Amistar

PROGRAMING LARGE AI-500 INSERTERS

AI-500 inserters which have more than 24 input stations use both upper case letters (A through Z excluding I and O) and lower case letters (a through z excluding i and o) to encode the various stations. Punched paper tape is used to select the input station from which a part is selected. The paper tape has a series of letter characters (both upper case and lower case) punched in the proper sequence to correspond to the codes for the parts to be selected. Each letter of the series represents a single part selection by the AI-500. The code for the hole pattern on the tape is ASCII, as shown in the Axial Inserter Manual, section 3-6.

The TWX Teletype machines may be used to produce the tape since they punch ASCII code. Both the Model 38 and 43 Teletype TWX machines punch upper case and lower case characters. The Model 33, which is the most popular TWX machine, does not punch the complete ASCII code; for instance, it creates only upper case letters and does not punch any lower case letters directly. Lower case letters can be created on a Model 33 TWX machine, however, in the following manner:

1. Punch the letter desired (an upper case code will be punched.)

2. Back space the tape one position by depressing the "back space" button on the punch; this push button is to the left of the "on" button and is labelled B.SP.

3. Depress the space bar. This will over-punch a hole in the sixth position on the tape, thereby changing the character from upper case to lower case.

7200

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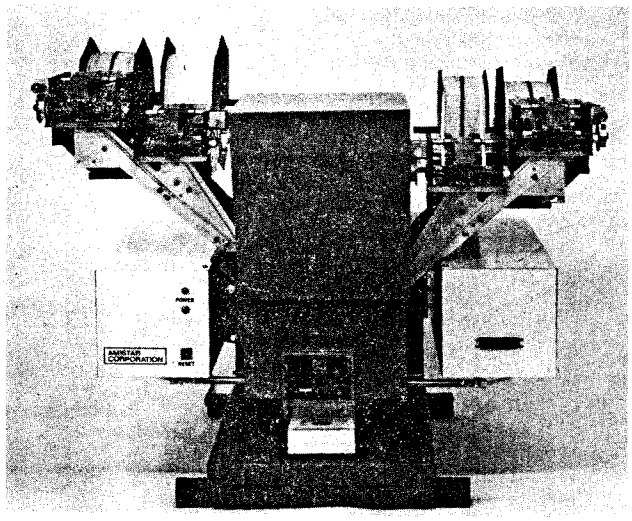
OWNER'S MANUAL

AXIAL LEAD COMPONENT INSERTER

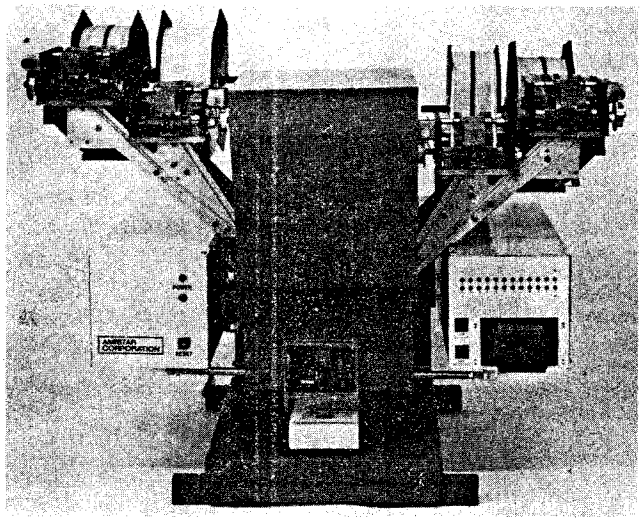
1.0 INTRODUCTION

Amistar's AI-series Axial Lead Component Inserters (abbreviated "Axial Inserter or AI") are designed to accept axial lead electronic components with cylindrical bodies, to form these into an inverted U or staple shape and to insert these into printed circuit boards quickly and efficiently. The board to be loaded is hand held, located by placing the holes for the component over two tapered pins. After insertion, the protruding wires are clinched to retain the component.

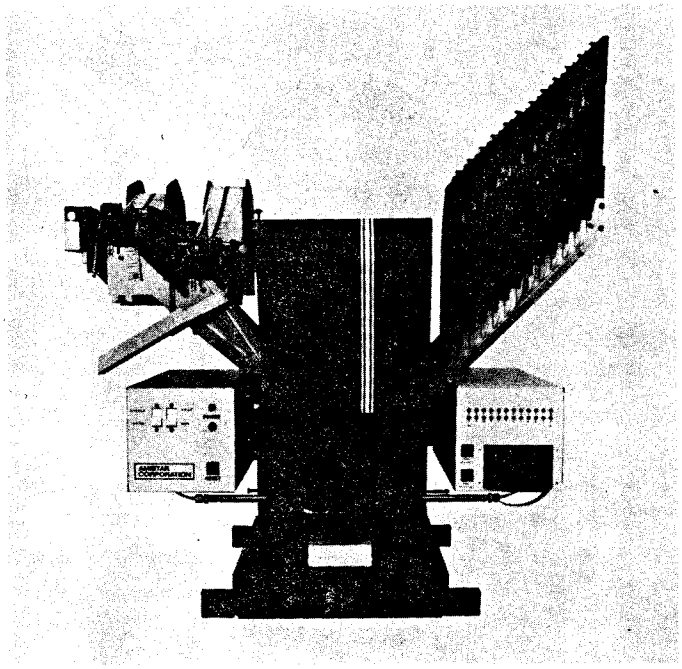
The Axial Inserters are built around a sturdy frame consisting of thick-webbed aluminum castings. The plate assembly directly in front of the operator holds the head shaft and head air cylinder. The optics assembly, which projects a location cross-hair pattern on the board, is mounted to the front of the plate assembly. Behind the plate assembly is the pneumatic shelf which contains the air controls for the machine. The Die Retract and Former Assembly is located behind and to each side of the head. This assembly transports the component from the slide holding station to the head and forms the lead wires into a staple shape. Two white boxes, one to the left and one to the right of the machine, contain the DC power supply and electronics for controlling the machine. The base assembly contains the locating pins, the clinching mechanism, and the sensor which initiates insertion action when the board is placed in the proper position. The selection system for input components varies according to model type. Several models are available, as described below. The differences have to do with the method of component input and selection.



The AI-100 accepts components from reels which are mounted directly on the machine. One to four reels are accommodated, and are selected by means of push-buttons, one for each reel. Parts are cut from each reel by a separate cutter, and fed to the insertion head by gravity.



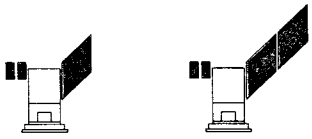
The AI-500 accepts components from reels which are mounted directly on the machine. One to four reels are accommodated. Parts are selected in the order they are to be used by a paper tape program.



The AI-500 Cartridge Series may have one, two, three or four cartridge modules; each model holds 12 cartridges. Each cartridge is loaded with components of one value, cut to the proper length. As shown at the left, if two modules (24 cartridges) or less are attached to the machine on the right side, two cutter stations, for components on reels, may be mounted on the left.

Possible configurations of the AI-500 Cartridge Series are shown below:

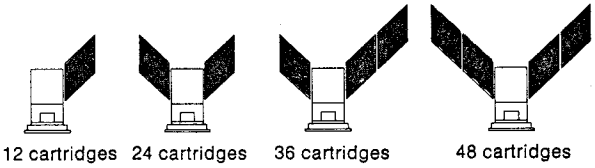
Possible Cartridge/Reel Combinations:



12 cartridges, 2 reels

24 cartridges, 2 reels

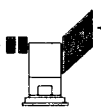
Possible Cartridge Combinations:



12 cartridges 24 cartridges 36 cartridges 48 cartridges

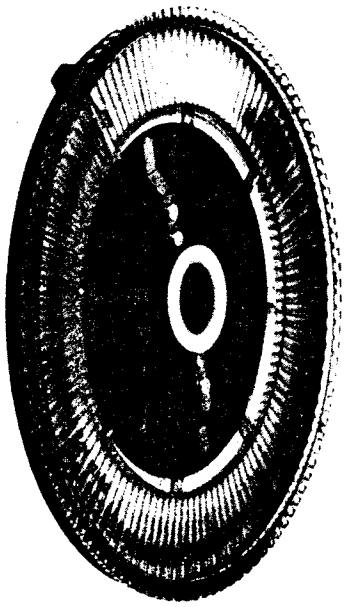
Key

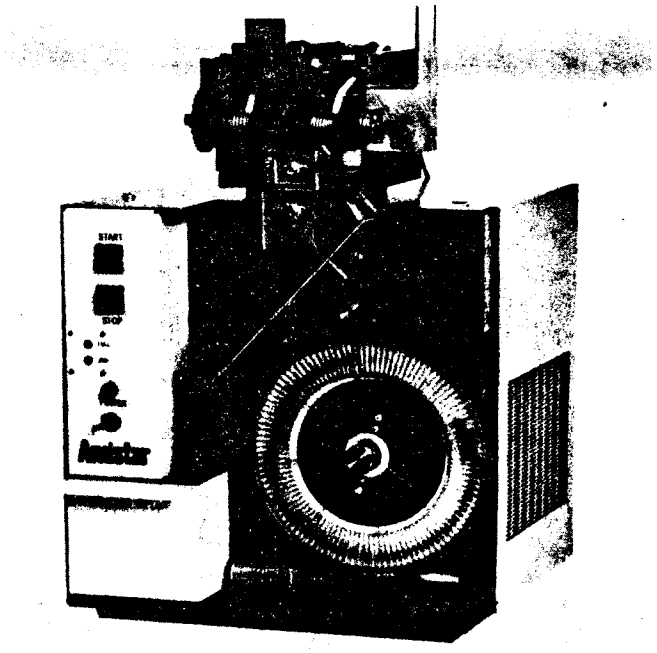
Cutter stations for two reels of components.



Receiving station for 12 cartridges.

The Cartridge AI-109, shown at the right, is an accessory. It contains axial lead parts, all one value, which have been cut to the proper length for later insertion.





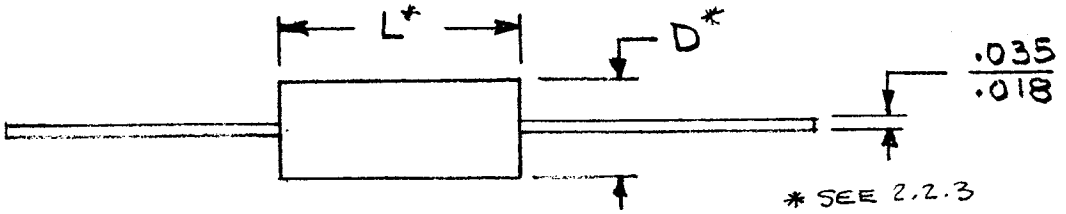
The AL-100 Axial Loader accepts components on reel or card (option available), cuts the parts to length, and loads the cartridge.

2.0 SPECIFICATIONS

2.1 Machine Rate: 2000 components per hour machine capability on automatic mode.

2.2 Insertable Components:

2.2.1 Maximum and minimum outline dimensions:



2.2.2 Dipped Components: Shall conform to max outline configuration. Flash on leads shall not extend beyond L.

2.2.3 Tooling available for various components and board thickness:

Tooling Group	Typical Component	L Max	L Min	D Max	D Min	Board Thickness
-1	1/4 watt or small diode	.375	.090	.110	.060	.030 - .045
-2 (shipped std)	1/4 watt or small diode	.375	.090	.110	.060	.050 - .075
-3 (see note below)	1/4 watt or small diode	.375	.090	110	.060	.080 - .095
	1/4 watt or large diode	.375	.150	.150	.090	.050 - .070

Note: A special set of fixed head jaws (dies) may also be required, depending upon components to be run. Contact the factory.

2.3 Hole Specifications in the Printed Circuit Board:

2.3.1 Variability of Spacing: Hole spacing may be any consistent value from 0.350 to .750. For a given machine setting, hole-to-hole spacing may vary ±.002 (hole dia. is .010 over lead dia.) to ±.004 (hole dia. is .015 or greater over lead dia.).

2.3.2 Spacing of Other Components from Hole: Low profile components, such as 1/4 watt resistors or DIPs, may be as close as .100 to the hole center line for successful axial component insertion. For higher profile obstructions, more spacing will be required.

2.3.3 Minimum Hole Separation: The minimum hole spacing for a given component depends upon body diameter D, as follows:

D	Minimum Hole Separation (Center to Center)
.060 to .110	L (Body length including flash) + .150
.110 to .150	L + .210

2.3.4 Finish Hole Diameter: .010 minimun over lead diameter, or .035 diameter minimum whichever is greater.

2.4 Lead Protrusion: Standard .040 to .060 below bottom surface of 1/16" board, after clinch.

2.5 Clinch: Inward (standard), adjustable inward bend.

2.6 Power: 110/220 volts, 50-60 cycles per second, 2 amps maximum.

2.7 Air: 90 PSI shop air is required through 1/4" minimum pipe or hose.

2.8 Weight: Approximately 150 lbs.

2.9 Mounting: Bench top mount.

3.0 UNCRATING & SET-UP

3.1 Unpacking: After removing outer crate, check for damage. The AI comes with one owner's manual and a service kit which contains set-up tools, maintenance lubricants, and a complement of commonly used spare parts. This kit is contained in a separate box inside the crate. The input air regulator may be detached for shipment, contained in a separate box inside the crate. The machine is bolted to the shipping pallet with four 1/4-20 screws into the four mounting feet. Remove these screws to free the machine from the pallet.

On the larger configuration Cartridge Series AI-500 units, the upper selection station modules may be shipped detached. If so, separate instructions for re-assembly are included.

3.2 Mounting: The AI should be mounted on a sturdy bench or table with several feet of work space on either side. It is suggested that the machine be attached to the table with 1/4-20 bolts through the bench top into the feet. The bench top should be reasonably flat and level.

3.3 Filter/Regulator/Oiler: If the input air filter/regulator/oiler assembly was detached for shipment, install it into the air inlet (1/8" pipe) at the rear of the machine. Connect an air line from a source of 90 PSI shop air to the input filter. Use a 1/4" pipe or air line, minimum. If an oiler is used in the shop air system, do not use oil in the machine oiler. If no oiler is in the air system, then fill the oiler with about one inch of 10W or 20W "NON-DETERGENT" oil and adjust the needle valve almost closed. The machine needs almost no oil to operate properly. Too much oil is worse than no oil. If during the first few weeks of operation oil is noticed in the nylon air lines of the machine, immediately remove the oil from the oiler. The one inch of oil in the oiler should not be used up in a year.

3.4 Electrical Checks: Before connecting the electrical power cord to the wall socket, remove the two white covers over the electronic boxes and check visually for damage. The printed circuit boards should be properly seated. Now connect the power to a source of 110 volts, and turn the power switch on. The red power indicator should light, and the green RESET button light should be lit.

3.5 Mechanical Checks: Turn power off, and check the following alignments: (Do not re-adjust unless out of tolerance since these have been carefully set at the factory)

a. Head to die retract clearance - see Section 6.3.3.
b. Die retract alignment - see Section 6.3.5.
c. Head rotation - see Section 6.3.4.
d. Former position - see Section 6.3.17.

Next, adjust machine spacings for the hole-to-hole length to be used, as explained in sections 6.3.8 and align base to head as described in section 6.3.15.

3.6 Programming the AI-500: Programming is simple and fast. Note that the input stations are each identified by a letter of the alphabet, A,B,C, etc. A particular component is associated with each station; for instance a 1K-1/4 watt resistor may be used in Station A, a 1N4454 diode (polarity

left) in Station B, 22K-1/4 watt resistor in Station C, and so forth.

The first step, then, is to assign a selection station letter to each part to be inserted by the machine on a given pass. Next, choose a loading path on the board for a given pass. Note that the center spacing must be the same for all insertions on any given pass.

Now make a list of the letter codes for the parts in the order that they are to be loaded into the board, along the chosen path.

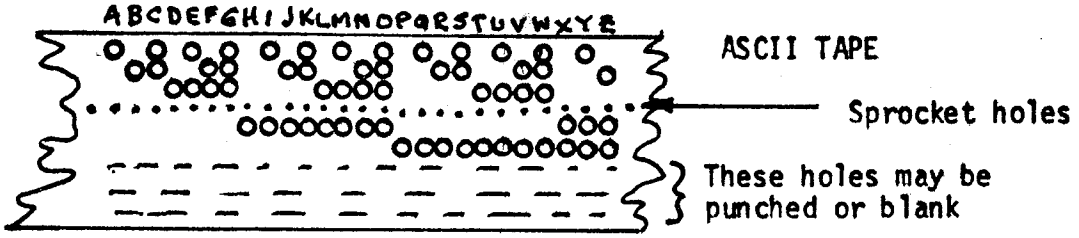
Prepare a paper tape with a teletype machine or other paper tape punch. Start by producing a 2" leader area (no holes punched or all holes punched). Then type the letter characters in the order given by the list, such as:

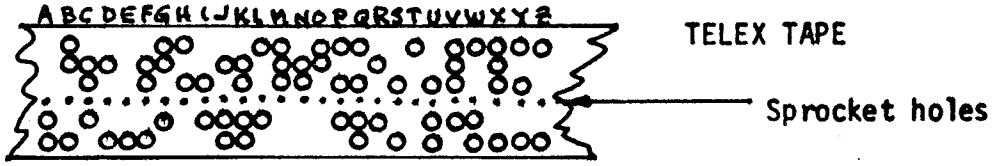
CCABDAA.....C

Do not key line feed or carriage return. If you make a mistake, backspace and overpunch with a rubout. Then add another leader area to make up a tape at least 12" in length. Two or more sequences may be punched onto the tape, but be sure to leave 2" of leader between sequences.

You may join the ends of the tape to form a loop, being careful to line up sprocket holes. Your tape is now ready to use.

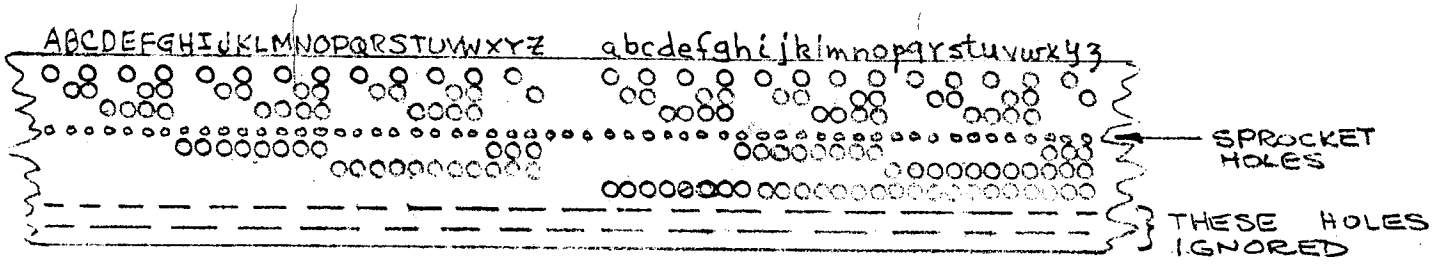
The AI-500 with 24 or less input stations can employ either of two paper tape codes: ASCII, as prepared on a TWX machine and many computer based systems, or the baudot code produced on a 5 level telex machine. Tapes punched with these codes are shown below.





The SC-270 Reader Interface PWB in the AI-500 electronics box card cage must be the proper model for the tape code used. An SC-270A board is used to decode an ASCII (TWX) tape, and a SC-270B board is needed for a Telex tape. Unless otherwise specified, the ASCII board is shipped standard with the telex board available upon request.

On some AI-500 Cartridge Series units, more than 24 stations are employed. These are identified with letter characters, as described above, except that both upper case and lower case characters are used. Six hole levels of the paper tape are used; therefore, the TELEX tape cannot be used. The ASC II tape format is as follows:



The AI-500 is programmed as described above, using the 48 letter characters A through Z (not I or O) and a through z (not i or o). Only the ASC II version of the SC-270 Reader Interface Board can be employed in these larger configurations.

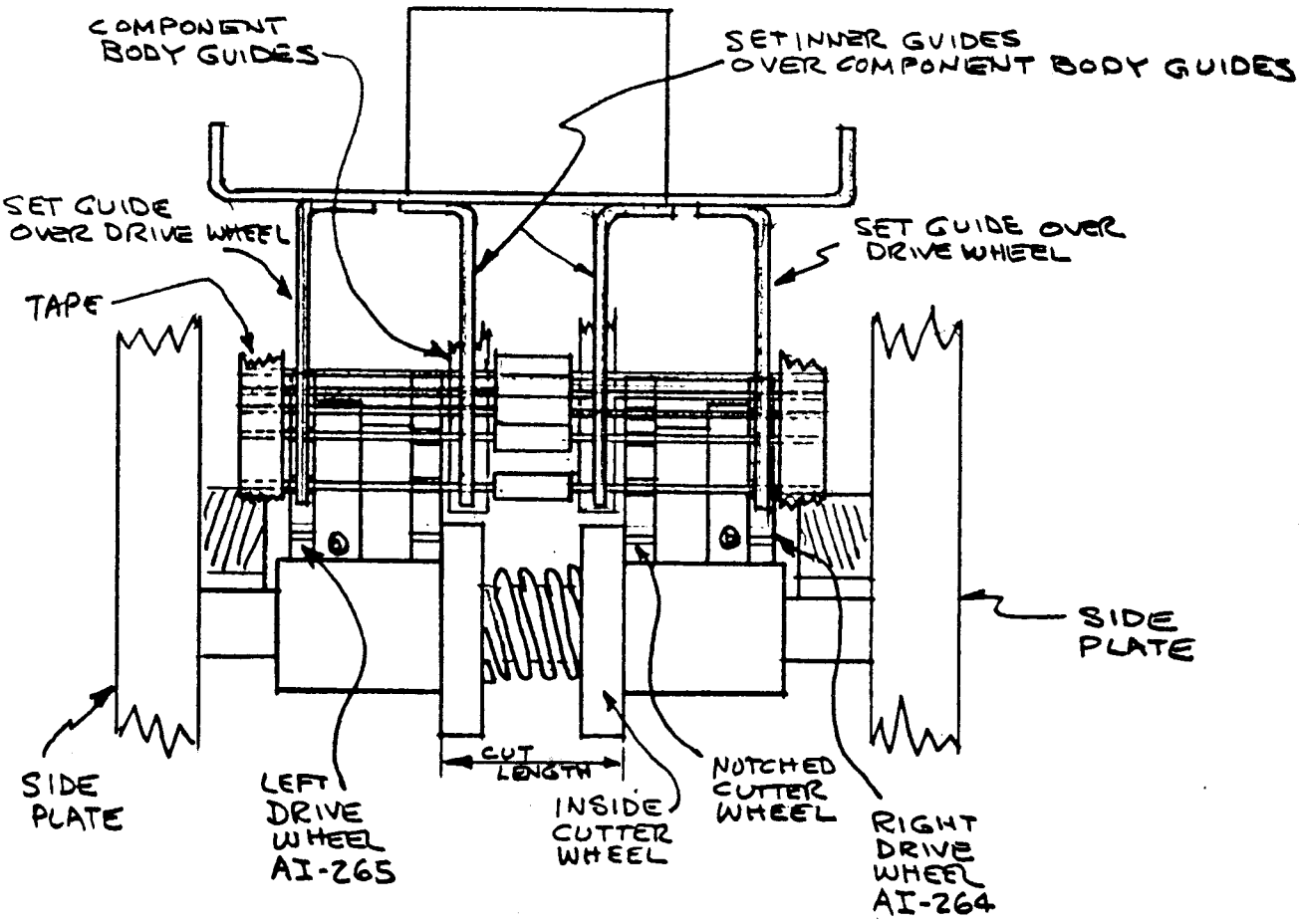
3.7 Feeding A Reel of Components to Cutter Station: The cutter station accepts a reel of components. The reel may contain all one-part value or may contain parts sequenced by a sequencing machine.

The reel is located on the black metal shaft with a conical hub on each side to center the reel. On some reels with a small center hole the inner hub is not used because it would offset the reel too far from the black plate. It is important that the reel be centered behind the cutter station so that the parts are fed to the cutter straight-on, not at an angle. The flat sheet metal spring drag is used to cause a little tension on the reel. Too much tension is caused by having the hubs too tight. Be sure that the cardboard reel flanges are not bent in, preventing free feeding of the taped components.

With the top guide raised, feed the taped components under the top guide pivot bar and into the notches of the cutter and guide wheels. Adjust the component body guides by loosening the four allen head cap screws and moving the guides left or right. The guides should be set to allow the body of the largest component on the tape to pass between with .010 clearance either side when the lead wires are down against the top surface of the guides. Take extra care to leave the lower end of the guides centered between the wheels when re-tightening the four cap screws. For badly taped reels where the body of a component is offset a larger amount from its neighbor, a larger spacing between the guides may be necessary to keep the parts from binding.

The outside drive wheels, AI-264 and 265 are held to the cutter hubs with allen set screws. These wheels are to be adjusted left or right so that they are about 1/16 inch inside the tape when the component bodies are centered. For sequenced reels the tapes are so close together it may be necessary to reverse the two guide wheels or to run the wheels outside the tape. Reversing the wheel required dissassembly of the cutter station.

Adjust the top guide parts to that they are over the wheels as shown below:



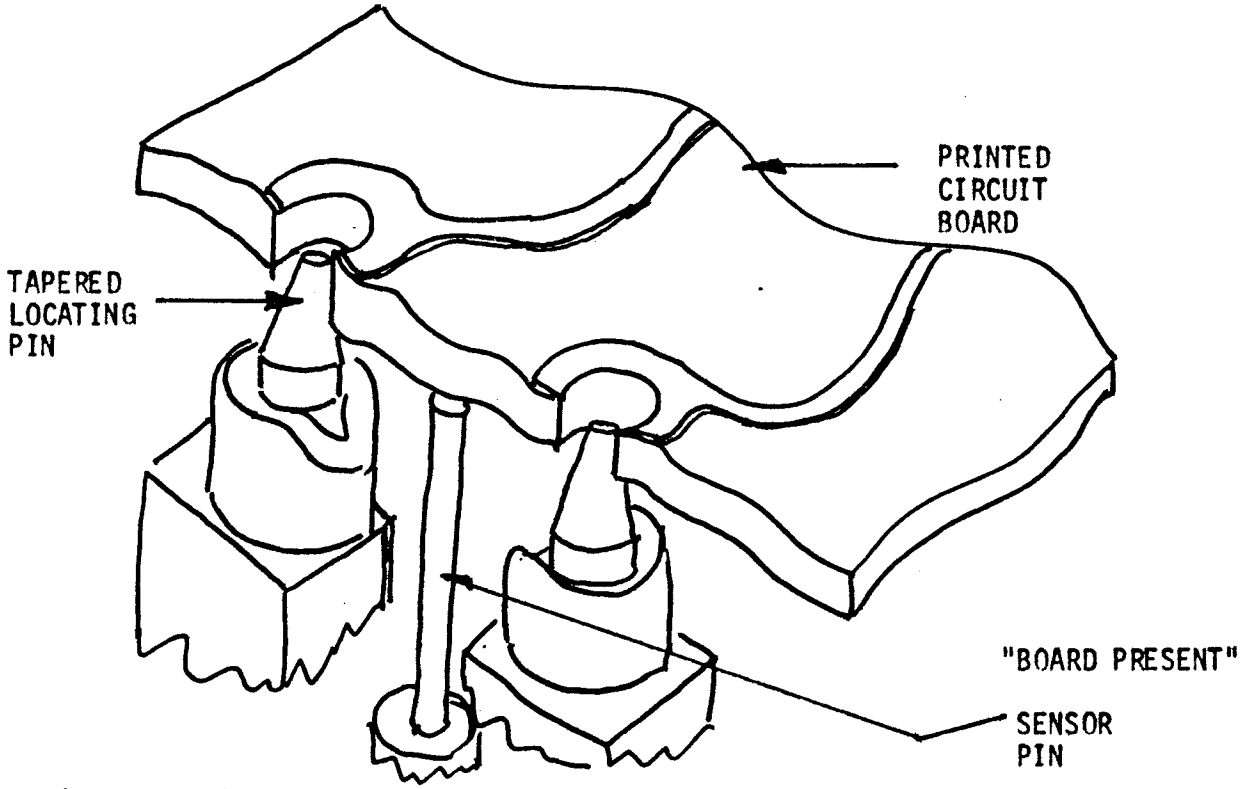
DANGER: THE CUTTER WHEELS WEAR SHARP AS THEY ROTATE. DO NOT PULL TAPE THROUGH BY PUTTING FINGERS ON CUTTER WHEELS: THEY WILL CUT!!

Cartridges are loaded into a 12 station module by raising the appropriate arm and slipping the loaded cartridge on the round hub, blue plastic toward the arm, and the blue plastic protrusion (pin) into the hole in the arm. Then the arm is swung gently into place in the module.

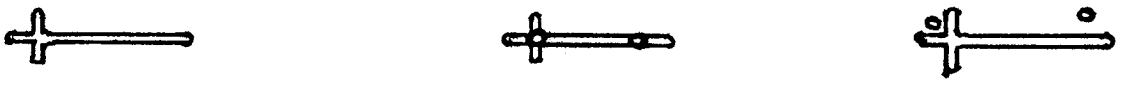
4.0 OPERATION OF THE AXIAL INSERTER

4.1 Machine Operation: When powered on, the AI will automatically reset to the initial, or "zero" state. The green RESET light indicates this reset condition. The die will retract with an audible noise.

To operate the AI, place the RUN-ALIGN rocker switch into the RUN position and place a board to be loaded with components such that the two tapered locating pins of the base assembly enter the two holes into which the component is to be inserted:



A cross-hair pattern is projected onto the top surface of the board to show the operator where the two pins are underneath:



cross-hair pattern | holes properly located | board improperly located

A very light touch is needed to locate the board properly over the pins: move the board until the cross-hair light pattern is squarely over the two holes, as shown. You should feel the board drop down over the pins as the proper location is achieved. Now press down lightly with the board and hold the board down lightly until a component is inserted. If you raise the board up off the pins before the head reaches the board, the machine will stop and wait for you to relocate the board.

DO NOT PRESS DOWN HARD WITH THE BOARD. THIS ACTION WILL LOCK THE TAPERED PINS INTO THE HOLES AND PREVENT PROPER COMPONENT INSERTION OR CLINCH.

Note that you may mislocate the board and push down to start the cycle. A misinsertion will result. For proper insertion, the pins must be centered in the holes.

You may operate the machine in either the AUTO or SINGLE mode. In the AUTO mode, the next part is selected and dropped to the monitor station behind the head while a part is being inserted. In the SINGLE mode, each part is selected only when the board is repositioned for each new insertion position. No parts are in que.

Most common usage of the AI will be in the AUTO mode because of the increased insertion rate. In this mode, the machine automatically selects, cuts, etc, the next component and forms it into staple shape after each insertion. The machine then stops in the WAIT state, with the component in the head ready to insert. When the "board present" sensor detects that a board is present, the head descends and the component is inserted. Do not trip this sensor with any object except a printed circuit board.

DANGER: DO NOT PUT FINGERS OR TOOLS INTO THE BASE AREA AROUND THE LOCATING PINS. DO NOT TOUCH THE BASE SENSOR PIN WITH ANY OBJECT EXCEPT A PRINTED CIRCUIT BOARD.

When the machine is in the WAIT state, the green RESET light is out and there are two parts in the machine; one in the head and one in the monitor station. If you wish to change part types on a pushbutton model, remember that the next two parts inserted will be from the previous station.

When the machine is in the WAIT state, you may open the head jaws to drop the part by depressing the RESET button. This action will also light the green light and return the machine to the reset or ZERO state. There will be a part in the monitor station, however, which will be the next one formed into staple shape when the base sensor is again triggered.

