

RH - MACH II

ROLLING HEAD PINSPOTTER



**MACHINERY
DIVISION**

OWNER'S MANUAL

INTRODUCTION

The RH Mach II Rolling Head was designed utilizing the best current technology to provide greater insulation fastening power and reliability.

The inherent minimal material handling combined with the utilization of welded fasteners will insure your shop of a cost efficient, quality product.

Trouble free service is the foundation on which all Duro Dyne Pinspotters are built. Proven solid state components located for easy access. Duro Dyne continues this concept and brings the RH MACH II Rolling Head to a new and higher level of reliability, serviceability and efficiency.

This Guide is designed to help you set up and operate your Mach II Rolling Head at peak performance for years to come.

IMPORTANT

Always follow manufacturer's recommendations for proper safety and handling procedures for all materials used in conjunction with this machine as outlined in Manufacturer's Safety Data Sheet (MSDS) for each product.

LIMITED WARRANTY

Duro Dyne Machinery is manufactured by skilled mechanics, utilizing the latest production techniques. Each unit has been rigorously tested prior to packaging and shipment in order to ensure trouble-free operation.

Your Duro Dyne machine has a two year warranty against defects in material. Any component found to be defective will be repaired or replaced (at the manufacturer's discretion) at no cost if the faulty component is returned freight prepaid to the nearest Duro Dyne Service Department. The warranty does not apply to expendable parts or repairs and service due to improper maintenance or operation procedures.

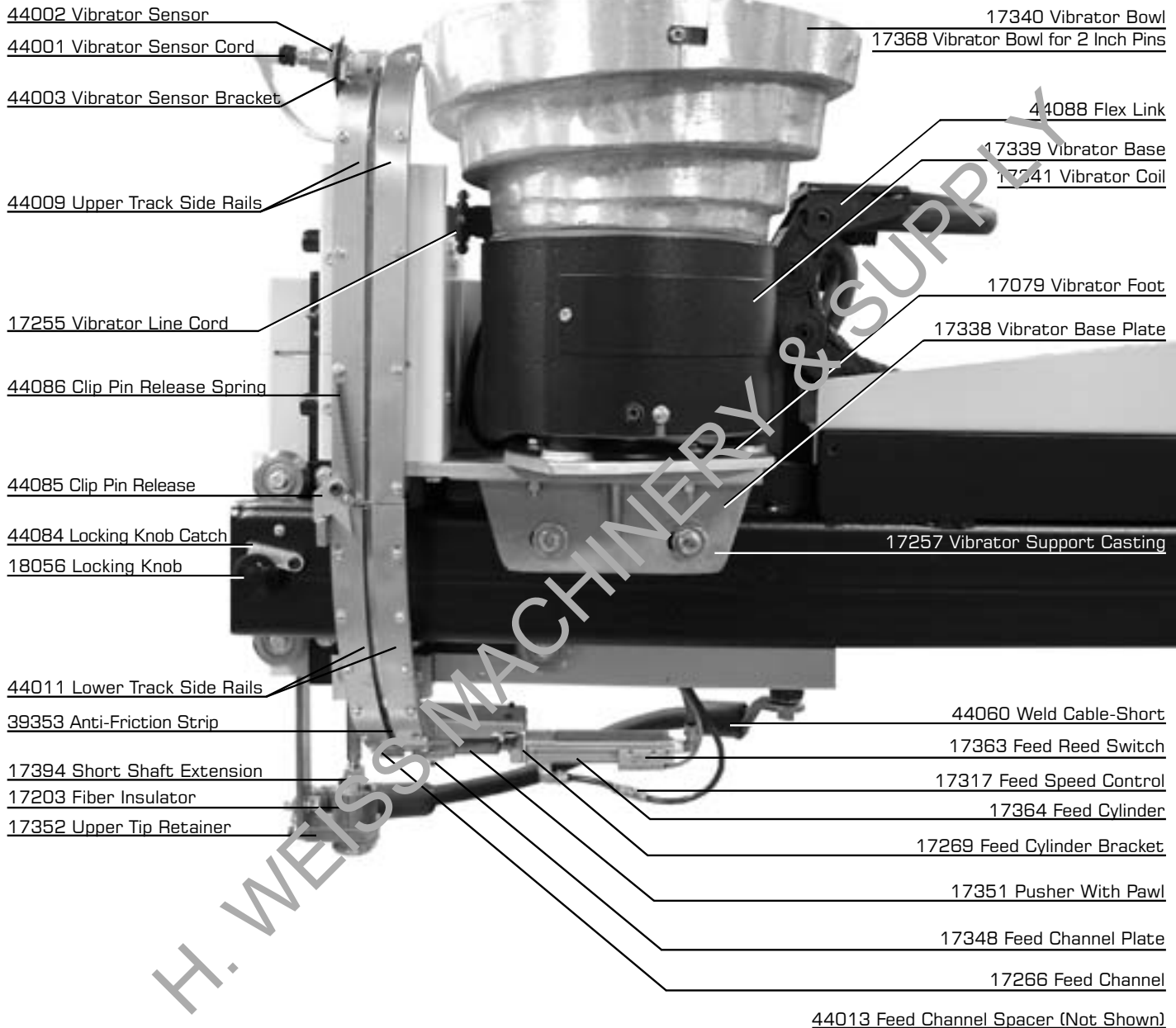
Duro Dyne products have been engineered to maximize operator safety. Unauthorized modification of this product will void the warranty.

All warranty claims must be accompanied by a serial number, date of purchase and the name and address of the distributor it was purchased from.

