GRIPNAIL

MODEL 560

AUTOMATIC FASTENING CENTER

OPERATOR'S MANUAL

JUNE 02, 1998

Revision 1, ECN 1508, November 2, 1998

980602

GRIPNAIL® FASTENING SYSTEMS

GRIPNAIL 560
ELECTRONIC AUTOMATIC FASTENING CENTER

The Gripnail 560 was introduced in 1997 and has proven itself reliable in the most severe duct manufacturing conditions. Critical components are sealed and not affected by dirt, airborne particles, temperature or humidity. They have been combined with the same rugged components that been proven over the last 25 years of machinery manufacturing; Our own drive cylinders, made from special alloys to withstand continuous pounding, nail tracks made of stainless steel for greater wear resistance and vibrator bowls that run for decades. The 560 is by far the simplest and most reliable Gripnail machine ever built.

PROUDLY MADE IN THE U.S.A.

NEW IMPROVED RELIABILITY
The 560 uses a single sealed circuit board and non contact proximity sensors in place of pneumatic valves and mechanical actuators. In addition, the nail track and V block have been redesigned to provide the most trouble free operation possible. The frame, feeder bowl and vibrator base are the same rugged construction that has been used to manufacture thousands of similar Gripnail machines.

EASY TO OPERATE
Just fill the feeder bowl with Gripnails, set the air pressure and step on the foot pedal. Drive up to 1,000 fasteners before refilling.

FAST
Gripnails fasten instantly and this machine will stay ahead of the operator.

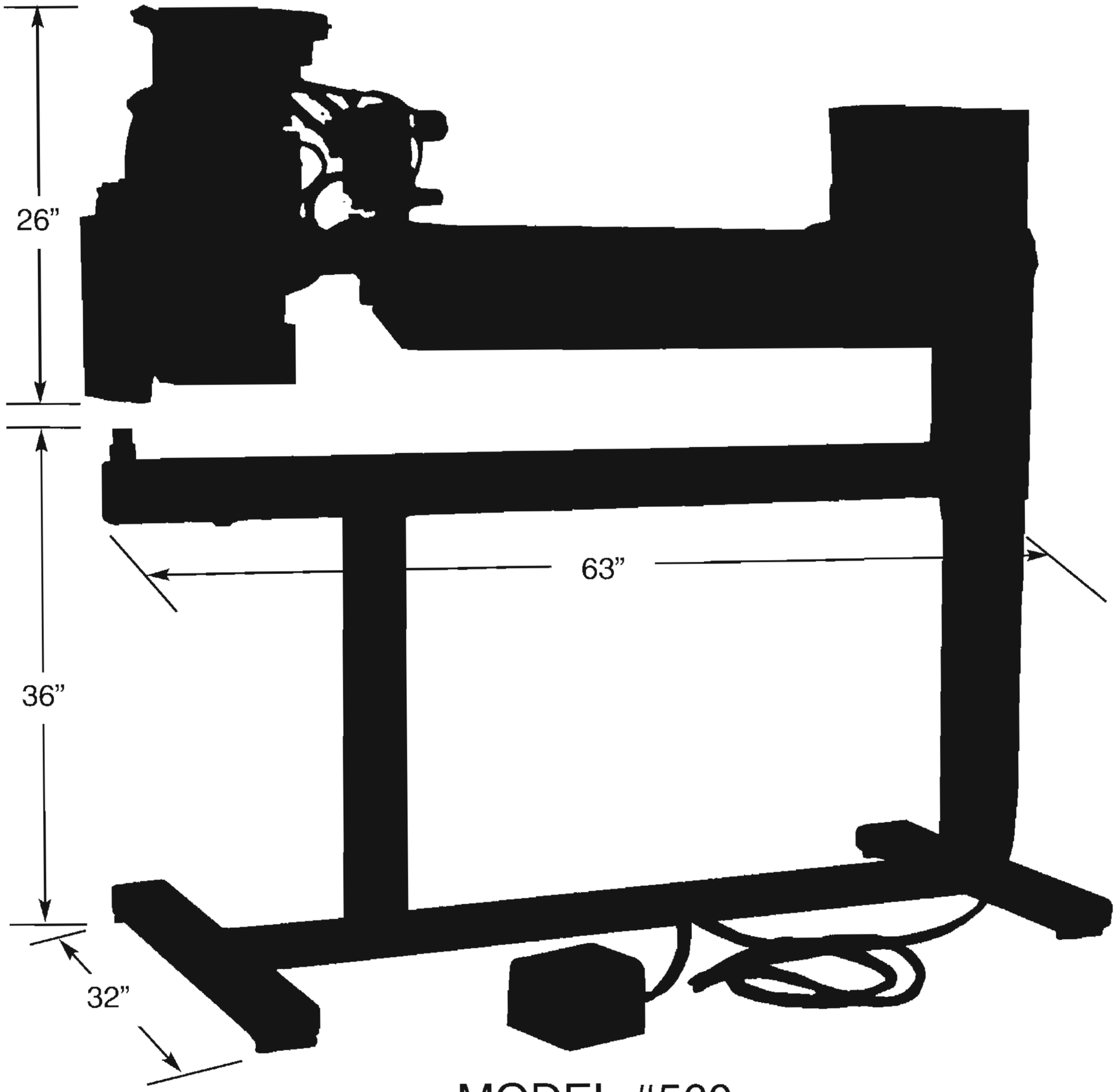
UNIFORM FASTENING
Regulated air pressure and our own proprietary drive cylinders, consistently deliver the exact same impact, for perfect fastening every time.

LOW MAINTENANCE
Draining condensation from the air tank and filling the oil reservoir is the only routine maintenance required. The automatic oiler lubricates both cylinders and the sealed electronic components are maintenance free.

COMPACT
Place between work tables for efficient work flow.