To insert an individual part, press RESET, and set the AUTO/SINGLE rocker switch to SINGLE. Select the desired part, either with the proper pushbutton on the AI-100 models, or by forward spacing or backspacing the tape on the AI-500 until the proper selection station is chosen. Trigger the machine by placing a board on the base sensor momentarily, but lift the board so the machine stops in the WAIT state. Examine the part in the head. If it is the one remaining from the previous operation, discard it by depressing the RESET button and retry. It it is the correct part, locate the board to insert it into the proper position.

IF HEAD DOES NOT PICK UP COMPONENT AND FORM A STAPLE; IMMEDIATELY RESET MACHINE AND TRY AGAIN. DO NOT CAUSE HEAD LOWER TO BOARD WITHOUT PART, SINCE LOCATING PINS CAN BE BROKEN AS A RESULT.

4.2 Theory of Operation:

4.2.1 Sensors: Several optical sensors are used on the AI, to determine that specific mechanical actions have been completed. The output signals from the sensors are used by the control logic to signal appropriate subsequent actions. The sensors and their functions are described below.

4.2.1.1 "Board Present" or BASE Sensor: This sensor is located in the base assembly and is used to detect that the printed circuit board to be loaded is in place. It is an optical sensor which is interrupted by a shutter that is depressed when the pin between the clinching feet is depressed. Very little downward motion of this pin is required to "trip" this sensor, causing a positive going output signal.

4.2.1.2 "Die Retract Forward" Sensor: This optical sensor is located on the rear of the die retract casting, and is interrupted by a shutter which is attached to the rear section of the die retract shaft. The shutter interrupts the sensor, causing a positive going output signal, when the die is within .050 of full forward.

4.2.1.3 "Test" or MONITOR Sensor: This optical sensor is used to tell if there is a part in the monitor station. The sensor is mounted above the monitor station, and is interrupted by a small shutter which is part of the "test bar" inside the monitor station. The sensor output is normally high. When a test pulse is fed to the TEST solenoid, the test bar is depressed. If there is a component in the station, then the test bar cannot depress very far and the sensor stays interrupted. If there is no part in the holding station, the test bar depresses all the way to close the cavity of the monitor station, and the shutter attached to the test bar clears the sensor causing a negative going output signal. Also, as the part is pushed from the monitor station, the shutter on the test bar clears the sensor, causing a negative going output signal.

4.2.1.4 "Head Up" Sensor: Two optical sensors are mounted on the HEAD PWB, CI-250. The top one is used to tell the logic that the head has been raised fully. A shutter is attached to the block at the top of the head shaft. This shutter interrupts the top sensor, causing a positive going output, when the head is raised to full up position. When the head is down to the die, the shutter should not be interrupting the sensor and the output voltage should be low.

4.2.1.5 "Head Down" Sensor: This is the lower of the two sensors on the HEAD PWB, CI-250. Its function is to tell when the head is almost all the way to the board so that the high pressure "clinch" can be begun. A second shutter is attached to the

head shaft block which interrupts this lower sensor, causing a positive going output, when the head is down to the board.

4.2.2 Machine Cycle: Machine operational motions are caused by air cylinders and electric solenoid actuators. Air for the air cylinders comes through electrically operated air valves which receive air from the input manifold.

Electronic drivers for each air valve and electric solenoid are located on the POWER DRIVER PWB, AI-320. Each driver causes a high power 24 volt signal to be applied to the appropriate valve or solenoid when the driver low power input is raised to the positive logic level (3^V to 5^V).

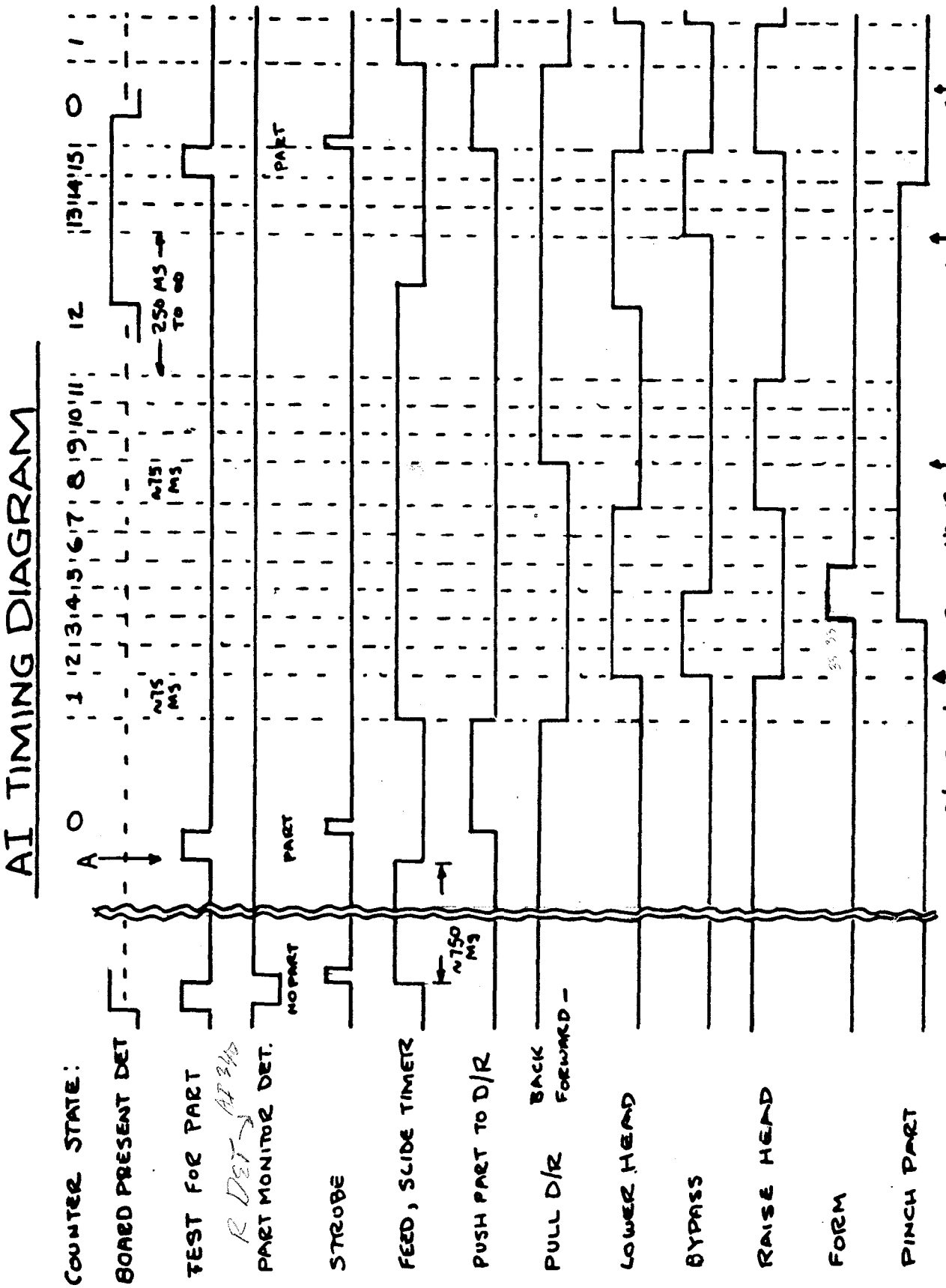
The input signals to the drivers are binary and come from the machine logic, located on two boards; the CONTROL PWB, AI-335 and the DECODER PWB, AI-330. These two boards accept the inputs from the various sensors, and by means of the output signals to the drivers cause the machine to behave in the desired manner.

The logical operation of the machine is partly "handshake" and partly "clocked." The clocked section of the logic is contained on the DECODER PWB. An integrated circuit clock, Z1, is stopped and started by the logic. This clock feeds pulses to a 16 state counter, which is decoded by Z8 to yield a pulse on one of 16 lines. Each line is labeled with a number (inverted since the decoder output is active low) that represents the "state" of the counter. Each state lasts for 33 milliseconds, the clock period, when the clock is running. If the clock is stopped at a particular state, this state will exist until the clock is started again.

The output lines from the decoder are re-combined to create blocks of time for each of the actions that the machine must make. The timing diagram shown on the next page illustrates the actions, versus time, that occur during the first machine cycle and during the beginning of the next cycle. From then on, the operation is repetitive.

Note that the timing diagram is drawn with the assumption that there is no part in the monitor station at the start. If there was a part in the monitor station, the diagram should have been started at point A.

When the machine is at state ZERO, the "reset" state, the head is up, the die is retracted, and the green light is lit. The first action is to call for a "test" pulse from the TEST solenoid on the monitor station when the pin PWB senses that a board to be loaded has been placed on the base pin. If no part is detected in the monitor station a feed pulse is initiated, and a part is selected or cut. At the end of the slide time,


AI TIMING DIAGRAM
COUNTER STATE:
BOARD PRESENT DET
TEST FOR PART
PART MONITOR DET.
STROBE
FEED, SLIDE TIMER
PUSH PART TO D/R
PULL D/R
LOWER HEAD
BYPASS
RAISE HEAD
FORM
PINCH PART
A
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 0
~15 MS
~15 MS
250 MS TO ∞
PART
NO PART
~750 MS
BACK
FORWARD
SENSE D/R FORWD
SENSE HD UP
SENSE HD DN
SENSE HOME

the TEST solenoid is activated again. This time there should be a part in the monitor station. If not, the green light is out and repeatedly depressing the board to be loaded on the base pin will cause additional TEST pulses, but no further action. Perhaps no part was dropped to the monitor station, or perhaps the part was dropped but hung up in the header. To select or cut another part, the operator must depress the RESET button to reset the machine.

Assuming that a part is in the monitor station at the time of the TEST pulse, the sensor output (high) causes the detector latch to be set. This latch tells the monitor station to push the part into the die via the PUSH output. The push output is delayed (via C18 and C23) and fed to the clock to start it. After enough delay to insure the part has dropped to the die, the clock causes the counter to go to state 1; then the clock automatically shuts off. State 1 causes the die to move forward, resets the detector latch (which returns the push signal to normal, closing the monitor station) and initiates another FEED pulse to obtain the next part.

When the die retract shaft gets fully forward under the head, the die retract sensor, an R-DET PWB, AI-305, located at the rear of the die retract shaft, is interrupted. Its output goes high, causing the clock to restart. The counter immediately goes to state 2, and the clock runs through to state 8 where again, the clock is stopped. The actions of the machine as the counter cycles through to state 8 are shown on the timing diagram; they are:

a. Head lowers under high pressure to partly form component.
b. Jaws close to grip component leads.
c. Formers impact component leads from the sides to bend them straight down.
d. Formers are removed.
e. Head is raised clear of the die.

When the head is up, according to the top sensor of the HEAD PWB, CI-250, then state 9 is begun as the clock is turned on again. The clock runs until state 12 is reached, during which time the die is given time to fully retract. The clock is turned off at state 12. During this time the head will lower if the board is in place on the base. The lowering of the head is under low air pressure generated by the low pressure regulator on the pneumatic shelf.

When the head reaches the bottom of its stroke, with leads started into the holes on the boards, the bottom sensor on the HEAD PWB is interrupted causing the clock to start once again. The counter goes to state 13 and continues to count through to 15, then to state zero, where it stops, shutting off the clock. States 13, 14 and 15 cause high pressure to be fed to the lower head air cylinder, which pushes the leads

through the holes in the board and clinches the protruding leads. The pinchers of the head are relaxed at state 15. At state zero, the head is told to return to the "up" position.

When the head is fully up, it is sensed by the HEAD PWB.

The next part is pushed into the die either by state 15 (if the slide timer has timed out) or by the end of the slide timer pulse if in state zero. This action causes the next cycle to begin and proceed to state 12, with a part in the head ready to descend.

If the board has not been lifted off the base since the prior insertion, the machine will wait until the board is lifted and placed again at the next part location. The re-location latch is used for this purpose.

4.3 Component and Board Considerations:

4.3.1 Components: Most axial lead components which fit within the outline configuration and meet the specifications given in Section 2 can be used in the AI series inserters. A few problems to be aware of are:

a. Flash on leads, particularly coated components where the coating continues well onto the leads.
b. Badly centered components between tapes. The cutter station can correct for small variations up to $\pm$1/32".
c. Bent or deformed leads on the tape.

4.3.2 Boards: Hole size, hole spacing accuracy, and thickness specifications are given in Section 2.0. Other potential problems are:

a. Plugged holes; solder, flux or other material.
b. Obstructions on either top or bottom of the board which prevent the locating pins from entering the holes on the underside, or depress the base trigger pin prematurely, or are closer than .100" of the hole center on the top side of the board, or are such as to prevent the board from being placed on the base under the guard.
c. Excessive solder build-up on the pads which would prevent proper clinching action.

5.0 PREVENTIVE MAINTENANCE

Any machine used in an industrial environment will collect dirt. In most places on the machine dirt will not create a problem. There are a few exceptions; some parts require cleaning and others lubrication to remove the dirt.

5.1 Cleaning: Each of the optical sensors should be cleaned once every two months or more often depending on the environment. To clean the sensors, use isopropyl alcohol, freon, or other electronics cleaning solvent. The slide tracks of the headers should be cleaned once a month with alcohol or freon. The plastic cover must be removed to gain access to the track.

Do not clean the plastic guard or with any solvent that attacks plastic, such as acetone, or that gets very cold during evaporation. Use a mild cleaner with a non-abrasive cloth.

Clean up the base assembly area weekly. The base collects debris from boards and parts at a rapid rate. This debris should be removed with a brush or air jet.

5.2 Lubrication: Once every 40 hours of operations, apply WD-40 to the following:

a. Die retract shaft, both ends, where the shaft enters the bronze bushings.
b. Head jaw pivot pins (2).
c. Head bar which moves the jaws.
d. Base clinch arms pivot pins. Wipe off excess.
e. Base trigger shaft

Lubricate cutter wheels, shafts, drive mechanism, etc. as needed to prevent rust and corrosion. Do not lubricate the head shaft bearings, monitor station, or tape reader (except as specified in the manufacturer's manual).

6.0 ADJUSTMENTS

6.1 Pneumatic: There are three pneumatic adjustments on the AI series inserters; one each for the cutter pressure, the mechanism operating pressure and the low pressure used to lower the head gently to the board. The cutter pressure should be set at 60 to 90 PSI, and the mechanism operating pressure should be set at 60 PSI. These regulators are located at the rear of the machine.

The low pressure regulator is located under the cad plated sheet metal cover over the pneumatic shelf. This regulator is set somewhere between 10 PSI and 20 PSI to produce gentle descent of the head to the board. Increasing this pressure reduces the cycle time of the machine but increases the danger of a pinch if the operator's finger is placed between head and base.

6.2 Electrical and Sensor: There is only one potentiometer in the machine; on the power supply. This adjustment is set such that the power supply output voltage is 24 VDC ±.5 volt. The setting is made at the factory and seldom, if ever, requires adjustment.

Sensor adjustments are mechanical adjustments, and are described below. Once set, these adjustments normally do not require readjustment unless other mechanical adjustments or sub-assembly replacements are made. When making sensor adjustments, remove air from the machine, but have electric power on.

6.2.1 "Board Present" Sensor: This sensor utilizes the PIN PWB, AI-315, and is located on the Base Assembly, AI-105 (see drawings in the back of this manual). Mounting screws for the AI-315 are accessible by removing the white cover over the base. The AI-315 is adjusted in the vertical direction so that depression of the sensor pin (AI-260) by an amount 0.010 to .020 causes the machine to actuate, and in the horizontal direction so that the shutter (AI-262) does not rub on the sensor.

6.2.2 "Die Retract" Sensor: This sensor utilizes an AI-305 PWB located at the rear of the AI-114 casting on the die retract and former assembly, AI-103 (see this drawing in the back of this manual).

The sensor is interrupted by a shutter, AI-210, which is connected to the rear of the die retract shaft, AI-201. The shutter is formed so that it interrupts the light beam in the sensor when the shaft is within .030 to .050 of being all the way forward. The output voltage from this sensor can be observed on pin 3 (the middle terminal) of the 5 pin connector on the sensor itself, or on terminal 2 of the DECODER PWB, AI-330. Make all measurements with respect to the negative distribution terminal strip (black wires) in the left white electronics box, or to the negative end of the power supply. When the shaft is back (sensor not interrupted by the shutter) the output voltage should be near zero volts; i.e., no greater than 0.1 volt. When interrupted by the shutter with shaft forward, the sensor output voltage should be 5 volts DC. The threshold is about 2 volts, and should correspond to the point

where the shaft is within .030 to .050 from all the way forward.

6.2.3 "Monitor" or "R-Detector" Sensor: This sensor AI-340 PWB, is located on the Monitor Station Assembly, AI-104 (see this drawing in the back of this manual). The mounting bracket may be bent very slightly to accommodate small changes in vertical adjustment. Horizontal adjustment is achieved by loosening the bracket mounting screws. The shutter, AI-231, should be centered in the side to side direction in the detector when the monitor station is closed. Vertically, the shutter should interrupt the light beam of the detector (5^V output on pin 4 of the 6 pin connector on AI-340 PWB) when the TEST solenoid is unactivated. The shutter may be depressed by hand by pushing down on the end of the plunger of the monitor solenoid (TP 2.5.9), and the sensor output should swing to near zero volts when the plunger is within .025 to .035 from bottoming out. Make sure there is no component in the monitor station when this test is made. When a .060 diameter component is in the monitor station, the sensor output should stay at 5^V when the plunger is depressed to the component.

6.2.4 "Head UP" Sensor: This sensor is the top detector on the HEAD PWB, CI-250, located on the plate assembly, AI-106 (see drawing in the back of this manual). The shutter, AI-248, is attached to the main shaft and is adjustable vertically and front-to-back by means of its mounting screw. Penetration of this shutter into the detector should be the maximum possible without the shutter rubbing on other components on the board when the head is lowered. Penetration is adjusted by moving the board CI-250. It is held to the casting by two phillips head screws.

The shutter should be adjusted so that it does not rub on, or touch, the detector, and so that the detector output transition from 0^V to 5^V (measured on pin ~~4~~, ~~fourth~~ down from the top on the 5 pin connector on the CI-250) occurs about half way in the travel of the head from full up to down against the die, which must be under the head for this adjustment.

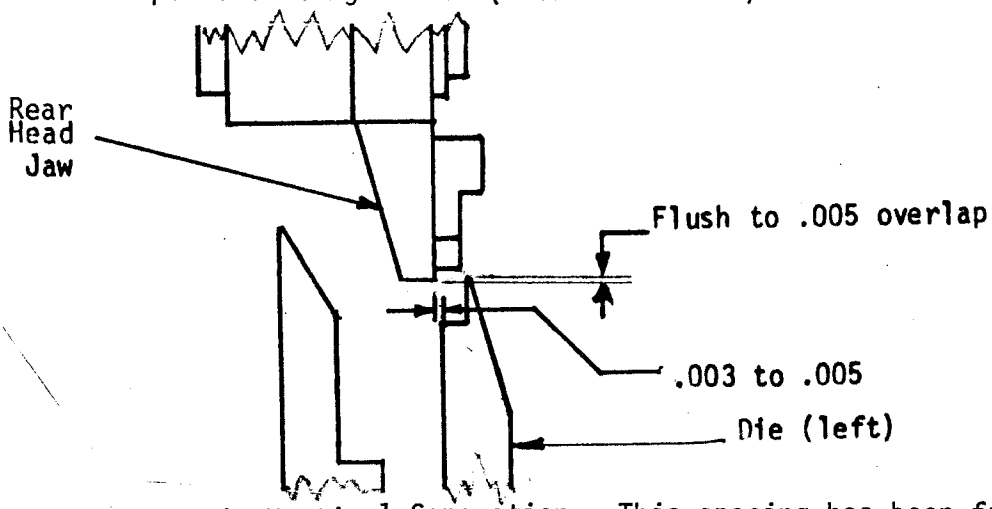
6.2.5 "Head Down" Sensor: This detector is the bottom one on the CI-250 HEAD PWB on AI-106. It is interrupted by the AI-247 shutter. Penetration adjustment of the shutter into the detector are described above in 6.2.4. Vertical adjustment is made such that the output signal (lowest terminal of the ~~5~~ pin connector) goes from 0^V to 5^V at the point where the bottom of the jaws of the head are 0.125 from the top of the tapered locating pins on the base clinching feet.

6.3 Mechanical Adjustments & Alignments

6.3.1 Fixed Jaw Height: The fixed (rear) jaws are attached to the head by means of allen socket head screws. They should be positioned in the vertical direction so that they are even across, left jaw to right jaw. Loosen the socket screws and compare the jaw

surfaces to die surfaces by bringing the head down by hand (no power). Retighten screws when jaws are even.

6.3.2 Head - Left Jaw to Die Spacing: This spacing should be as shown in the figure, below, and should come from the factory with this spacing. This adjustment does not change with time and once verified should never need re-adjustment. It is established by the position of the AI-114 casting (shown on AI-103) as bolted to the main plate casting AI-111 (shown on AI-106).



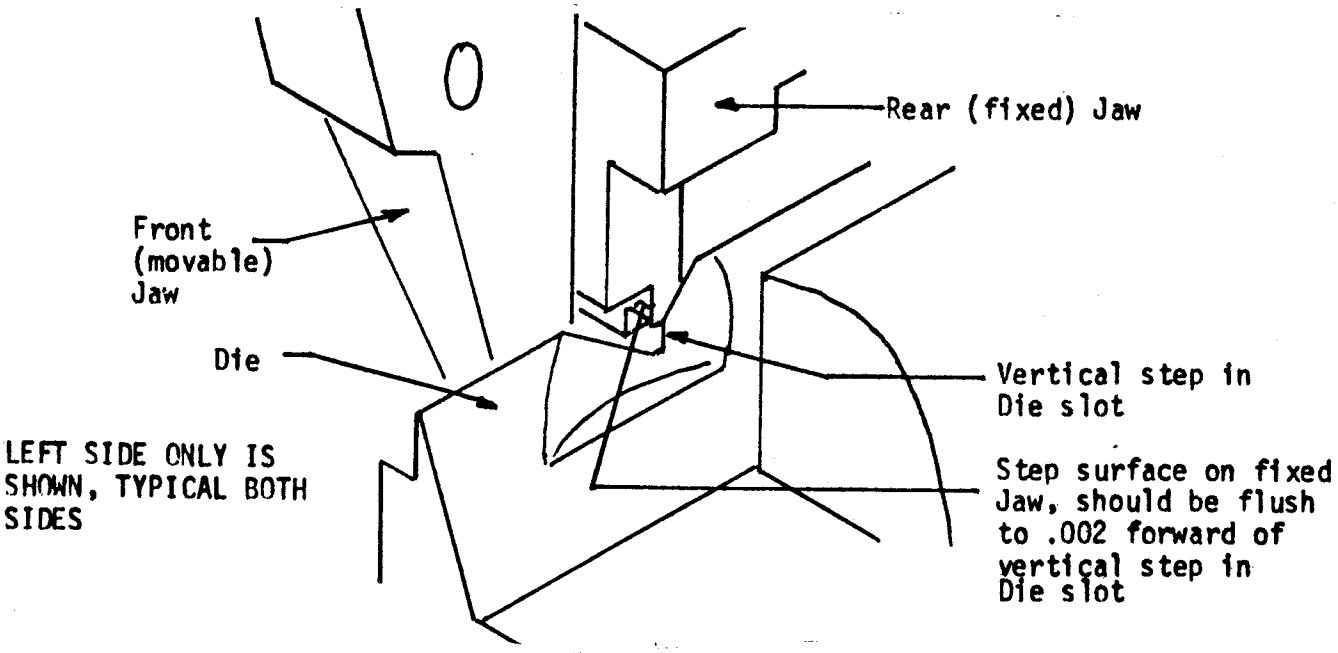
6.3.3 Head to Die Vertical Separation: This spacing has been fixed at the factory and normally does not need adjustment. Correct spacing is as shown above, with the head full up. If adjustment is needed, loosen the two allen head cap screws that hold the stop (AI-421) to the casting (AI-111) on the plate assembly (see AI-106), and raise or lower the stop. Retighten these allen head screws when the stop in in the correct position.

WARNING: MAKE SURE THAT THE STOP, AI-421, DOES NOT RUB ON THE MAIN HEAD SHAFT OVER ITS FULL VERTICAL TRAVEL AFTER PERFORMING THIS ADJUSTMENT.

6.3.4 Head Rotation: This adjustment may be needed if a die set is exchanged or the head is loosened on the shaft (see 6.3.2). The small step on the bottoms of the fixed jaws are aligned with respect to the vertical edge of the rear of the slots on the die, so that the two sides (left and right) are the same. See the figure on next page.

Loosen the two allen head cap screws, item 24 on the head assembly (AI-102), which clamps the head to the shaft. Rotate the head to the proper position, and while pushing the head up as far as it will go, retighten the screws.

WARNING: DO NOT TIGHTEN CLAMP SCREWS SO MUCH THAT CENTER SHAFT TO MOVABLE JAW LINK, AI-196, IS BOUND. MAKE SURE THAT LINK, AI-196, IS FREE TO MOVE, SO THAT JAWS CLOSE FREELY.

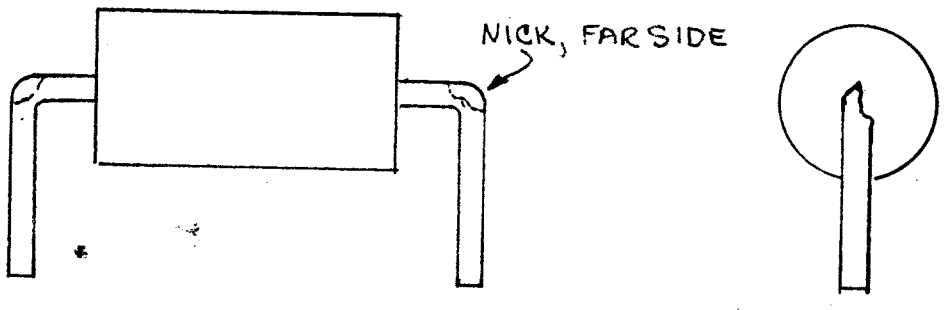


6.3.5 Die Retract Assembly Position: This adjustment may be necessary if a die is exchanged or the nylon stops on the die retract shaft block wear in, or move. Proper adjustment is achieved when the vertical surface of the small step on the bottom of the fixed jaw is flush to .002 in front of the vertical part of the slot (rear) or the die. See the figure above. This position is adjusted by loosening the two hold down allen head screws (items 45 on AI-103), moving the die retract assembly forward or backward to obtain proper spacing, and retightening screws. See instructions with AI-077 Tool

Because of a visual parallax problem, it is very difficult to make this adjustment within .002. Therefore, it is recommended that the correctness of the setting be verified by forming a component into staple with a normal machine cycle. If the adjustment is proper, the part will be picked up by the head and properly formed, without nicking the side of the lead at the bend point. If the setting is wrong, then the following conditions occur:

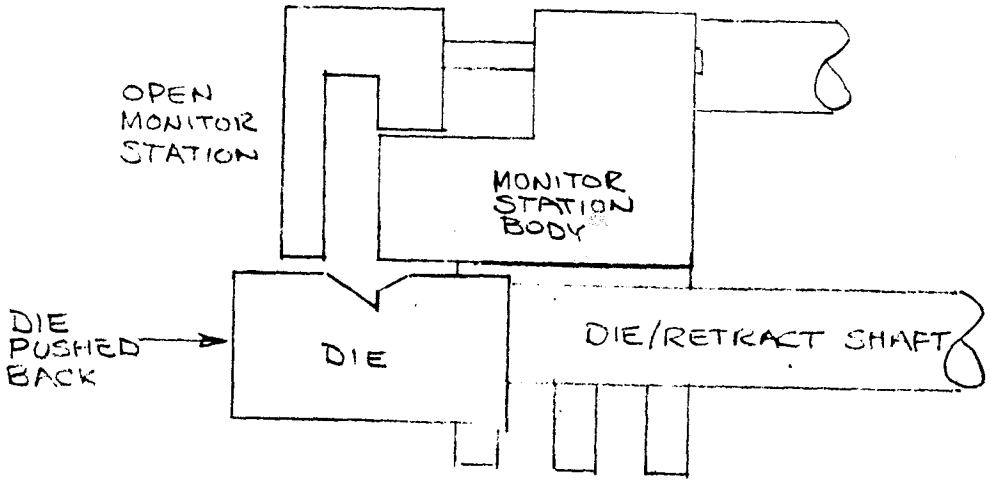
Die Retract Assembly too far forward: The component will not be picked up reliably by the head.

Die Retract Assebmly too far back: The component will be formed into staple shape, but the lead wire will be grouged or nicked by the head jaw at the bend point on the side away from the operator, as shown below:



6.3.6 Monitor Station Spacing to Die Retract: The monitor station should be spaced .003 to .010 above the extended die retract shaft. Adjustments may be made after loosening the two allen head screws, items 37 on AI-103.

The monitor station may be tilted incorrectly causing the gap in the "opened" monitor station to be misaligned with slot in the die (shaft fully retracted). For best results, the alignment should be approximately as shown below.



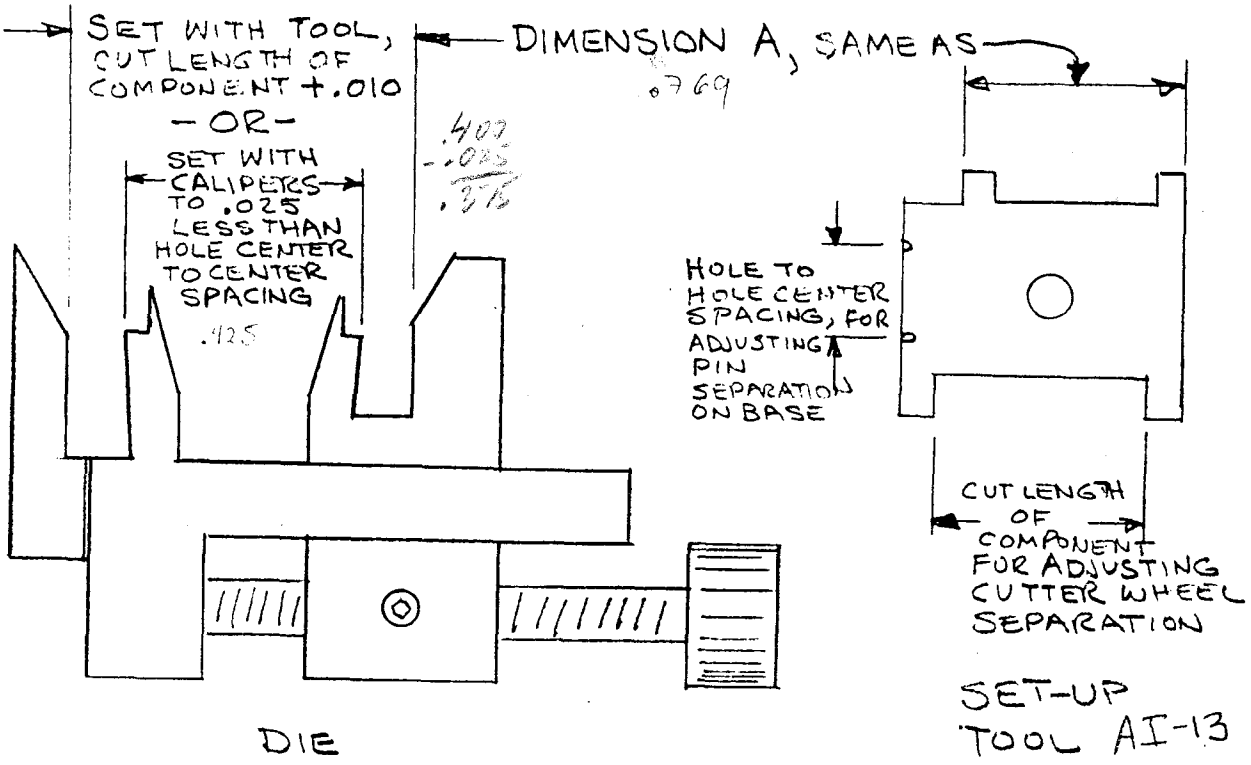
6.3.7 Clinch: The amount of clinch can be adjusted by the screw AI-219, on the top of the head shaft. See plate assembly drawing CI-106. Less clinch is obtained by rotating the screw to lower it, more clinch by raising the screw. When making this adjustment, turn the screw no more than 1/2 turn at a time since very small adjustments are needed to greatly affect the amount of clinch. The nut should be retightened against the plate to prevent the clinch adjustment from changing.