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PARTS LOCATION***FRAME ASSEMBLY***

PARTS LOCATION***DWELL & FEED ASSEMBLY***

PARTS LOCATION

Located Inside Control Console

17250 Vibrator Speed Control

17256 Vibrator Socket

44006 Vibrator Socket Guard

44007 Vibrator Circuit Breaker

44025 LCD Display

17288 Trigger Actuator Plug

44030 Operations
Display Board

44033 Vibrator Power Switch

44032 Vibrator Lamp

44031 Vibrator Potentiometer
44027 Knob

17276 Upper Bearing

44062 Trolley Mounting Plate

44082 Bearing Mounting Plate

44083 Locking Knob Spring

44061 Weld Cable
Female Camlock

44008 Upper Feed
Track Casting

44065 Control Console

44024 Main Power Switch

44077 Weld Potentiometer
44027 Knob

39110 Pin Feed Switch

44029 Head Test Switch

44087 Clip Pin Release Stop

18056 Locking Knob

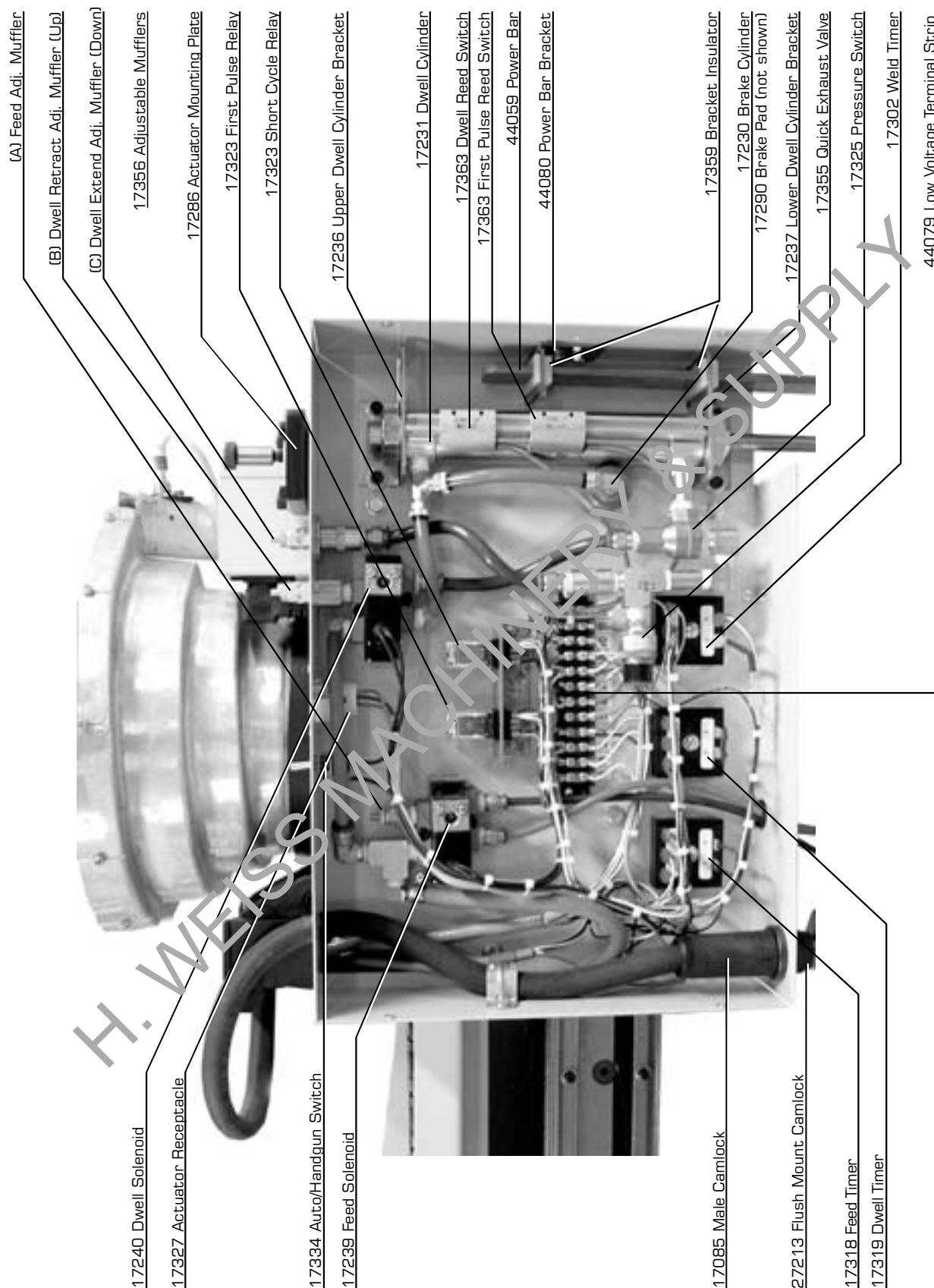
44034 Weld Lamp

17277 Lower Bearing

17261 Lower Feed Track Casting

44071 Feed Cover

CONTROL CONSOLE AND FRONT END ASSEMBLY

PARTS LOCATION**TROLLEY**

PARTS LOCATION

44073 High
Voltage Terminal Strip

44047 Power Contactor

39306 Incoming
Voltage Select Switch

17222 Terminal
Strip Low Voltage

44091 24 Volt Multi-Tap
Low Voltage Control
(XSFMR-2)

44091 24 Volt
Multi-Tap Transformer
(For Contractor)
(XSFMR-1)