GRIPNAIL CORPORATION
97 Dexter Road • East Providence, RI 02914 • (401)431-1791 • Fax:(401)438-8520 • 800-474-7624

560 AUTOMATIC FASTENING CENTER



MODEL #560

SPECIFICATIONS

AIR PRESSURE	80PSI
ELECTRICAL	100 VAC
WORKING DEPTH	63”
TOTAL DEPTH	68”
WEIGHT	650 #
VOLUME	2 - 3 CFM
ANVIL HEIGHT	36”
TOTAL WIDTH	32”
FREIGHT CLASS	90

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FOREWORD

The Gripnail Model 560 AFC Automatic Fastening Center, is the newest in a line of state-of-the-art fastening systems pioneered by Gripnail Corporation.

This Gripnail Fastening System has been carefully constructed with the finest quality parts and materials. Because of its unique circuitry, this system will be inexpensive to operate and maintain. To ensure long and trouble free performance, it has been subjected to rigid inspection and reliability testing.

This manual is designed to provide the operator with all knowledge of system operation, applications, and diagnostics, necessary to operate the system in the most reliable and productive manner.

For further information and service, contact your Gripnail representative, or contact Gripnail directly at 1-800-474-7624.

LIMITED WARRANTY

All Gripnail Fastening Equipment is thoroughly inspected and tested before leaving the factory. Gripnail Corporation warranties its equipment to be free from defects in workmanship and materials under normal and proper use for a period of 1 year from date of sale to original end purchaser.

The warranty does not apply where repairs or attempted repairs have been made by persons other than Gripnail Corporation's authorized service personnel, or where it is determined by our service personnel the the equipment has been subjected to misuse, negligence or accident. If it is determined that any fasteners other than those manufactured by Gripnail Corporation have been used in this machine or tool, the warranty is terminated.

This warranty is not effective unless equipment is properly registered with the factory through the use of our warranty information card prior to use. Gripnail Corporation shall not be liable for contingent damages or delays caused by defective materials or any other means beyond our control.

SERVICE POLICY

Proper operation of your machine is a top priority with Gripnail Corporation. We will be happy to assist you to the best of our abilities to see it is kept in peak operating condition.

In many cases, service needs can be met by simply calling Gripnail Customer Service Department. If it becomes necessary for a service technician to visit your plant, we can make the arrangements.

All Gripnail machines are covered under a one (1) year New Machine Warranty. Replacement parts covered by this warranty are supplied free of charge, provided the original parts are returned to Gripnail.

At the end of the warranty period, the original end buyer has the option to purchase an Extended Parts Warranty. This warranty covers specified machine parts. See your Local Gripnail Distributor for details or call Gripnail Service Department.

All warranties on Gripnail machines are good only if Gripnail manufactured fasteners are used. If it is determined that fasteners other than those have been used, the warranty is terminated.

At Gripnail, we believe in servicing what we manufacture for the lifetime of the equipment. If you are having any difficulty with your machine or if you have any questions regarding service and warranty policy, please call or write:

Customer Service Department
Gripnail Corporation
97 Dexter Road
East Providence, Rhode Island 02914

1-401-431-1791,
1-401-438-8520 fax, or
1-800-GRIPNAIL (474-7624)

SECTION I. OPERATOR SAFETY

1.000. As with any new piece of equipment, proper safety precautions must be observed. This section contains guidelines designed to ensure operator safety. FOLLOW THESE DIRECTIONS AT ALL TIMES.

REMEMBER - SAFETY FIRST!

1. Insulate yourself from ground with rubber-soled shoes or rubber mat.

2. Maintain equipment in good operating condition.

3. Wear protective clothing to avoid injury.

4. Wear protective mask, etc., to avoid breathing fumes and particulate debris.

5. Connect chassis ground in accordance with local or National Electrical Code.

6. Troubleshooting should be done by qualified personnel.

7. Disconnect **ALL** power sources before servicing.

8. Do not operate this machine without all covers and guards in place.

SECTION II. DESCRIPTION OF OPERATING SYSTEM

2.000. POWER UNIT AND CONTROL TIMING

1. The Gripnail Model 560 AFC Automatic Fastening Center is a self contained, solid state, control system designed for use with mechanical duct liner pins in the HVAC industry. This system is capable of applying pins from1/2" to 1-1/2" long. The machine's control system contains all the electronics and logic necessary to operate. The machine requires only 120VAC and 80 psi shop air.

2.100. SYSTEM SPECIFICATIONS

1. ELECTRICAL REQUIREMENTS

CONTROL CIRCUITRY: 120 VAC 2 A

VIBRATOR BOWL: 120 VAC 3A

SYSTEM FUSING: 5 A

2. AIR REQUIREMENTS

IMPORTANT: See **SECTION 3.130, "CONNECTING AIR SUPPLY"**

PRESSURE: 80 PSI minimum

PIPING SIZE: 1/2 " NPT Connection

CONSUMPTION @ 80 PSI: 1.5 CFM

3.120. INSTALLATION OF VIBRATOR BOWL & 120 VOLTS AC

1. Refer to **FIG 3-4**. Locate 120 VAC line cord on front panel of rear control box. Box is at top rear of machine. Plug cord into a nearby 120 Volt AC outlet.

2. Connect the Vibrator Bowl cord to the short extension cord provided on the top of the welder. NOTE: This extension cord connects to front panel housing.

3. Push the black POWER ON/ OFF switch, located where the AC cord enters the module, to the "ON" or "I" position.

4. The fuse compartment contains two 5 amp, 250 V standard fuses. DO NOT attempt to change these fuses until first reading **Section V Troubleshooting, 5.310** for replacement procedures.