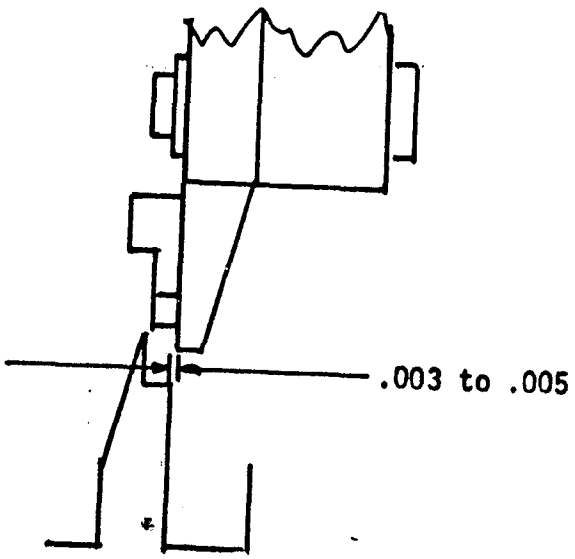
WARNING: WHEN RETIGHTENING LOCK NUT, DO NOT PUT A TWISTING FORCE ON LINK FROM AIR CYLINDER TO SHAFT SINCE THIS WILL CAUSE MACHINE MISALIGNMENT AND CAN BEND THE SHAFTS.

6.3.8 Changing Hole-to-Hole Center Spacing Adjustments: When components are to run on a different center spacing hole-to-hole, then it is necessary to make four adjustments on the AI machine. The order of adjustments are: The die spacing adjustment, the head spacing adjustment, the base locating pin separating adjustment, and the cutter adjustment. The cutter adjustment may not be required if the AI machine uses cartridges exclusively or if the different cutters are permanently set up for different cut lengths.

6.3.8.1 Die Spacing Adjustment: Loosen the set screw (item 20 of AI-103) which clamps the thumbscrew (AI-207-208). Turn the thumbscrew to separate the two halves of the jaws by the proper amount and retighten the set screw. Proper separation can be set either with the tool (AI-13) or with calipers as shown on the next page.

6.3.8.2 Head Spacing Adjustment: After the Die is properly spaced, then the head spacing must be adjusted to match. Loosen the allen screw (item 20 on AI-102) to allow rotation of the thumbscrew AI-237. The right jaw set is moved with the thumbscrew to provide the following spacing: (See bottom of page):



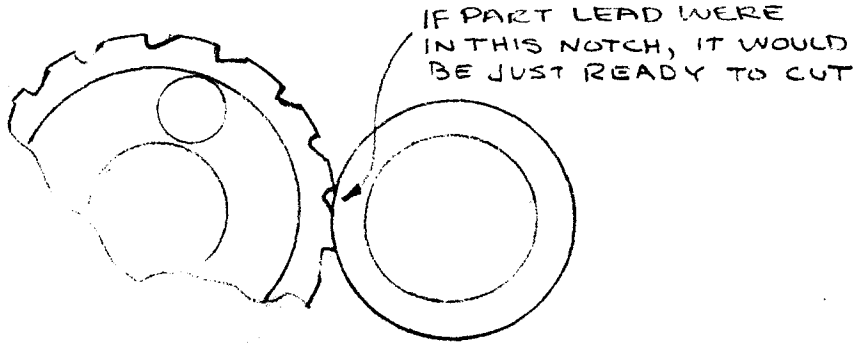


6.3.8.3 Base Location Pin Separation: When the head jaw separation is adjusted to accommodate a new hole center to center spacing, it is necessary to readjust the pin separation also. Use the tool (AI-13) with marks along one edge to set up the proper spacing. The spacing is adjusted by loosening the two allen clamp screws (items 21 of AI-105), adjusting separation with the thumbscrew AI-237, and reclamping the moveable assembly by the allen screws.

6.3.8.4 Cutter Separation: The cutter separation is adjusted to provide component lead lengths proper for the desired hole to hole center distance. A gage is provided (AI-13) which can be used to set the cutter separation. Reference is made to AI-107 (see drawing in back of manual). If the gage is unavailable, the cutter separation can be set using calipers. The measurement between cutter wheels should be .010 less than the dimension "A" of the die set (see paragraph 6.3.8.1).

The cutter wheels AI-142 and AI-144 are attached to hubs AI-138 and AI-141. These hubs turn on the shaft AI-145 which has left hand threads on one side and right hand threads on the other. The hubs can be clamped to the shaft by means of an AI-150 clamp. The item 33 allen head screw causes the split clamp to grip the shaft. The inner cutters, AI-146, are spring loaded against the cutter wheels and will automatically follow any adjustment made to the cutter wheels.

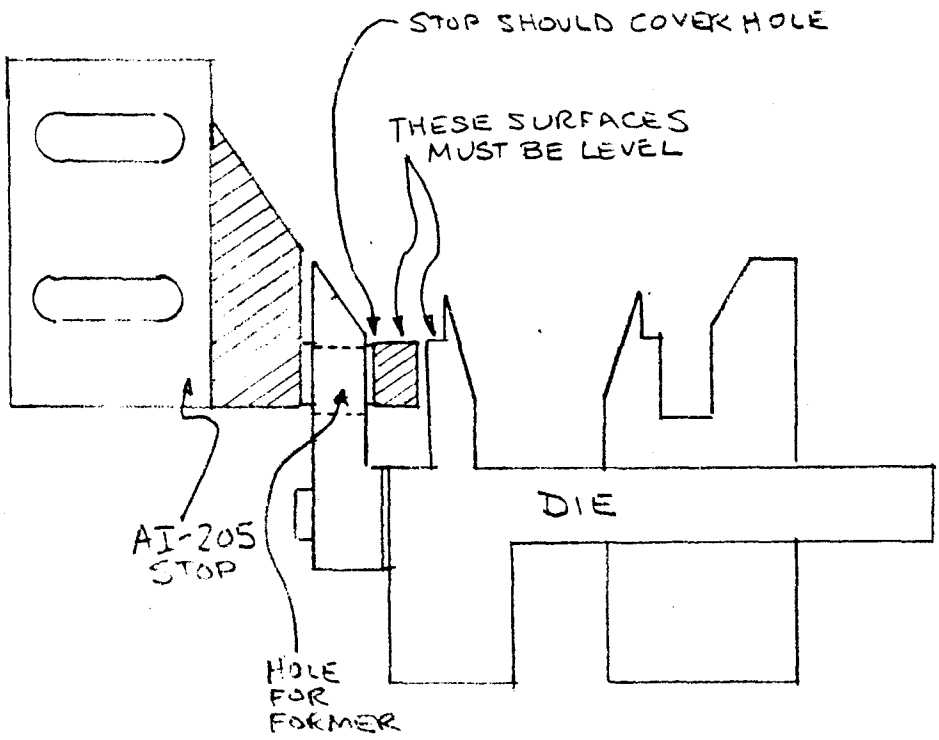
To adjust the cutter separation loosen the clamp screw (item 33) and leave the allen wrench in this screw head. Put a wrench on the castle nut, item 41, and turn the clamp with respect to the shaft until the desired separation is achieved. Now, by hand, move the escapement (AI-155) forward until it engages the step wheel AI-143, and keep moving it forward to the stop. While holding the escapement in the full forward position, make a final adjustment on the cutter wheels to leave a slot almost engaged, as shown.



Now release the escapement and tighten the clamp screw.

6.3.9 Stop Adjustment: The Stop, AI-205 (see AI-103 assembly drawing), should be adjusted so that it does not interfere with the die when the die retract shaft is pushed fully to the rear of the machine. This stop is held by two allen head cap screws, which can be loosened to allow adjustment.

Also, it is important that the right hand bar of the AI-205 stop be properly placed vertically in the die when the die is fully retracted. See the sketch below.



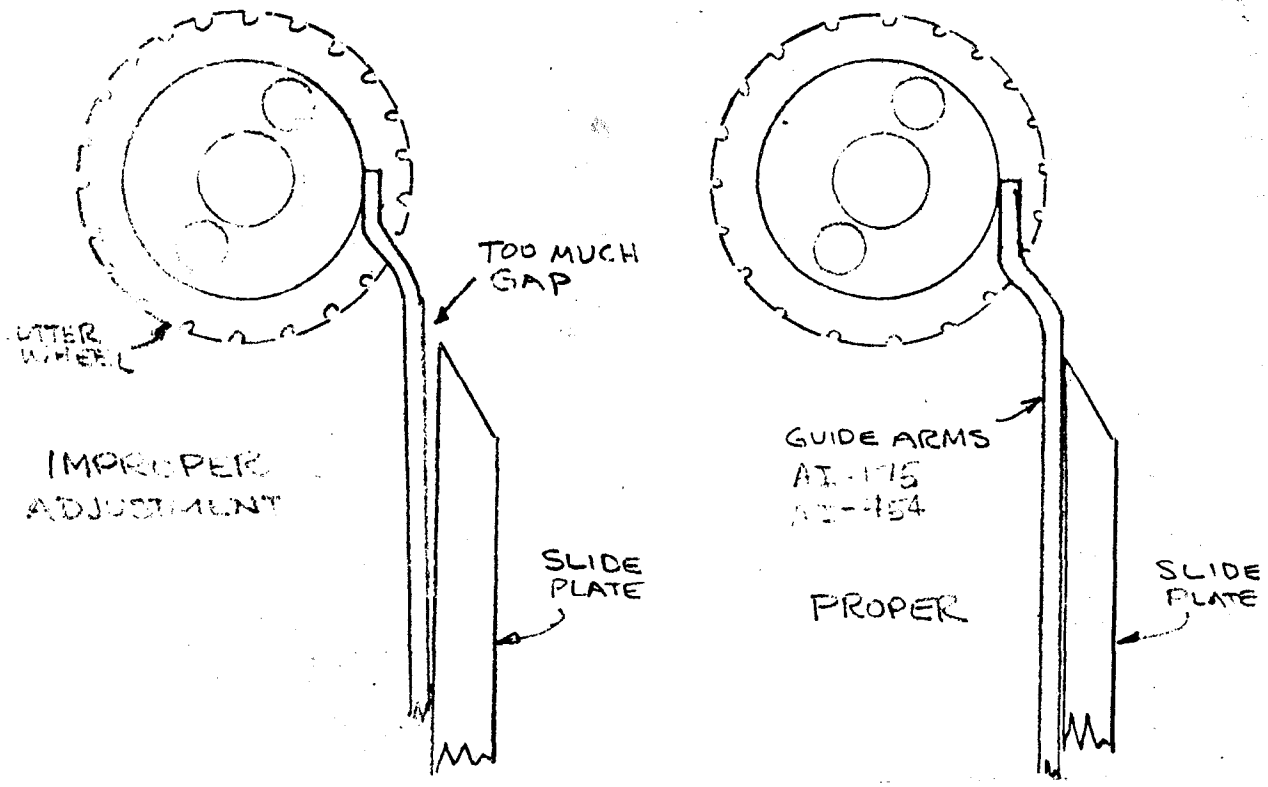
6.3.10 Drive Wheel Adjustment: When components are taped with a spacing between tapes that requires adjustment of the drive wheel (AI-264) position, loosen the set screws, item 67, move the wheels to about 1/16 inch inside the tape, and retighten the set screws. (See section 3.7).

6.3.11 Component Centering Guide Adjustment: When components of different body lengths are to be fed to a cutter, it is necessary to re-adjust the AI-136 guides so that the component bodies are centered in the cutter. The guides are held by four allen head screws, item 51 of the AI-107, which clamp the guides to the plate AI-137. Loosen these screws to adjust the guides, and retighten when the guides are adjusted to slightly wider than the maximum body length and centered between the cutter wheels.

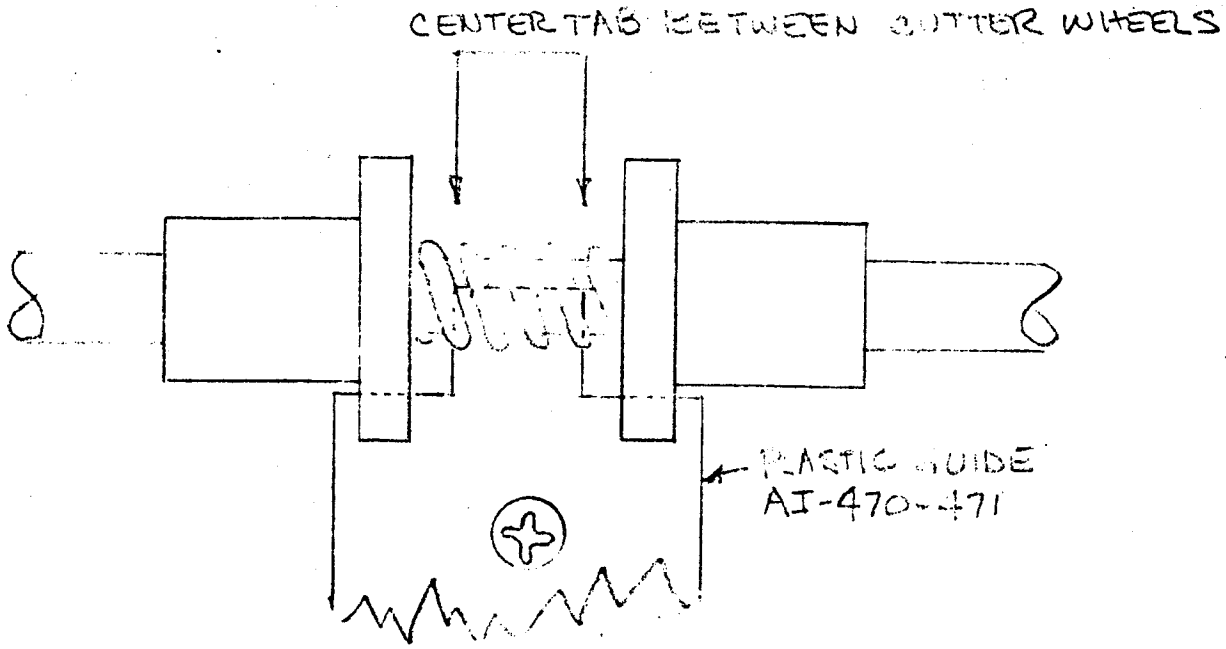
6.3.12 Top Guide Adjustments: See section 3.7 for proper top guide adjustment procedure.

6.3.13 Guiding Adjustment - Cutter of Header: For the cut parts to feed reliably into the header, it is necessary that all of the following conditions be proper.

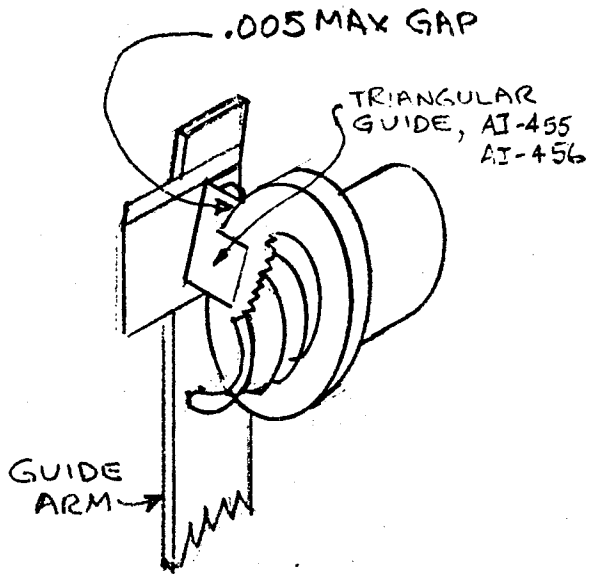
6.3.13.1 Cutter Position: The cutter assembly, AI-107, is held to the mounting plate with four #10-32 allen head cap screws, through slotted holes. Loosening these screws allows cutter position adjustment. Adjust front to rear so that the guides (AI-175 and AI-454) touch the cutter hub and there is no gap between these guide arms and the aluminum slide (AI-164, AI-165 or AI-166). This condition is shown in the sketch below. Do not move the cutter so far forward that the AI-175 and AI-454 guide arms exert a lot of force between the slide and cutter hubs or the cutter wheels can become hard to turn.

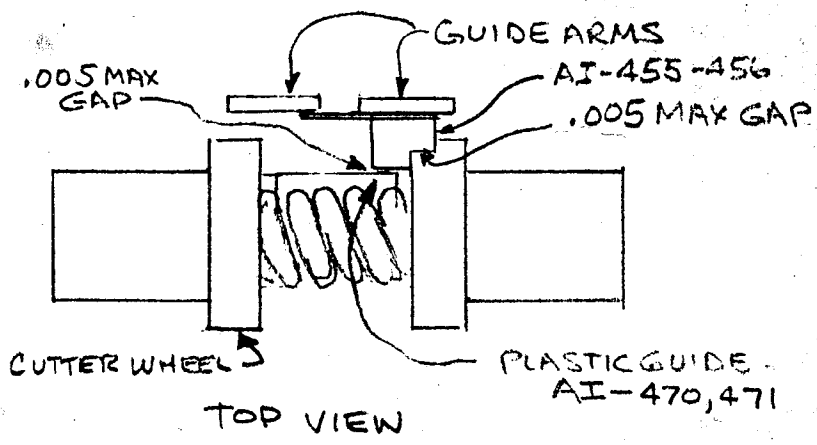


Move the cutter position right to left to center upper tab on the plastic guide (AI-470 or AI-471) between the inner cutter wheels, as shown on following page.



6.3.13.2 Triangular Guide (AI-455 or 456): This guide is a small piece of sheet metal attached to the arm guides, AI-175. Its purpose is to cause the cut component to tip the proper direction into the header opening. This effect is especially important for diodes since polarity must be consistent. The triangular guide must a) be spaced close to or touching the cylindrical surface of the cutter wheel and b) be spaced close to the plastic guide (AI-470 or 471) without touching. Gaps greater than 0.005 in any of these two openings will cause parts to catch. These two spacings are shown below:

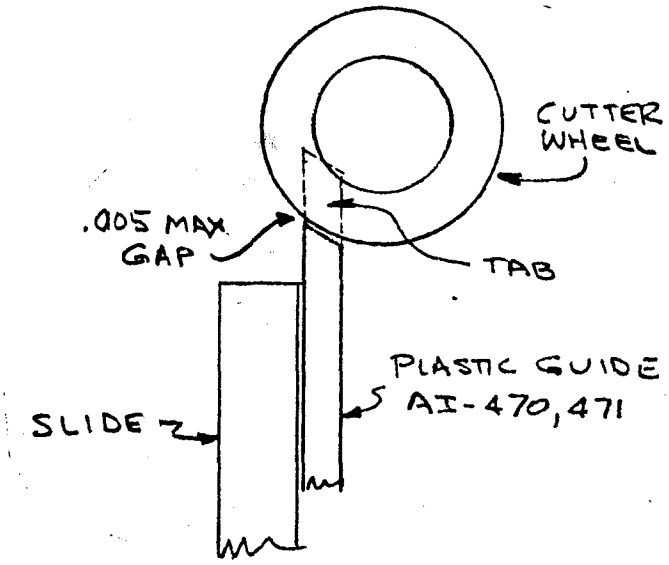




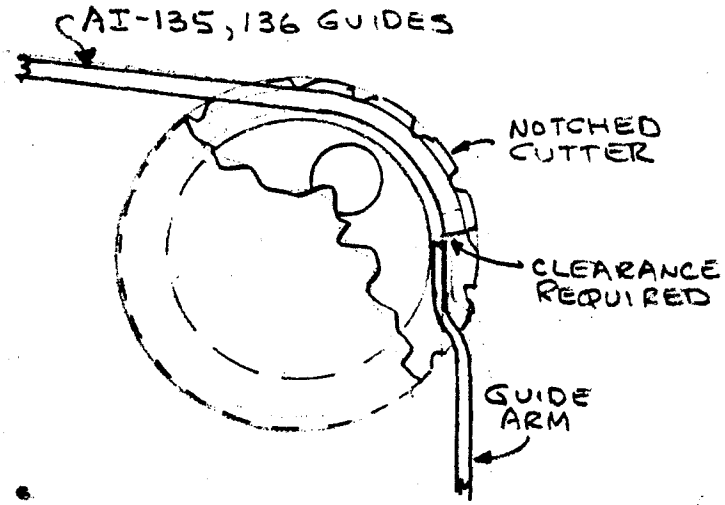
There are no adjustments to affect these spacings since they are factory set. If they are too large, it is usually due to bent guide arms. Reshape after removing entire slide assembly from machine.

6.3.13.3 Plastic Guide AI-470 or 471: These plastic guides fill in between the cutter wheels. There are three standard sizes (tab widths) depending on the length of the part. If, with group 2 tooling, the parts are to be inserted on hole to hole center distances of 0.3 to .399, then use AI-470 (right hand) or AI-471 (left hand) guides G-1. For .4 to .499 center distance between holes, use AI-470 or 471, G-2. For .5 or larger center distance between holes, use AI-470 or 471, G-3.

These guides should be located up against the side edge of the cutout of AI-179 or 180 plastic cover, and up against the cutter wheels, as shown:



6.3.13.4 Component Body Guides: These guides, AI-135 and AI-136 guide the component bodies into the cutter center. Side to side adjustment is described in paragraph 6.3.11. It is important that the top surface be opposite the bottom of the notches in the cutter wheels, as shown.



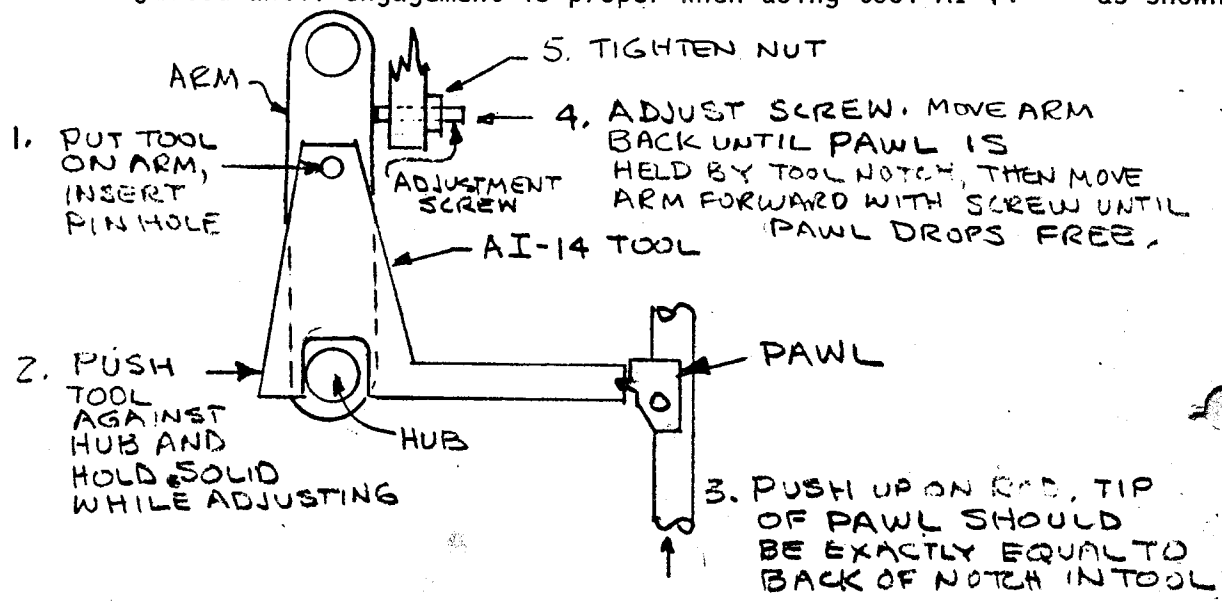
6.3.13.4 Wire Guide AI-424: These are used to strip off the tape and wire ends after the parts are cut off. These may require a slight bend downward to prevent binding the tape strip.

6.3.14 Cutter Escapement/Step Wheel Adjustment: Refer to AI-107 assembly drawing. Two screws, part 61, hold the AI-160 mount to the side plate of the cutter assembly. These screws may be loosened to allow adjustment of the escapement in the Step Wheel (AI-451). With the air cylinder fully extended, i.e, the escapement is against the stop pin (item 45), then the escapement should not bottom out in the trough between teeth. The step wheel should be free to turn a small amount. Retighten the screws when this adjustment is achieved, and re-check.

6.3.15 Base to Head Alignment: Since the head is not movable laterally, the base assembly AI-105, is moved to align the tapered locating pins to the head. To accomplish this alignment:

a. Power and air connected, power on.
b. Initiate a cycle by depressing base sensor momentarily with a board. A part should be fed and formed in the head, and the machine stops in the WAIT state (state 12).
c. Depress the rocker switch from RUN to ALIGN.
d. Move the head down by hand to line up the component lead and base pin (left only).
e. Move base casting left or right, to obtain perfect alignment, by loosening the three allen head clamping screws holding the base casting (AI-115) to the black plate. Retighten clamp screws.
f. Move the block plate front or back to obtain perfect alignment by loosening the four allen head shoulder screws which hold the black plate to the blue bottom casting. Retighten shoulder screws.
g. Move the head back up by hand, rocker switch to RUN, and depress RESET to discard part. Repeat alignment check with several more components to verify alignment.

6.3.16 Cartridge Arm Adjustment: There is a stop screw which establishes the pawl engagement with the cartridge gear slot. This screw is adjusted until engagement is proper when using tool AI-14 as shown:



6.3.16 (Continued):
If the tool is unavailable, adjust screw until pawl reliably indexes the cartridge, when activating the solenoid plunger by hand.

6.3.17 Formers: The formers may be adjusted vertically or horizontally by means of the appropriate allen head screws. The formers should adjust so that they freely enter the appropriate size hole in the die.

7.0 DISASSEMBLY

7.1 Die Retract Assembly: This assembly may be removed by removing the two allen head screws, items 45, AI-103, and the air line.

7.2 Die Retract Shaft: The shaft may be removed, without removing the entire assembly, by the following procedure; remove the two allen head screws, item 38 on AI-103; remove the block AI-206 by removing its screw, item 22. The shaft is now free to be removed toward the front of the machine.

7.3 Monitor Station: The monitor station is removed by removing the stop (AI-205), then the two monitor station mounting screws, items 37 on AI-103, and loosening and removing the manifold which feeds the parts to the monitor station. Remove the 6 pin connector.

7.4 Head Jaws: The movable jaws can be removed by removing the snap ring, bearing pin (AI-193), and jaw in that order.

8.0 TROUBLE SHOOTING

8.1 Upon power-on, there is no red power indicator light:

a. No power from power line.
b. Blown fuse at rear of machine.

8.2 Upon power-on, the green RESET light does not come on:

a. Light bulb in RESET swtich is burned out.
b. Defective control PWB.

8.3 Upon power-on, no die retract action, no green RESET light, and no optical cross-hair (i.e., no 24^V power):

a. Pigtail fuse (+) terminal strip is blown.
b. Defective power supply.
c. 24^V to ground short.

8.4 No action when base sensor pin is depressed:

a. Panel switch in TEST position instead of RUN.
b. Front cover up.

8.5 When base pin is depressed, the monitor station tests twice and the green RESET light goes out, but no part is fed from monitor station:

a. No cutter station or cartridge station selected.

8.6 Monitor "TEST" occurs, no part pushed out, but part is there because next "TEST" produces part:

a. Part was temporarily hung up on mismatch between header interfaces, or between header and monitor station. Re-align headers better.
b. Slide is dusty or dirty. Remove plactic cover and clean slide track with isoprophyl alcohol.

8.7 Monitor "tests", pushes out, without part in monitor station:

a. Sensor misadjusted on monitor station, move sensor up.
b. "Test" mechanism binding.
c. Monitor sensor defective.

8.8 Monitor appears to open, part inside, but doesn't drop to Die:

a. Monitor doesn't open fully due to bind in mechanism. Clean and lubricate shafts.
b. Monitor doesn't open fully due to lead of component wedging itself between moving surfaces. Monitor station surfaces may be worn: replace station.

8.9 Monitor opens, releases part, but die won't come forward:

a. Upper sensor/shutter alignment Head PWB incorrect; sensor light beam not interrupted when head is up. See section 6.3.4.
b. Light entering Head PWB sensor. Put cover on.
c. Defective Head PWB.
d. Parts are jammed between monitor station and die.

8.10 Part drops from monitor station but does not center on die properly; is not formed by head:

a. Part too long, won't fit in die.
b. Part severely bent.
c. Part body too long (including flash) to fit between die guides.
d. AI-205 Stop not covering hole in Die. See section 6.3.9.

8.11 Part drops to die properly, but is disturbed when die moves forward, then not picked up by head:

a. AI-205 stop is adjusted too high, rubbing on bottom side of lead of component. See section 6.3.9.
b. AI-205 stop has a burr on it which catches component lead as die moves forward. Remove burr.
c. Die is broken. Replace Die Set.

8.12 Part formed and clamped, head moves up, but die does not retract:

a. "Head Up" sensor not adjusted properly; never gets interrupted by shutter.
b. Top cover is off causing external light to enter "Head Up" sensor.

8.13 Part clamped in head, but leg(s) bent, lead wire(s) marked on far side at the head:

a. Die retract assembly too far back; move forward.
b. Improper die spacing adjustment. See section 6.3.8.1.
c. Head jaws not aligned vertically. See section 6.3.1.

8.14 Part clamped in head, but leg(s) bent, lead wire not marked except by formers:

a. Improper former adjustment.

8.15 Part clamped in head, bent down at 45°, but not formed:

a. Former position misadjusted; not hitting hole in guide.
b. Pneumatic or electronic malfunction; low air pressure at input.

8.16 Component lead severely bent or U shape on right side:

a. Part cut too long for die.
b. Part leads not cut symmetrically with respect to the body.

8.17 Part clamped in head, bent down at 45°, but not formed:

a. Former position misadjusted; not hitting hole in guide.
b. Punched air line to former.
c. Bad air valve for former air pressure.
d. Low air pressure to mechanism; must be at least 60 PSI.

8.18 Component lead severely bent or U shape on one side:

a. Part cut too long for die.
b. Part leads not cut symmetrically with respect to the body.
c. AI-205 stop too low (U on left side).

8.19 Part leg occasionally swept 45° toward operator:

a. Sticky jaw, not closing before former hits.
b. Movable jaw worn, pivot pin loose, so that movable jaw does not engage accurately with fixed jaw. Replace pin or movable jaw.

8.20 Part legs consistently not parallel when observed from side: i.e., one leg slightly forward, other leg slightly back.

a. Head rotation not correct: See section 6.3.3.
b. Main air cylinder not tracking parallel to main head shaft. Contact factory.

