people.
2. Disconnect and lock out all input power before doing any work on the equipment.
3. Follow the procedures outlined under "Warning When Using Lift Bail" whenever the equipment is lifted.
4. Make the electrical installation in accordance with the National Electrical code and local codes.
5. Properly ground the equipment in accordance with the National Electrical Code.
6. Be sure shaft key is fully captive before unit is energized.
7. Keep hands, hair, clothing and tools away from all moving parts when operating or repairing equipment.
8. Carefully consider the application and provide proper safeguards for personnel to prevent contact with rotating parts.

It is strongly recommended that all concerned personnel be familiar with and adhere to the contents of NEMA MG 2, "Safety Standard For Construction and Guide For Selection, Installation and Use of Electric Motors and Generators."

WARNING: WHEN USING LIFT BAIL

Do not use the lift bail on the motor to lift the motor along with additional equipment, such as pumps, compressors or other driven machinery. In the case of assemblies on a common base, do not lift with the motor lift bail, but rather use a sling around the base or the lifting means provided on the base. In all cases, take care to assure lifting only in the direction intended in the design of the lifting means. also, be careful to avoid hazardous overloads due to deceleration, acceleration or shock forces.

Symptom	Possible Cause	Correction
High Input Current (all three phases) Running idle (Disconnected from load)	Accuracy of ammeter readings.	First check accuracy of ammeter readings on all three phases.
	High Line Voltage	Consult power company - possibly decrease by using lower transformer tap.
Running Loaded	Motor Overloaded	Reduce load or use larger motor.
	Motor voltage rating does not match power system voltage.	Replace motor with one of correct voltage rating. Consult power company - possibly correct by using a different transformer tap.
Unbalanced Input Current (5% or more deviation from the average input current)	Unbalanced Line Voltage due to: a. Power Supply b. Unbalanced System Loading c. High Resistance Connection d. Undersized Supply Lines	Carefully check voltage across each phase at the motor terminals with good, properly calibrated voltmeter.
	Defective Motor	If there is doubt as to whether the trouble lies with the power supply or the motor, check per the following: Rotate all three input power lines to the motor by one position - i.e. move line #1 to #2 motor lead, line #2 to #3 motor lead and line #3 to #1 motor lead. a. If the unbalanced current pattern follows the input power lines, the problem is in the power supply. b. If the unbalanced current pattern follows the motor leads, the problem is in the motor. Correct the voltage balance of the power supploy or replace the motor, depending on the answer to a & b above

Symptom	Possible Cause	Correction
Excessive Voltage Drop (more than 2 or 3% of nominal supply voltage)	Excessive Starting or Running Load	Reduce Load
	Inadequate Power Supply	Consult power company
	Undersized Supply Lines	Increase Line Size
	High Resistance Connections	check motor leads and eliminate poor connections.
	Each Phase Lead Run in Separate Conduits.	All 3 phase leads shall be in a single conduit, per National Electrical Code. (This applies only to metal conduit with magnetic properties.)
Overload Relays Tripping Upon Starting (Also see "Slow Starting")	Slow Starting (10-15 seconds or more) due to High Inertia load	Reduce starting load. Increase motor size if necessary.
	Low voltage at motor terminals	Improve power supply and/or increase line size.
Running Loaded	Overload	Reduce load or increase motor size.
	Unbalanced Input Current	Balance supply voltage.
	Single Phasing	Eliminate
	Excessive voltage drop	Eliminate (see above)
	Too frequent starting or intermittent overloading	Reduce frequency of starts and overloading or increase motor size
	High ambient starter temperatures	Reduce ambient temperature or provide outside source of cooler air
	Wrong size relays	Correct size per nameplate current of motor. Relays have build in allowances for service factor current.
		Refer to National Electrical Code.

Symptom	Possible Causes	Correction
Motor Runs Excessively Hot	Overload	Reduce load peaks and number of starts in cycle or increase motor size
	Blocked Ventilation a. TEFC's b. O.D.P.'s	Clean external ventilation system, and check fan Blow out internal ventilation passages Eliminate external interference to motor ventilation.
	High ambient temperature over 40 C or 105 F	Reduce ambient temperature or provide outside source of cooler air
	Unbalanced input current	Balance supply voltage. Check motor leads for tightness.
	Single Phased	Eliminate
Won't Start (Just hums and heats up)	Single phased	Shut power off. Eliminate single phasing. Check motor leads for tightness.
	Rotor or bearings locked	shut power off. check shaft for unrestricted rotation. Be sure proper sized overload relays are in each of the 3 phases of the starter. Refer to National Electrical Code.
Runs Noisy Under Load (excessive electrical noise or chatter under load)	Single Phased	Shut power off. If motor cannot be restarted, it is single phased. Eliminate single phasing.
	Rotor or bearings locked	Be sure proper sized overload relays are in each of the 3 phases of the starter. Refer to National Electrical Code.