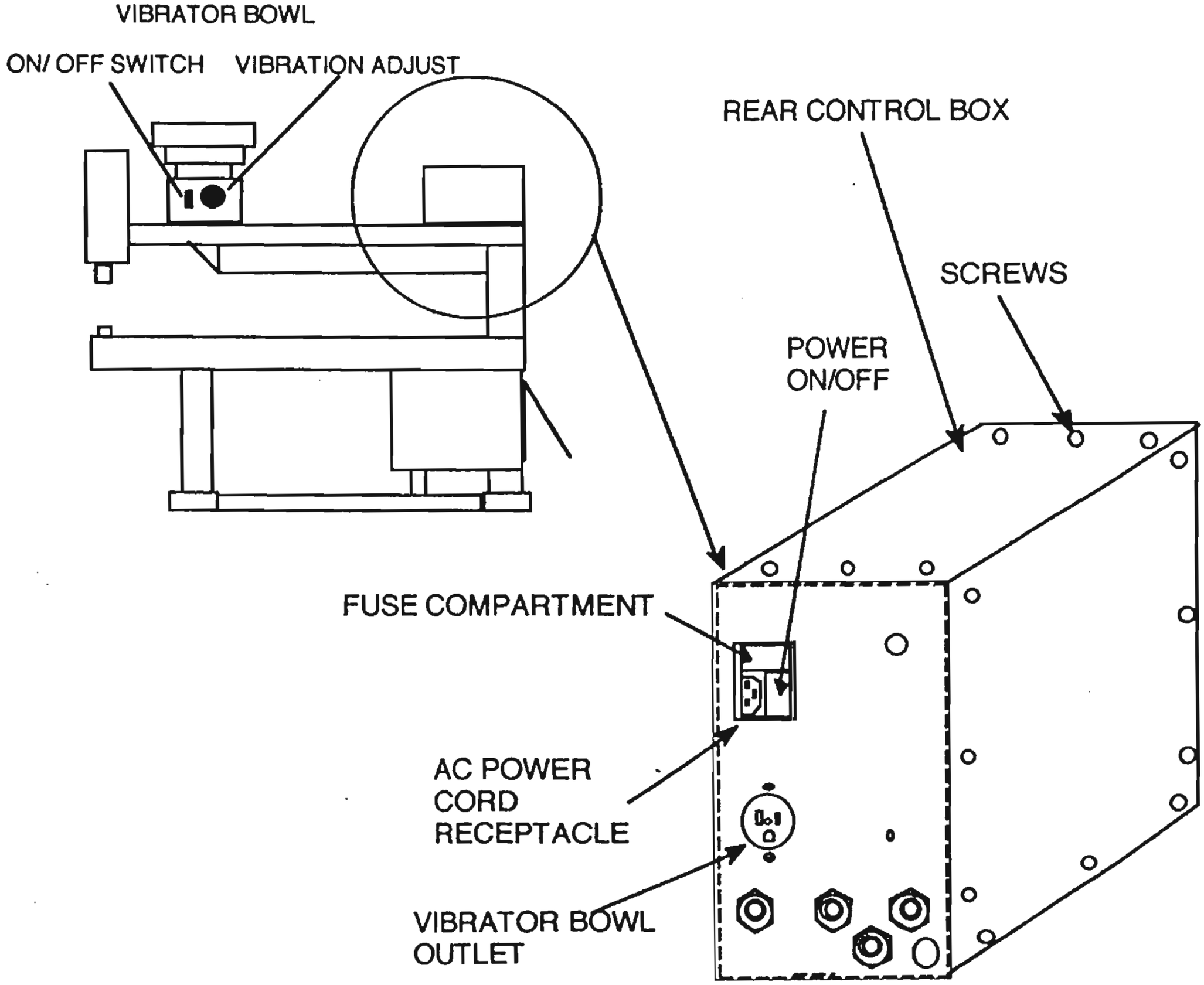

Fig 3-4

3.130. CONNECTING THE AIR SUPPLY

1. Refer to **Section 2.100.2** Air Requirements.

2. Use 1/2" NPT pipe, hose & fittings to connect the air supply.

3. Minimum recommended pipe size is 3/8" NPT.

3.150. PREPARING TO DRIVE FASTENERS

1. Turn air "ON". All air regulators are preset at the factory. However, the DRIVE pressure regulator, in the multi-regulator stack, requires Operator adjustment to accomodate the gage of metal being fastened. **See Section VI.**

2. Fill vibrator bowl about 3/4 full with Gripnails. (Track sensor will turn bowl ON, then OFF, **automatically**, when the proper track level is reached.)

3. Turn "ON" power switch on the Rear Control Box. **See Fig. 3-4.**

4. Position the sheet metal **flat** on the lower anvil and press the foot pedal.

5. Make several test drives to insure uniformity and proper machine cycle.

SECTION IV. COMPONENT DESCRIPTION AND OPERATION

4.000. CIRCUIT BOARDS

1. FUNCTION CONTROL BOARD - PCB #1

   a. Refer to **FIG 4-1**. This board provides 24 VDC power and timed output signals to operate the DRIVE and LOAD valves. It also monitors the safety interlock function of the proximity sensor.

   b. Fuses used on this board are **ALL** slow blow 250 V series.

Fuse Legend	Mfr's no.	Gripnail p/n#
F1 - 1/4 AMP SLOW	3 AG (313)	#51038
F2 - 1/4 AMP SLOW	" "	"
F3 - 1 AMP SLOW	" "	#51039
F4 - 1 AMP SLOW	" "	"

   c. See **Section V. TROUBLESHOOTING,** for replacement procedures.