8.21 Component crumples upon insertion:

a. Board not located properly by operator.
b. Locating pin broken, or sticking down, making board location difficult.
c. Hole spacing improper.
d. Locating pin separation improper.
e. Head to base alignment improper.
f. Part deformed when in head.
g. Holes in board too small. Should be .035 of .010 greater than lead dia., whichever is larger.

8.22 Component doesn't fully insert:

a. Holes too small.
b. Hole spacing not proper.
c. Head to base alignment improper.
d. Operator pressing down on board too hard.

8.23 Inadequate clinch:

a. Head to base alignment improper.
b. Operator pressing down on board too hard.
c. Clinch misadjusted; raise screw adjustment.
d. Holes too small or too large.
e. High pressure air does not turn on at bottom of head stroke; "head down" sensor on HEAD PWB misadjusted; shutter not interrupting sensor soon enough.

8.24 Too much clinch; lead bent over flat or sheared off:

a. Clinch misadjusted; lower screw adjustment.

8.25 Cutter doesn't feed properly:

a. Improper orientation of slot in cutter wheels at end of escapement travel.
b. Tape spacing improper or bent components on tape.
c. Guide improperly adjusted. See Section 6.3.13.
d. Escapement misadjusted. See section 6.3.14.

9.0 REPLACEMENT PARTS PROGRAM

9.1 Spare Parts: Amistar maintains a stock of spare parts for its machines at the factory in Torrance, California. All parts shown on the mechanical assembly drawings, whether or not identified by an Amistar part number, are available; if not numbered, use the assembly number plus the circled part number, such as AI-102 part 25.

A spare parts list, showing the more common parts of the machine with prices current at the time of machine shipment, is appended to this manual.

9.2 Tools and Gages: Several tools and gages are available for use in adjusting the AI series inserters. These are listed on the spare parts list, appended to this manual, with prices current at the time of machine delivery.

9.3 Refurbish Program: Amistar will refurbish any part of the AI series machine, or the entire machine, if returned to the factory. The price for this service will be quoted upon request.

10.0 WARRANTY

Amistar guarantees to the original retail purchaser that we will repair, or at our option, replace at our factory any part of this product that we find to have been defective, under normal use in the U.S.A., within ninety days of the purchase date. Service and transportation charges, as well as damage resulting from causes beyond our control, are the purchaser's responsibility. This warranty contains Amistar's entire obligation and no other warranties, expressed or implied, including consequential damages, are given.

AI-100 AND AI-500 SPARE PARTS LIST

PART/ASSEMBLY NUMBER	DESCRIPTION	PRICE, each*
Electrical and Electronic Parts		
CI-250	Head PWB	$ 50.00
SC-260	X-Y Driver PWB	200.00
SC-270-A	ASCII Reader Interface PWB	178.00
SC-270-B	BCD Reader Interface PWB	178.00
AI-305	R-Det PWB	30.00
AI-315	Pin PWB	30.00
AI-320	Power Driver PWB	150.00
AI-325	Display PWB	95.00
AI-330	Decoder PWB	150.00
AI-335	Control PWB	150.00
CI-001-2	Power Supply, 5 amp, 24 volt	150.00
CI-002	Pushbutton Switch, RESET IND	8.50
CI-003	Lamp for RESET Switch	1.00
CI-004	Power Indicator	1.00
CI-038	Paper Tape Reader (EECO)	500.00
CI-035	220V to 115V Autotransformer	40.00
Pneumatic Assembly (AI-108)		
CI-005	Air valve, 3 way, small orifice	18.50
CI-006	Air valve, 3 way, large orifice	23.50
CI-008	Air valve, 2 way, large orifice	20.50
CI-239-2	Orifice (.024 dia.)	4.00
CI-239-3	Orifice (.032 dia.)	4.00
CI-009	90° Elbow, nylon	.60
CI-010	3 FT. length 1/4" nylon tubing (price/length)	.90
CI-013-1	High pressure regulator with gage	10.00
CI-013-2	Low pressure regulator with gage	10.00
AI-15	Oiler	15.25
Cutter Assembly (AI-107)		
041NR	Air Cylinder	8.85
AI-126	Pawl	24.00
AI-154	Escapement Body	12.50
AI-155	Escapement	15.90
AI-143	Step Wheel	27.60
AI-159	Top Guide	9.75
AI-264	Drive Wheel, right	30.00
AI-265	Drive Wheel, left	30.00
AI-144	Cutter Wheel, right	45.00
AI-142	Cutter Wheel, left	45.00
FS3KDD	Bearing	4.75
AI-146	Cutter	45.00
AI-145	Shaft	60.00
AI-147	Shaft	40.00

Plate Assembly (AI-106)

CI-154	Spring	5.50
CI-114	R-4 Ball bearings, set of 4	9.50 set
~~AI-293~~ DWG AI-106	Return spring	4.50
AI-216	Shaft	16.00
093D	Air Cylinder	12.00
AI-217	Shaft	49.00

Head Assembly (AI-102)

AI-184	Body, Head	335.00
AI-183	Block, Head	185.00
AI-186	Bar, Head	24.50
AI-237	Screw	20.50
AI-199-1	Cam, standard .35 to .5	48.50
AI-199-2	Cam, standard .5 to .75	48.50
AI-188	Clamp, head, LH	38.00
AI-189	Clamp, head, RH	38.00
AI-190	Die, head, LH	33.00
AI-191	Die, head, RH	33.00
AI-196	Link	31.50
AI-197	Pin	14.25
AI-193	Pin	7.00

Die Retract and Former Assembly (AI-103)

012.5	Air Cylinder	8.75
042	Air Cylinder	8.75
AI-205	Stop	32.35
AI-204	Guide	53.00
AI-393 (Specify group #)	Die Set (Includes AI-202, 203, 204, 207 208 and hardware)	400.00
AI-201	Shaft	79.00
CI-326	Nylon Blocks (set of 2)	6.00 set
AI-206	Block	11.25
AI-223	Air Cylinder block (left)	29.75
AI-225	Air Cylinder block (right)	9.00
AI-227	Cylinder Tip	48.00
CI-230	Washer (set of 2)	1.00 set
AI-210	Shutter	5.25
AI-207	Shaft	16.50
AI-208	Knob	10.50
AI-209	Link	13.50
AI-104	Monitor Station Assembly	320.00
TP 2.5 x 9	Monitor Solenoid	8.00
TP 4 x 12	Push Solenoid	10.00

Former Assembly (AI-390)

AI-390 G-1	Former Assembly, left	110.00
AI-390 G-2	Former Assembly, right	110.00
AI-227	Cylinder tip	48.00
AI-469	Spring	1.00
012.5	Air Cylinder	12.00

AMISTAR

OVERALL CUT LENGTH OF COMPONENT FOR AL-100 & AI-500

CENTER DISTANCE	GI DIE	GII DIE	GIII DIE
300	.560	.600	.640
350	.610	.650	.690
400	.660	.700	.740
450	.710	.750	.790
500	.760	.800	.840
550	.810	.850	.890
600	.860	.900	.940
650	.910	.950	.990
700	.960	1.000	1.040
750	1.010	1.050	1.090

NOTE: CUT LENGTH MEASURED ON OUTSIDE OF LARGE CUTTER WHEELS ON AL-100 CUTTERS.

CUT LENGTH MEASURED ON INSIDE OF LARGE CUTTER WHEELS ON AI-500 CUTTERS.

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Amistar

OVERALL CUT LENGTH OF COMPONENT FOR AL-100 & AI-500

Center Distance	GI DIE	GII DIE	GIII DIE
300	.560	.600	.640
350	.610	.650	.690
400	.660	.700	.740
450	.710	.750	.790
500	.760	.800	.840
550	.810	.850	.890
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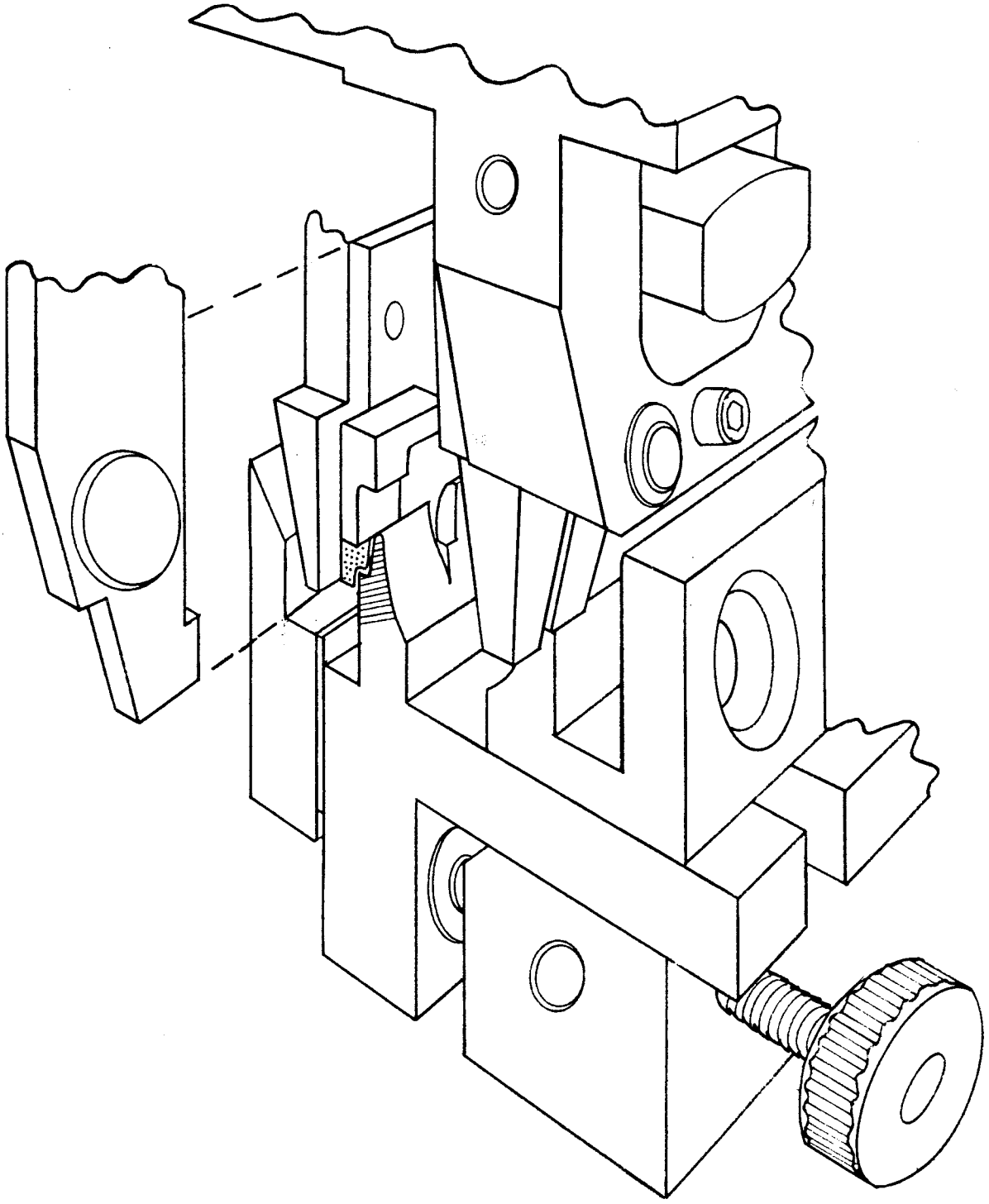
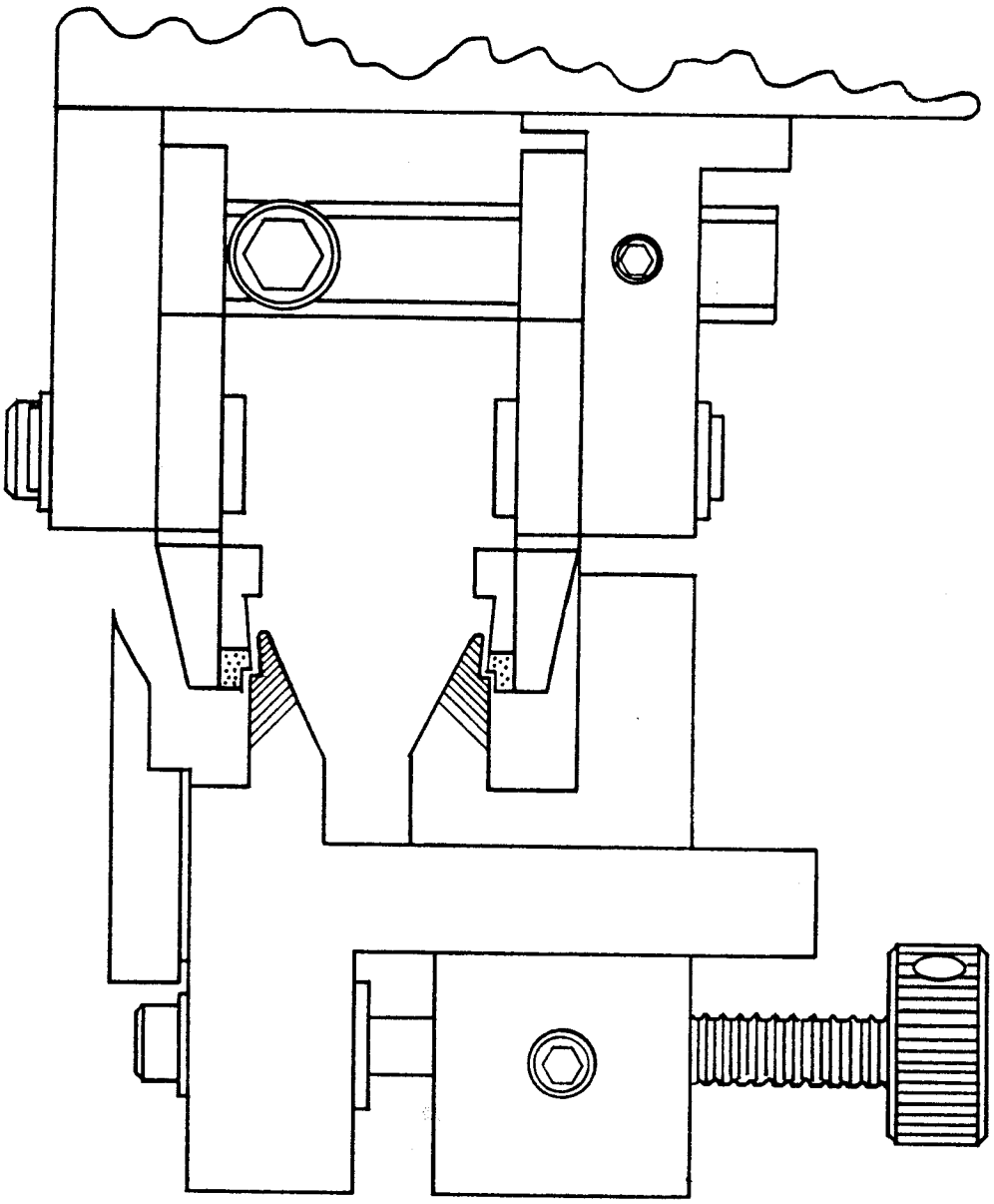
650	.910	.950	.990
700	.960	1.000	1.040
750	1.010	1.050	1.090

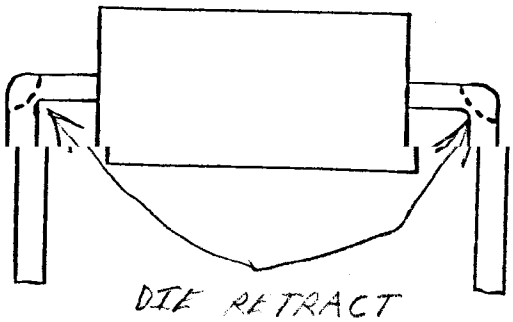
NOTE: CUT LENGTH MEASURED ON OUTSIDE OF LARGE CUTTER WHEELS ON AL-100 CUTTERS.

CUT LENGTH MEASURED ON INSIDE OF LARGE CUTTER WHEELS ON AI-500 CUTTERS.

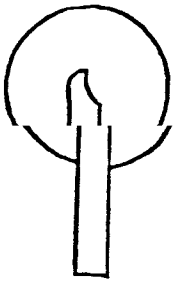
2675 SKYPARK DRIVE, UNIT 203, TORRANCE, CALIFORNIA 90505 • (213) 539-1303



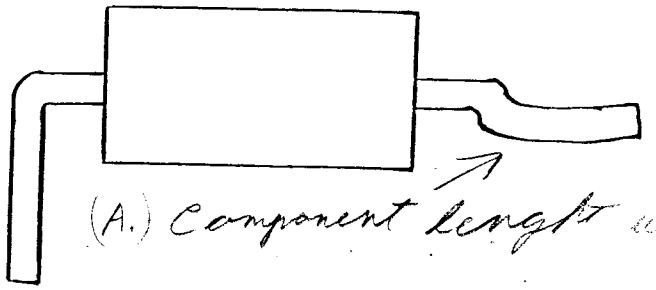




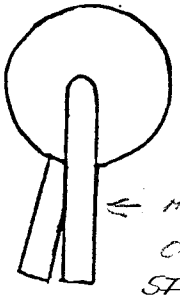
DIE RETRACT
BACK TOO FAR



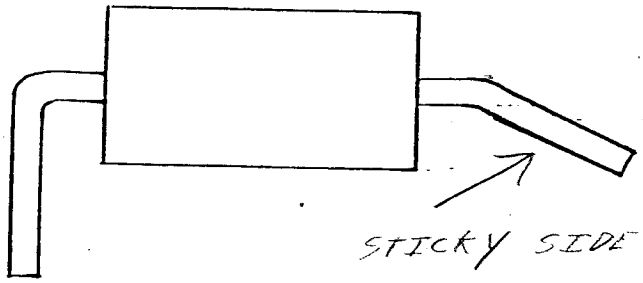
0-.002"
ADJUSTMENT



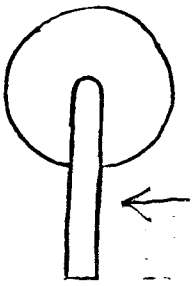
(A.) Component length wrong.



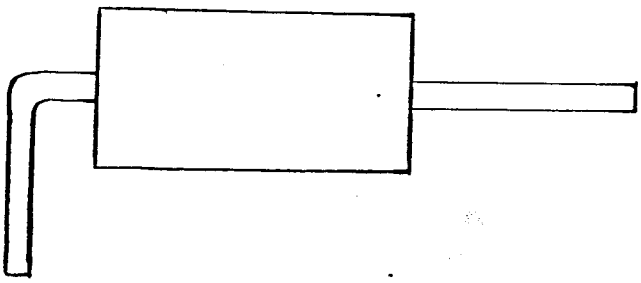
← HEAD ROTATION
OFF - OR
SIDE FORMER
MISADJUSTED

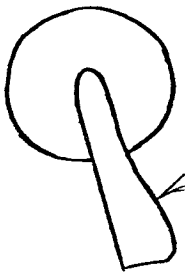


STICKY SIDE FORMER.



← O.K.





← SMASHED
LEAD.

SIDE FORMER

BOARD	FUNCTION
AI-330 AI-335	Control Boards: Contain state counter and decoder logic. Receive sensor input and send instructions to driver boards.
AI-320	Driver board for air solenoids.
AI-260	X-Y driver board for selection stations. Two are required for more than 24 stations. Refer to AI-500 LOGIC FLOW CHART at the end of the module for relationship of AI-330 and AI-335 boards to machine cycle.
AI-260	Reader Interface

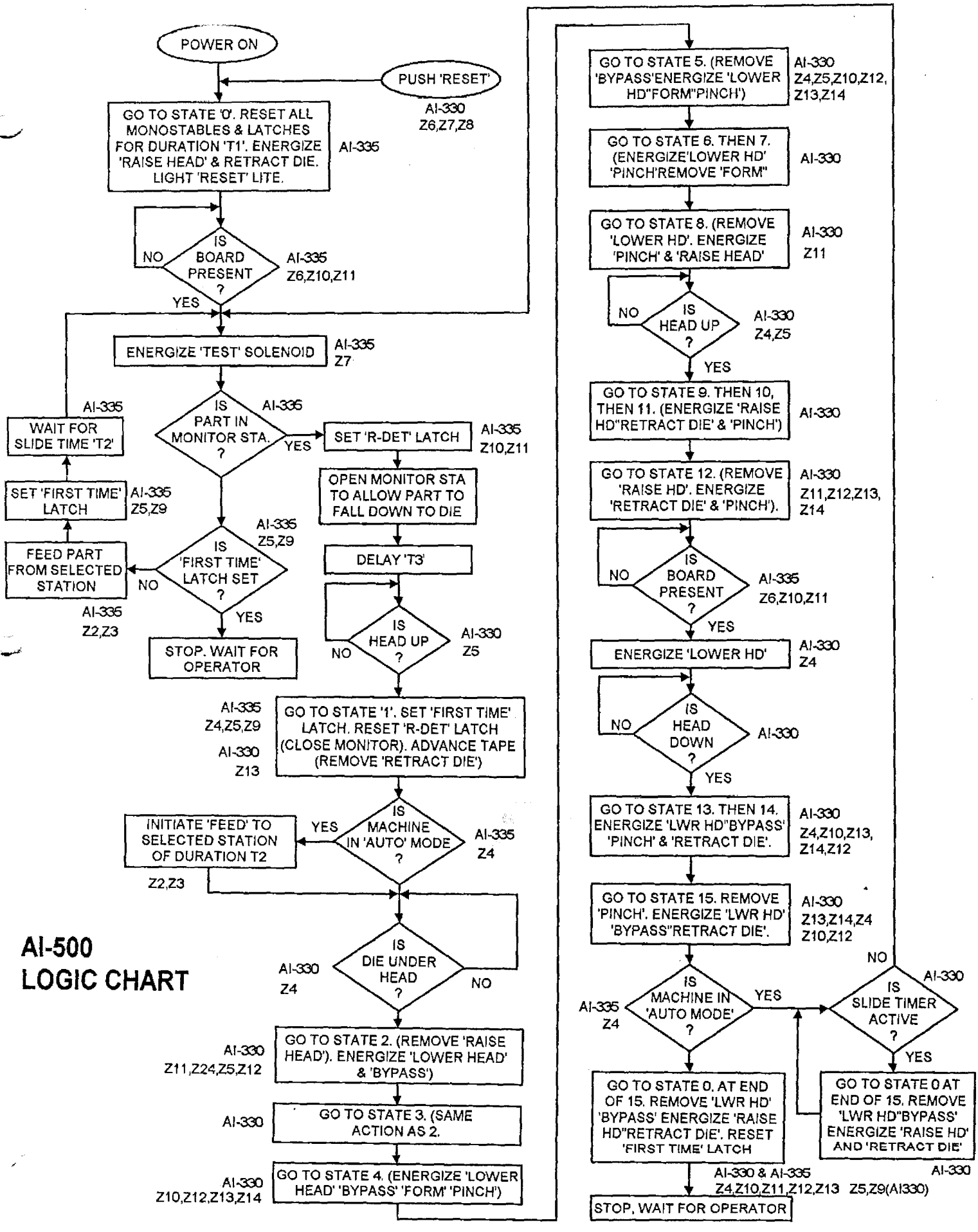
Objective #16
Sensor Adjustments

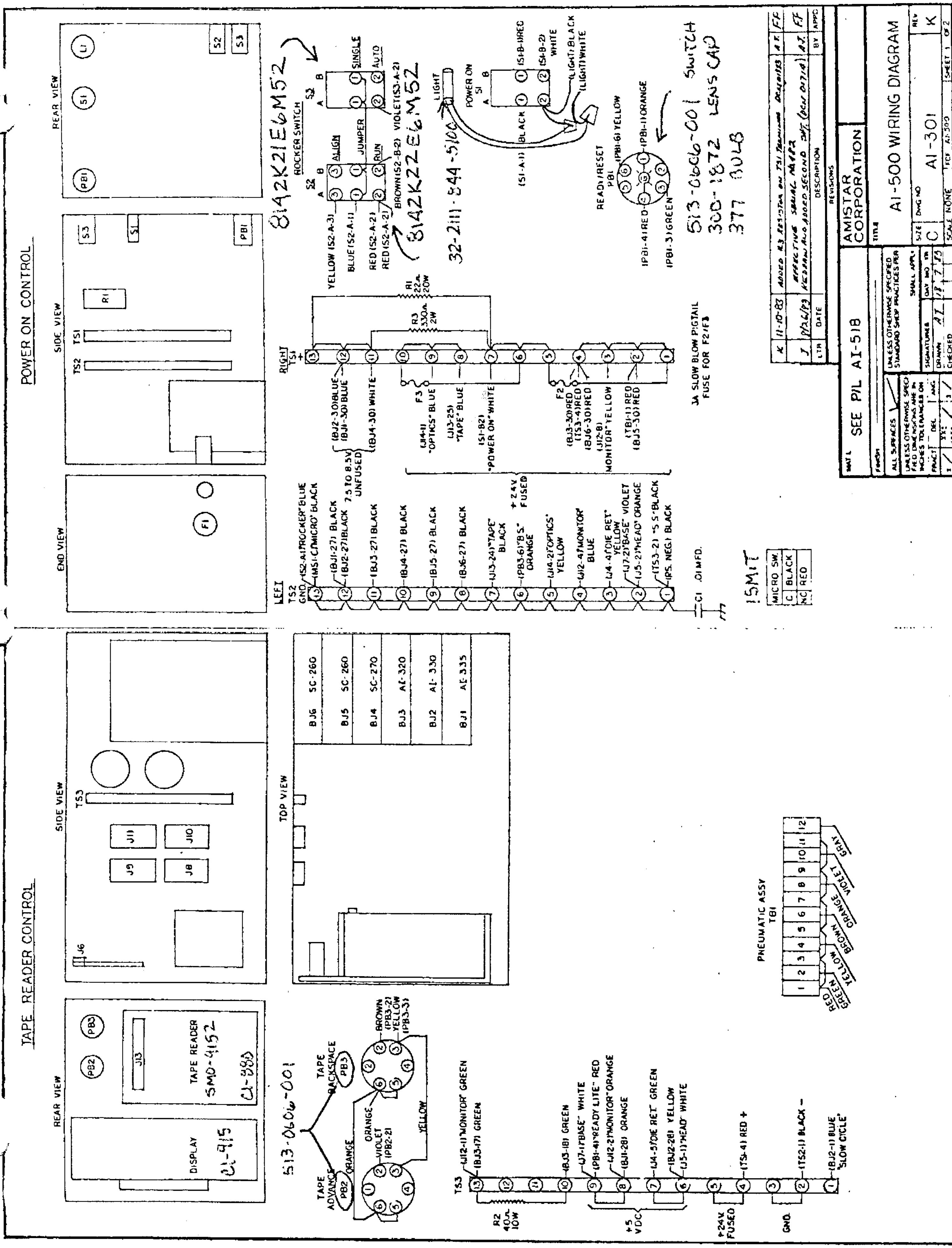
Generally a sensor shutter should be adjusted to penetrate 2/3 the sensor at the point of travel where the impulse will be sent to the machine logic signalling the correct position of the assembly. Malfunction symptoms for the various sensors are listed below.