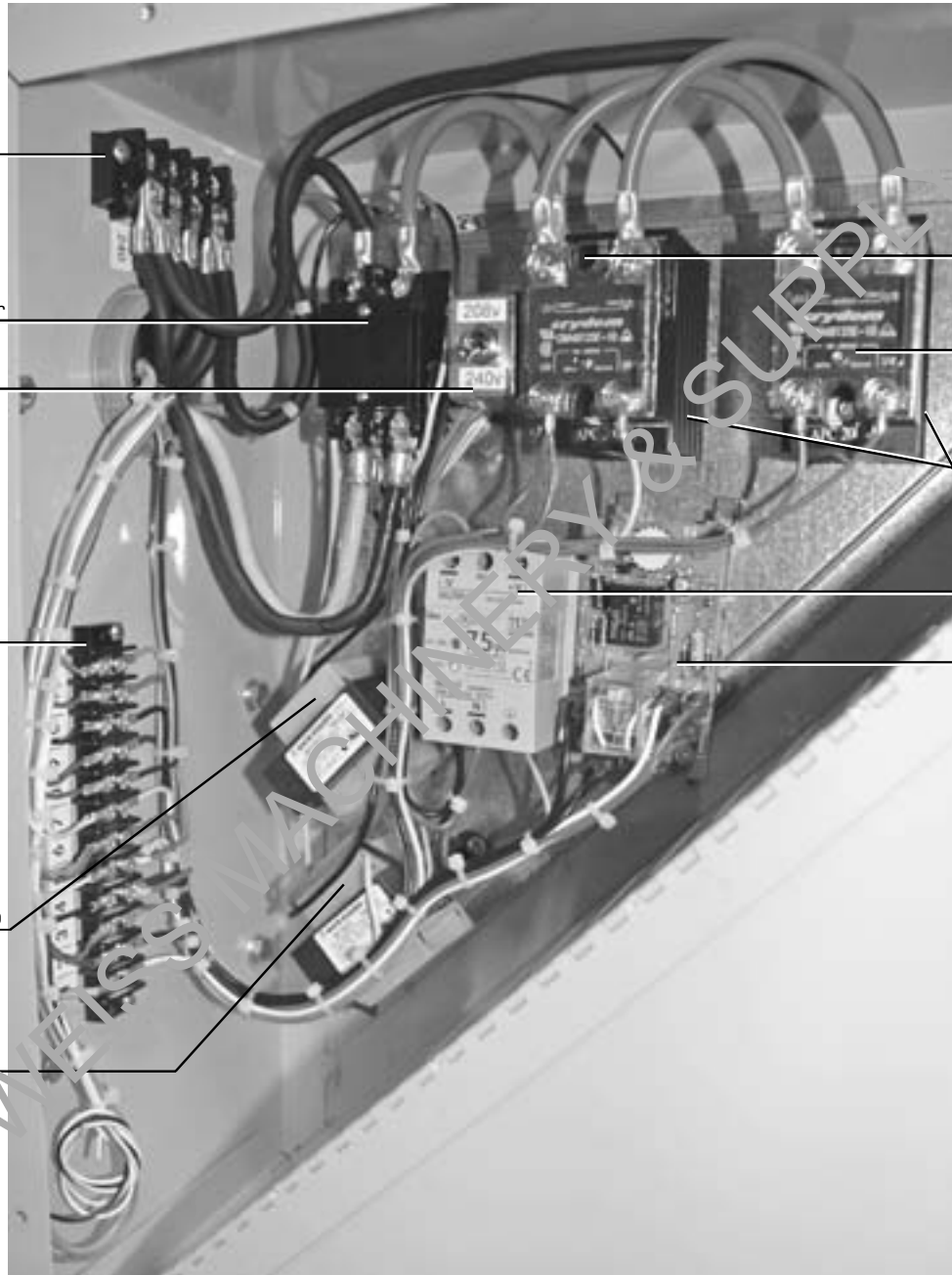
44053
Weld Relay (#1)

44053
Weld Relay (#2)

44054 Heat Sink

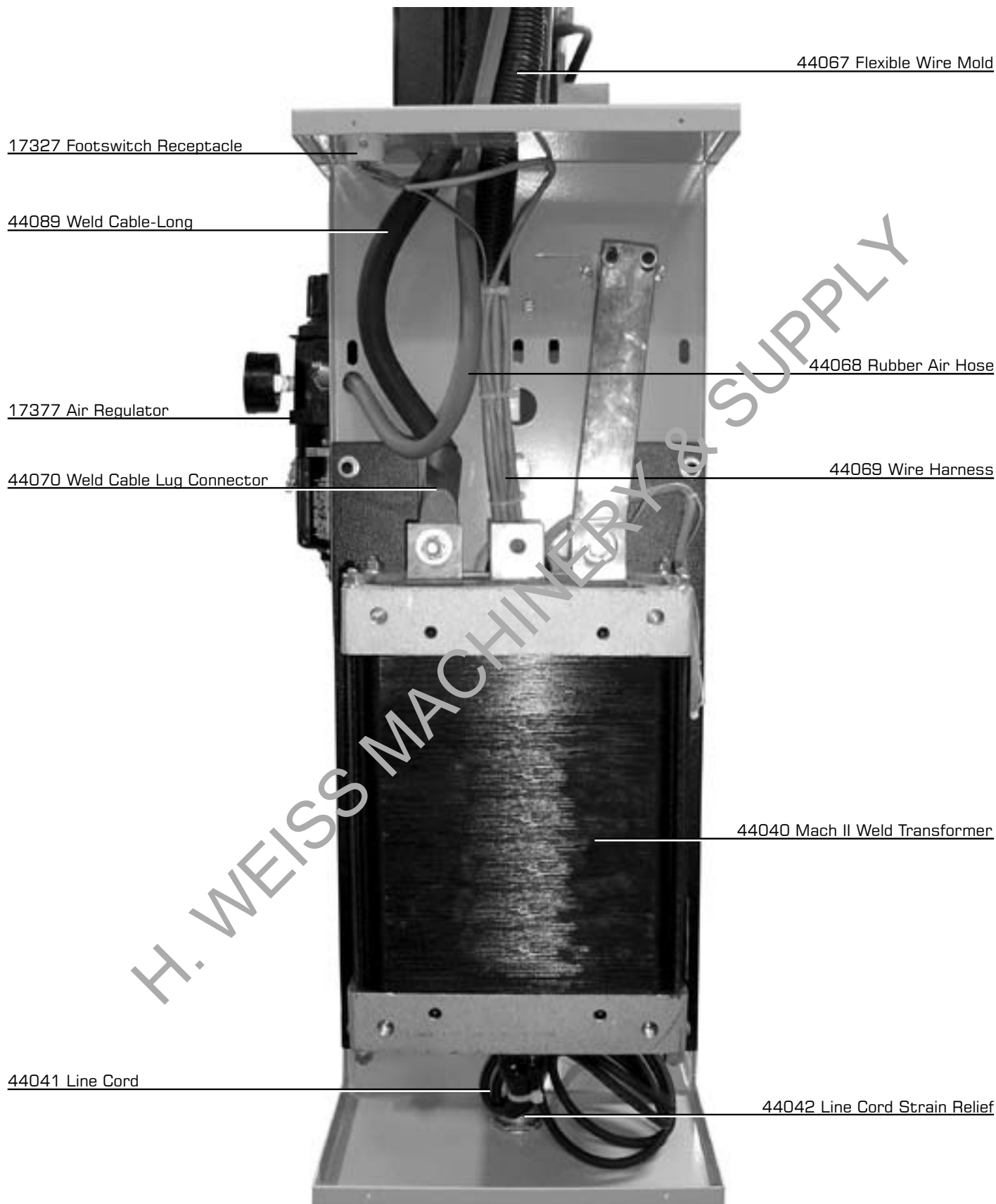
44052 12 Volt DC
Power Supply

44090 Vibrator
Control Relay Board



TRIANGLE ENCLOSURE

PARTS LOCATION



TRANSFORMER ENCLOSURE

MACHINERY
DIVISION



RH MACH II
WIRING DIAGRAM



Triangle Enclosure

AS SHOWN FOR MODELS WITH 24v SINGLE-TAP TRANSF'S (4-WIRES)