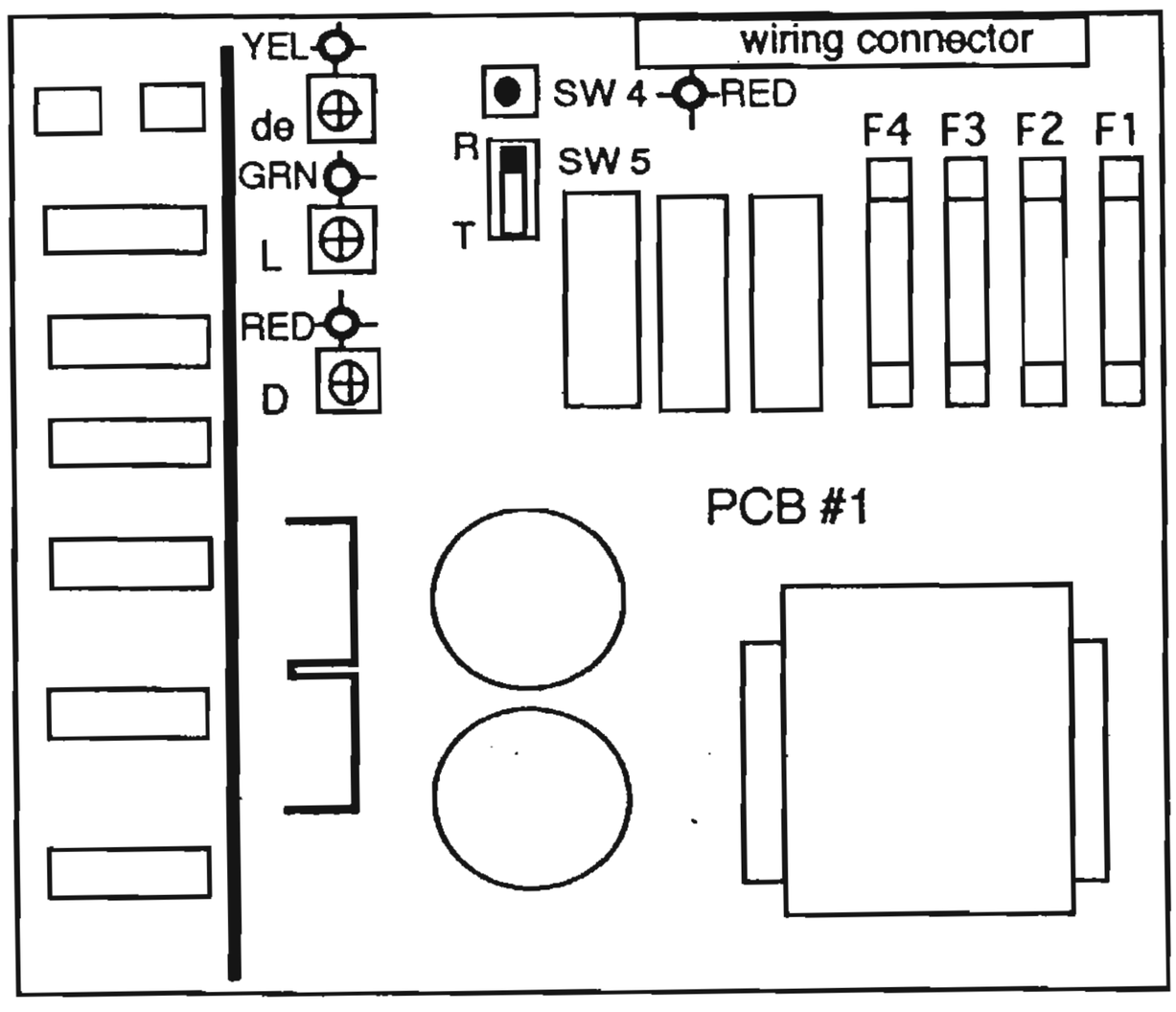

FIG 4-1

4.200. PORT SENSORS

1. A single port sensor is used on the Model 560 AFC. It sends a signal to initiate the load cycle. **See Fig 4-2.**

2. It is installed in the NORMALLY CLOSED (A) port of the DRIVE VALVE, and is provided with a quick change, inline plug.

4.250. PROXIMITY SENSOR

1. A 24 VDC proximity sensor, with a red LED indicator light, is used to sense the retracted position of the loading V-block. The sensor acts as an electrical interlock to prevent accidental operation of the drive cylinder whenever the loading operation is in process.

2. A clearance gap of 1/16" - 1/8" is provided to sense properly. Physical contact must be avoided between the sensor and the V-block. The red LED light will glow BRIGHTLY to indicate the sensor & V-block are adjusted and operational.

   IMPORTANT NOTE: All Model 560 AFC's use one of two basic sizes of proximity sensor. All units have provision for 12 mm & 18 mm sensors. Sensors may be used interchangeably and with the existing machine cable.

4.300. FOOT PEDAL PRESSURE SWITCH

1. A pneumatic pressure switch, located above PCB#1, in the rear control box, is used to initiate the machine cycle when the foot pedal is depressed.

2. A signal pressure of 10 PSI, activates this switch to start the machine cycle. The pressure regulator is preadjusted to 15 PSI, with a maximum range of 25 PSI.

4.320. TRACK LEVEL PRESSURE SWITCH

1. This pressure switch is located on the front panel of the rear control box. It operates the vibrator bowl unit, automatically, as fasteners are used. It is signaled by low pressure air coming from the output track sensor.

2. An air stream, directed across the track, is blocked by the fastener caps when the track is full. As fasteners are used, pressure is restored to the output sensor. This supplies a signal to the switch to turn ON the vibrator unit.

4.350. DRIVE AND LOAD VALVES

1. Both DRIVE and LOAD VALVES are 12 VDC. They have interchangeable electric coils. Each coil contains a recessed, white button which, when depressed, operates as a manual override to test valve/ cylinder function. Electrical power does NOT have to be present to operate this override feature.

2. IMPORTANT! When using manual override to test the **DRIVE VALVE**, visually check the position of load cylinder and V-block to insure they are fully retracted. Damage to the LOAD CYLINDER may occur if struck by the DRIVE CYLINDER. The override defeats the safety interlock function of the proximity sensor.

4.400. DRIVE AND LOAD CYLINDERS

1. The DRIVE CYLINDER is a 4" stroke , 1.5" bore pneumatic cylinder. This cylinder has been specially designed by Gripnail to be repairable. In addition, a special composite bearing is used to provide long life and resist the highly abrasive properties of the fiberglass environment.

2. The LOAD CYLINDER is a standard, 2" stroke, 3/4" bore cylinder with a hexagon shaft. NOTE: Round shaft replacement cylinders are **NOT RECOMMENDED** due to their erratic loading characteristics, lateral instability and should be avoided.

4.450. PRESSURE REGULATORS / FILTER / LUBRICATOR

Refer to **Section VI. REFERENCE** for pressure adjustments.

1. MAIN REGULATOR / FILTER

a. A main regulator/ filter unit, containing a water trap, is used to clean the incoming air supply as in enters at the rear of the machine. It utilizes a 10 micron washable/ replaceable filter element.

b. The operating pressure range is 0-125 PSI. It has a maximum line pressure rating of 250 PSI.

NOTE: REFER TO FIG 4-2

2. LOAD REGULATOR

The load regulator is located in the multi-regulator assembly, at the Operator's lower left hand position. It provides a constant pressure to consistently operate the load cylinder during each reloading cycle. The gage has an operating range of 0-160 psi.