Symptom	Possible Causes	Correction
Slow Starting (10 or more seconds on small motors - 15 or more seconds on large motors)		
Across the line start	Excessive voltage drop (5-10% voltage drop causes 10-20% or more drop in starting torque)	Consult power company - Check system. Eliminate voltage drop.
	High inertia load	Reduce starting load or increase motor size.
Reduced Voltage Start	Excessive Voltage drop loss of starting torque	Check and eliminate
Y - Delta	Starting torque reduced to 33%	Reduce starting load or increase motor size
PWS	Starting Torque Reduced to 50%	Choose starting method with higher starting torque
Auto. Transformer	Starting torque reduced - 25% to 64%	Reduce time delay between 1st and 2nd stop on starter - get motor across the line sooner.

Symptom	Possible Causes	Correction
Excessive Vibration (Mechanical)	Out of Balance a. Motor mounting	Be sure motor mounting is tight and solid
	b. Load	Disconnect belt or coupling - restart motor - if vibration stops, the unbalance was in load.
	c. Sheaves or coupling	Remove sheave or coupling - securely tape 1/2 key in shaft keyway and restart motor - if vibration stops, the unbalance was in the sheave or coupling.
	d. Motor	If the vibration does not stop after checking a, b, and c above, the unbalance is in the motor - replace the motor.
	e. Misalignment on close coupled application	Check and realign motor to the driven machine.
Noisy Bearings (listen to bearings)		
Smooth mid range hum	Normal fit	bearing OK
High whine	Internal fit of bearing too tight	Replace bearing - check fit
Low rumble	Internal fit of bearing too loose	Replace bearing - check fit
Rough clatter	Bearing destroyed	Replace bearing - Avoid: a. Mechanical damage b. Excess Greasing c. Wrong Grease d. Solid Contaminates e. Water running into motor f. Misalignment on close coupled application. g. Excessive belt tension.
Mechanical Noise	Driven machine or motor noise?	Isolate motor from driven machine - check difference in noise level
	Motor noise amplified by resonant mounting	Cushion motor mounting or dampen source of resonance.
	Driven machine noise transmitted to motor through drive	Reduce noise of driven machine or transmission to motor
	Misalignment on close coupled application	Improve alignment

MAINTENANCE

CAUTION: Before performing any maintenance on the Vertical Baler of power unit, shut off the power at the disconnect switch and lock this switch in the "Off" position. Do Not service the machine if it is possible for someone to activate the equipment.

GREASE FREQUENCY

Our vertical balers have a number of areas which must be greased on a regular schedule. All grease points are marked and equipped with grease zerte fittings. See the chart below for recommended grease frequency.

Usage	Grease Frequency
Heavy: 6 hrs per day	Every 2 weeks
Medium: 2-6 hrs per day	Every 2 weeks
Light: up to 2 hrs per day	Once a month

FILTER CLEANING

TL Industries Inc. power units use 2 types of hydraulic oil filters on all power units: Permanent Type - (in tank strainer found at the end of the pump suction line), and Cartridge Type - (removable type found in the fluid tank return line).

Cartridge Type - The cartridge type filter system has an indicator gauge on the filter body that warns the user when the filter needs changing. The gauge should be checked at the same intervals described in the FILTER CHANGE OR CLEAN FREQUENCY chart below. Replace the filter cartridge only with a new filter cartridge of the same specifications.

Permanent Type - To keep down time at the minimum while cleaning the dirty filter, replace it with a spare clean filter. The dirty filter may then be cleaned as follows:

1. Soak the filter in kerosene or other solvent to loosen the contaminant.
2. Lightly scrub the filter with a soft bristle paint brush. DO NOT USE A WIRE BRUSH
3. Remove embedded contaminants with clean, dry air. Direct the flow of air against the inside of the filter with a perforated support.
9. Again, wash the filter in a solvent and blow with air, then inspect for damage. Holes in the filter cloth will leak dirt into the pump and valve, which may cause malfunctions in the hydraulic system. See the chart below for recommended filter change frequency.

USAGE	FILTER CHANGE OR CLEAN FREQUENCY
Heavy: 6 Hrs. Per Day	Initial change after 2 weeks Thereafter every 3 months
Medium: 2-6 Hrs. Per Day	Initial change after 3 weeks Thereafter every 6 months
Light: Up to 2 Hrs. Per Day	Initial change after 4 weeks Thereafter every 12 months

INITIAL MAINTENANCE CHECK

The first maintenance check should take place with the first filter change and include the following:

1. Check and tighten all electrical and hydraulic connections on the power unit, control head, and cylinder.

2. Check and tighten all mechanical fasteners, nuts, bolts, set screws, etc.

3. Drain some hydraulic fluid from the bottom of the reservoir be removing the 3/4" plug from the half coupling under the oil level gauge. Inspect the fluid for the presence of water. Drain all water.

HYDRAULIC FLUID CHANGES

Under normal conditions the fluid can be used for an indefinite time. If you suspect that the fluid has been contaminated or has otherwise lost its usefulness, drain off some of the fluid, take it to an oil distributor and have it analyzed.

The bottom of the reservoir should be inspected every 12 to 18 months for sludge deposits. If there is a detectable layer of sludge, the reservoir should be drained, flushed with kerosene or another suitable solvent, then refilled with clean hydraulic fluid.

COLD WEATHER OPERATION

Recommended oil may be used for all but extremely cold temperatures. An immersion oil heater is recommended for an area where temperatures are expected to frequently reach 0 degrees Fahrenheit or below.