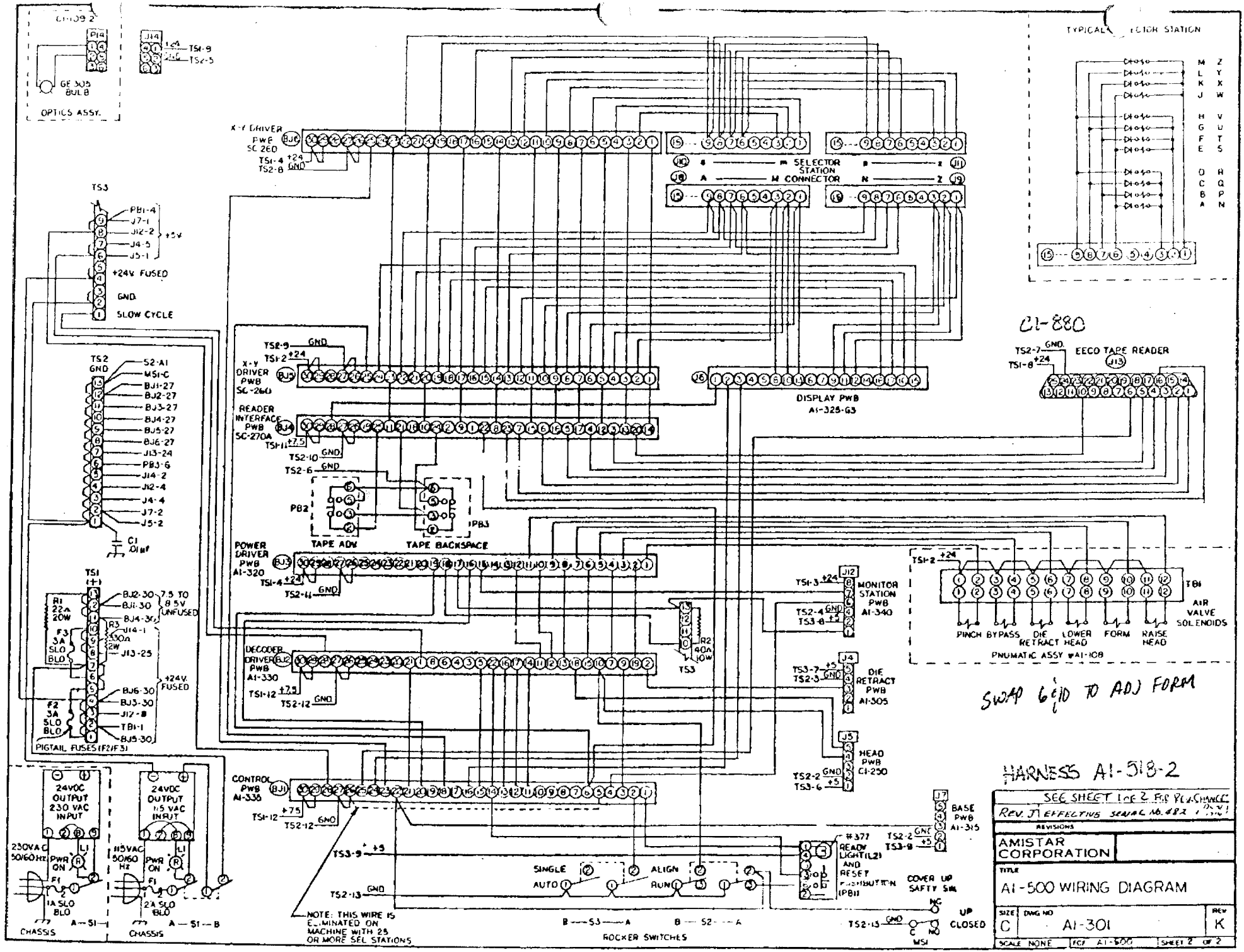
SENSOR	SIGNALS	MALFUNCTION SYMPTOMS	OUTPUT
Monitor Station	Part/No Part Open/Closed	Machine cycles with no part present. Machine stops without cycling new part.	-5
Head Up	Head Up	Part drops to die set and machine stops.	+5
Head Down	Head Down	Head picks up part but does not continue to board. Head goes to board and stops. High pressure does not remain on long enough for proper insertion.	+5
Die Retract	Out/In	Head will not come down. Head, die retract and side formers operate together at once.	+5
Board Present	Board/No Board	Cycles once then stops. Machine stops.	+5

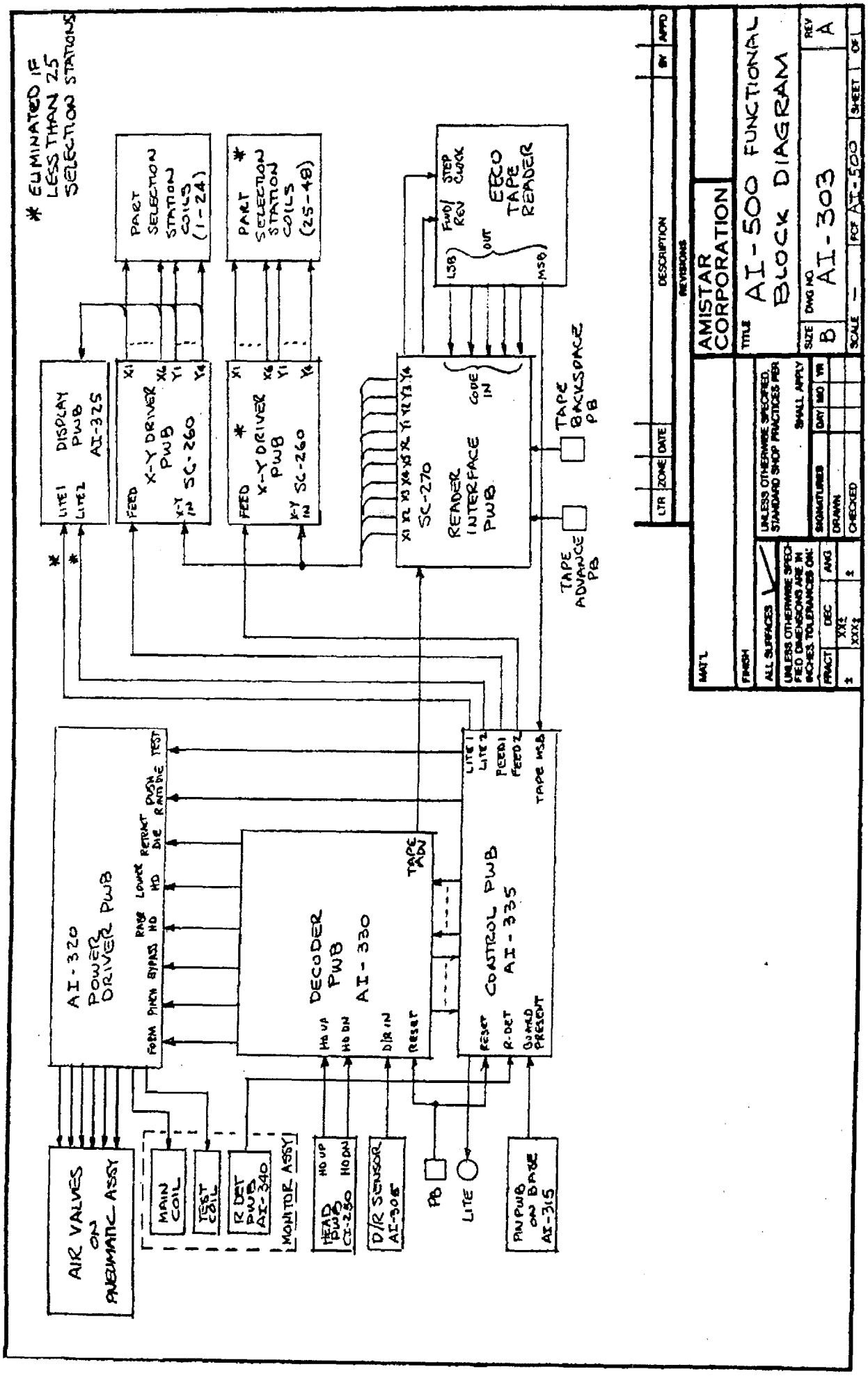
JIM, THIS IS THE SYMTOM OF A BAD MONITOR STATION SENSOR.. CHECK THE WIRES ON THE SENSOR BOARD

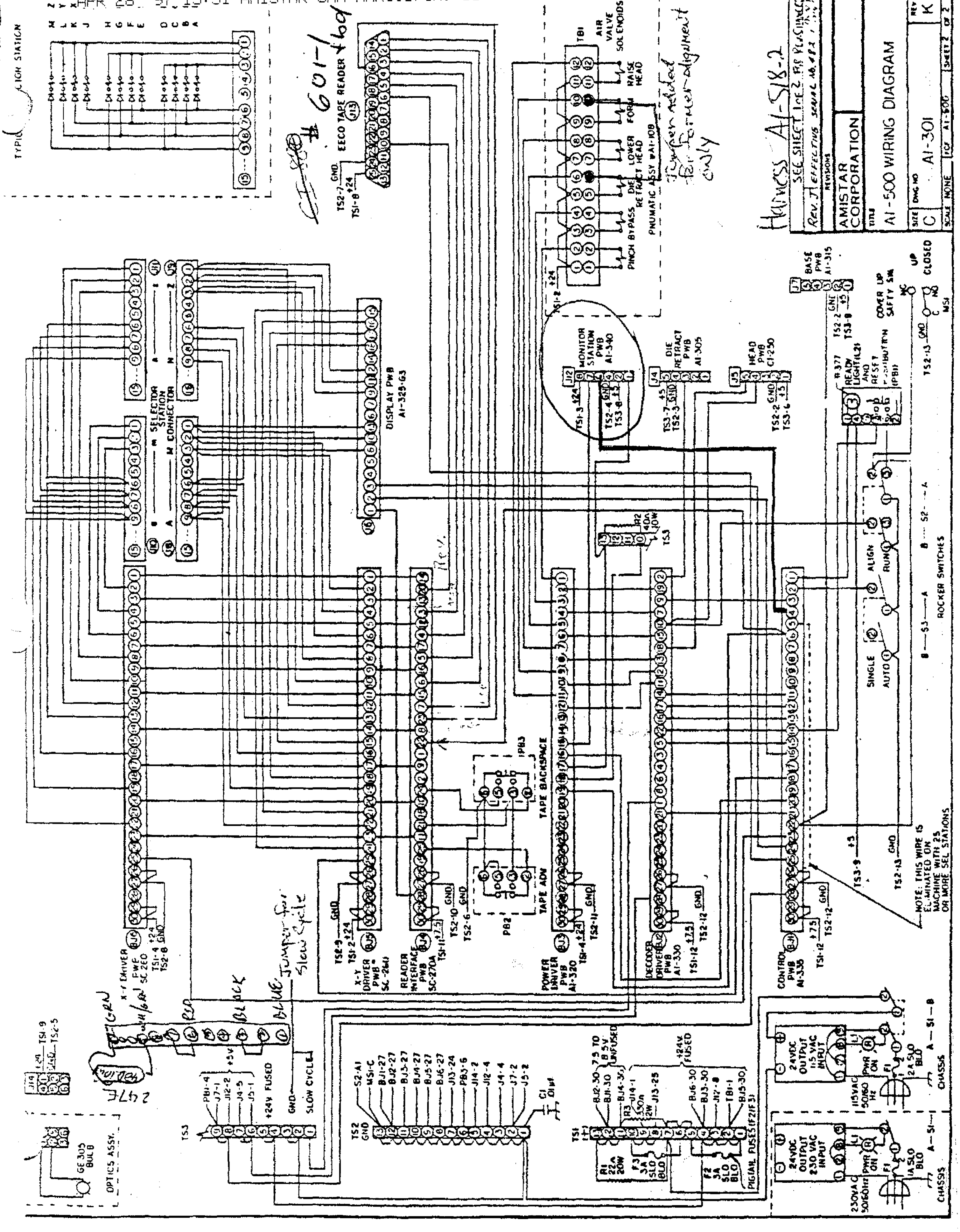
AI-500 LOGIC CHART

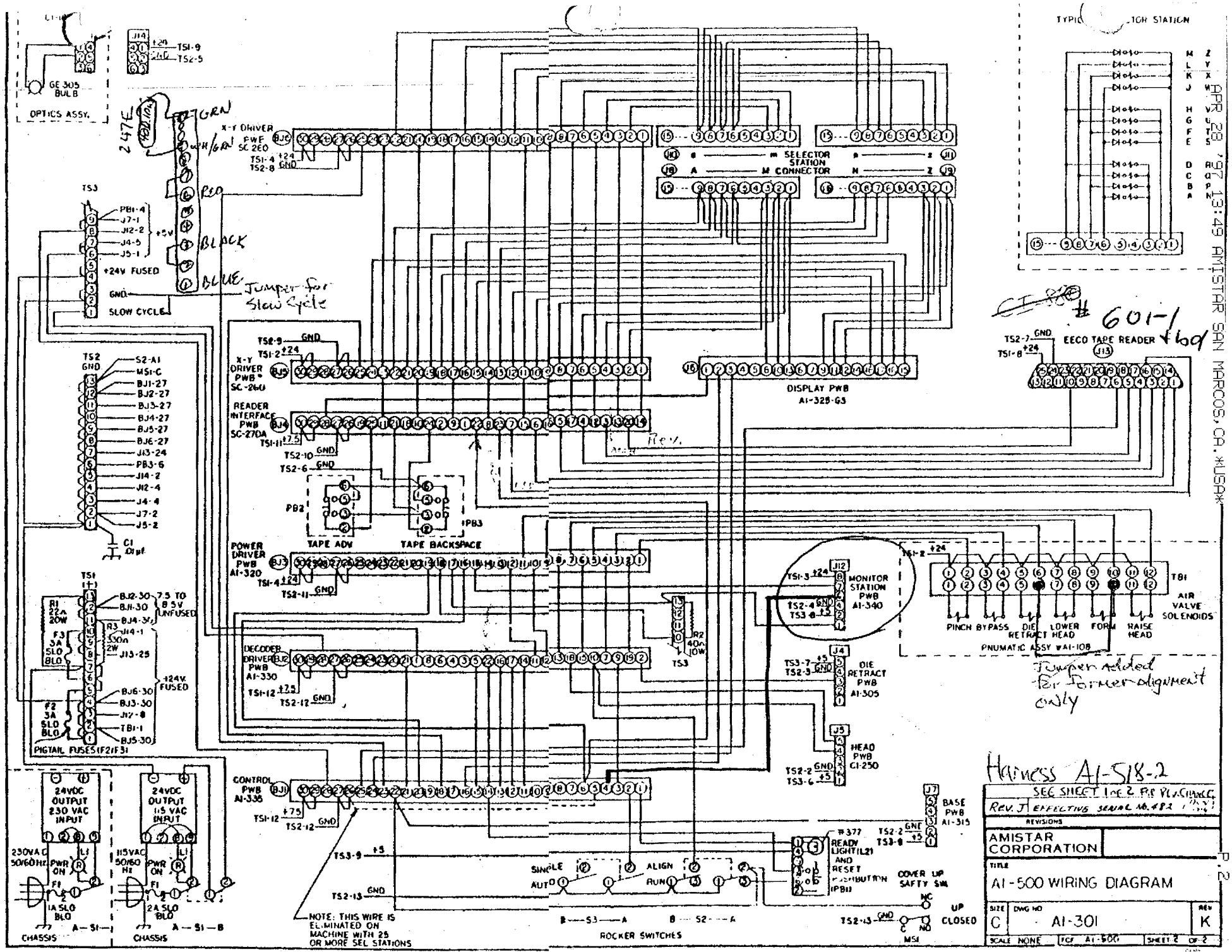



POWER ON CONTROL
TAPE READER CONTROL
REAR VIEW
SIDE VIEW
END VIEW
TOP VIEW
ROCKER SWITCH
ALIGN
RUN
SINGLE
AUTO
JUMPER
POWER ON S1
LIGHT
READY/RESET PB1
1A SLOW BLOW PIGTAIL FUSE FOR F2/F3
RIGHT TS1
LEFT TS2
C1 .01 MFD.
MICRO SW.
C BLACK
NC RED
PNEUMATIC ASSY TB1
RED
GREEN
YELLOW
BROWN
ORANGE
VIOLET
GRAY
BJ6 SC-260
BJ5 SC-260
BJ4 SC-270
BJ3 AI-320
BJ2 AI-330
BJ1 AI-335
DISPLAY
TAPE READER
TAPE ADVANCE
TAPE BACKSPACE
+5 VDC
+24V FUSED
GND.
R2 40Ω 10W
R1 22Ω 20W
R3 330Ω 2W
814 2K21E6M52
814 2K22E6M52
32-2111-544-5100
513-0606-001 SWITCH
300-1872 LENS CAP
377 BULB
15MIT
513-0606-001
5MO-4152
SEE P/L AI-518
AMISTAR CORPORATION
AI-500 WIRING DIAGRAM
AI-301
REV K




* ELIMINATED IF LESS THAN 25 SELECTION STATIONS
PART SELECTION STATION COILS (1-24)
PART SELECTION STATION COILS (25-48)
ECO TAPE READER
STEP CLOCK
FWD/REV
OUT
LSB
MSB
DISPLAY PWB AI-325
LITE1
LITE2
X-Y DRIVER PWB SC-260
FEED
X-Y IN
X-Y DRIVER PWB SC-260
READER INTERFACE PWB SC-270
CODE IN
TAPE BACKSPACE PB
TAPE ADVANCE PB
AI-320 POWER DRIVER PWB
FORM PUNCH BYPASS RANGE HD LOWER HD RETRACT DIE PUNCH RANGE TEST
DECODER PWB AI-330
HD UP
HD DN
DIR IN
RESET
TAPE ADV
CONTROL PWB AI-335
LITE 1
LITE 2
FEED1
FEED 2
TAPE MSB
RESET
R-DET
GUARD PRESENT
AIR VALVES ON PNEUMATIC ASSY
MAIN COIL
TEST COIL
R DET PWB AI-340
MONITOR ASSY
HEAD PWB CI-280
HD UP
HD DN
D/R SENSOR AI-305
PB
LITE
PW PWB ON BASE AI-315
LTR
ZONE
DATE
DESCRIPTION
BY
APPD
REVISIONS
MATL
FINISH
ALL SURFACES
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:
FRACT
DEC
ANG
XX±
XXX±
±
UNLESS OTHERWISE SPECIFIED, STANDARD SHOP PRACTICES PER
SHALL APPLY
SIGNATURES
DRAWN
CHECKED
DATE
ISO
YR
AMISTAR CORPORATION
TITLE
AI-500 FUNCTIONAL BLOCK DIAGRAM
SIZE
B
DWG NO
AI-303
REV
A
SCALE
—
FOR AI-500
SHEET
OF


AMISTAR CORPORATION
AI-500 WIRING DIAGRAM
AI-301
REV K
SIZE C
SCALE NONE
SHEET 2 OF 2
ROCKER SWITCHES
TAPE BACKSPACE
TAPE ADV
DISPLAY PWB AI-325-G3
EECO TAPE READER (J13)
PNUMATIC ASSY #AI-108
OPTICS ASSY.
GE 305 BULB
NOTE: THIS WIRE IS ELIMINATED ON MACHINE WITH 25 OR MORE SEL STATIONS


GE 305 BULB
OPTICS ASSY.
J14
+20
GND
TS1-9
TS2-5
247E
GRN
WHT/GRN
RED
BLACK
BLUE
X-Y DRIVER PWB SC-260
TS1-4 +24
TS2-8 GND
TS3
+5V
+24V FUSED
GND
SLOW CYCLE
Jumper for Slow Cycle
TS2 GND
X-Y DRIVER PWB SC-260
READER INTERFACE PWB SC-270A
TS1-11 +7.5
TS2-10 GND
TS2-6 GND
PB2
TAPE ADV
PB3
TAPE BACKSPACE
POWER DRIVER PWB AI-320
TS1-4 +24
TS2-11 GND
DECODER DRIVER PWB AI-330
TS1-12 +7.5
TS2-12 GND
CONTROL PWB AI-336
TS1-12 +7.5
TS2-12 GND
TS1
F1 3A SLO BLO
F2 3A SLO BLO
F3 3A SLO BLO
PIGTAIL FUSES (F2 & F3)
7.5 TO 8.5V UNFUSED
+24V FUSED
R1 22Ω 20W
R2 40Ω 10W
R3 150Ω 2W
TS3
24VDC OUTPUT 230 VAC INPUT
24VDC OUTPUT 115 VAC INPUT
230VAC 50/60 HZ
115VAC 50/60 HZ
PWR ON
1A SLO BLO
2A SLO BLO
CHASSIS
A — S1 — B
NOTE: THIS WIRE IS ELIMINATED ON MACHINE WITH 25 OR MORE SEL STATIONS
TS3-9 +5
TS2-13 GND
SINGLE
AUTO
ALIGN
RUN
B — S3 — A
B — S2 — A
ROCKER SWITCHES
#377 READY LIGHT (L21) AND RESET DISTRIBUTION (PB11)
TS2-2 GND
TS3-8 +5
COVER UP SAFTY SW.
NC
NO
C
TS2-13 GND
UP CLOSED
MSI
BASE PWB AI-315
M SELECTOR STATION
M CONNECTOR
DISPLAY PWB AI-325-G3
TS2-7 GND
TS1-8 +24
EECO TAPE READER
J13
MONITOR STATION PWB AI-340
TS1-3 +24
TS2-4 GND
TS3-8 +5
TS1-2 +24
TB1
AIR VALVE SOLENOIDS
PINCH BYPASS
DIE RETRACT
LOWER HEAD
FORM
RAISE HEAD
PNUMATIC ASSY #AI-108
DIE RETRACT PWB AI-305
TS3-7 +5
TS2-3 GND
HEAD PWB CI-250
TS2-2 GND
TS3-6 +5
Jumper added for former alignment only
TYPICAL SELECTOR STATION
APR 28 '97 13:49 AMISTAR SAN MARCOS, CA. *USA*
CI #601-1 thd
Harness AI-518-2
SEE SHEET 1 OF 2 FOR WIRE CHANGES
REV. J EFFECTIVE SERIAL NO. 482
REVISIONS
AMISTAR CORPORATION
TITLE
AI-500 WIRING DIAGRAM
SIZE C
DWG NO AI-301
REV K
SCALE NONE
PCF AI-500
SHEET 2 OF 2
P.2

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San Marcos, CA 92069
Tel: [619] 471-1700
Fax: [619] 471-9065

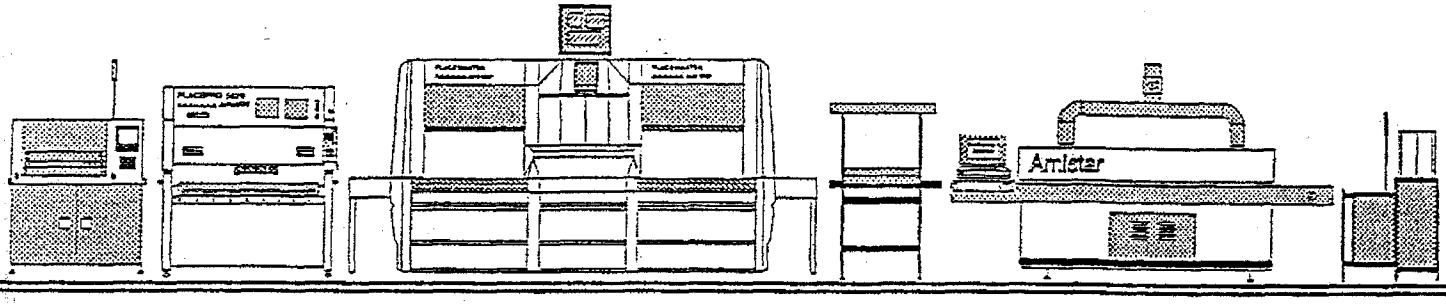
To: Suzanne 503-232-7910 Page 1 of 2

Company: Sign Video (Including this cover page)

From: Rick 619-471-9065 Date: 4/28/97

Subject: AI 500 Wiring Diagram

FAX TRANSMISSION



☆ ☆ ☆ ☆ ☆ MESSAGE ☆ ☆ ☆ ☆ ☆

— Sensor connector is circled, signal wire is highlighted.

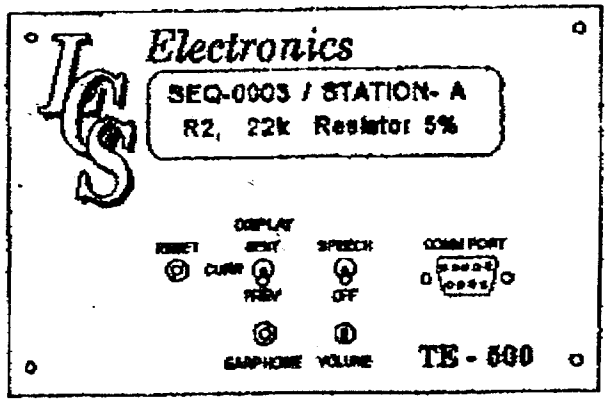
Good Luck!

~ Please contact us immediately if any portion of this message is unclear ~

The **TE-500** paper tape emulator is designed to directly replace the paper tape reader on Amistar AI-500 axial component inserter. The **TE-500** is simple to install and operate.

FEATURES:

- Stand alone, NO external connections or computers are required for operation. Only to load Sequence Files.
- Plug and play. NO additional wiring or modifications are required. The **TE-500** bolts to the AI-500 where the paper tape reader was removed.
- Load sequence programs from any personal computer. The program file can be created by a text editor or spread sheet program and up loaded using DOS commands or a modem communication program. See the sample sequence file.
- Once you have finished the up load, your sequence is stored in battery backed memory in the **TE-500**. Even after you turn off the power to your AI-500, the program sequence will not be lost.
- No support software is required. All required programs are embedded in the **TE-500**.
- 20 characters by 2 line LCD display. The LCD display shows sequence number, cassette number and 20 characters of user programmable data. User programmable data can include the component reference designator, part number and description.



- Files of up to 1,000 sequences can be stored in the **TE-500**.
- Speech synthesizer for learning the sequence. As the component is ready for insertion, the **TE-500** will read the programmed reference designator in English voice.
- The speaker and ear phone have a front panel volume control.
- The display can be set to show the previous, current, and next component. Set the **TE-500** display to previous component, to display the current component in the auto load mode.
  - Reset the sequence to the beginning at any time.
  - Status monitoring. You can plug the **TE-500** into a Personal Computer and monitor the status of the assembly process.

SEQUENCE FILES:

The sequence file has 4 parts. Each part is separated by a comma.

1. The sequence number. A zero in this position Identifies the beginning of the file.
2. The cassette number. A zero in this position Identifies the end of the file.
3. User data. The information in this position will be read back in voice. Quick sequence learning tool.
4. User data. Any user information that will help in the sequence process to reduce errors. The total user data can consist of 2 characters.

SAMPLE SEQUENCE FILE

```
0,
1,a,R1, 10K Resistor
2,b,R3, 4.7K Resistor
3,A,R2, 22K Resistor
4,f,CR1, 1N4148 Diode
5,c,R4, 49.9K, 1% Res.
6,Ø,End of sequence
```

PERSONAL COMPUTER REQUIREMENTS:

- DOS text editor. The file is saved in the computer as an ASCII text file.
- Serial port (RS-232) set at 2400 baud N81.
- A modem communication program

316. Check Side Formers
  a) Air cylinder extends and retracts completely without binding or sticking
  b) Cylinder tips enter forming die holes (toward bottom of slot) without touching
  c) All screws (8) have flat washers and are tight
  d) ~~Increase inlet air pressure regulator(s) to 80 psi and~~ run 1 parts. Side formers should not stick. ~~Reset air to 80 psi on first gage, 60 psi on second gage (if only one regulator set at 60 psi).~~

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

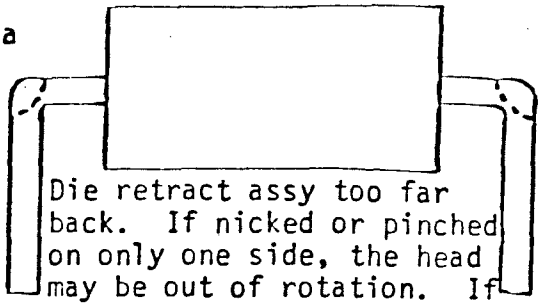
To Gary Hood	From Chuck Kahms
Co. Sigh Video	Co. Amistar
Dept.	Phone #
Fax # (503) 232-7910	Fax #

TO ADJUST SIDE FORMERS:

1. TURN AIR DOWN TO ZERO — 270 psi
2. ~~[illegible]~~ ~~R[illegible]~~ TURN OFF POWER
3. REMOVE WIRE # 6 (BROWN) Die Back AND WIRE # [redacted] 10 (Former) (VIOLET) FROM TERMINAL BLOCK AT TOP REAR OF MACHINE
4. PLACE BROWN WIRE (#6) ON TERMINAL # [redacted] 10 AND TIGHTEN
5. # [redacted] 10 (VIOLET) IS NOT USED (dangle)
6. TURN ON POWER
7. SLOWLY TURN AIR PRESSURE UP UNTIL THE FORMERS SLOWLY ENTER HOLES ON DIE.
8. MAKE SURE FORMER DIES ARE NOT HITTING OR BINDING ON ~~[illegible]~~ SIDES OF DIE HOLES
9. TURN AIR PRESSURE BACK TO ZERO

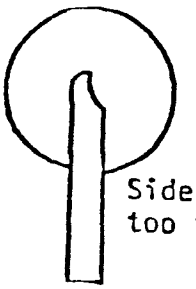
ANSWER #17

1 a



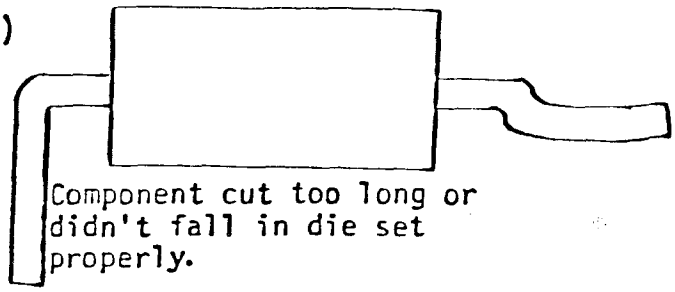
Die retract assy too far back. If nicked or pinched on only one side, the head may be out of rotation. If rotation is way out, both leads will be cut off.

1 b



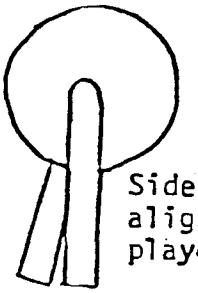
Side view D/R assy. too far back.

2)



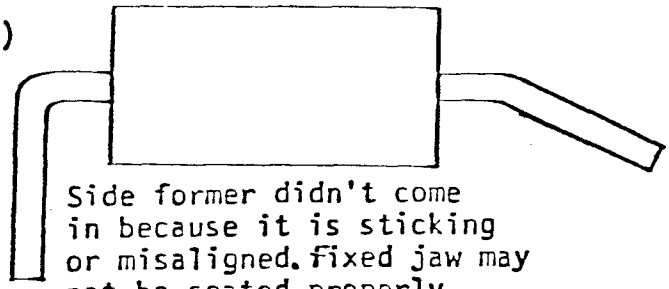
Component cut too long or didn't fall in die set properly.

3)



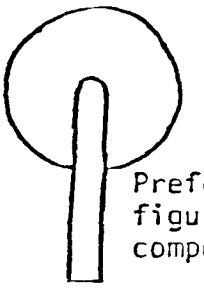
Side former misaligned or has play.

4)



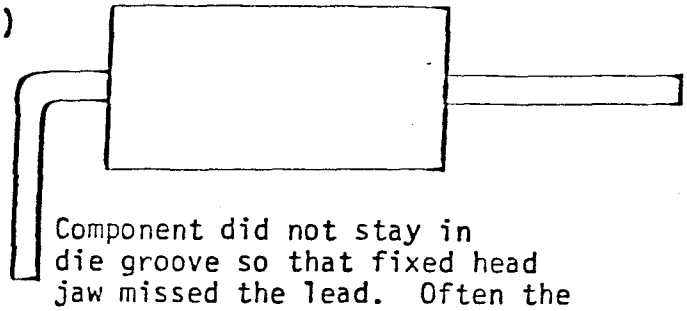
Side former didn't come in because it is sticking or misaligned. fixed jaw may not be seated properly.

5)



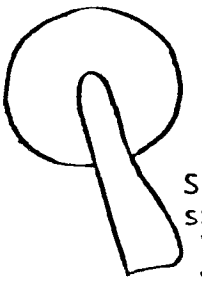
Preferred configuration of formed component.

6)



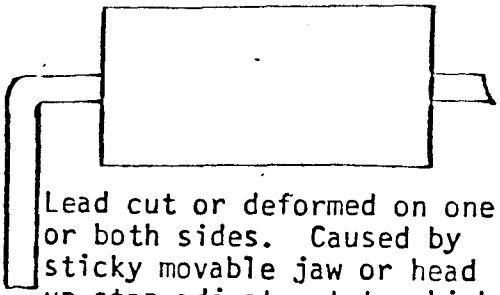
Component did not stay in die groove so that fixed head jaw missed the lead. Often the part is cut too long or monitor station is not properly adjusted.

7)



Side former smashed the lead because the lead was bent (angled) prior to the side former coming in.

8)



Lead cut or deformed on one or both sides. Caused by sticky movable jaw or head up stop adjustment too high allowing part to come too far forward.

The finish hole diameter must be at least .010 over lead diameter or .035 diameter minimum, whichever is greater.

Objective #6
Wear Modes

Part	Replacement Criteria
Cartridge AI-109	Replace if 1) Teeth are missing or worn, 2) A gap between blue cover and clear body allows component lead to protrude, 3) The outer blue cover does not freely turn on the inner hub.
Cutter Wheel AI-146	Replace when leads are not cut cleanly.
Cutter Hub CI-386	Replace if nicks inside the sprockets are .005 or deeper.
Monitor Station AI-104	Replace when 1) Stickiness or binding is not eliminated by cleaning, 2) Bushings on the test solenoid will wear to the point that it will no longer detect a part accurately, 3) Wear between the gate (AI-230) and body of the monitor station can allow leads to slip in between. Check shutter (AI-231) for tightness to solenoid.
Die Set AI-393	Check notch in "V" block. Rounding indicates wear.
Die Retract AI-103	Replace when extended die retract has more than .006 side to side or top to bottom play at bushing (B-1214-4).
Movable Jaws AI-188, AI-189	Replace when play at pivot pin (AI-193) causes binding against fixed jaw (AI-190, AI-191). Also, replace when wear at bottom becomes excessive.
Fixed Jaws AI-190, AI-191	Replace when wear at lower notch is such that parts are no longer held or formed properly. Replace moveable jaws at this time also.

Side Former
AI-394

Replace when wear at upper bushings prevents adjustment into die set, or when "V" grooves in former dies are worn shallow enough to deform the leads when forming.

Rocking Blocks
AI-235

Replace when pivot becomes worn to the point that rocking blocks no longer hold center adjustment. Also replace when clinching dies are worn to the point that an improper clinch is obtained.

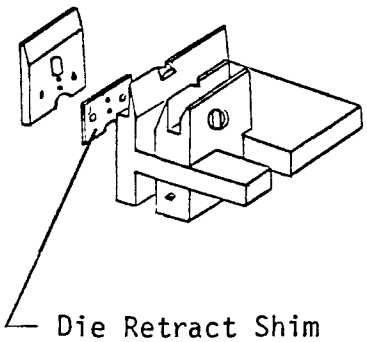
Objective #7
Die Groups

Different board thicknesses will often require different die sets. Die sets can be recognized by the shims (Spacer AI-419) placed between the guide (AI-204) and the fixed die (AI-202). The monitor station is shimmed (Spacer AI-419) between the monitor station body (AI-229) and the casting to complement the die set group according to the following chart.