3. FOOT PEDAL REGULATOR

The foot pedal regulator is located in the multi-regulator assembly, at the Operator's lower right hand position. It provides a constant pressure to operate the foot pedal pressure switch, assembled above PCB#1, when the pedal is depressed. The gage has an operating range of 0-30 psi.

4. DRIVE REGULATOR

The drive regulator is located in the upper middle section of the multi-regulator assembly. It provides a constant pressure to operate the drive cylinder. The gage has an operating range of 0-160 psi.

5. LUBRICATOR

The lubricator, preset at the factory, contains a heavy duty zinc bowl which holds approximately 5 ounces of oil. A light weight (10W), non-detergent oil is recommended. The flow rate should be adjusted to about one drop per 100 machine cycles.

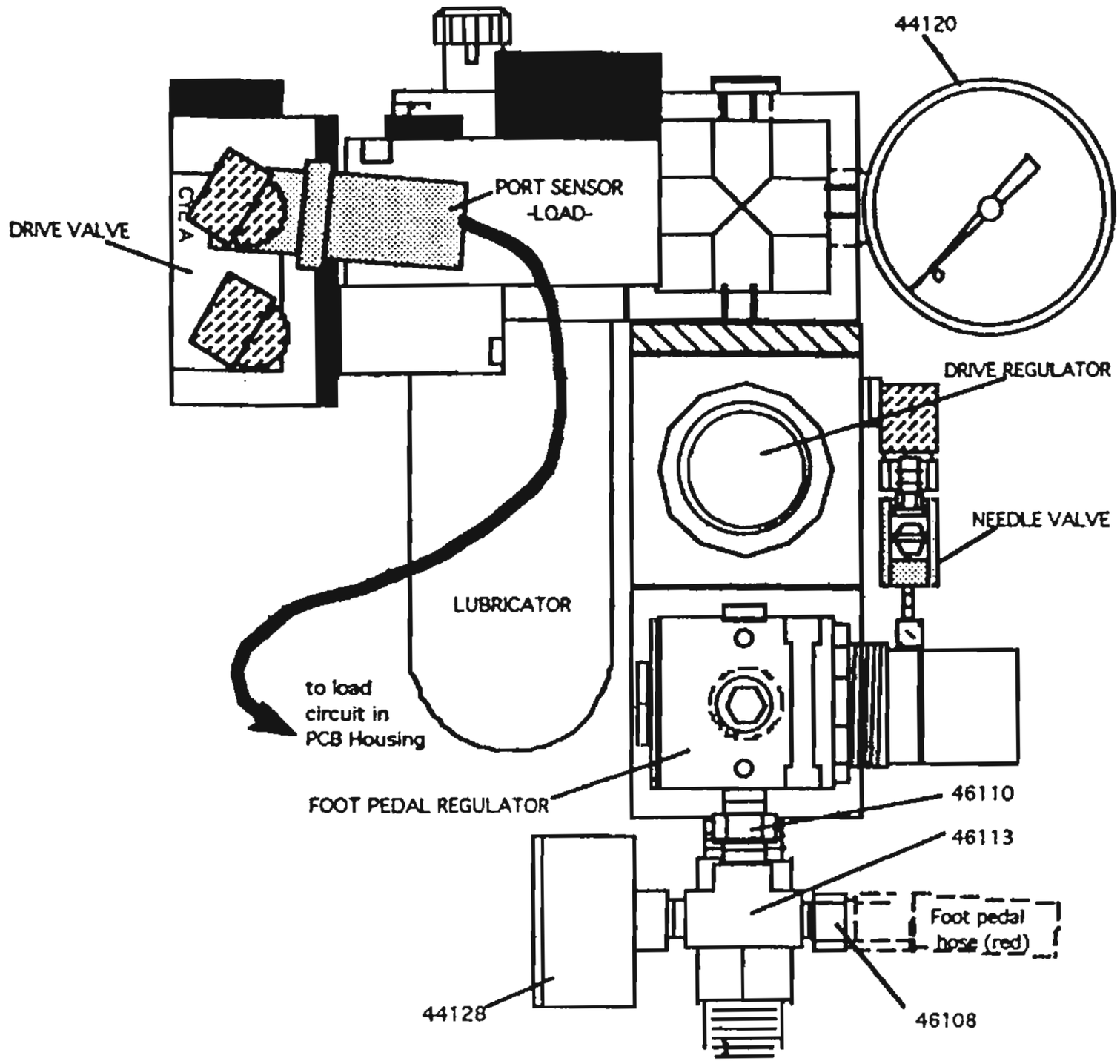
44120
PORT SENSOR
-LOAD-
DRIVE VALVE
CYL A
DRIVE REGULATOR
NEEDLE VALVE
LUBRICATOR
to load
circuit in
PCB Housing
FOOT PEDAL REGULATOR
46110
46113
Foot pedal
hose (red)
44128
46108
OPERATOR'S RIGHT

FIG 4-2

SECTION V. TROUBLESHOOTING

5.000. FLOW CHART INSTRUCTIONS

1. **Please feel free to call us if you have any questions or problems.** Although not every fault condition can be represented in this section, it is possible to troubleshoot some of the obvious problems that can occur. The flow charts contain various procedures to follow, in order to make troubleshooting this system as user friendly as possible. The flow charts use symbols that are explained as follows.

SYMBOLS	DESCRIPTION

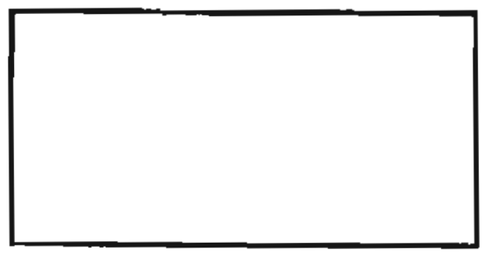

Fig 5-1

Fig 5-1 contains general information useful to the operator.