INSTRUCTIONS FOR REPLACING COMPONENTS

CAUTION: Before attempting any repairs on the compactor or power unit, shut off all electrical power at the disconnect switch and lock this switch in the "off" position. See power lockout procedure on page 6. Make sure that no one can start the machine while it is being serviced.

The following procedures should be used when replacement of any component is necessary.

MOTOR

1. Remove the wiring plate from the side of the motor.
2. Loosen and remove the 4 or 6 wire nuts fastening the power wires and the motor leads.
3. Take the electrical lock nut off the fitting where the conduit enters the motor, and then drop the conduit out of the hole.
4. Remove the bolts from one side of the coupling guard, where applicable. Remove the 4 bolts holding the motor to the pump mounting bracket.
5. Remove the four bolts which hold the motor to the mounting base.
6. Remove the motor from the baler.
7. Making sure the new motor is of proper size and voltage, use the removal steps above in reverse order to install the new motor. If a C-face motor is in use, the following warning is automatically taken care of by the C-flange.

WARNING: When installing a motor, the coupling alignment between the pump and the motor must be very accurate. Pump manufacturers recommend an alignment with +/- .005 inch tolerance. Excessive misalignment will usually cause leaking pump shaft seals, short bearing life in the pump and motor, and/or short total pump life. Shim the pump or motor with banding material, small washers, etc., if necessary.

PUMP

1. Loosen the union between the pump and the suction line.
2. Remove the nipple and half union from the pump.
3. Loosen the hose from the fitting on top of the valve, then remove the fitting from the pump.
4. Remove the 2 bolts holding the pump to the pump mounting bracket, and then remove the pump.
5. Remove the coupling from the pump shaft, noting its location from the end of the pump shaft.
6. Install a new pump in reverse order using teflon sealant tape on the pressure side of the pump and tape or pipe dope on or Permatex on the nipple and union being fastened to the pump.

CAUTION: Care must be taken when aligning the coupling between the pump and motor. Pump manufacturers recommend an alignment with +/- .005 inch tolerance. Excessive misalignment will usually cause leaking pump shaft seals, short bearing life in the pump and motor, and/or short total pump life. Shim the pump or motor with banding material, small washers, etc. if necessary.

DIRECTIONAL CONTROL VALVE

1. Remove the wiring plate, wire nuts, wiring conduit, and conduit fitting.
2. Remove the 4 mounting bolts holding the valve to the manifold block. Remove the valve.
3. Replace with a new valve in reverse order, making sure all O-rings are installed and properly placed. If an O-ring is left out or pinched between the valve and manifold, the fluid will leak.
4. All valve mounting bolts must be torqued as indicated on the hydraulic schematic.

RELIEF VALVE

If a relief valve must be changed in whole or part, the systems relief pressure must be reset. A pressure gauge must be mounted on the pressure port side of the valve to set pressure. If the correct factory pressure setting is not known, call the factory for information.

HYDRAULIC HOSES

TL Industries, Inc. compacting units are equipped with SAE rated hose. All hoses must be replaced with hoses of the same type. The SAE number is stamped or impressed on the outer layer of the hose. If there are any questions, call the factory. If sections of hose 3 feet or longer are used, make sure that no part of the hose rubs against an abrasive surface during machine operation. This rubbing could eventually cause a leak, creating a low oil level and a fire hazard.

CYLINDER PISTON SEALS

Loss of power in the hydraulic system may be caused by any one or more of the following:

1. Defective relief valve (broken spring, scored ball, etc.)
2. Defective pump (pump seals, defective vanes or gears, etc.)
3. Defective directional valve (scored spool, etc.)
4. Leakage through rod end of the cylinder (rod seals, scored rod)
5. Internal cylinder leakage through the piston seals.

TL Industries, Inc. recommends that before making an attempt to replace the piston seals, check items one through four. If these parts are in good condition and a power loss is still experienced, the piston seals will most likely have to be replaced. If the internal cylinder walls are found to be scored with deep scratches and grooves, new seals will not eliminate the leakage; the entire cylinder must be replaced. New piston seals must be of the same make and model. Extreme care must be taken not to score, tear, or otherwise damage the seals during installation.

RELAYS

Install the same type of relay with the hole locator in the right position.

TIMERS

Install the same type of timer adjusted to the proper setting with the hole locator in the right position.

STARTERS

Install the same size of starter with a 120 volt coil. All wires must be installed in the correct positions.