NOTE ON RELAY #3: WHITE 20GA JUMPERS BETWEEN TERMINALS- 5-6; 7-8; 9-10; 11-12

AS SHOWN FOR MODELS WITH RELAY/BASE ASSY

Rear Transfomer Encl Assy

SEE SPEC. ABOVE FOR WELD TRANSF OPTIONS

Trolley

20/6 CABLE (WHITE BAND)

20/6 CABLE (BLUE BAND)

16/3 CABLE

20/20 CABLE

18/2 CABLE

RH-II WIRING DIAGRAM

RH-II WIRING DIAGRAM

RH MACH II

INSTALLATION INSTRUCTIONS

- 1)** Connect the Power Pack to a source of 208-240V 100 Amp. power. This service should be connected to a 60 amp disconnect box fitted with 60 amp slow blow fuses. The Power supply line to the power pack pigtail should be #6 (or heavier) wire to minimize voltage losses. The black and white wires are the power, the green is ground. Select 208V or 240V at the voltage switch in the triangle enclosure to the closest match to the power supply voltage.
- 2)** Attach the Actuator Arm to the socket on the top of the Trolley.
- 3)** Connect the air line to the Regulator. Adjust the regulator pressure to 80-85 PSI.
- 4)** Plug the Vibrator Power Plug into the socket on the rear of the Control Panel.

TECHNICAL SPECIFICATIONS

RH MACH II

AIR REQUIREMENTS:

Input pressure 80 PSI.

ELECTRICAL:

Input voltage: 208-240 V 60 HZ
single phase. 100 amp service

Fuse for 60 amps. using slow blow fuses

OPERATION

Mach II INITIAL ADJUSTMENTS

- 1)** Turn the power switch to "ON".
- 2)** Turn the vibrator switch to "ON".
- 3)** Add the weld pins to the hopper (Vibrator Bowl).
- 4)** Adjust the vibrator speed so that the weld pins climb the spiral track inside the vibrator bowl without vibrating off.
- 5)** When the weld pins fill the track up to the Vibrator Sensor, the vibrator automatically shuts off.
- 6)** Flip the HEAD TEST Switch to either the "WELD #1" or "WELD #2" position.

NOTE: Your Mach II Rolling Head Pinspotter has two redundant weld circuits. In the event that the solid state relay controlling the weld fails you may simply flip the switch to the other circuit and continue production. A replacement Weld Relay should then be ordered through your local Duro Dyne wholesaler.

STARTING OPERATION

- 1) Never actuate the unit without metal over the mandrel or lower copper ground bar. For maximum weld quality, the metal should be in flat contact with the ground bar and mandrel. An adjacent table or roller on which the sheet metal rests must be either exactly flush with, or slightly below, the top of the ground bar and mandrel.
- 2) The WELD TIME knob controls the weld quality of the pinspotter. The display goes from 0 to 300. These numbers are for reference only and have no relationship with actual time. It is recommended that an initial setting of 150 be used and then adjust up or down accordingly in reference to the quality of welds.

Weld time is the length of time the welding transformers are on. A fraction of a second is generally all the time needed for a quality weld. Unnecessary weld time not only wastes energy but can also burn up the pins. (If the pins glow red up to the washer, the weld time is set too high.) Always set the weld timer to the minimum time required for a good weld.

- 3) Before beginning production, always "pre-test" with smaller pieces of the same gauge sheet metal thickness and the liner density you intend to use in the final production. The different densities and thicknesses of the liner may require adjustments of the weld timer setting. For example: heavier gauge steel, thicker liner, higher density liner and/or longer weld pins may require longer weld time. To make sure, always pre-test any adjustment before you begin "final production." However, only change the weld timer settings when a change in the materials results in inefficient welding or a poor quality weld.

OPERATIONS DISPLAY

Your RH Mach II Pinspotter is provided with an OPERATIONS DISPLAY to help identify the source of the problem should your pinspotter fail to perform properly. Watching these indicator lights will give you a clear understanding of the electrical flow of the various circuits and components during use. Should a problem arise, simply press the footswitch and watch to see which indicator fails to illuminate. A call to our Technical Services Dept at 1-800-899-3876 will quickly identify the component to order, repair, or adjust.



MAINTENANCE

- 1) To prolong the weld tip life and improve the weld quality, it is imperative that the weld tips and lower ground bar always be kept clean. For best results, use a solvent to remove any built-up adhesive; a wire brush to remove any galvanizing deposits; and a fine emory cloth to smooth the tip and ground bar surfaces.
- 2) When lower weld tip becomes worn in one area, loosen the locking cap screw and rotate the point of wear away from the point of contact. Additional lower weld plates can be ordered from your local distributor.
- 3) Depending on usage and maintenance, the upper welding tip plate will have to be periodically replaced. Replacement weld tip plates can be ordered from your local distributor. To replace the upper weld tip, loosen the locking cap screw and remove the weld tip. Remove the plate by loosening three (3) brass screws. Throw away the screws and attach the new plate to the tip using the three brass screws supplied. Be sure to align the angled section of the plate so it faces the feed mechanism. Then lock the tip in place. Cycle the machine to check the feeding.
- 4) If feeding is erratic, re-adjust the upper weld tip height by loosening the lock nut on bottom of the dwell cylinder shaft and then turning the dwell cylinder shaft clockwise to raise the tip; counter-clockwise to lower the tip. Lock the tip in place with the locking nut.

SERVICING

A SIMPLIFIED STEP-BY-STEP PROCEDURE

Duro Dyne has called upon its many years of pinspotting experience in designing the Mach II Rolling Head. Your unit has been rigorously factory tested and inspected to provide many years of dependable service.

WHAT TO DO BEFORE YOU BEGIN TROUBLESHOOTING:

CONSULT THE MANUAL.

Most of the functional problems that occur are due to an oversight in the set-up, operational or normal maintenance procedures. Therefore, you should re-check all "Set Up", "Initial Adjustment", "Operation" and "Maintenance" procedures.

INSPECT THE UNIT

If the problem still persists, the next step is careful visual inspection. Turn off the electricity - that is, disconnect your Pinspotter from its power supply and carefully check the control box for loose, broken or disconnected wires. Also check the air circuit for leaky air connections or cut hoses.