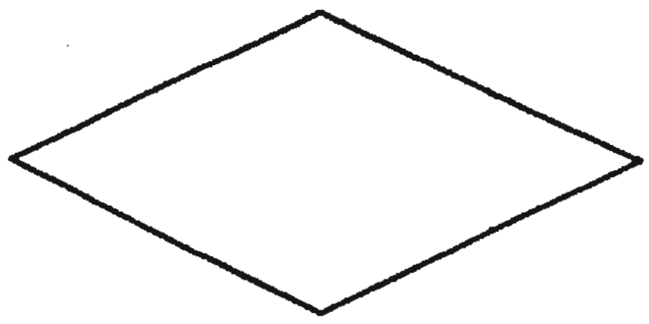

Fig 5-2

Fig 5-2 represents a decision for the operator to make, YES or NO. Once answered, follow the arrow in the direction of the answer.

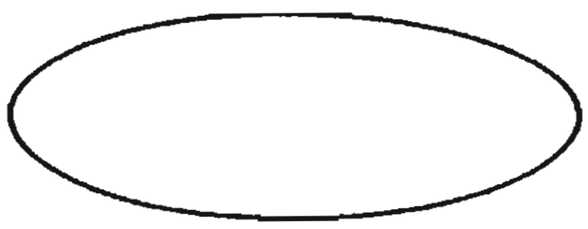

Fig 5-3

Fig 5-3 contains instructions for the operator to follow.

2. **IT IS VERY IMPORTANT NOT TO SKIP OVER ANY BLOCKS WHEN USING THESE CHARTS.** If the answer in a decision block is YES, follow the "YES" arrow to the next block. If the answer is "NO", follow the "NO" arrow.

3. All unlabeled arrows are to be followed to the next block on the chart.

4. It is our hope that the use of these charts and maintenance information contained in this manual, will make the machine as user serviceable as possible.

5.300. FUSE REPLACEMENT - CIRCUIT BOARD PCB#1

1. Disconnect **ALL** electrical power before proceeding then see **FIG 4-1**.

2. **AVOID INJURY!** DO NOT attempt to grasp the glass portion of the fuse with any tool other than a standard fuse puller. If unavailable, gently pry out **ONE** end of the fuse with a suitable tool first, then pull from remaining end of holder.

3. Replace fuses with **SAME** type (slow or fast blow), voltage and amp ratings.

5.310. FUSE REPLACEMENT - POWER ENTRY MODULE Fig 3-4.

1. Disconnect ALL electrical power, then pull 120 volt supply cord from socket of power entry module.

2. Carefully insert a small, flat blade screwdriver, shown in **Fig. 5-4,** and with a twisting motion, gently pry cover free to remove fuse holder.

3. Gently pull on locking tab to release fuse carrier, shown in **Fig. 5-5,** and slide the carrier out to access fuses.

4. Replace fuses with **SAME** type (slow / fast blow), voltage & amp ratings, (250V, 5 A), return carrier to holder, push in until flush, then restore electrical power.

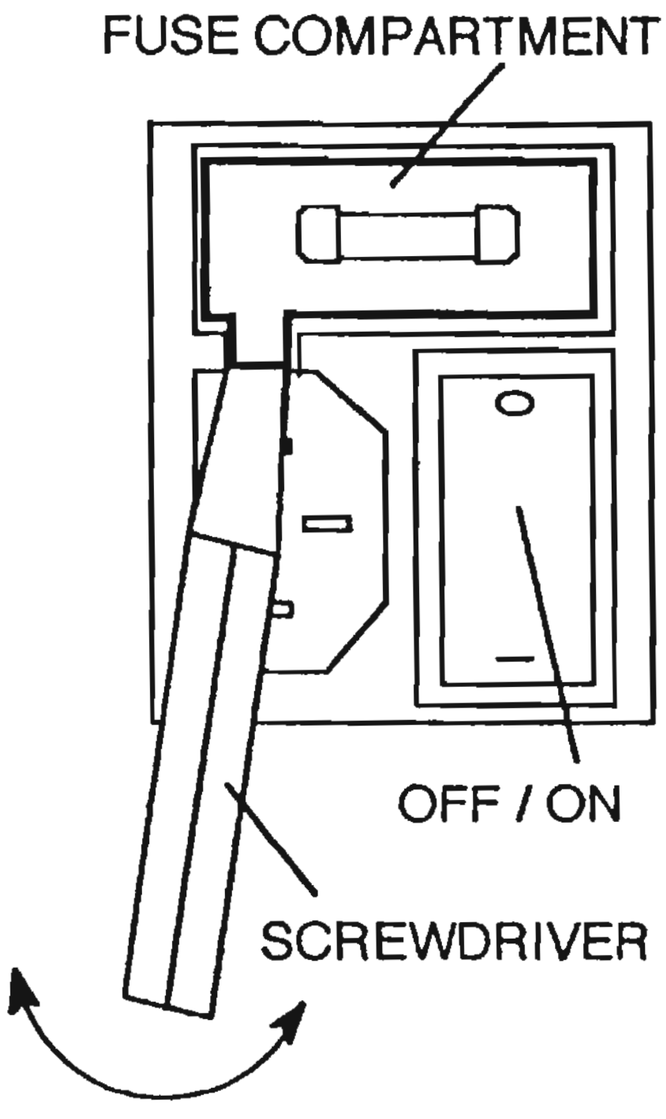

Fig 5-4

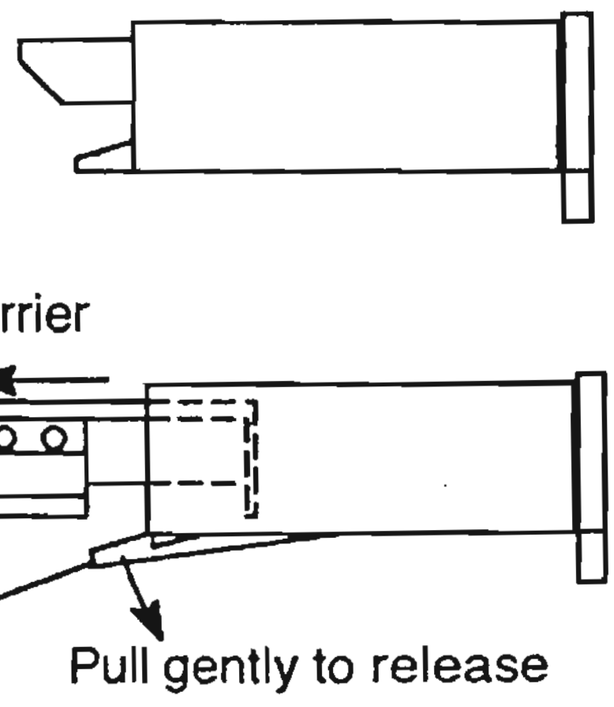

Fig 5-5

5.320. VIBRATOR BOWL

1. DOES NOT OPERATE

Before proceeding, connect vibrator's short cord to an ordinary extension cord.

a. If vibrator operates NORMALLY, reconnect to machine cord.