MOTOR OVERLOADS

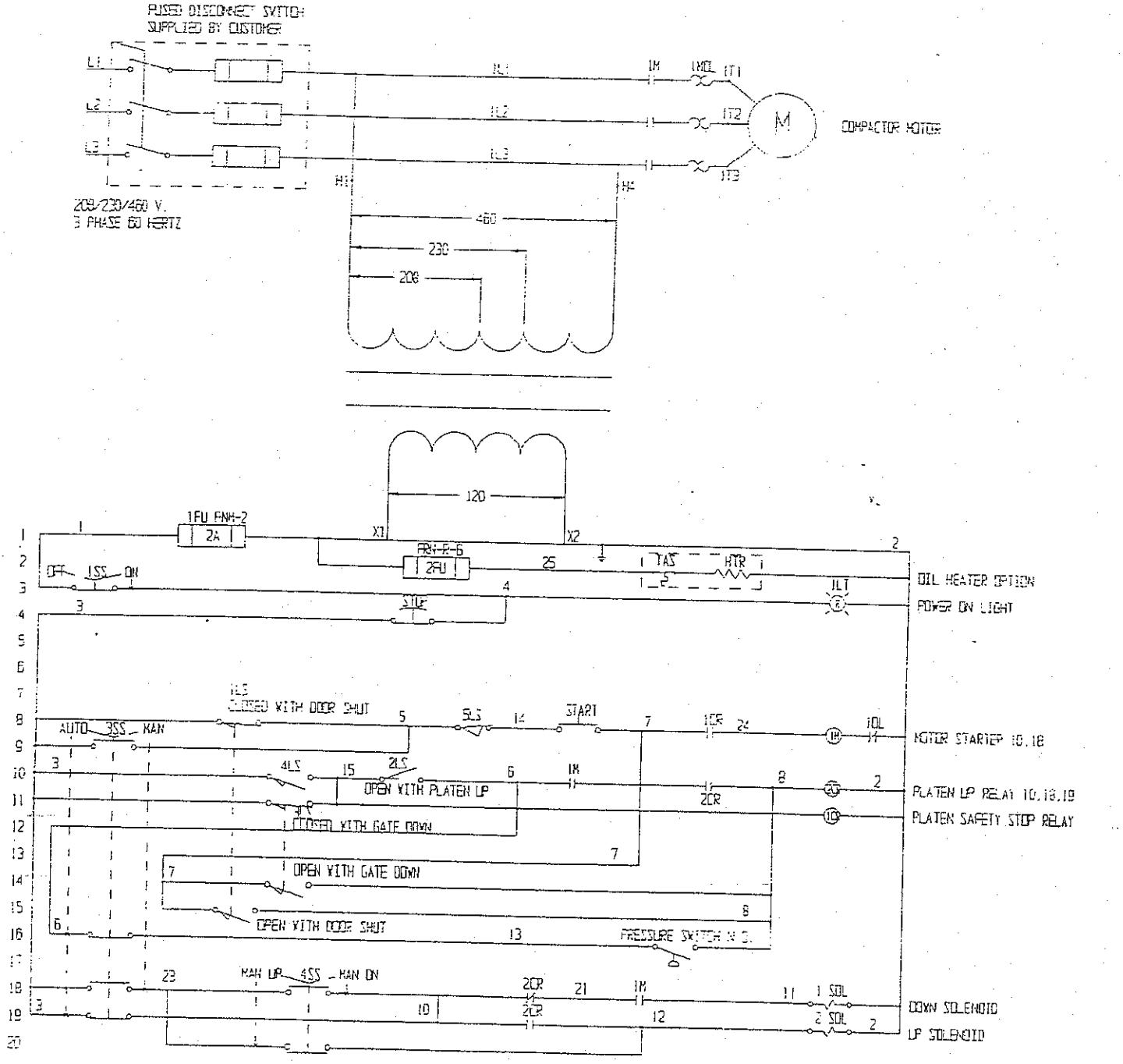
Install the proper size and make according to the heater chart supplied with the starter. Check with the factory for variations.

TRANSFORMERS

Install a transformer with the same KVA rating. Connect the wires in their correct positions.

CIRCUIT BOARD

If the wires are not numbered, number them before removing to assure that all wires will be attached to the new board correctly.