Group Number	Die Set # Shims	Monitor Station # Shims	Board Thickness
1	0	2	.030 - .045
2	1	1	.050 - .075
3	2	0	.080 - .095

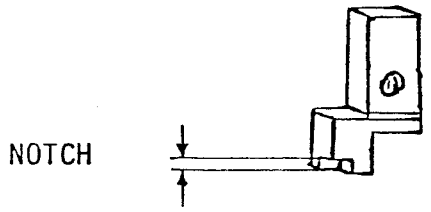
NOTE: 1/2 watt or large diode components may require a group 3 die set for board thicknesses .050 - .070.

A group 1 die may be used for minimum lead length on 1/16 (approx. .040) boards. General use in this application is not recommended due to the added precision required in body length to die spacing.



Objective #8
Fixed Jaw Types

The fixed (rear) jaw is notched at the bottom to hold the component leads for insertion. The standard group 1 notch measures .052 from bottom to top.



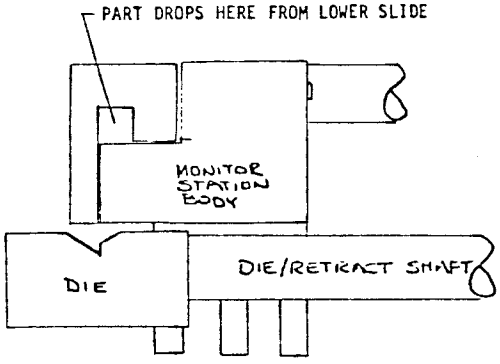
The group 2 jaw is used for larger diameter components (.090 - .150). A group 2 fixed jaw notch measures .085.

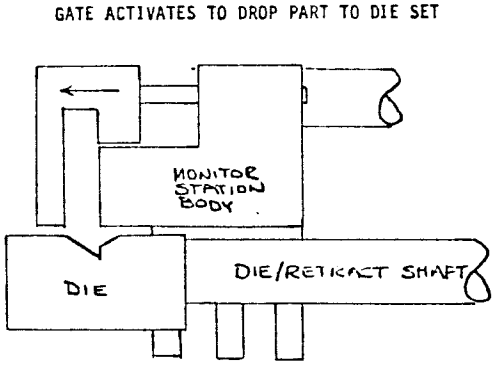
Objective #9
Exhaust Orifice

The die retract air cylinder activates to move the die retract backwards from beneath the head to beneath the monitor station. When the monitor station drops a component, the air pressure which held the die retract beneath the monitor station is released through the exhaust orifice and the die retract is returned to its original position by a spring. When using small diodes a smaller orifice may be used to prevent component bounce.

Objective #10
Monitor Station

The function of the monitor station is to transfer components from the lower slide to the die set. A test solenoid is activated to signal the machine logic if a part is present in the monitor station. If present, the monitor station solenoid would operate the gate (AI-230) to drop the part onto the die set.





Objective #11
Regulators

Any AI-500 machine that uses reel mechanisms will require a second air regulator to power the cutters. Cutter air pressure is set at 80 p.s.i.

Objective #12
TELEX/ASCII

Two types of coding methods are available on the AI-500.

TELEX can carry up to 24 coded letters across 5 bit machine tape. This can be used on machines with up to 24 selection stations.

ASCII can carry 48 upper and lower case letters across 8 bit machine tape (only 6 bits are used). This is used on machines with up to 48 selection stations.

Objective #13
Card Pack Adapter

Adjustments:

Springs AL-244. Adjust the springs on both sides of the release gate so that they will evenly stop and hold a part dropped by the release gate just below the gate points.

Solenoid. Adjust the solenoid so that, in its resting state, the release gate does not block the path of the part. In its activated state, it cannot send the release gate across the path to the point that it crimps the component leads.

Side Plates AL-38, 39, 40, & 41. The gap between the side plates on the solenoid side of the Card Pack Adapter is set at .040 $\pm$ .005. The initial adjustment is made at the factory using precision washers beneath the shoulder screws.

The side plates adjust in and out for different sized parts with the adjustment block and screw assembly on top of the Card Pack Adapter. The lower portion of the side plates form the end of the axial component path. These lower "jaws" must never block the path of the release gate. Because all four plates adjust independently, this must be checked throughout the entire in/out travel of the parts.

To check adjustments:

Swing the card pack adapter away from the loader and press START to activate the solenoid.

Objective #14
Circuit Boards

The machine logic of the AI-500 is contained on 5 circuit boards. Their functions are listed on the following page:

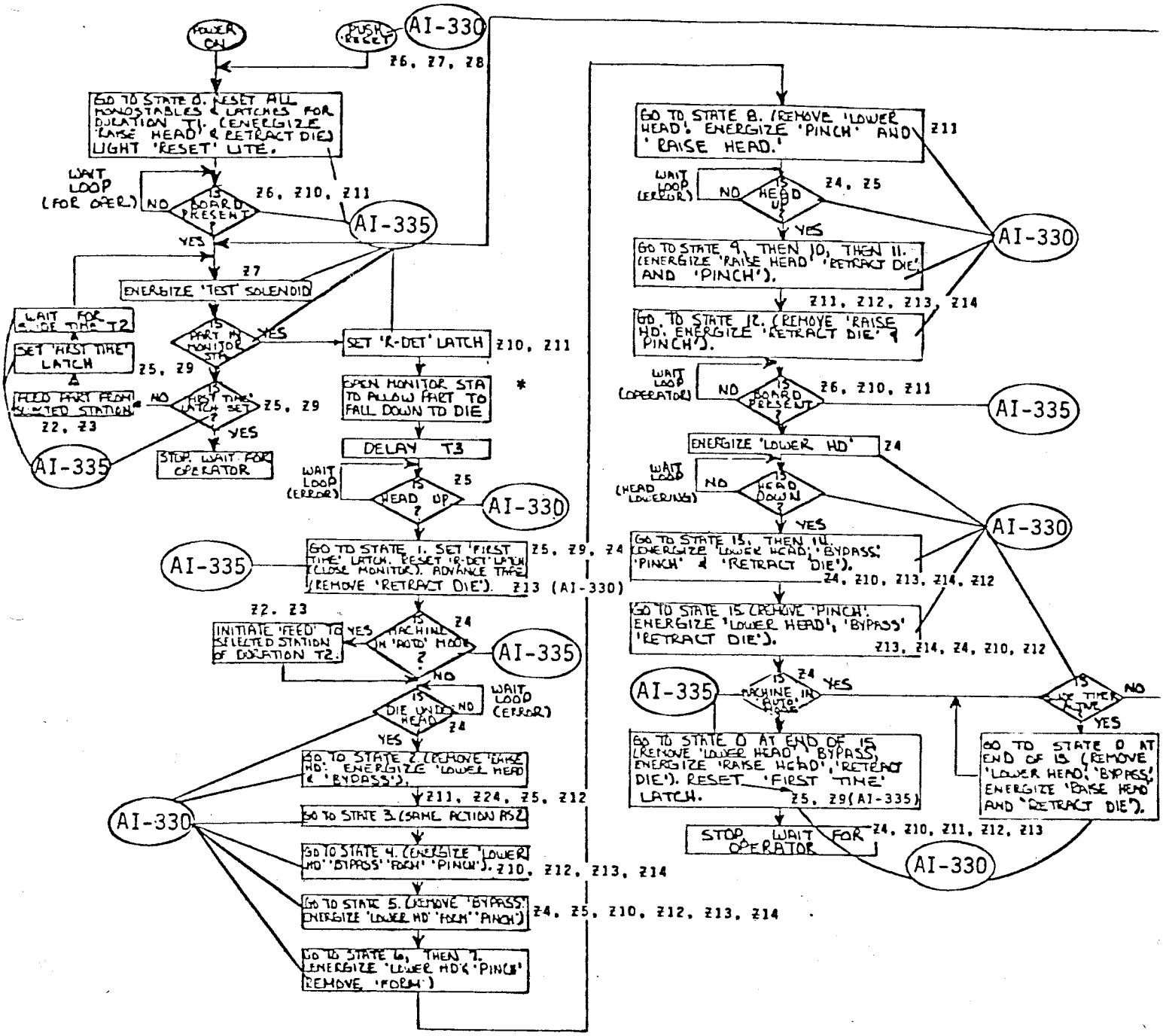
BOARD	FUNCTION
AI-330 AI-335	Control Boards: Contain state counter and decoder logic. Receive sensor input and send instructions to driver boards.
AI-320	Driver board for air solenoids.
AI-260	X-Y driver board for selection stations. Two are required for more than 24 stations. Refer to AI-500 LOGIC FLOW CHART at the end of the module for relationship of AI-330 and AI-335 boards to machine cycle.
AI-260	Reader Interface

Objective #16
Sensor Adjustments

Generally a sensor shutter should be adjusted to penetrate 2/3 the sensor at the point of travel where the impulse will be sent to the machine logic signalling the correct position of the assembly. Malfunction symptoms for the various sensors are listed below.

SENSOR	SIGNALS	MALFUNCTION SYMPTOMS	OUTPUT
Monitor Station	Part/No Part Open/Closed	Machine cycles with no part present. Machine stops without cycling new part.	-5
Head Up	Head Up	Part drops to die set and machine stops.	+5
Head Down	Head Down	Head picks up part but does not continue to board. Head goes to board and stops. High pressure does not remain on long enough for proper insertion.	+5
Die Retract	Out/In	Head will not come down. Head, die retract and side formers operate together at once.	+5
Board Present	Board/No Board	Cycles once then stops. Machine stops.	+5

AI-500 LOGIC FLOW CHART

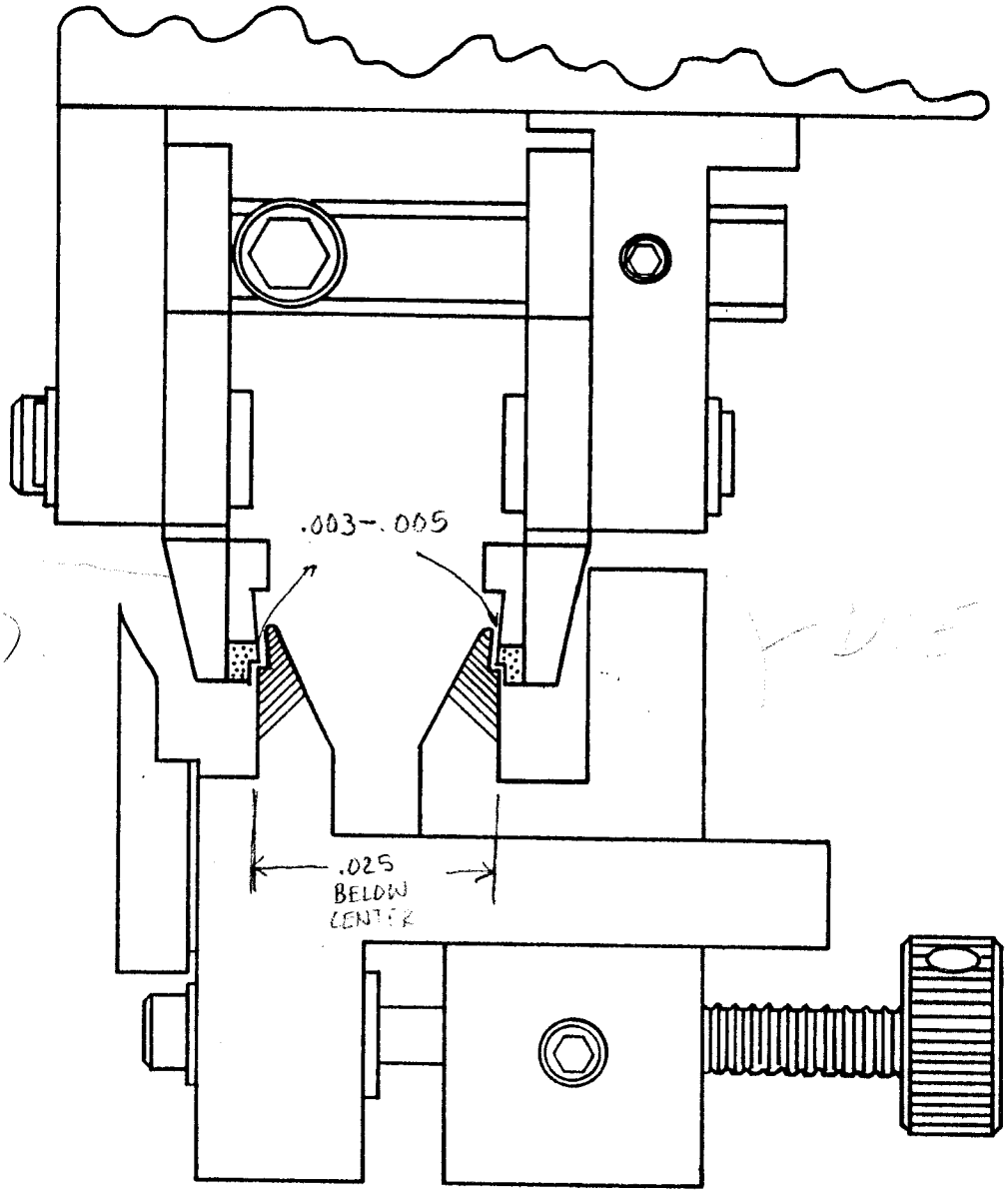


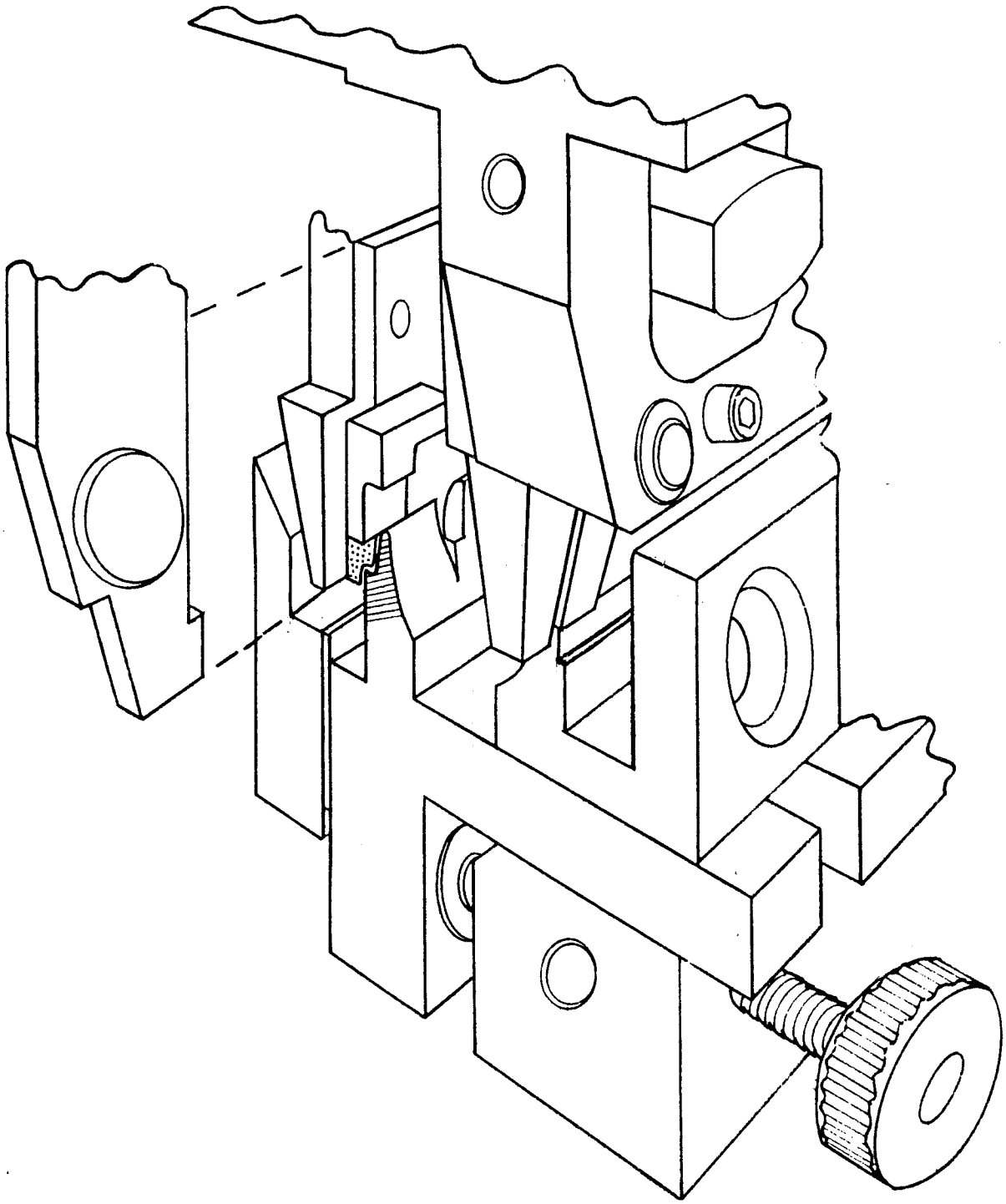
The AI-500 logic flow chart above shows the path of machine logic during the insertion cycle. AI-330 and AI-335 indicate the board that controls the machine operation. Z numbers refer to the DIPs on the board that control each operation.

* *SET 'R-DET' LATCH causes monitor station to open.*

FIXED

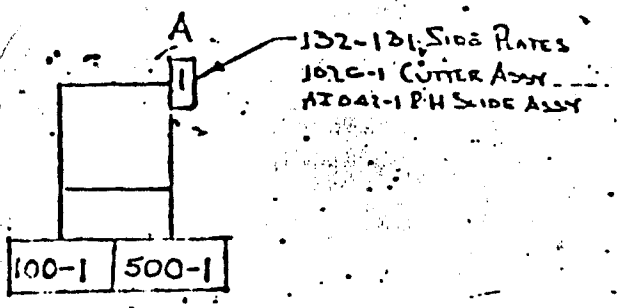
ADJUSTABLE

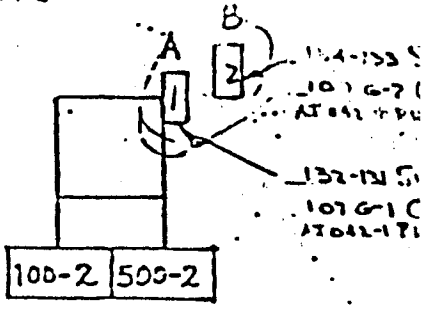


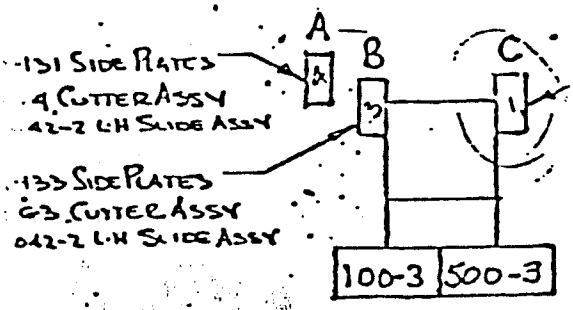


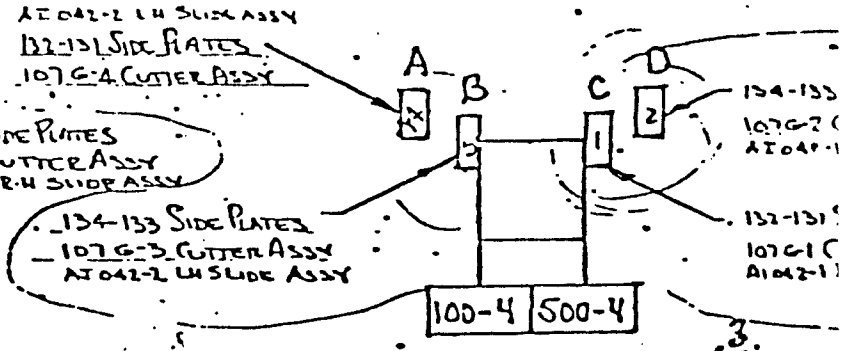
ANALOG INTEGRATOR CONF. & STATION CODE

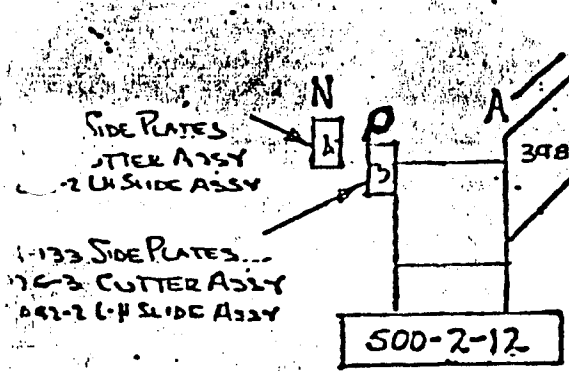
SEE PAGE 2 FOR CUTTER BREAKDOWN

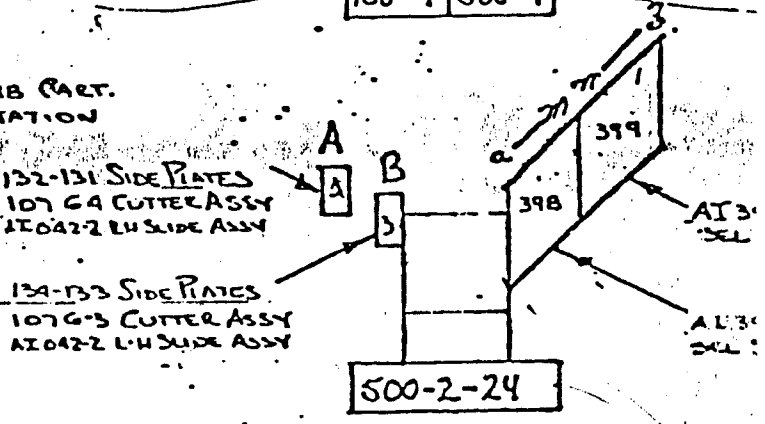


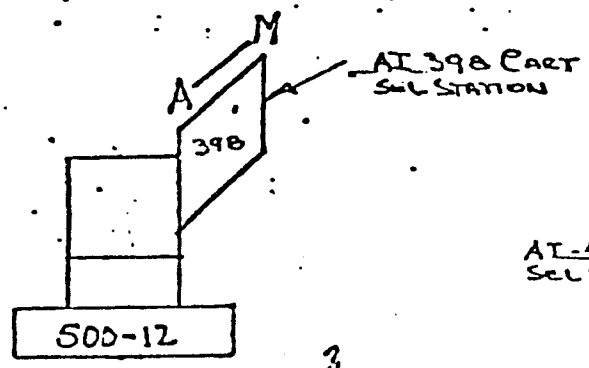


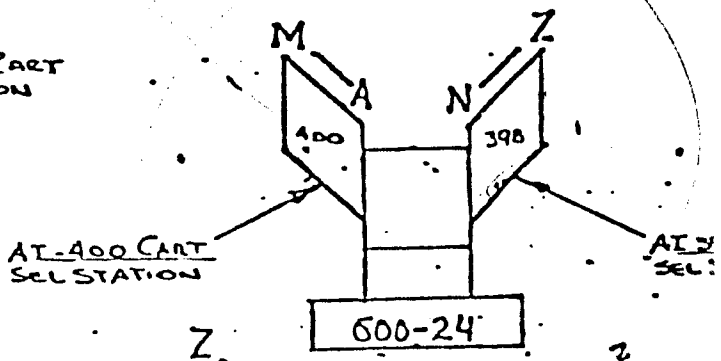


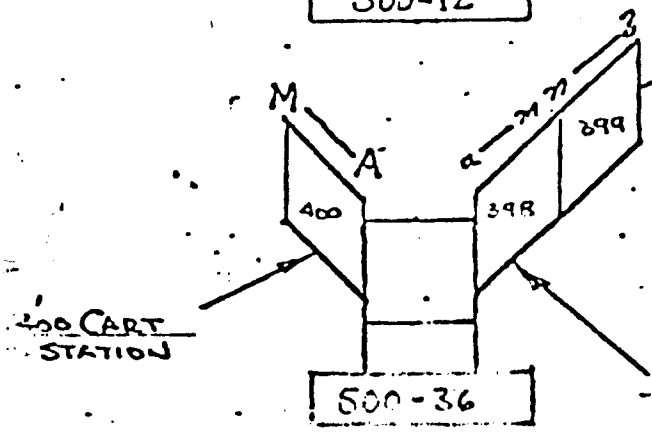


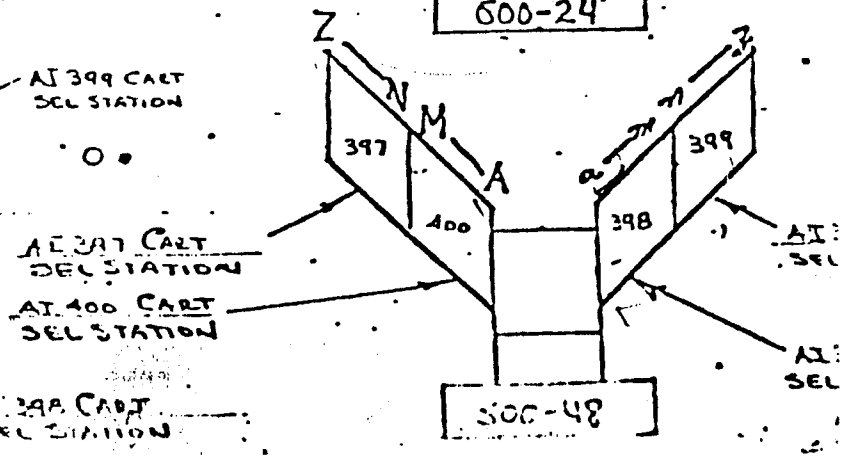


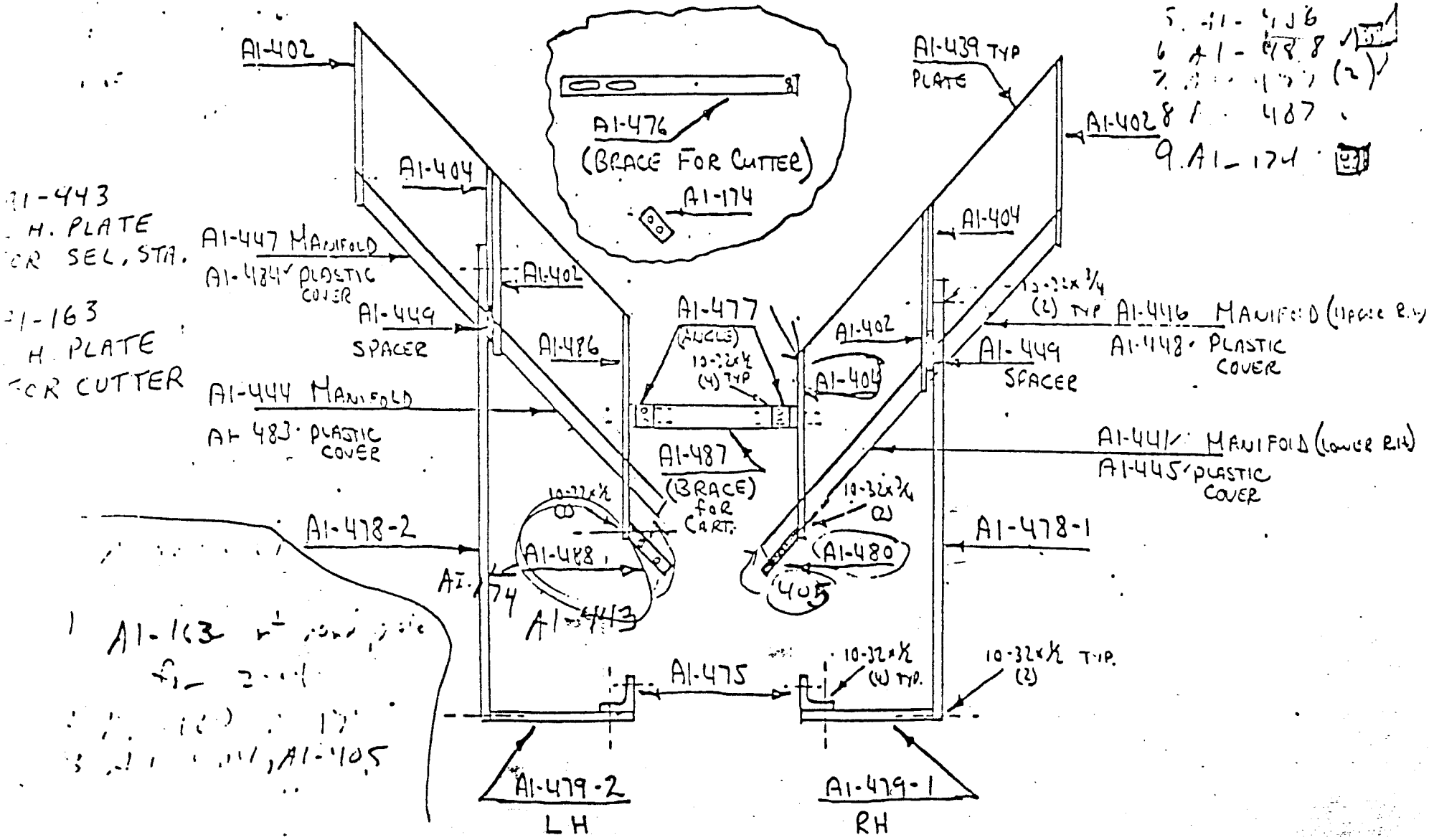




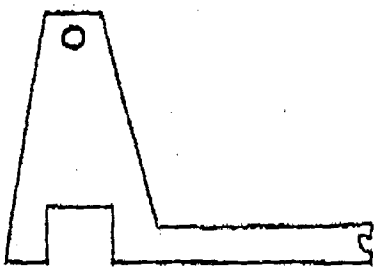







A1-402
A1-476
(BRACE FOR CUTTER)
A1-174
A1-439 TYP
PLATE
A1-402
A1-404
A1-447 MANIFOLD
A1-484 PLASTIC COVER
A1-402
A1-444
SPACER
A1-486
A1-477
(ANGLE)
10-32x1/4
(4) TYP
A1-402
A1-404
A1-449
SPACER
(2) TYP A1-446 MANIFOLD (UPPER R.H.)
A1-448 PLASTIC COVER
A1-444 MANIFOLD
A1-483 PLASTIC COVER
A1-487
(BRACE)
for CART.
A1-441 MANIFOLD (LOWER R.H.)
A1-445 PLASTIC COVER
10-32x1/4
A1-478-2
A1-488
A1-174
A1-443
10-32x3/4
(2)
A1-480
405
A1-478-1
A1-475
10-32x1/4
(4) TYP.
10-32x1/4 TYP.
(2)
A1-479-2
LH
A1-479-1
RH

AI-014 Cartridge Arm Adjustment Tool



1. Put the tool on the cartridge arm and insert into the pin hole.

2. Push the tool against the hub and hold solid while adjusting.

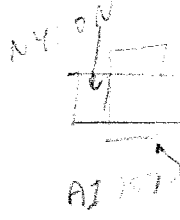
3. Push up on the Index Shaft by hand. The tip of the pawl should be exactly equal to the back of the notch in the tool. The tool should not be pushed forward by the pawl entering the notch.

4. Adjust the cartridge arm adjustment screw so that the arm can be moved back until the pawl is held by the tool notch. Then move the arm forward using the screw until the pawl drops free.

   The cartridge arms should hang straight so that the cartridges are positioned directly over the manifold entrance holes and do not touch each other over the length of their movement.

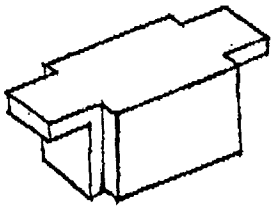
   A cartridge can be used in place of the AI-014 tool. Adjust the alignment screw until the pawl reliably indexes the cartridge when activating the solenoid plunger by hand.