HOW TO IDENTIFY WELD QUALITY PROBLEMS

By weld we mean that the Weld Transformer is energized, sending a pulse of electricity through the weld pin, causing it to begin to fuse to the sheet metal. To properly troubleshoot the weld quality problems, you must first pinpoint the symptom by test welding the pins to bare sheet metal. The symptom will then show up in one of four categories:

- 1)** The pins weld to bare metal but not on lined work.
- 2)** The pins weld to bare metal but can easily be removed.
- 3)** Pins weld to bare metal but remain on the weld tip as it retracts.
- 4)** The pins do not weld at all.

Before troubleshooting, always check:

- 1)** Air pressure for a minimum of 80 PSI during usage of unit.
- 2)** The input Voltage for a minimum of 208V.
- 3)** The Weld Timer is set properly.
- 4)** The Upper and the Lower Weld tips for extreme wear.

It may become necessary to use a voltmeter and/or ohmmeter to perform some servicing procedures. An analog type is best. Our Technical Services Dept will help you if necessary.

TROUBLESHOOTING SECTION

Your Rolling Head Mach II Pinspotter is equipped with an Operations Display that will assist you in quickly locating the probable cause should your machine fail to operate. While the display can point you to a defective component, it is recommended that an analog type volt meter be used to verify the indication. In some cases a loose or broken wire could cause a false indication.

This troubleshooting section has been divided into separate sections depending on the type of malfunction.

MACHINE DOES NOT OPERATE

PIN FEED PROBLEMS

DWELL CYLINDER PROBLEMS

PINS DO NOT WELD

POOR WELD QUALITY

VIBRATOR PROBLEMS

After determining the type of problem, go to that section, cycle the machine watching the Operations Display indicator lights and then follow the instructions in that part of the chart. If further assistance is needed you may call Duro Dyne Technical Services Dept at 1-800-899-3876 between the hours of 7am - 6pm EST.

MACHINE DOES NOT OPERATE

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
No Power Indicator. No display.	Power Indicator goes on and off with main power switch.	(A) Incoming power supply	(A) Check the incoming power (208-230VAC) L1 and L2 on the Power Contactor in the Triangle Enclosure.
		(B) Power Contactor.	(B) In the Triangle Enclosure, check the voltage (24VAC approx.) at the coil of the contactor. If the voltage is present, check the voltage (208-230VAC) at terminals T1 and T2 on the contactor. If the voltage is present, the contactor is good. Proceed to step (E). If the voltage at the coil is present and T1 and T2 have no voltage, replace the contactor. If the voltage at the coil is not present, proceed to the next two steps (C and D).
		(C) Main Power Switch.	(C) Check the Main Power Switch terminals B4 and B5 in the Control Console. Terminals B4 and B5 should have 24VAC approx. when the switch is in the off position and 0 volts when the switch is in the on position. If the voltage stays at 24VAC approx. replace the switch. If the voltage stays at 0 volts proceed to step (D).
		(D) 24VAC Transformer (for Contactor only) (XSFR-1).	(D) In the Triangle Enclosure, check the transformer primary input voltage (208-230VAC) at terminal L1 and L2 of the contactor. Check the transformer secondary voltage (24VAC approx.) at the coil of contactor. If the voltage at the coil is not present and step (C) is correct replace the transformer. (This transformer is for the contactor only).
		(E) 24VAC Transformer low voltage control (XSFR-2).	(E) In the Triangle Enclosure, check the transformer primary input voltage (208-230VAC) at terminal T1 and T2 on the contactor. Check the transformer secondary voltage (24VAC approx.) at terminals #4T and #5T. If the voltage at terminals #4T and #5T is not present replace the transformer. (This transformer is for all the low voltage control circuits except for the coil of the contactor).
Power Indicator on. Initiate Indicator is not functioning.	Initiate Indicator goes on with Actuator and off after the machine cycles.	Trigger Actuator.	Check the voltage (24VAC approx.) at terminals #4 and #8 in the Trolley while depressing the trigger. This voltage reading should go from 0 to 24VAC. If this voltage reading is not correct replace or repair the Trigger Actuator.
Power Indicator on. Initiate Indicator is functioning. Weld Timer Indicator is not functioning.	Weld Timer Indicator goes on and off with every cycle.	Weld Timer.	Turn the weld time to the highest setting and check the voltage (24VAC approx.) at terminals #8 and #9 in the Trolley. This voltage should come on then go off every time the Trigger Actuator is depressed. If this voltage reading is not correct replace the Weld Timer. (0 – 24VAC – 0)
Power, Initiate, and Weld Timer Indicators are functioning. Feed Reed Switch indicator is not functioning.	Feed Reed Switch Indicator goes on and off with every cycle.	Feed Reed Switch.	The Feed Reed Switch is a safety that will not allow the machine to operate if the Feed Cylinder has not fully retracted. To test the Feed Reed Switch jump terminals #7 and #9 in the Trolley. Now try to cycle the machine with this jumper in place. If the machine operates this means that the Feed Reed Switch is not functioning. This reed switch is located on the Feed Cylinder and may be out of position. To check the position, turn the power off (remove the jumper from the previous test) and loosen the set screws on the reed switch. Now put an ohmmeter on terminals #7 and #9. Slide the reed switch back and forth near the rear of the cylinder until the meter reads continuity. Now lock the set screws. If this procedure can not be accomplished replace the Feed Reed Switch.
Power, Initiate, Weld Timer and Feed Reed Switch Indicators are functioning. Dwell Solenoid Indicator is not functioning.	Dwell Solenoid Indicator goes on and off with every cycle. (Stays on 150 ms longer than Feed Reed Switch Indicator.)	Short Cycle Relay.	Turn the weld time to the highest setting and check the voltage (24VAC approx.) at terminals #7 and #8 in the Trolley. This voltage reading should go from 0 to 24VAC and then back to 0 every time the Trigger Actuator Switch is depressed. If this voltage reading is not correct recheck the symptom. Now do the same procedure at terminals #8 and #12 in the Trolley. If this voltage reading is incorrect replace the Short Cycle Relay.
Power, Initiate, Weld Timer, Feed Reed Switch and Dwell Solenoid Indicators are all functioning.	All lights flash in sequence.	(A) Air pressure, Adjustable Exhaust Mufflers and Dwell Cylinder.	(A) Check the Air Regulator for proper setting (80psi). Now press the test button located on the Dwell Solenoid body. If the Dwell Cylinder does not operate check the Adjustable Exhaust Mufflers connected to the Dwell Solenoid for proper adjustment. If either or both mufflers are closed or restricted it will not allow the Dwell Cylinder to operate. Also check the cylinder by turning the air off and then move the shaft up and down. The shaft should move freely. If the mufflers (these mufflers control the speed of the up and down motion on the cylinder) are properly adjusted and have no restrictions and the Dwell Cylinder operates when the solenoid test button is pressed proceed to step (B).
		(B) Dwell Solenoid.	(B) Turn the weld time to the highest setting and check the voltage (24VAC approx.) at terminals #8 and #12 in the Trolley. The voltage reading should go from 0 to 24VAC and back to 0 every time the Trigger Actuator Switch is depressed. If this voltage reading is correct replace the Dwell Solenoid.