USED FOR:
1 .TV8-48-S
2 .TV8-54-S
3 .TV8-60-S
4 .TV8-72-S

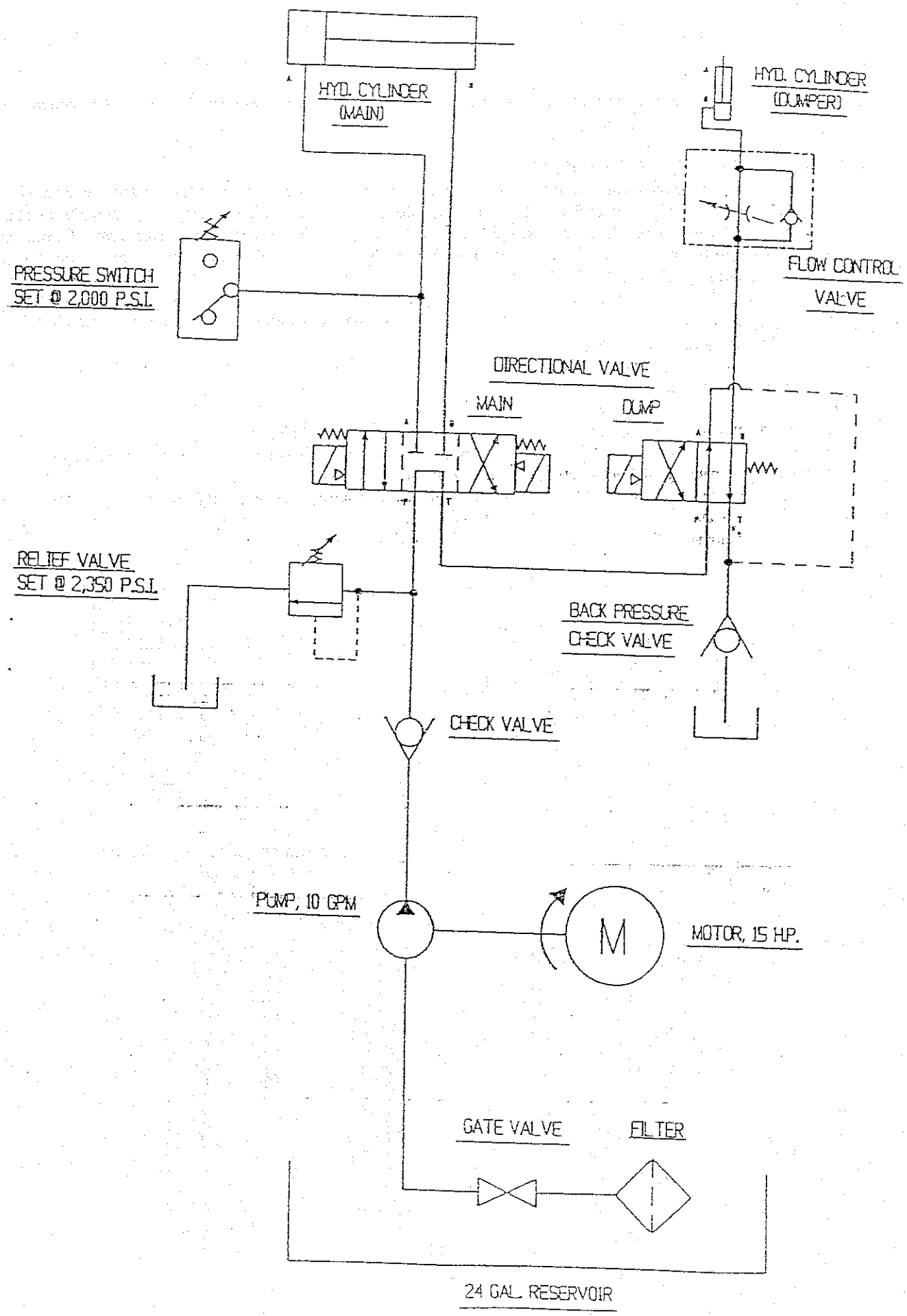
INDUSTRIES, INC.

TITLE: VERTICAL BALER
ELECTRICAL SCHEM

OPTIONS : CHAIN DUMP

DRAWING: ES-VBS1

DATE: 3/20/15


HYD. CYLINDER (MAIN)
HYD. CYLINDER (DUMPER)
FLOW CONTROL VALVE
PRESSURE SWITCH SET @ 2,000 P.S.I.
DIRECTIONAL VALVE
MAIN
DUMP
RELIEF VALVE SET @ 2,350 P.S.I.
BACK PRESSURE CHECK VALVE
CHECK VALVE
PUMP, 10 GPM
M
MOTOR, 15 H.P.
GATE VALVE
FILTER
24 GAL. RESERVOIR

SWITCHES

Install the same type of switch. If the same name brand is not available use a different brand switch which performs the same functions in the exact same manner.

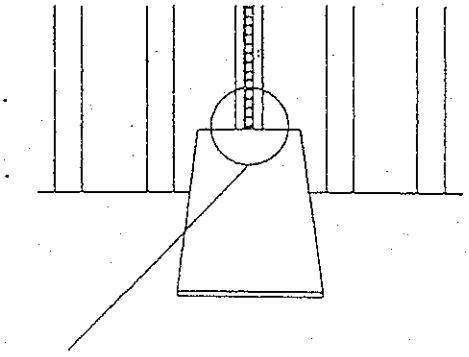
MASTER LINKS ON THE CHAIN EJECT

Safety Master Links are located at the top and bottom of the manual chain eject mechanism and are used to attach the chain to the Eject Hook and the Eject Plate. These links are designed to break before excessive force on the mechanism damages other components. If these links are damaged or broken, they must be replaced with Master Links of equal size and strength. Two spare master links are supplied with the baler, free of charge, and are located in the information packet in the main electrical control panel.

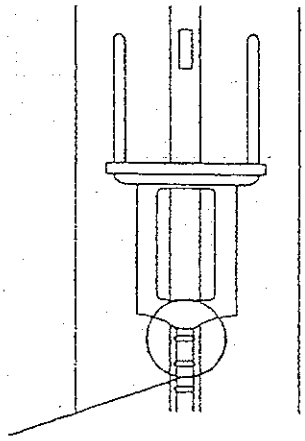
The Master Links are #80 Double Pitch and consist of a Pin Link Plate with Pins attached, a removable Pin Link Plate, and either two cotter keys or a Spring Clip.

To install a Master Link:

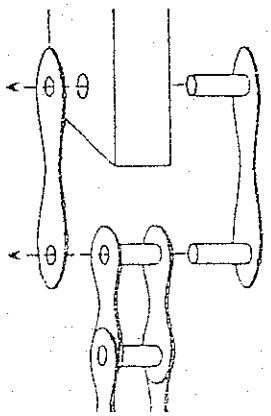
1. Remove any remaining part of the broken Master Link from the chain.
2. Insert the pins of the Master Link through the holes of each half of the chain. The chain must not be twisted.
3. Slide the Removable Pin Link Plate over the exposed Pins.
4. Fasten the Removable Pin Link Plate to the Pins with the Cotter Keys or Spring clip.