1. **See Section 5.330.**, CLEANING TRACK SENSOR.

2. Check tubing/ connections on track's output sensor (right hand).

3. Open needle valve 1/4 turn. (Located behind multi-regulator unit)

b. If vibrator does NOT operate;

1. Disconnect power cord.

2. Examine power cord, plug, fuse, switch, speed control. Remove outer housing and check all internal wiring connections.

3. Reassemble unit completely before testing.

2. OPERATES CONTINUOUSLY

a. Output sensor has become clogged, trapping air pressure in the signal line to the track level switch.

b. Remove air fitting from output sensor on right side of track. Vibrator should stop immediately. **See Section 5.330.**, CLEANING TRACK SENSOR.

c. If unit continues to run, replace track level pressure switch.

3. UNIT IS SLOW or NOISY

a. **Avoid complications**. Please consult the factory before proceeding.

b. Tighten center bolt in feeder bowl.

c. Check rubber isolators. They should be soft and pliable, otherwise replace.

d. An internal spring or mount may be loose or damaged.

5.330. CLEANING TRACK SENSOR

1. Remove air pressure from machine.

2. Disconnect air fitting from OUTPUT sensor on RIGHT side of track.

3. Remove fitting from INPUT sensor on LEFT side & connect to OUTPUT sensor.

4. Connect air to back flush OUTPUT sensor. Remove air & reconnect as normal.

5.360. CIRCUIT BOARD REMOVAL AND REPLACEMENT

SAFETY FIRST! With the power from wall panel turned OFF, use a test meter to verify that NO voltage exists at the machine.

1. TO REMOVE:

a. Locate the green wiring header/ plug(s) along the top edge of the printed circuit board.

b. With a small screwdriver, completely loosen the **E N D** retaining screws on wiring plug.

c. Carefully pull on plug, using a rocking action, to disconnect from the board.

d. Locate the circuit board removal tool, **FIG 5-8**, in the rear control box.

Fig 5-8

e. Push on over one nylon standoff, which supports the circuit board, until it contacts the board surface. This will temporarily collapse the locking tab.

f. With the tool still in place, carefully pull the board from the standoff. Repeat process with the remaining standoffs.

2. TO REPLACE:

a. Carefully align board over standoffs and push firmly to engage locking tabs.

b. Attach wiring plug(s) and carefully tighten **E N D** retaining screws.

5.380. PORT SENSOR REPLACEMENT

1. Disconnect ALL electricity, air and allow full bleed down. See **Fig 5-9.**

2. Using a small, flat blade screwdriver, slip under top of retaining clip and remove to release sensor. **DO NOT** discard clip.