PIN FEED PROBLEMS

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
First Pulse Indicator is not functioning.	First Pulse Indicator turns on with the first machine cycle. It stays on until main power is turned off.	First Pulse Reed Switch.	The First Pulse Reed Switch sends power to the coil of the First Pulse Relay. To check the reed switch, remove the wire that goes to terminal #4 on the Dwell Timer (located in the Trolley) and then jump terminals #1 and #10 in the Trolley. With this jumper in place cycle the machine. If the machine feeds check the reed switch position (The First Pulse Reed switch should be mounted to the middle off the Dwell Cylinder). If the reed switch position is correct replace the First Pulse Reed Switch.
First Pulse Indicator is functioning. Dwell Reed Switch Input Indicator is not functioning.	Dwell Reed Switch Input Indicator turns on with the first machine cycle. Stays on until main power is turned off.	(A) First Pulse Relay (Coil).	(A) The First Pulse Relay should engage the first time the machine cycles and should stay engaged until the power is turned off. To check the First Pulse Relay, remove the wire that goes to terminal #4 on the Dwell Timer and then jump terminals #1 and #10 in the Trolley. With this jumper in place and the power on check the voltage (24VAC approx.) at terminals #3 and #10. If voltage is present and the relay is engaged (the indicator on the relay is on) proceed to step (B). If the voltage is present and the relay is not engaged (the indicator on the relay is off) replace the First Pulse Relay.
First Pulse Indicator is functioning. Dwell Reed Switch Input Indicator is not functioning.	Dwell Reed Switch Input Indicator turns on with the first machine cycle. Stays on until main power is turned off.	(B) First Pulse Relay. (Contacts)	(B) If the relay is engaged (the indicator on the relay is on) check the voltage (24VAC approx.) at the terminals #3 and #11 in Trolley. If the voltage is not present replace the First Pulse Relay. If the voltage is present proceed to next step.
First Pulse and Dwell Reed Switch Input Indicators are functioning. Dwell Reed Switch Output Indicator is not functioning.	Dwell Reed Switch Output Indicator turns on with the first machine cycle. Goes off and then back on with every cycle.	Dwell Reed Switch.	The Dwell Reed Switch is the upper of the two reed switches located on the side of the Dwell Cylinder. The Dwell Reed Switch activates the Feed Timer. To check the Dwell Reed Switch, first cycle the machine once and then check the voltage (24VAC approx.) at terminals #3 and #11 in the Trolley. If the voltage is not present recheck the symptom. If this voltage is present now check the voltage (24VAC approx.) at the terminals #3 and #6 in the Trolley. Terminals #3 and #6 should go from 24VAC to 0 and back to 24VAC with every cycle. If this is correct the Dwell Reed Switch is functioning properly. If the voltage reading is incorrect check the Dwell Reed Switch position. To check the Dwell Reed Switch position first loosen the reed switch set screws. Slide the reed switch down and check the voltage at terminal #3 and #6. The voltage should read 0. Now slide the reed switch up until terminals #3 and #6 have 24VAC and then lock the set screws. If this procedure cannot be accomplished, replace the Dwell Reed Switch. (Please refer to note #4 on page 18.)
First Pulse, Dwell Reed Switch Input and Output Indicators are functioning. Feed Solenoid Indicator is not functioning.	Feed Solenoid Indicator goes on and then back off with every cycle.	Feed Timer.	The Feed Timer activates the Feed Solenoid. In the Trolley, check the voltage (24VAC approx.) at terminal #1 and #4 on the Feed Timer. The voltage at terminals #1 and #4 should go from 0 to 24VAC and back to 0 on every cycle. If this voltage reading is incorrect replace the Feed Timer. If the voltage reading is correct proceed to the next section. (This voltage is only present for 150ms. Some voltmeters may not react fast enough to record this voltage).
All Indicators are functioning.	All lights flash in sequence.	Feed Solenoid, Feed Cylinder, and Pusher With Pawl.	The Feed Solenoid controls the Feed Cylinder. To test the Feed Solenoid check the voltage (24VAC approx.) at terminals #1 and #4 on the Feed Timer in the Trolley. Terminals #1 and #4 should go to 24VAC and back to 0 on every cycle. If correct turn the power and the air off. Now try to move the Pusher With Pawl in and out. The Pusher With Pawl should move easily. If so, replace the Feed Solenoid. If not, check for jammed weld pins in the Feed Channel or for a damaged Feed Cylinder. Also check the Feed Speed Control (located on the air line going to the Feed Cylinder) for proper adjustment.
Feed Cylinder does not retract. Feed Solenoid Indicator on constantly.	Feed Solenoid Indicator goes on and then back off with every cycle.	Feed Timer.	Remove the push-on connector from terminal #4 of the Feed Timer. If the Feed Cylinder retracts replace the Feed Timer.
Feed Cylinder does not retract. All Indicators are functioning correctly.	All lights flash in sequence.	(A) Feed Cylinder or Pusher With Pawl.	(A) Turn the power off and inspect the Feed Cylinder for air leaks. If there are no air leaks, turn the air off and slide the Pusher With Pawl in and out. The Pusher With Pawl should go in and out with just a slight restriction.
		(B) Feed Solenoid.	(B) To check the Feed Solenoid turn the power off. If the Feed Cylinder does not retract and step (A) above is correct replace the Feed Solenoid.