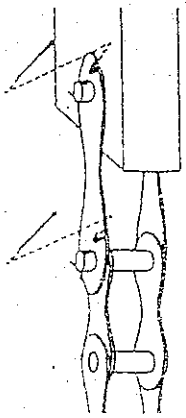
Location for Master Link on Chain Eject Plate



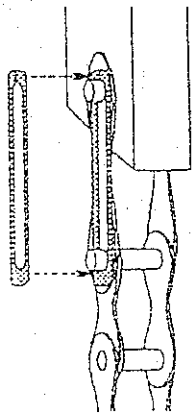
Location for Master Link on Chain Eject Ring



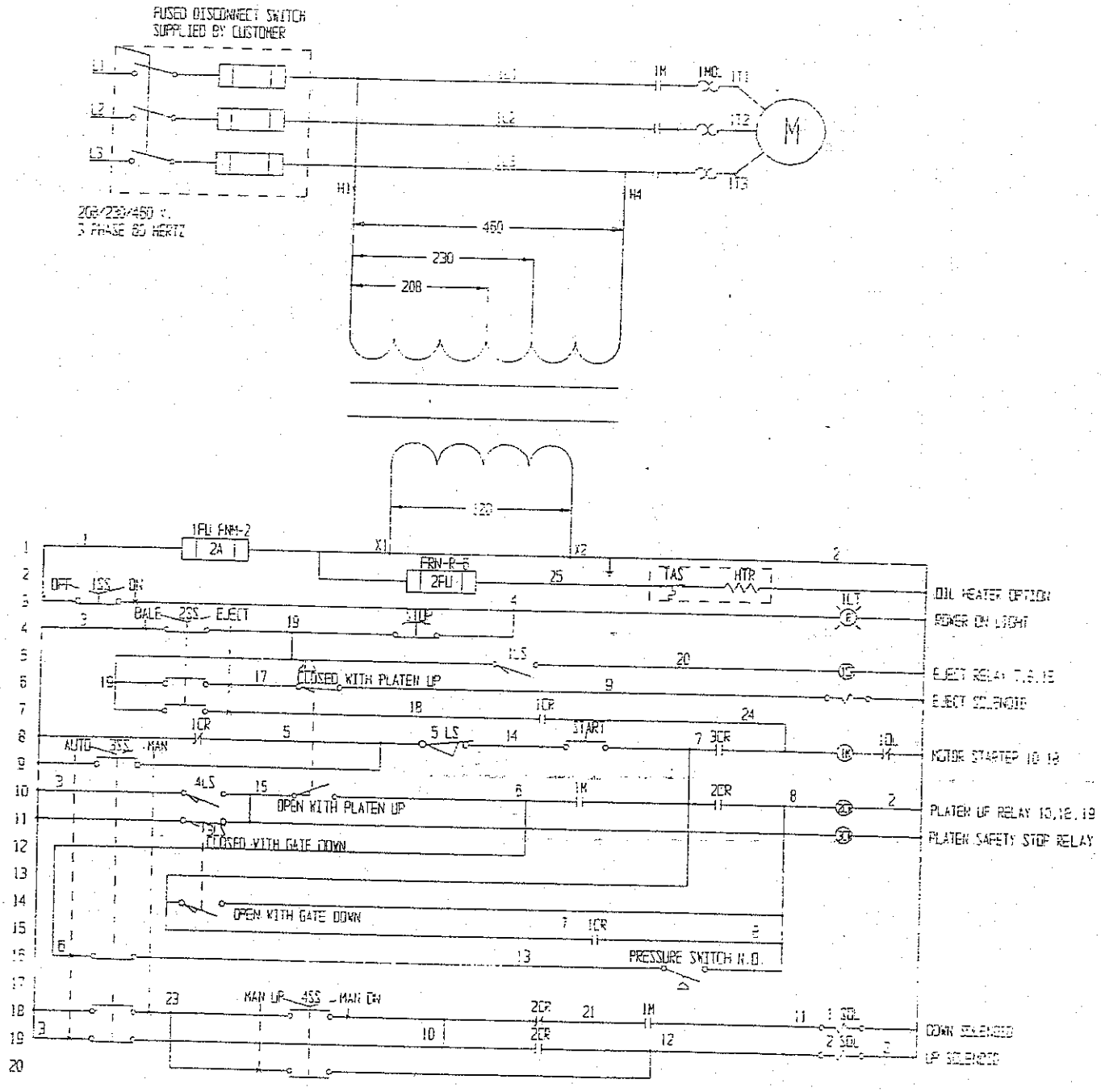
Master Link Alignment



Fastening Master Link with Cotter Keys



Fastening Master Link with a Spring Clip



1 L.S.-CHAMBER DOOR LIMIT SWITCH
CLOSES WHEN DOOR OPENS
2 L.S - PLATEN LIMIT SWITCH
3 L.S - LOAD GATE LIMIT SWITCH
4 L.S. PLATEN INTERLOCK
CLOSES WHEN LOAD GATE RESETS ON PLATEN