3. Remove old sensor from port connector housing.

4. Locate electrical connector on sensor cable.

5. Depress AND hold locking tab on connector with thumb and pull to disconnect.

6. Install new sensor into port connector housing and install retaining clip.

7. Align inline electrical connector with mate and push until locked.

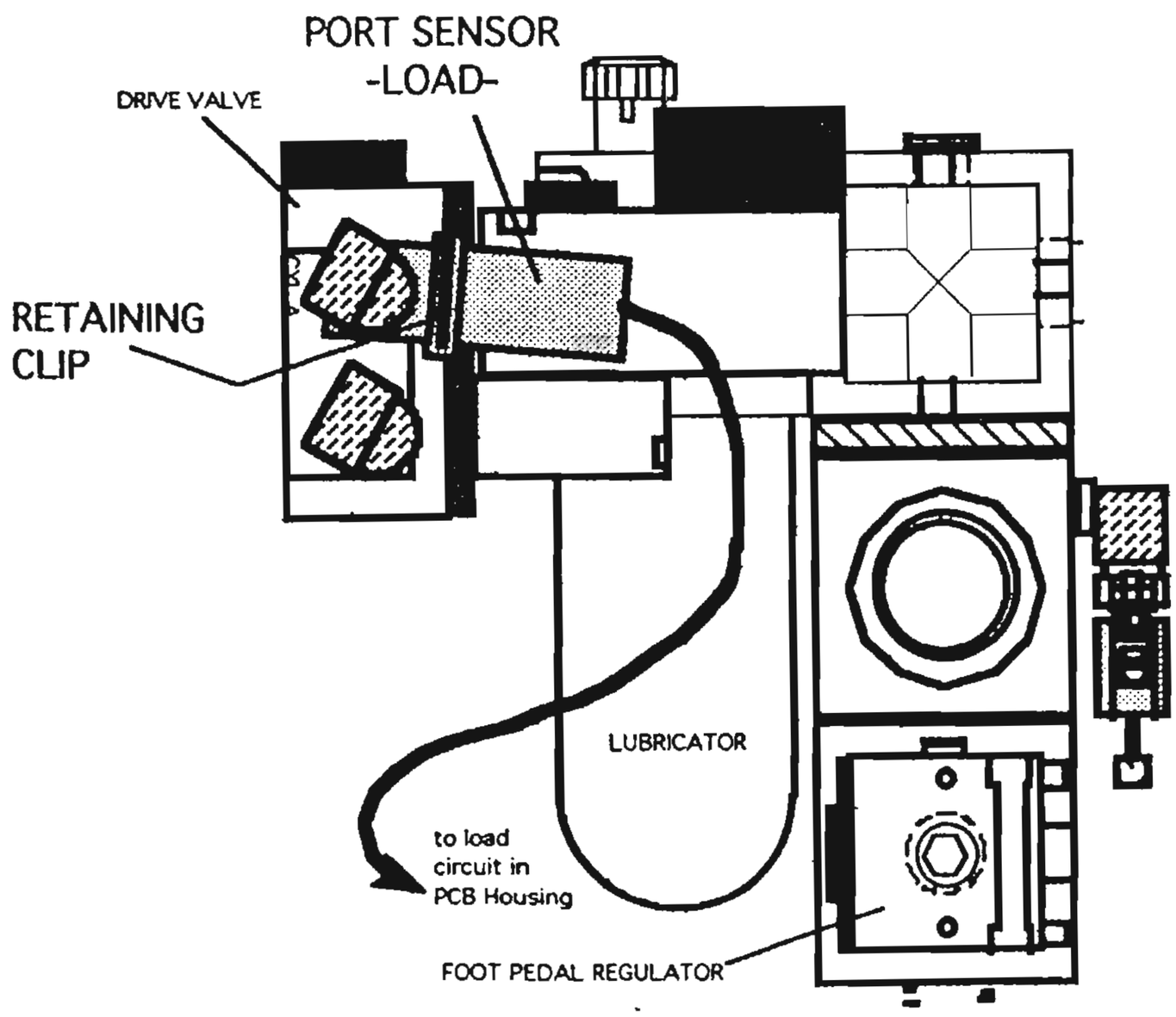

Fig 5-9

SECTION VI. REFERENCE Pressure Adjustments

1. The following air pressure adjustments are factory preset and require **no** further changes. They are provided here for reference only.

		MULTI-REGULATOR ASSEMBLY		
AIR REGULATORS:	**Main**	**[Drive**	**Load**	**Low]**
	80 psi	**[** see below	**50 psi**	**15 psi]**

2. The following settings are **APPROXIMATE** and are for reference only. They represent adjustments which provide the best fastening obtained using a variety of metal brands under different conditions.
The user may adjust to suit.

SETTINGS FOR DRIVE REGULATOR OPERATION

METAL GAGE	**26**	**24**	**22,20**	**18,16**
PRESSURE	**50**	**50-55**	**55-65**	**70-80**

MODEL 560 – REPLACEMENT PARTS LIST

PART #		DESCRIPTION
44113		Load cylinder
30734		V-block
44223		Load valve 12VDC
20300		Load restrictor assembly
44222		Drive valve 12VDC
20291		Port sensor assembly
30295		Magnetic driver
30588		Anvil
44192		Drive cylinder
44112		Exhaust valve
62112	R[1]	Hex nut 1"-14 SAE
61304		Shakeproof washer 1" INT.
31049		Cylinder spacer (A)
40222		Cylinder foot bracket
60413		HHMS 5/16-18 x 2 1/2" gr5
61109		Flat washer 5/16"
61205	R[1]	Lockwasher, split ring 5/16"
62009		Nut, ESN 5/16
20280		Multi-Regulator sub-assembly
44117		Load gage
44120		Drive gage
44128		Low pressure gage (foot pedal)
44101		Needle valve (track control)
46105		Barb fitting 1/4"
46130		Universal elbow

PART #		DESCRIPTION
40206		Main regulator
44120		Main gage
20275		Foot pedal hose assembly
20237		Foot pedal assembly
51111		Foot pedal pressure switch
60503		Screw, pan head #6-32 x 3/8"
62104		Hex nut, #6-32
20281		Track pressure switch assembly
60019		Screw, pan head #2-56 x 1/2"
62111		Hex nut, #2-56
		FUSES
50056		Fuse 5A (Power entry module)
51038		Fuse 1/4A slow blow
51039		Fuse 1A slow blow
51085		Fuse 2A fast blow
20147		Track Assembly
20131		Escapement Assembly
30199		Nail stop blade
31038		Front guard
51117		Proximity sensor 18mm
51147		Proximity sensor 12mm
44177	R[1]	Muffler, ¼ NPT

R[1] 11/2/98

DRIVE and LOAD CYLINDER MALFUNCTIONS CHART #1

SYMPTOMS

- Fastener does not load on to upper tip
- Drive head stopped & won't operate when foot pedal is depressed
- Drive head won't operate after machine is turned ON

Does load cylinder valve operate with manual override? Sec. 4.350
- YES → Are all power lamps lit?
- NO → Check load pressure regulator for 50 psi or call factory

Are all power lamps lit?
- YES → Is V-block jammed beneath track?
- NO → Is 120V power ON and connected?

Is V-block jammed beneath track?
- NO → Is the proximity sensor's RED indicator light ON? Sec. 4.250
- YES → Turn OFF all power and air before clearing jam → Restore All power & air

Is the proximity sensor's RED indicator light ON? Sec. 4.250
- YES → Did a fastener load onto the upper tip?
- NO → Check sensor operation by lifting side of V-block nearest the sensor

Did a fastener load onto the upper tip?
- YES → Did fastener reload?
- NO → Turn OFF power at Operator's box for 15 sec. → Restore All power

Check sensor operation by lifting side of V-block nearest the sensor → Did the proximity sensor's RED indicator light turn ON?
- NO → Is 120V power ON and connected?
- YES → Check sensor adjustment outlined Section 4.250

Is 120V power ON and connected?
- YES → Check fuses. See Section5.310
- NO → Connect 120 V and turn ON

Did fastener reload?
- YES → Resume normal operations. If malfunction recurrs contact factory.
- NO → Check foot pedal regulator for 15 psi

Check foot pedal regulator for 15 psi → Pressure OK?
- YES → Move foot pedal to rear of machine. Depress pedal and HOLD. Check for air leaks in hose and inside of rear control box.
- NO → Adjust as required See SECTION VI.

Move foot pedal to rear of machine. Depress pedal and HOLD. Check for air leaks in hose and inside of rear control box. → Any leaks detected?
- NO → Turn OFF all electrical power & air pressure. Remove rear control cover. Refer to Fig 3-4 & call factory for further assistance.
- YES INTERNAL → Turn OFF all electrical power & air pressure. Remove rear control cover. Refer to Fig 3-4 & call factory for further assistance.
- YES EXTERNAL → Repair all external leaks and retest.