AI-017 Die Retract Tool



SEP 13 1996

~~$250.00~~ $225.00



The die retract tool is used to perform the die forward adjustment on the AI-500. Refer to drawing AI-103. Place the AI-017 tool between the AI-206 stop block on the main shaft and the forward nylon block. Now align the front surface of the die with the step surface or the fixed jaw. The die should be flush to .002 behind the step of the fixed jaw. The alignment is made by loosening the two mounting screws of the cylinder block and sliding the whole assembly into position.

NOTE: This tool is a must for working on AI-500's

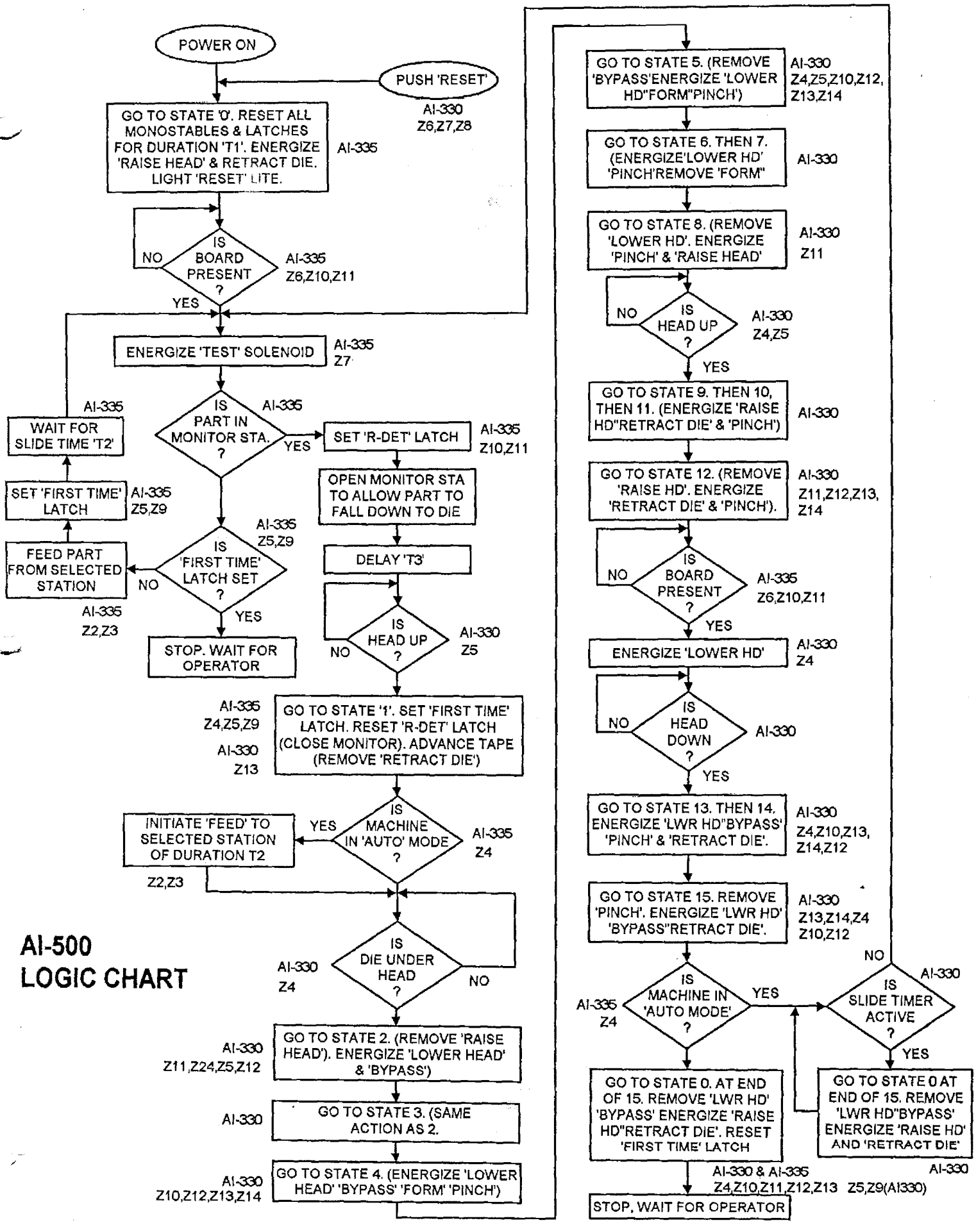
BOARD	FUNCTION
AI-330 AI-335	Control Boards: Contain state counter and decoder logic. Receive sensor input and send instructions to driver boards.
AI-320	Driver board for air solenoids.
AI-260	X-Y driver board for selection stations. Two are required for more than 24 stations. Refer to AI-500 LOGIC FLOW CHART at the end of the module for relationship of AI-330 and AI-335 boards to machine cycle.
AI-260	Reader Interface

Objective #16
Sensor Adjustments

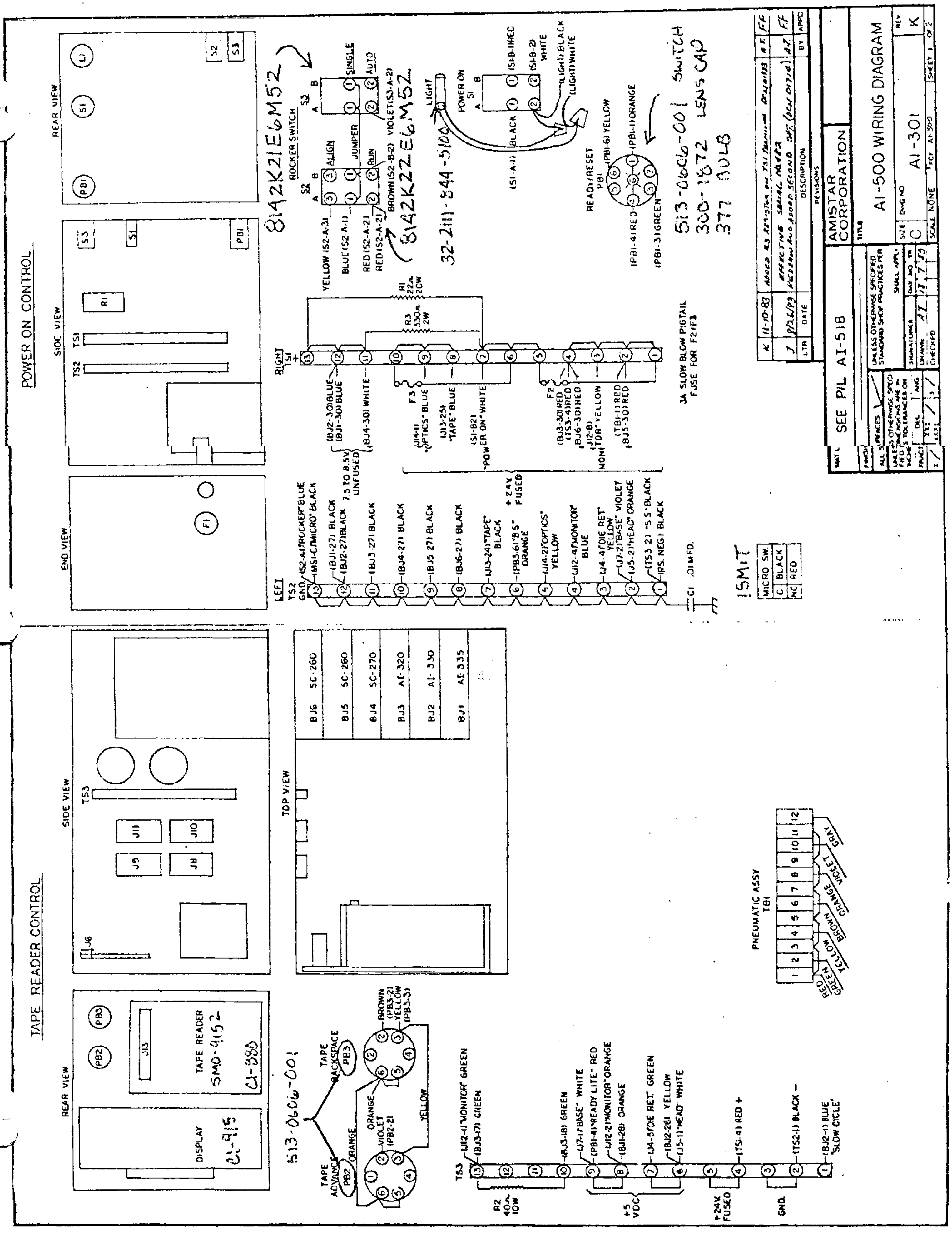
Generally a sensor shutter should be adjusted to penetrate 2/3 the sensor at the point of travel where the impulse will be sent to the machine logic signalling the correct position of the assembly. Malfunction symptoms for the various sensors are listed below.

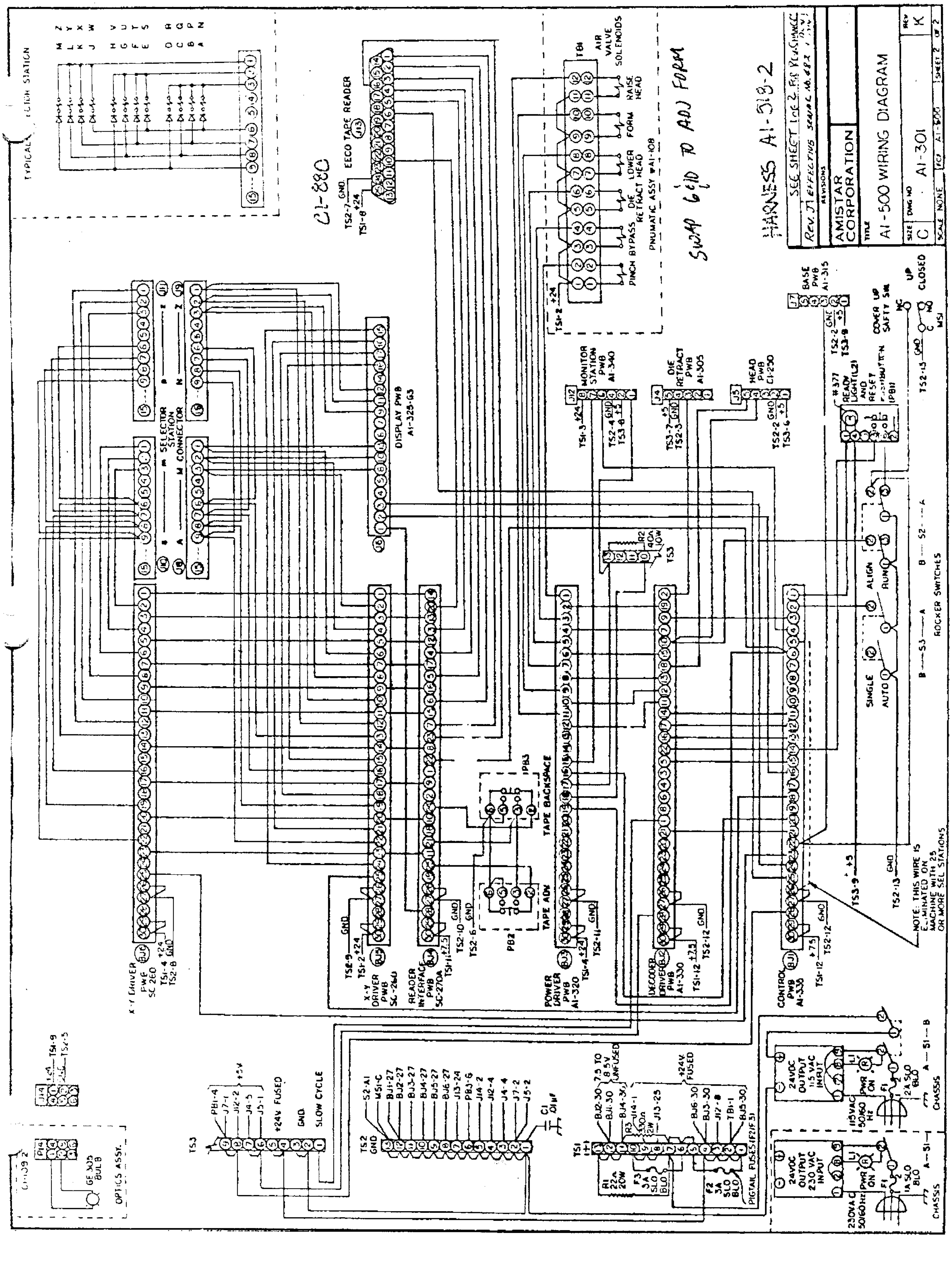
SENSOR	SIGNALS	MALFUNCTION SYMPTOMS	OUTPUT
Monitor Station	Part/No Part Open/Closed	Machine cycles with no part present. Machine stops without cycling new part.	-5
Head Up	Head Up	Part drops to die set and machine stops.	+5
Head Down	Head Down	Head picks up part but does not continue to board. Head goes to board and stops. High pressure does not remain on long enough for proper insertion.	+5
Die Retract	Out/In	Head will not come down. Head, die retract and side formers operate together at once.	+5
Board Present	Board/No Board	Cycles once then stops. Machine stops.	+5

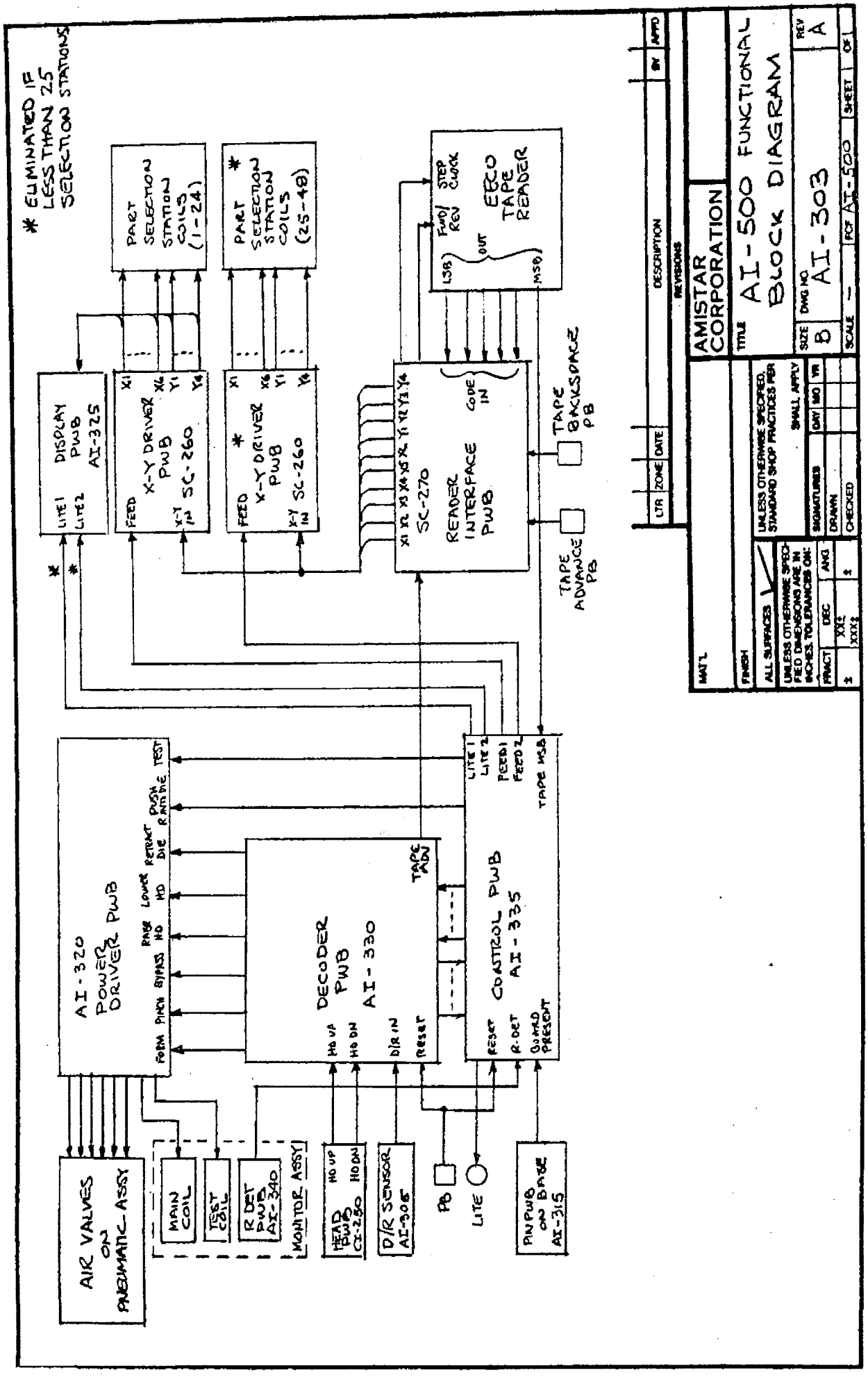
JIM, THIS IS THE SYMTOM OF A BAD MONITOR STATION SENSOR.. CHECK THE WIRES ON THE SENSOR BOARD

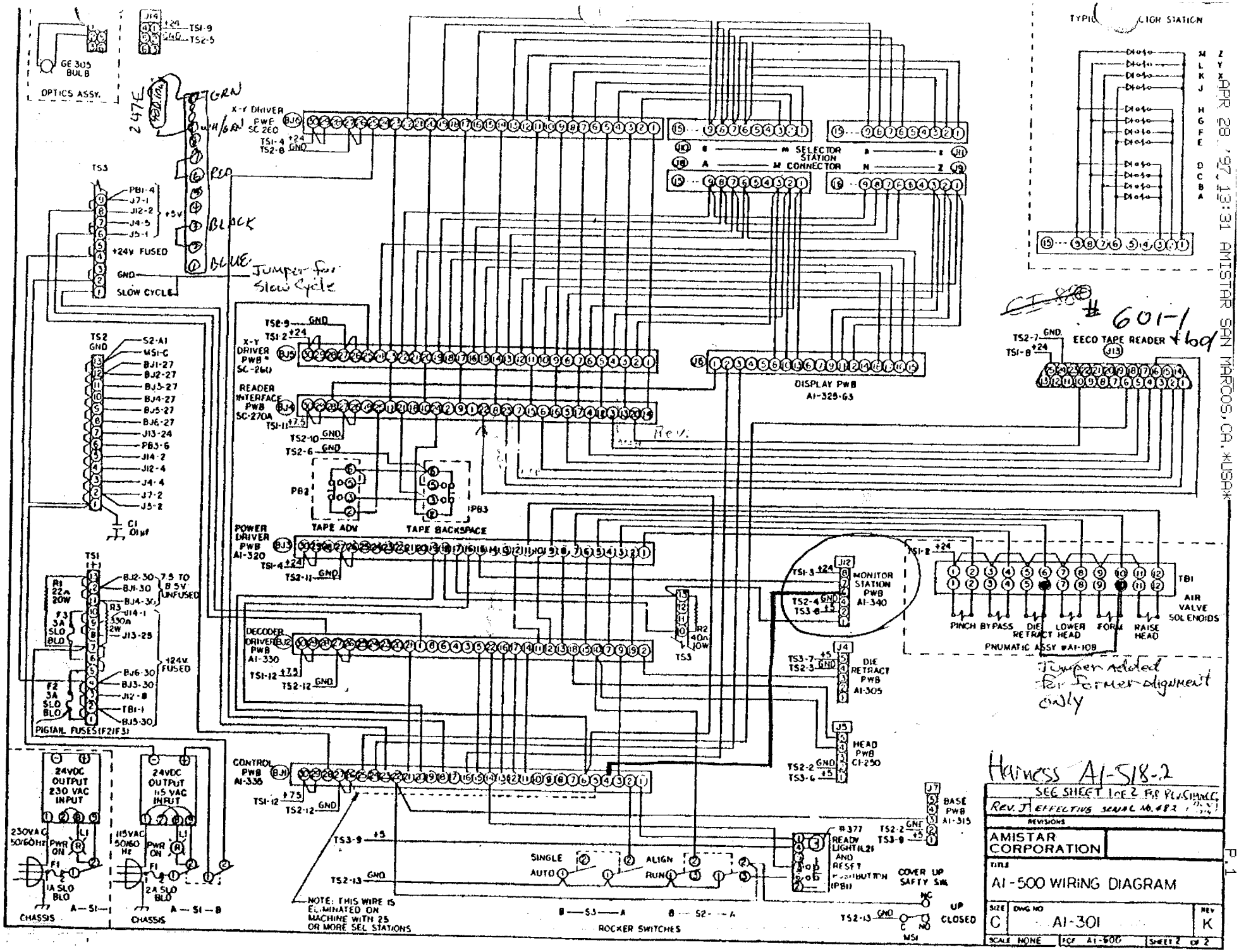


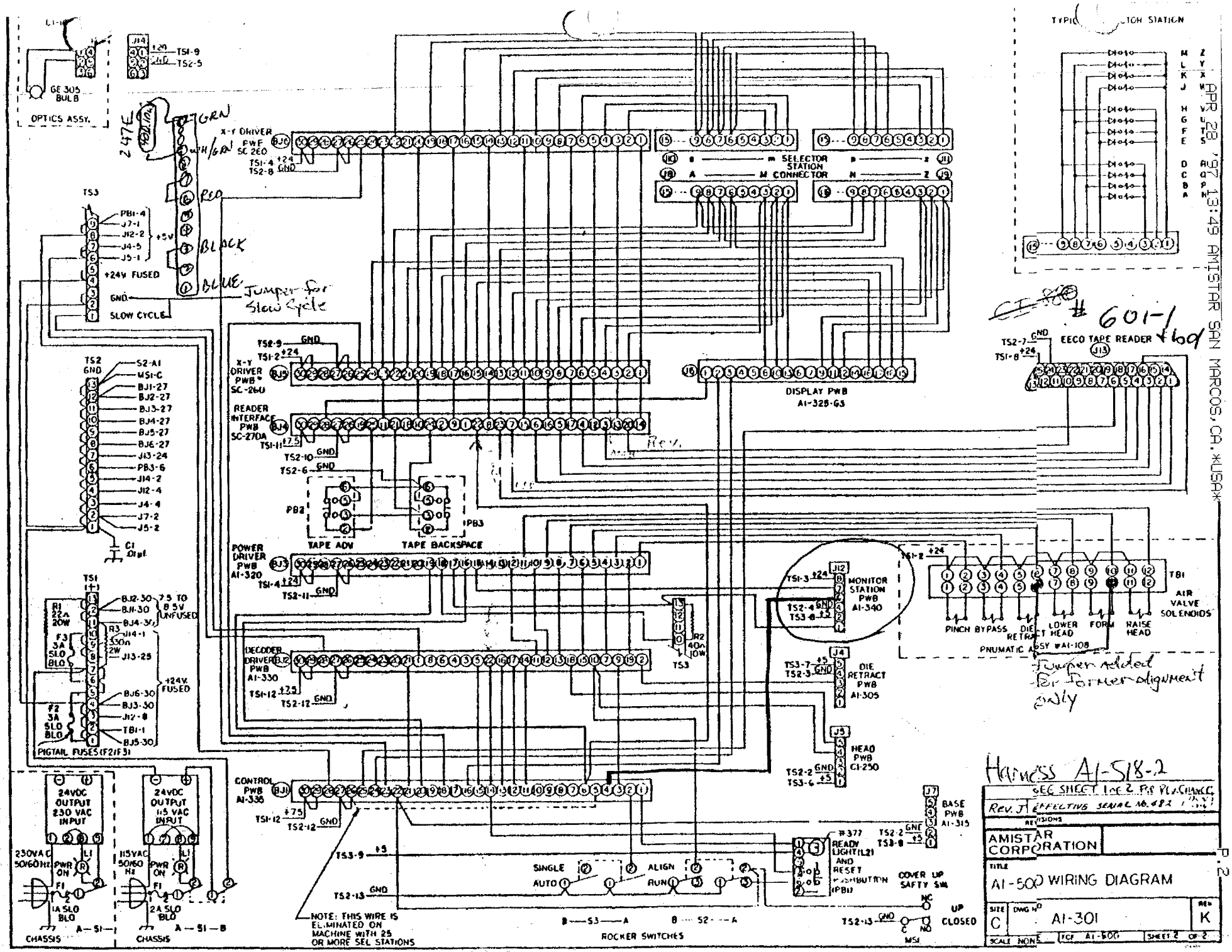
AI-500 LOGIC CHART


POWER ON CONTROL
REAR VIEW
SIDE VIEW
END VIEW
TAPE READER CONTROL
TOP VIEW
ROCKER SWITCH
ALIGN
JUMPER
RUN
SINGLE
AUTO
POWER ON
LIGHT
READY/RESET
8142K21E6M52
8142K22E6M52
32-2111-544-5100
513-0606-001 SWITCH
300-1872 LENS CAP
377 BULB
3A SLOW BLOW PIGTAIL FUSE FOR F2/F3
15MIT
MICRO SW.
C BLACK
NC RED
PNEUMATIC ASSY TB1
TAPE READER SMO-4152
DISPLAY
TAPE BACKSPACE
TAPE ADVANCE
513-0606-001
BJ6 SC-260
BJ5 SC-260
BJ4 SC-270
BJ3 AI-320
BJ2 AI-330
BJ1 AI-335
SEE P/L AI-518
AMISTAR CORPORATION
AI-500 WIRING DIAGRAM
AI-301
REV K
SHEET 1 OF 2


AMISTAR CORPORATION
AI-500 WIRING DIAGRAM
AI-301
HARNESS AI-318-2
SWAP 6 & 10 TO ADJ FORM
CI-880
EECO TAPE READER
DISPLAY PWB AI-325-G3
SELECTOR STATION CONNECTOR
X-Y DRIVER PWB SC-260
READER INTERFACE PWB SC-270A
POWER DRIVER PWB AI-320
DECODER DRIVER PWB AI-330
CONTROL PWB AI-330
TAPE BACKSPACE
TAPE ADV
ROCKER SWITCHES
AIR VALVE SOLENOIDS
PNUMATIC ASSY AI-108
MONITOR STATION PWB AI-340
DIE RETRACT PWB AI-305
HEAD PWB CI-250
BASE PWB AI-315
OPTICS ASSY.
SLOW CYCLE
CHASSIS


* ELIMINATED IF LESS THAN 25 SELECTION STATIONS
PART SELECTION STATION COILS (1-24)
PART SELECTION STATION COILS (25-48)
ECCO TAPE READER
STEP CLOCK
FWD/REV
OUT
LSB
MSB
DISPLAY PWB AI-325
LITE1
LITE2
X-Y DRIVER PWB SC-260
FEED
X-Y IN
X-Y OUT
SC-270 READER INTERFACE PWB
CODE IN
TAPE BACKSPACE PB
TAPE ADVANCE PB
AI-320 POWER DRIVER PWB
FORM
PUNCH
BYPASS
PAGE HD
LOWER HD
RETRACT DIE
PUNCH REMOTE
TEST
DECODER PWB AI-330
HD UP
HD DN
DIR IN
RESET
TAPE ADV
CONTROL PWB AI-335
FEED1
FEED2
TAPE MSB
R-DET
GUARD PRESENT
AIR VALVES ON PNEUMATIC ASSY
MAIN COIL
TEST COIL
R DET PWB AI-340
MONITOR ASSY
HEAD PWB CI-280
D/R SENSOR AI-305
PB
LITE
PIN PWB ON BASE AI-315
REVISIONS
LTR
ZONE
DATE
DESCRIPTION
BY
APPD
AMISTAR CORPORATION
TITLE AI-500 FUNCTIONAL BLOCK DIAGRAM
SIZE B
DWG NO AI-303
REV A
SCALE —
REF AI-500
SHEET
OF
MATL
FINISH
ALL SURFACES
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:
FRACT
DEC
ANG
XX±
XXX±
SHALL APPLY
SIGNATURES
DRAWN
CHECKED
DAY
MO
YR




GE 305 BULB
OPTICS ASSY.
J14
+24V
GND
TS1-9
TS2-5
247E
GRN
WHT/GRN
RED
BLACK
BLUE
X-Y DRIVER PWB SC 260
BJ6
TS1-4 +24
TS2-8 GND
SELECTOR STATION CONNECTOR
J11
J9
TS3
PB1-4
J7-1
J12-2
J4-5
J5-1
+5V
+24V FUSED
GND
SLOW CYCLE
Jumper for Slow Cycle
TS2
S2-A1
MS1-C
BJ1-27
BJ2-27
BJ3-27
BJ4-27
BJ5-27
BJ6-27
J13-24
PB3-6
J14-2
J12-4
J4-4
J7-2
J5-2
C1 .01μf
TS2-9 GND
TS1-2 +24
X-Y DRIVER PWB SC-260
BJ5
DISPLAY PWB A1-328-G3
READER INTERFACE PWB SC-270A
BJ4
TS1-11 +5
TS2-10 GND
TS2-6 GND
PB2
PB3
TAPE ADV
TAPE BACKSPACE
TS2-7 GND
TS1-8 +24
EECO TAPE READER
J13
601-1 Hog
POWER DRIVER PWB A1-320
BJ3
TS1-3 +24
TS2-11 GND
TS1
R1 22Ω 20W
F3 3A SLO BLO
R3 50Ω 2W
BJ2-30
BJ1-30
BJ4-30
7.5 TO 8.5V UNFUSED
J14-1
J13-25
F2 3A SLO BLO
BJ6-30
BJ3-30
J12-8
TB1-1
BJ5-30
+24V FUSED
PIGTAIL FUSES (F2 & F3)
DECODER DRIVER PWB A1-330
BJ2
TS1-12 +5
TS2-12 GND
R2 40Ω 10W
TS3
MONITOR STATION PWB A1-340
J12
TS1-3 +24
TS2-4 GND
TS3-8 +5
TB1
AIR VALVE SOLENOIDS
PINCH
BYPASS
DIE RETRACT
LOWER HEAD
FORM
RAISE HEAD
PNUMATIC ASSY #A1-108
Jumper added for former alignment only
J4
TS3-7 +5
TS2-3 GND
DIE RETRACT PWB A1-305
J5
HEAD PWB C1-250
TS2-2 GND
TS3-6 +5
CONTROL PWB A1-336
BJ1
TS1-12 +5
TS2-12 GND
J7
BASE PWB A1-315
TS2-2 GND
TS3-8 +5
#377 READY LIGHT (L2) AND RESET PUSHBUTTON (PB1)
TS3-9 +5
TS2-13 GND
SINGLE
AUTO
ALIGN
RUN
COVER UP SAFTY SW
NC
NO
UP CLOSED
TS2-13 GND
MS1
NOTE: THIS WIRE IS ELIMINATED ON MACHINE WITH 25 OR MORE SEL STATIONS
B — S3 — A
B — S2 — A
ROCKER SWITCHES
24VDC OUTPUT 230 VAC INPUT
230VAC 50/60Hz
PWR ON
LI
R
F1
1A SLO BLO
CHASSIS
A — S1 — A
24VDC OUTPUT 115 VAC INPUT
115VAC 50/60 Hz
2A SLO BLO
CHASSIS
A — S1 — B
TYPICAL SELECTION STATION
M Z
L Y
K X
J W
H V
G U
F T
E S
D R
C Q
B P
A
APR 28 '87 13:49 AMISTAR SAN MARCOS, CA. *USA*
Harness A1-518-2
SEE SHEET 1 OF 2 FOR REVISIONS
REV. J EFFECTING SERIAL NO. 482
AMISTAR CORPORATION
TITLE
A1-500 WIRING DIAGRAM
SIZE C
DWG NO A1-301
REV K
SCALE NONE
FOR A1-500
SHEET 2 OF 2

Amistar
Better value. By design.