USED FOR:
1 . TVB-48
2 . TVB-54
3 . TVB-60
4 . TVB-72
5

INDUSTRIES, INC

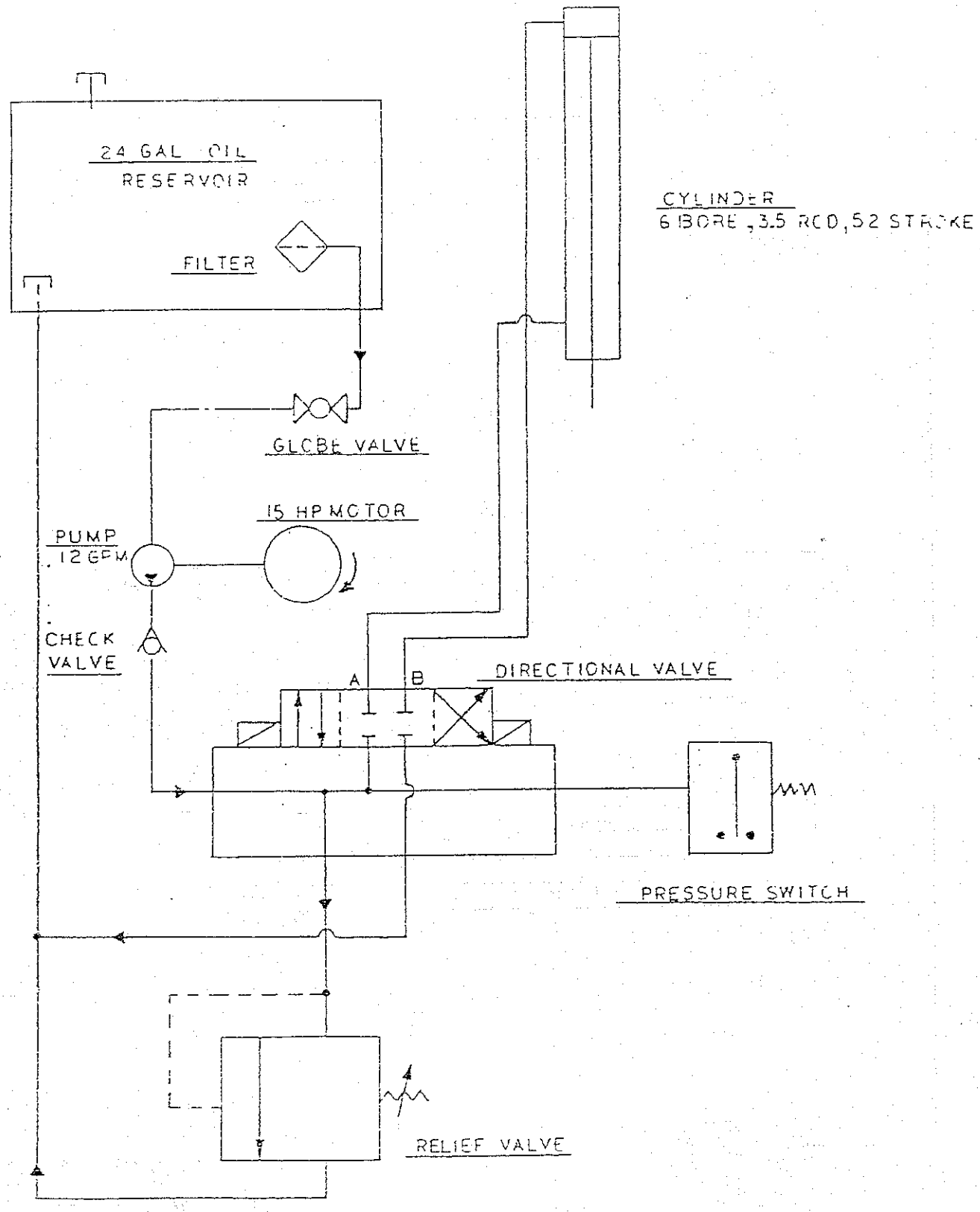
TITLE: VERTICAL BALER
ELECTRICAL SCHEM

OPTIONS 1 HYDRAULIC PUMP
2
3
4

DRAWING: ES-VB-HE

DATE: 961014

Hydraulic Schematic Vertical Baler with Chain Eject



WARRANTY

TERM

Unless terminated as hereinafter provide, this warranty shall continue in full force for a period of one year, and shall govern all transactions between the parties hereto following the completion of installation of the product at the end user's facility, and evidenced by a signed and dated installation report and warranty registration returned to J.V. Manufacturing, Inc. If no registration card is remitted or the installation is not provided by the factory, the warranty period shall be considered to start on the date of shipment.

LIMITED WARRANTY

As limited herein, the *CRAM-A-LOT®* products (the "goods") you have purchased are warranted by J.V. Manufacturing, Inc. ("seller") to be free of all defects in material and workmanship. This warranty does not apply to any defects caused by negligence, misuse, modifications, alterations, or accidents by purchaser or third parties.