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
Feed collides with dwell. All Indicators are functioning correctly except: Dwell Reed Switch Output and Feed Solenoid Indicators are not coming on in the correct sequence.	Dwell Reed Switch Output Indicator turns on with the first machine cycle. Goes off and then back on with every cycle. Feed Solenoid Indicator goes on and then back off with every cycle.	Dwell Reed Switch.	The Dwell Reed Switch activates the Feed Timer. If this switch is malfunctioning or out of position it will activate the feed at the wrong time. For instructions on how to check and adjust, refer to the action section on page 14 for "Possible Problem" Dwell Reed Switch. (Also refer to note #4 on page 18.)
Sluggish movement of the Feed. All Indicators are functioning correctly.	All lights flash in sequence.	(A) Feed Speed Control.	(A) Readjust the Feed Speed Control located on the air line going to the Feed Cylinder.
		(B) Air Lines.	(B) Check the Air Lines for leaks and water. If there is water in the Air Lines, disconnect and blow out all Air Lines. Remove and clean the Exhaust Muffler. Reconnect the Air Lines and the muffler.
		(C) Feed Cylinder.	(C) Turn the power and air off. Check the Feed Cylinder and the Pusher With Pawl for binding. Move the Pusher With Pawl in and out. The Pusher With Pawl should move in and out with a slight resistance.
		(D) Feed Solenoid.	(D) If the above procedures check out and the Feed still has sluggish movement the problem may be the Feed Solenoid. Remove the Air Line from air inlet of the Solenoid and spray a light oil into the solenoid. Reconnect the Air Line and cycle the machine. If the Feed still has sluggish movement, replace the Feed Solenoid.
Feed does not place weld pins on Upper Weld Tip. All Indicators are functioning correctly.	All lights flash in sequence.	(A) Feed Speed Control.	(A) If the Feed Speed Control is open too much it may throw pins past the Upper Weld Tip. Adjust Feed Speed Control so that it places the pin on the Upper Weld Tip.
		(B) Upper Weld Tip.	(B) Check the Upper Weld Tip for magnetism. Place a weld pin under the Upper Weld Tip. If the tip does not retain the pin or the magnets feel weak replace the Upper Weld Tip.
		(C) Pusher With Pawl.	(C) The pawl (hinged part) on the pusher may be damaged or missing. If so replace the Pusher With Pawl.

DWELL CYLINDER PROBLEMS

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
Dwell Cylinder does not retract and weld stays on. Initiate, Weld Timer, Feed Reed Switch, Dwell Solenoid and Weld Signal Indicators are all on constantly.	All lights flash in sequence.	Weld Timer	Remove the push-on connector from terminal #4 of the Weld Timer. If the Dwell Cylinder retracts and the weld turns off replace the Weld Timer.
Dwell Cylinder does not retract and weld stays on. Initiate, Dwell Solenoid and Weld Signal Indicators are all on constantly.	All lights flash in sequence.	Short Cycle Relay	In the Trolley, test for voltage (24VAC approx.) at terminals #7 and #8. If the voltage is present return to the step above. If the voltage is not present, now check the voltage (24VAC approx.) at terminals #4 to #8 and #1 to #12. If the voltage is present all the time on these terminals replace the Short Cycle Relay.
Dwell Cylinder does not retract. Dwell Solenoid and Dwell Delay Indicators are on constantly.	Dwell Solenoid Indicator goes on and off with every cycle. Stays on 150ms longer than Feed Reed Indicator	Dwell Timer	Remove the push-on connector from terminal #4 of the Dwell Timer. If the Dwell Cylinder retracts replace the Dwell Timer.
Dwell Cylinder does not retract. All Indicators are functioning correctly.	All lights flash in sequence.	(A) Dwell Solenoid.	(A) Turn the power off. (If the Dwell Cylinder shaft retracts, recheck the symptom). Now try and lift the Dwell Cylinder shaft up. If the cylinder shaft cannot be lifted replace the Dwell Solenoid.
		(B) Dwell Cylinder	(B) If the Dwell Cylinder shaft can be lifted easily check the Dwell Cylinder and the air lines for air leaks. Turn the air off and then move the cylinder shaft up and down. If the cylinder shaft moves up and down without any air resistance the seals in the cylinder are most likely worn. Replace the Dwell Cylinder. If a slight air resistance is present on the up and down motion check the Quick Exhaust Valve.
		(C) Quick Exhaust Valve.	(C) The Quick Exhaust Valve is a pneumatic check valve. To check the Quick Exhaust Valve, disassemble the valve and inspect the conical shaped diaphragm for any tears. If any damage is noted, replace the Quick Exhaust Valve or repair it with a repair kit (part# 17078).
Sluggish movement of the Welding Tip. All Indicators are functioning correctly.	All lights flash in sequence.	(A) Air Regulator	A) Adjust the Air Regulator (80psi).
		(B) Air Lines and Adjustable Exhaust Mufflers.	(B) Check Air Lines for leaks or water. If there is water in the Air Lines, disconnect and blow out the Air Lines. Remove and clean out the Adjustable Exhaust Mufflers. Reconnect the Air Lines and the Adjustable Exhaust Mufflers.
		(C) Dwell Cylinder	(C) Turn the power and air off. Check the Dwell Cylinder shaft for binding by moving the shaft in and out of the cylinder. A slight air resistance should be present when the shaft is being moved in and out of the cylinder.
		(D) Dwell Solenoid.	(D) If the above procedures check out and the Dwell Cylinder still has sluggish movement, the problem maybe the Dwell Solenoid. Remove the Air Line from air inlet of the solenoid and spray a light oil into the solenoid. Reconnect the air line and cycle the machine. If the Dwell Cylinder still has sluggish movement replace the Dwell Solenoid.