25 years

Amistar Corporation
237 Via Vera Cruz
San Marcos, CA 92069
Tel: [619] 471-1700
Fax: [619] 471-9065

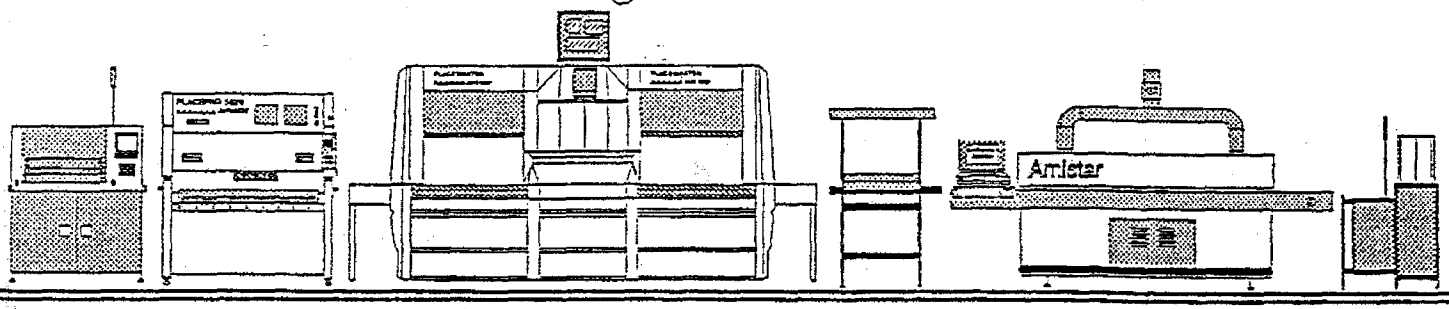
To: Suzanne 503-232-7910 Page 1 of 2

Company: Sign Video (Including this cover page)

From: Rick (619-471-9065 Date: 4/28/97

Subject: AI 500 Wiring Diagram

FAX TRANSMISSION



☆ ☆ ☆ ☆ ☆ MESSAGE ☆ ☆ ☆ ☆ ☆

— Sensor connector is circled, signal wire is highlighted.

Good Luck!

— Please contact us immediately if any portion of this message is unclear —

AT-500

SEP 13 1996

Slot in formers
must be absolutely
perpendicular

rather touchy adjustment

air pressure
90 regulated to 80

Check regulator / gauge

air valve itself
take body of solenoid (air valve)
see a stem that also turns &
may need a spanner wrench to get
those out. Don't compress stem.
See spring & plunger - seals
both ends & when worn out a
noticeable indentation in seals.
Might give a diff amount of air
each time.

SEP 13 1996

Amistar

Slight head rotation

Slight misalign of die to head

↳ if too far forward or back will not close (bump em slightly)

→ usually head rotation on shaft

position of jaws in rel. to die

2 screws - head clamps onto shaft.

~~alignment~~

Die retract tool to make the adjustment ~~part~~ - must have that tool the tool → AI-017 die retract tool.

In stock.

Amistar

Better value. By design.

FAX

TO:	Suzanne	**PHONE NUMBER:**	503-232-4943
COMPANY:	Sign Video	**FAX NUMBER:**	503-232-7910
FROM:	Dale Johnson	**TOTAL PAGES:**	2
DATE:	22 April 1997		
SUBJECT:	AI-500 Rocking Blocks		

Suzanne,

Here is the drawing you need. You should order Items 1,3, and 6. Item 1, Bushing, is pressed and Loctited in place so getting the old one out can make for a challenging afternoon. When installing the new Bushing, be sure it is seated completely and not rotated. You can order the entire Rocking Block Assy. (AI-714) if removing the old bushings is too difficult.

Let me know if you have any questions.

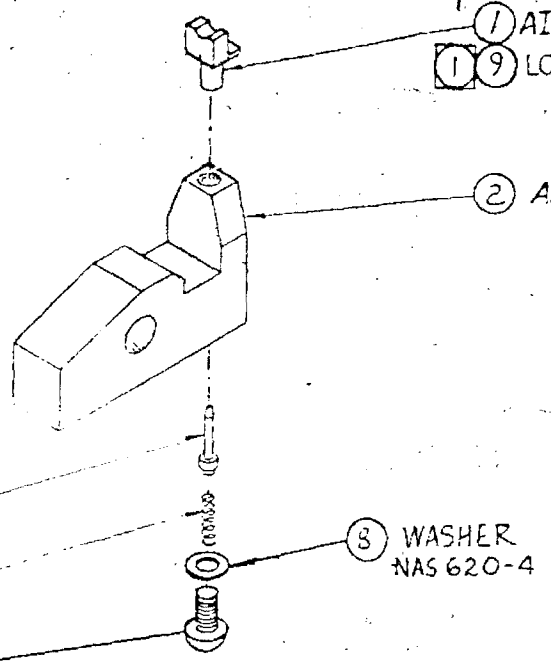
Best Regards,

Dale Johnson
Customer Support Engineer
Phone/FAX: 360-687-6308
E-Mail: dale@amistar.com

Rocking Block Assy. AI-714

2 x 410.00 only one in stock
2 - 3 wks. for 2nd one

4/25/97



(1) AI-760-1 BUSHING #160.00 x 2 = #320.00 — 5 in stock
(19) LOCTITE 601
(2) AI-718 ROCKING BLOCK
20 in stock 10.00 ea — 2.
AI-761 PIN (5)
(in stock) 2.00 ea
CI-008B-4MW SPRING (6)
(8) WASHER NAS620-4
SCREW (7) BUTCAP 4-40 X 1/8

LTR	DATE	DESCRIPTION	BY	APPD
F	12-21-88	DCN 06849	RN	JLW
E	6-6-88	DCN 6334	D	JLW
D	2-4-88	DCN 05359	CHC	JLW
B	12-8-86	DCN 05213	CHC	JLW
A	5/6/86	NEW RELEASE (DCN04364)	R.D.	

REVISIONS

P.L. ISSUED

(1) FOR AI-760-1 BUSHINGS WHICH SLIP FIT INTO AI-718 ROCKING BLOCKS, APPLY A SMALL DROP OF LOCTITE 601 AFTER BOTH PARTS HAVE BEEN DEGREASED WITH TRI-CHLOR. BE CAREFUL THAT THE THRU HOLE OF AI-760-1 REMAINS OPEN.

NOTES:

MAT'L

FINISH —

ALL SURFACES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:

FRACT	DEC	ANG
± —	XX ± — XXX ± —	± —

UNLESS OTHERWISE SPECIFIED, STANDARD SHOP PRACTICES PER SHALL APPLY

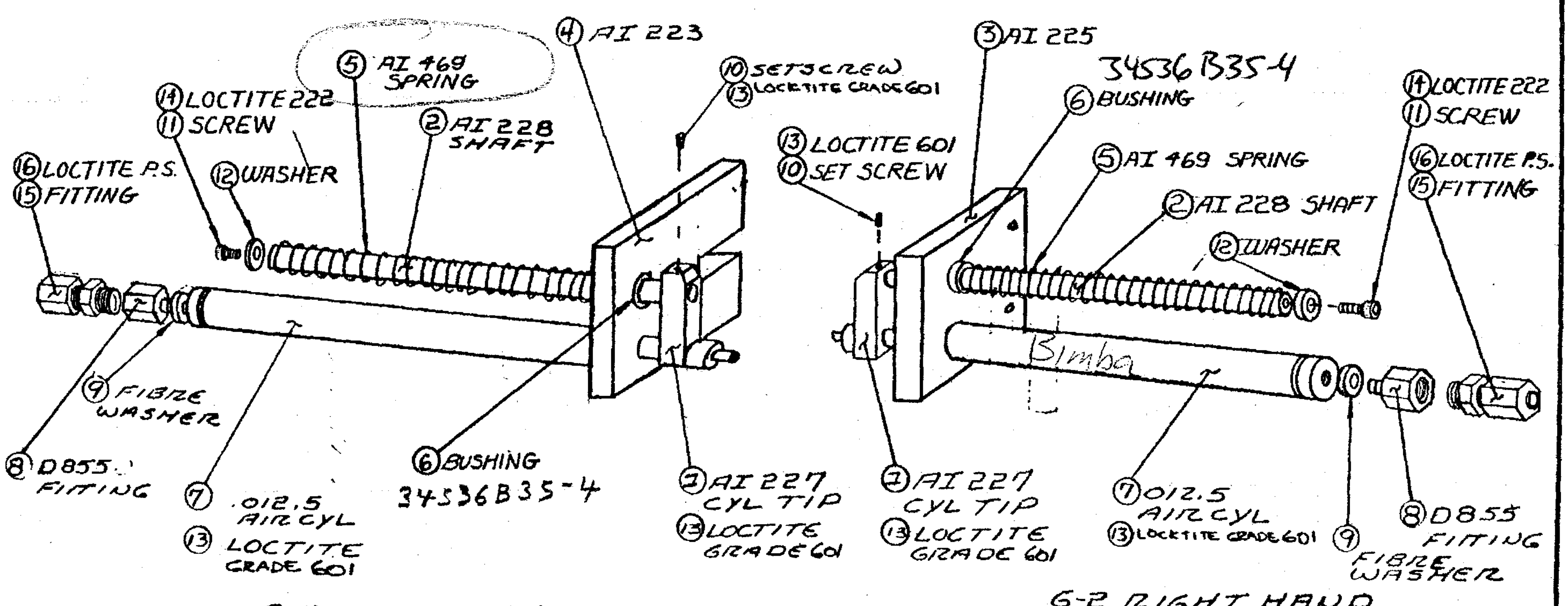
SIGNATURES	DAY	MO	YR
DRAWN R.D.	6	5	86
CHECKED			

AMISTAR CORPORATION

TITLE: ASSY, ROCKING BLOCK

SIZE B | DWG NO. AI-714 | REV F

SCALE 2 X | FCF AI-10 | SHEET 1 OF 1



LTR	ZONE	DATE	DESCRIPTION	BY	APPD
D		7/13/19	ADDED ITEMS 15 & 16	17	Cr
C		3/5/9	ITEM 11 1/2 LONG WAS 1/4, ADDED ITEM 14 222 LOCTITE	Raw	CR
B		7/24/9	AI 223 WAS 225, AI 225 WAS 223 ADDED LOCKTITE	Raw	
A			RELEASED	CR	

REVISIONS

AL. ISSUED

MAT'L	AMISTAR CORPORATION
FINISH	TITLE: FORMER ASSY G1 & G2
ALL SURFACES ✓ / UNLESS OTHERWISE SPECIFIED, STANDARD SHOP PRACTICES PER ... SHALL APPLY	SIZE: B / DWG NO: AI 394 / REV: D
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: FRACT ± / DEC .XX± .XXX± / ANG ±	SIGNATURES / DAY / MO / YR — DRAWN — CHECKED
	SCALE / FCF AI-391 / SHEET 1 OF 1

Post-it® Fax Note 7671	Date 5/15 / # of pages ▶ 1
To Susanne	From Don Tobar
Co./Dept. Sign Video	Co. Amistar
Phone #	Phone #
Fax # 503 232-7910	Fax #

IBM Parallel Port

Port ADDR 378 (Base): (IN = TO CPU)

Bit	Pin	Polarity	IN/out	Printer Usage
0	2	Normal	OUT	Data to Print
1	3			
2	4			
3	5			
4	6			
5	7			
6	8			
7	9			

for Amistar

ecco 16 = Forward

ecco 10 = Reverse

Bit	ECCO Pin	Amistar PCB Pin
0		7
	+	
1		7
2		6
3		5
4		4
5		3
6		To Control PCB (Vk select)
7		

Port Addr 379 (Base+1)

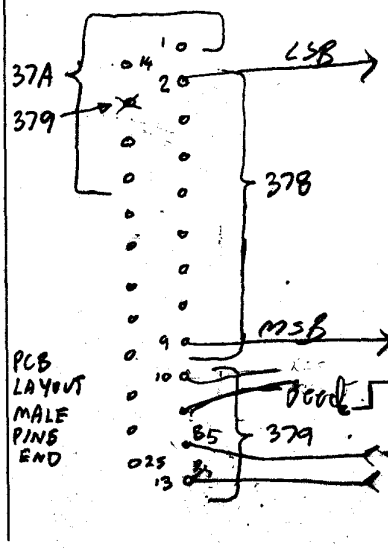
Bit	Pin	Polarity	IN/OUT	used for
0	-			
1	-			
2	-			
3	15	?	IN	error
4	13	Normal	IN	Select
5	12	"	IN	Paper end
6	10	"	IN	acknowledge
7	11	INV	IN	Busy

16 → 4

32 → 5

Port Addr 37A (Base+2):

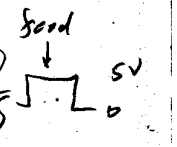
Bit	Pin	Polarity	IN or out	used for
0	1	INV	I/O	strobe
1	14	INV	I/O	auto feed
2	16	Normal	I/O	init printer
3	17	INV	I/O	select input
4	(IRQ 5)		(all have 4K7 pull up in original IBM card)	
5	-			
6	-			
7	-			

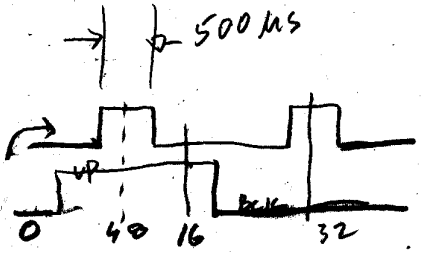


15→0 = end insertion

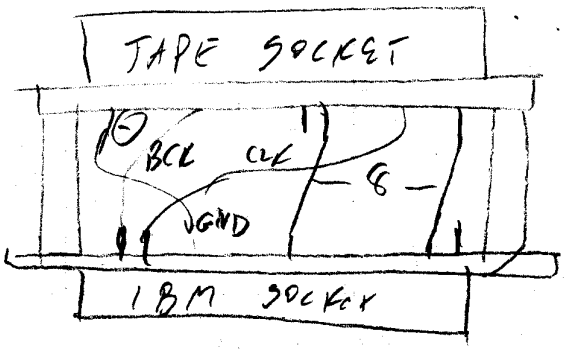
RST = Pin 22 of Decoder

feed = Pin 25 of x-y Driver
Pin 23 of control



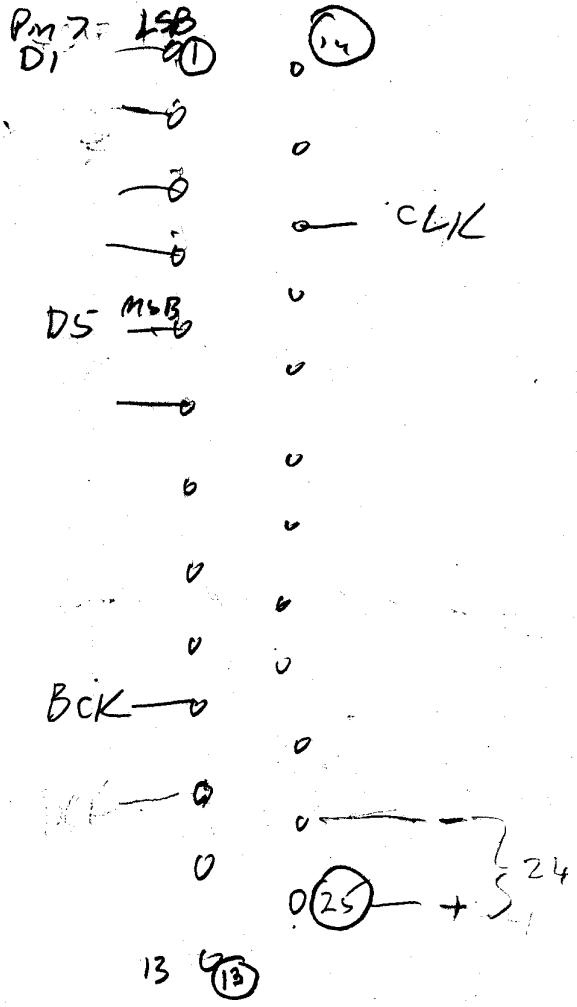


0	1	2	3	4	5	
1	0	0	0	0	0	a
0	1	0	0	0	0	b
0	0	1	0	0	0	D
0	0	0	1	0	0	H



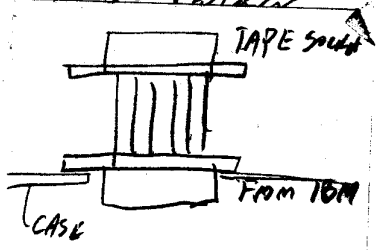
gnd -24?
CK R to gnd

AMISTAR TAPE CONNECTOR:



Spacers to make adapter

VDE for holder

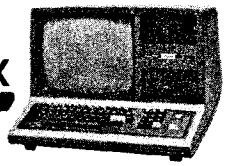


In the following table, we summarize the keyboard and video display control characters.

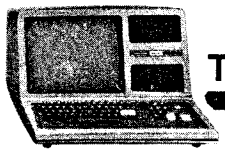
Code Dec.	Code Hex.	Keyboard †	Video Display PRINT CHR$ *(code)*	POKE *vidram, code**
1	00		No effect	See **Special Characters** 0 through 31 later in this Appendix.
1	01	BREAK SHIFT ↑ A	No effect	
2	02	SHIFT ↑ B	No effect	
3	03	SHIFT ↑ C	No effect	
4	04	SHIFT ↑ D	No effect	
5	05	SHIFT ↑ E	No effect	
6	06	SHIFT ↑ F	No effect	
7	07	SHIFT ↑ G	No effect	
8	08	← SHIFT ↑ H	Backspace and erase	
9	09	→ SHIFT ↑ I	Tab (0, 8, 16, 24, . . .)	
10	0A	↓ SHIFT ↑ J	Move cursor to start of next line and erase line	
11	0B	SHIFT ↑ K	No effect	
12	0C	SHIFT ↑ L	No effect	
13	0D	ENTER SHIFT ↑ M	Move cursor to start of next line and erase line	
14	0E	SHIFT ↑ N	Cursor on	
15	0F	SHIFT ↑ O	Cursor off	
16	10	SHIFT ↑ P	No effect	
17	11	SHIFT ↑ Q	No effect	
18	12	SHIFT ↑ R	No effect	
19	13	SHIFT ↑ S	No effect	
20	14	SHIFT ↑ T	No effect	
21	15	SHIFT ↑ U	Swap space compression/ special characters	
22	16	SHIFT ↑ V	Swap special/alternate characters	
23	17	SHIFT ↑ W	Double-size characters	
24	18	SHIFT ← SHIFT ↑ X	Backspace without erasing	
25	19	SHIFT ↑ Y	Advance cursor	
26	1A	SHIFT ↑ Z	Move cursor down	
27	1B	SHIFT ↑	Move cursor up	
28	1C	SHIFT ↑ ,	Move cursor to upper left corner	
29	1D	SHIFT ↑ 9	Erase line and start over	
30	1E	SHIFT ↑ .	Erase to end of line	
31	1F	CLEAR SHIFT ↑ /	Erase to end of display	

† Some of these keyboard characters can only be input using the INKEY$ function.

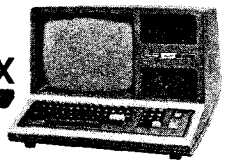
***See** Special Characters 0 through 31 later in this Appendix.



Code		Key-board	Video Display	
Dec.	Hex.		PRINT CHR$ *(code)*	POKE *vidram, code*
32	20	(SPACEBAR)	ø	ø
33	21	!	!	!
34	22	"	"	"
35	23	#	#	#
36	24	$	$	$
37	25	%	%	%
38	26	&	&	&
39	27	'	'	'
40	28	(	(	(
41	29	)	)	)
42	2A	*	*	*
43	2B	+	+	+
44	2C	,	,	,
45	2D	-	-	-
46	2E	.	.	.
47	2F	/	/	/
48	30	0	0	0
49	31	1	1	1
50	32	2	2	2
51	33	3	3	3
52	34	4	4	4
53	35	5	5	5
54	36	6	6	6
55	37	7	7	7
56	38	8	8	8
57	39	9	9	9
58	3A	:	:	:
59	3B	;	;	;
60	3C	<	<	<
61	3D	=	=	=
62	3E	>	>	>
63	3F	?	?	?
64	40	@	@	@
65	41	A	A	A
66	42	B	B	B
67	43	C	C	C
68	44	D	D	D

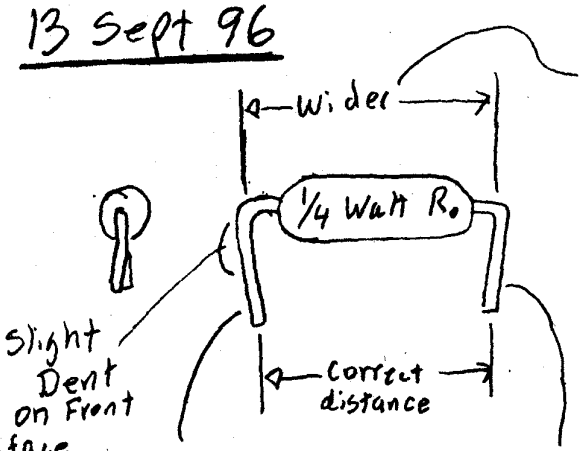


Code		Key-board	Video Display	
Dec.	Hex.		PRINT CHR$ *(code)*	POKE *vidram, code*
69	45	E	E	E
70	46	F	F	F
71	47	G	G	G
72	48	H	H	H
73	49	I	I	I
74	4A	J	J	J
75	4B	K	K	K
76	4C	L	L	L
77	4D	M	M	M
78	4E	N	N	N
79	4F	O	O	O
80	50	P	P	P
81	51	Q	Q	Q
82	52	R	R	R
83	53	S	S	S
84	54	T	T	T
85	55	U	U	U
86	56	V	V	V
87	57	W	W	W
88	58	X	X	X
89	59	Y	Y	Y
90	5A	Z	Z	Z
91	5B	↑	[	[
92	5C		\	\
93	5D		]	]
94	5E		^	^
95	5F		—	—
96	60	SHIFT @	`	`
97	61	A	a	a
98	62	B	b	b
99	63	C	c	c
100	64	D	d	d
101	65	E	e	e
102	66	F	f	f
103	67	G	g	g
104	68	H	h	h
105	69	I	i	i



Code		Key-board	Video Display	
Dec.	Hex.		PRINT CHR$ *(code)*	POKE *vidram, code*
106	6A	J	j	j
107	6B	K	k	k
108	6C	L	l	l
109	6D	M	m	m
110	6E	N	n	n
111	6F	O	o	o
112	70	P	p	p
113	71	Q	q	q
114	72	R	r	r
115	73	S	s	s
116	74	T	t	t
117	75	U	u	u
118	76	V	v	v
119	77	W	w	w
120	78	X	x	x
121	79	Y	y	y
122	7A	Z	z	z
123	7B		{	{
124	7C		¦	¦
125	7D		}	}
126	7E		~	~
127	7F		±	±
128	80	Codes 128-191 output graphics characters. See the graphic display table in this Appendix.		
192 : :	C0	Codes 192-255 output either space compression codes or special characters when used with PRINT CHR$ *(code)*.		
255	FF	They always output special characters when used with POKE *vidram, code*. See the special character table in this Appendix.		

13 Sept 96



This happens to about 1 part in 3

this lead Bent back

Bent Straight } as Viewed in Jaw down

- Reversed 10 parts in cartridge & still had problem
- Both formers clear holes without touching
- after operating formers by hand, there seems to be more vertical play at left end of part

Possible Causes:

Slight head rotation

" Mis align head - Die - forward/Back

former slot must be perpendicular

air pressure problems

There are Fake unistar Parts made in KOREA

Observations:

① Die (retract) has 1/100th Horz/Vert or rotational play

② Head can be pushed back ≈ 1/64" - on spring - little rotation or Left-Right

③ formers: left ≈ .005" rotation Right ≈ same — Typically loose

④ Jaws grip tightly

Problem is on Non Gold band end

⑤ hole that Left former goes thru is eroded →

16 Sept DALE

.050 hole in Die Retract AIR Cylinder - cover with tape, poke hole in tape to slow die - this stops part Bounce in Die

Can try lower AIR - 60-90 OK try 65-70 (Set head reg 10-20 psi)

is former coming in at an angle (from front & back?)

are former Tips flush with Die & Slot lined up with die

try swapping tips (Left/Right) —

" moving Tip back even let it Rub lightly

is lead hitting bottom.

Tied up till 30 Sept 96 — Suggest → Chuck Coons (Best = instructor) DON, TRICK for A1500

hole - .140 W → .139 W (Back)
>.150 H .1405 front

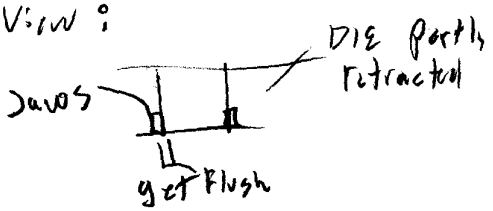
Former .131 .154 High

Shaft: .1855, .1855

23 Sept 96

1) check for <u>head rotation</u> w knife blade at front of Machine

Top View:



2) Right side might cause prob problem – try New Bushing

3) is die in right place Front/Back

4) loosen two bolts at Back, side-allows More die in-out
(under Air cylinder → Bolts that mount Assy to Casting – Note NO AIR mode is when adjust is done

Bolts above left former – hex head NOT socket bolts
Bolts screw into upper casting on left almost behind left former

Moved DIE Assy CASTING ← to reduce clear to 2.005

leads usually a little slanted

is die rotated Left/Right? implied by tip wear not same on L/R faces

when Dale got here the machine wouldn't even feed a part to DIE!

Check parts in Magazines for bent leads!

---

24 Sept 96: 360 687 6308

1 in 75 to 1-100 typical missed rate

800 was 3 in 100 missing

(might have probs mixing New/OLD carts – factory changed some parts for New carts also loaders!

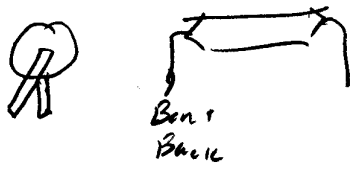
easy to find used carts!

Never heard of AI 500 Breaking teeth (has seen later missing teeth)

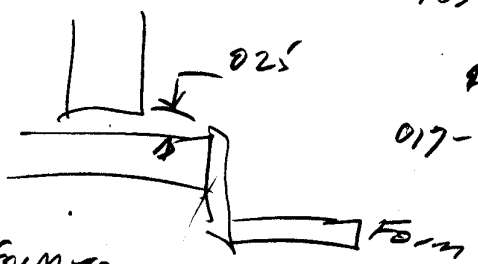
Can file parts to get down to 300 c.c.

6 July 01

Problem:



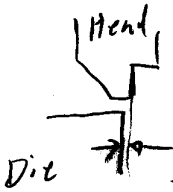
Solution: ① Move Die retract back to .025 spacing btwn front of Block & side-former mounts:



Tested
~~.015~~ - .035
& .025 was best
.017 - .018 is ≈ flush

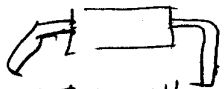
② Align formers

Note this is about 4 mil using Amista's method with AI-017 die retract tool:



Amistar = 0.0 - .002
I left it about .004 since it worked better

also replaced missing rubber pad on top of Head with Pad:



Per Note on other manual: "this can be head too far forward"

17 July 01 - Same Problem
Changed Left former HP - still bad
Mucked with Die-Head spacing - left at .025 gap in back (See above)
Seems OK

19 July:

6.3.1: Gap is visible btwn L. Rear (fixed) Jaw & DIE when down
erosion is visible on both ~~...~~ sides – AI 190 & AI 191 ← suggest replace?

6.3.2 – 5 mil gage won't fit in gap – OK

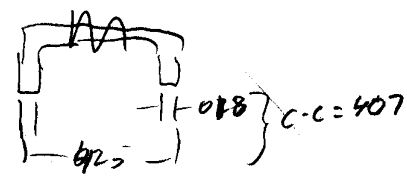
6.3.3 – Replaced Rubber Pad – Set to ≈ 003 overlap

6.3.4 – Previously set at 025, found @ 024 set to 020 – Btwn AI-226 Back & AI 200 front

Test Result: 31 1/4w R's = perfect & smooth
31 Jumpers – OK but not smooth
a few more Jumpers gave some problem,

Jumper Lead: 018 dia
1/4w R = 022 dia
Cap ≈ 020 → for 020 in .400 c-c = 380 c-c die

Die is at .376 c-c & forms parts:

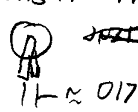


→ Reset dia to ~~.372~~ ~~370~~ ~~.366~~ .363
.3

Cinch was found at .515 btwn blocks (AI 258 & 238)
at back of Assy but left @ ≈ .510

2 Aug 01 – same problem – Ocassional bent leads, left –
Replaced fixed jaws (AI-190-1, AI-191-1)
found ≈ 026+ (< 028) Gap
Set Die forward to ≈ .001 behind Notch = 022 sliding, 023 stops

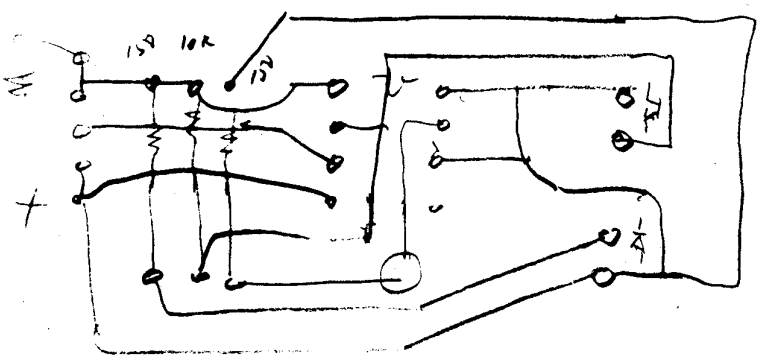
Parts are now at 424 outside which is 406 c-c for 018 lead dia
die is .366   401 " 023 " "
Try .362
error rate ≈ 1/100 both lead dia's
Try 024 Gap
did 113 1/4w – 1 missed
142 1/8w – 1 slight error
leads still:

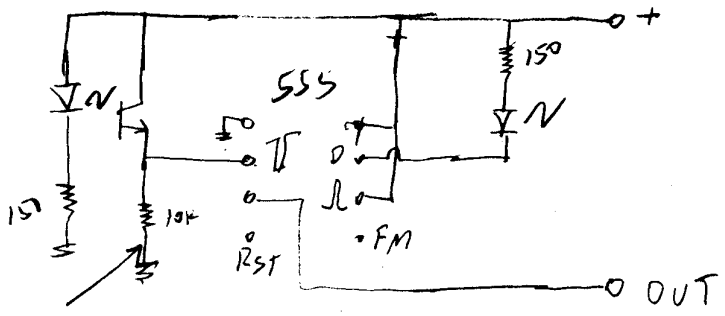


~~[illegible]~~

Amistar AL 205 R&D 23 Jul 81

Cartridge rotation sensor for loader





Added 50 ic ΔR here

AMISTAR 15 Apr 03
760-471 1700

Roland McKnight

- is Cutting Right Ind - appears clamps closed
- replaced leaky AIR HOSE
-

3 in 1 oil - drop on cylinder

041R - Bimba brand
Lube bottom bushing

McGuire - 238-1570
Royal - 231 0982
VS Blasting - 239-5021
Motion 460 0403
Power Transmission - 227 1271 - ALEX = 2570 NW 31st
Helen - Pipeline Steel - 1851