Seller's liability under warranty shall be limited to the repair and replacement of parts and the necessary labor and services required to repair the goods and shall be in lieu of any other remedy available under applicable law and shall not to exceed the purchase price of the goods. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED, OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY, AND ALL SUCH OTHER WARRANTIES ARE HEREBY REVOKED AND DISCLAIMED.

- Seller neither assumes nor authorizes any representative or person to assume for seller any other liability in connection with the sale or shipment of our products.
- Seller reserves the right to make changes or improvements in our products without notice and without incurring any obligation to prospective customers.
- Seller reserves the right to make changes or improvements in our products without incurring any obligation to similarly alter products previously purchased.
- Except in the case of damages or defect attributable to the Seller, Buyer shall not make any claim against Seller for any damaged or defective product or part.
- If Seller breaches or repudiates this contract, Buyer shall not be entitled to recover any incidental damages as that term is defined in the Uniform Commercial Code.
- If Seller breaches or repudiates this contract, Buyer shall not be entitled to any consequential damages as defined in the Uniform Commercial Code.
- Seller does not warrant that any product purchased shall conform to: (1). any affirmation of fact or promise relating to it, or (2). any description of it. No affirmation, promise, or description relating to any product purchased shall be deemed part of the basis of the parties bargain.
- No agent, employee, or representative of Seller has any authority to bind Seller to any affirmation, representation, or warranty concerning the goods sold under this contract, and unless an affirmation, representation, or warranty made by agent, employee, or representative is specifically included within this contract, it will not be enforceable by Buyer.

ITEMS NOT COVERED

Seller waives the standard warranty on the following components and systems: Downstroke Baler bale ejection system - to include dump rods, dump handles, dump trays and associated components; Sonozaire hoses and fittings; Broken or lost machine keys; Lift-up door systems: Loading door handles; Broken or bent limit switch arms; Maladjusted or dirty photo-electric eyes and reflectors; All fuses and thermal / voltage / current limiting devices; Guide islands, wheel-stops, and anchor bolts; Container nose rollers.

RETURN OF PRODUCTS OR SERVICE PARTS FOR REPAIR OR CREDIT

Unless Seller shall have authorized or permitted the return of any products or parts, in writing, or by phone with Return Material Authorization Number assigned by J.V. Manufacturing, Inc. to the specified product or parts, seller shall not be obligated to accept from Buyer any products or parts returned, nor to make any exchange thereof, nor to credit Buyer therefor.

WARRANTY

NOTICE OF CLAIMS

A) Buyer must notify Seller immediately by phone or writing, or fax, of any defect, malfunction, or nonconformity after he or she knows or has reason to know the basis of any claim, and in no event more than ten days thereafter. Within 24 hours after receiving notice from the buyer, Seller will authorize repair or replacement of the defective part.

(1) J.V. Manufacturing, Inc., at its sole discretion, will have the option to make repairs or authorize a distributor or third party to make repairs. *(2)* All claims for repairs must be accompanied with a Warranty Job Order Number. Failure to obtain a Job Order Number will relieve Seller from all liability.

B) Failure to give the notice prescribed by Subsection shall relieve the seller from all liability on any claim in respect to any transaction growing out of this warranty.

C) The provisions of this shall survive the termination of any other portions of this warranty.

COMMON CARRIERS AGENTS OF DISTRIBUTOR

Whenever Seller shall deliver or cause to be delivered to a common carrier any goods ordered by Buyer, whether the particular carrier shall have been designated in the shipping or routing instructions of the Buyer or not, Seller shall not be responsible for any delays or damages in shipment and the common carrier, to which Seller shall deliver goods shipped to the Buyer, is declared to be the agent of the Buyer.

COMPLETENESS OF INSTRUMENT

This instrument contains all of the agreements, understandings, representations, conditions, warranties, and covenants made between parties hereto. Unless set forth herein, neither party shall be liable for any representations made, and all modifications and amendments hereto must be in writing.

NO IMPLIED WAIVERS

The failure of either party at any time to require performance by the other party of any provision hereof shall not affect in any way the full right to require such performance at any time thereafter. Nor shall the waiver by either party of a breach of any provision hereof be taken or held to be a waiver of the provision itself.

CONTROLLING LAW

The validity, interpretation, and performance of this warranty shall be controlled by and construed under the laws of the State of Arkansas, the state in which this warranty is being executed. It is understood, however, that this is a general form of warranty, designed for use in the United States wherever the Seller may desire to sell its products and that any provision herein which in any way contravenes the laws of any state or jurisdiction shall be deemed not to be a part of this warranty therein.

BUYER NOT AN AGENT

This warranty does not constitute the Buyer as the agent or legal representative of the Company, or the Company as the agent or legal representative of the Buyer for any purpose whatsoever. Neither party is granted any express or implied right or authority by the other party to assume or create any obligation or responsibility on behalf of or in the name of the other party, or to bind the other party in any manner or thing whatsoever.

FINALITY OF THIS WRITING

The parties intend this document to be the final expression of their agreement and it is intended also as a complete and exclusive statement of the terms of their agreement. No course of prior dealing between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this document. Acceptance or acquiescence in a course of performance rendered under this document shall not be relevant to determine the meaning of this contract even when the accepting or acquiescing party has knowledge of the nature of the performance and opportunity for objection.