PINS DO NOT WELD

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
All Indicators are functioning except: Weld Signal, Weld #1 and Weld #2 do not function.	Weld Signal Indicator goes on and off with every cycle.	(A) Short Cycle Relay	(A) The Short Cycle Relay controls the voltage that turns on the solid-state Weld Relays that turn on the Weld Transformer. To test the Short Cycle Relay circuit check the voltage (24VAC approx.) at terminals #5 and #7 in the Trolley. Terminals #5 and #7 should go from 0 to 24VAC and back to 0 on every cycle. If this voltage reading is incorrect Proceed to step B.
		(B) Pressure Switch.	(B) To test the Pressure Switch place a jumper between terminals #5 and #8 in the Trolley. If the machine welds with jumper in place replace Pressure Switch. If the machine does not weld replace the Short Cycle Relay.
All Indicators are functioning except: Weld #1 and Weld #2 do not function.	Weld Relay #1 or Weld Relay #2 Indicator should correspond with Weld Signal Indicator. Goes on and off with every cycle.	Head Test Switch.	The Head Test Switch is single-pole, double-throw and center off switch. This switch selects which of the 2 solid state Weld Relays will control the Weld Transformer. To test this switch check for continuity at the switch in the Control Console.
All Indicators are functioning. Welding Indicator on the frame is not functioning. This Indicator shows when there is voltage (230VAC approx.) present at the primary of the Weld Transformer.	All lights flash in sequence.	Weld Relay.	The Weld Relay controls the voltage to the primary of the Weld Transformer. To check the Weld Relay, test for voltage (24VAC approx.) at terminals A1 and A2 on the selected relay in the Triangle Enclosure. Terminals A1 and A2 should go from 0 to 24VAC and back to 0 on every cycle. If this voltage reading does not correspond, check the Head Test Switch is in Weld 1 or Weld 2 position and that the weld relay you are checking is the active one. If the voltage reading was correct, test the voltage (208-230 VAC approx.) at the terminals L1 and T1. Terminals L1 and T1 should go from (208-230 VAC approx.) to 0 and back to (208-230 VAC approx.) with every cycle. If this voltage is incorrect replace the Weld Relay.
All Indicators are functioning including the Weld Indicator on the frame.	All lights flash in sequence.	Weld Transformer.	To test the primary of the Weld Transformer check the voltage at the terminals L1 and T1 on either of the Weld Relays. They should go from (208-230 VAC approx.) to 0 and back to (208-230 VAC approx.) every time the machine cycles. Now test the secondary output voltage. Place the meter leads on the copper bars coming out of the Weld Transformer and test the voltage every time the machine is cycled. The Mach 2 Weld Transformer should read approximately 10VAC. (or 5VAC if on the center tap.) If the secondary voltage reading is incorrect replace the transformer. (Turn the weld time to the highest setting when performing this test.)

POOR WELD QUALITY

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
Dwell Delay Indicator is not functioning.	Dwell Delay Indicator comes on when the Weld Timer Indicator goes off and then goes off when the Dwell Solenoid Indicator goes off.	(A) Short Cycle Relay or First Pulse Relay.	(A) The Dwell Timer keeps the dwell circuit on 150ms longer than the Weld Timer circuit. To check the Dwell Timer, test for voltage (24VAC approx.) at terminals #1 and #2 on Dwell Timer located in the trolley. The voltage on terminals #1 and #2 should go from 24VAC to 0 and back to 24VAC with every machine cycle. If this voltage reading is correct proceed to step (B). If this voltage reading is incorrect replace the Short Cycle Relay. If the voltage reading at terminals #1 and #2 is still incorrect replace the First Pulse Relay.
		(B) Dwell Delay Timer.	(B) If procedures in (A) test correctly, check the voltage (24VAC approx.) at the terminals #1 and #4 on the Dwell Delay Timer. The voltage at terminals #1 and #4 should go from 0 to 24VAC and back to 0 on every machine cycle. If this voltage reading is incorrect replace the Dwell Timer.
All Indicators are functioning.	All lights flash in sequence.	(A) Weld Cable.	Any connection from the secondary of the Weld Transformer to the weld tips can contribute to a poor quality weld. All the connections should be clean, bright and tight . The Weld Cable can break down from use. Always inspect the Weld Cable, Weld Transformer secondary connections and weld tips for they are the most common causes for a poor weld quality.
		(B) Upper and Lower Welding Tips.	Clean and Retighten
		(C) Upper Tip Retainer.	Clean and Retighten
		(D) Female Camlock.	Clean and Retighten
		(E) Flush Mount Camlock.	Clean and Retighten
		(F) Power Supply Bar.	Clean and Retighten

VIBRATOR PROBLEMS

SYMPTOM	CORRECT FUNCTION INDICATOR	POSSIBLE PROBLEM	ACTION
Vibrator does not vibrate at all.	N/A	(A) Vibrator Circuit Breaker	(A) Check the Vibrator Circuit Breaker (Located on the rear of the Control Console.) (208-230VAC approx.)
		(B) Vibrator Power Switch.	(B) Check the Vibrator Power Switch in the Control Console. (208-230VAC approx.)
		(C) Vibrator Sensor.	(C) The Vibrator Sensor controls the Vibrator Control Relay that supplies power to the Vibrator Base when there is a demand for weld pins. Check that the indicator light on the Vibrator Sensor goes on and off when the weld pins go past the Vibrator Sensor. (The Vibrator Sensor is located on top of the Upper Feed Track Casting) If the indicator light does not go on and off try to adjust the sensor closer to weld pins. If the indicator light still does not function, replace the Vibrator Sensor.
		(D) Vibrator Control Relay (Relay-3)	To check the Vibrator Control Relay, test the voltage (24VAC approx.) at terminals #T2 and #T5 on the Vibrator Control Relay Board located in the Triangle Enclosure. There should be 24VAC at terminals #T2 and #T5 when there is no weld pin at the Vibrator Sensor. If this voltage reading is correct, now check the voltage (208-230VAC approx.) at terminals #T1 and #T11 on the relay board. When the main power is on, terminals #T1 and #T11 should always have voltage. Now check the voltage (208-230VAC approx.) at terminals #T3 and #T9. If there is no voltage at terminals #T3 and #T9 and the above is correct, replace the Vibrator Control Relay.
		(E) Vibrator Speed Control.	(E) In the Control Console, check for voltage (208-230VAC approx.) at terminals #1 and #3 on the Vibrator Speed Control. If there is 208-230VAC at terminals #1 and #3 replace the Vibrator Speed Control.
		(F) Vibrator Coil.	(F) Measure the resistance at the plug (two outside pins) of the Vibrator Base. The resistance reading should be approximately 60 ohms. If this reading is not correct replace the Vibrator Coil.
Vibrator vibrates but not enough to move weld pins.	N/A	(A) Vibrator Speed Control.	(A) To test the Vibrator Speed Control place your hand on the Vibrator Bowl and watch the Vibrator Sensor Indicator. Now adjust the Vibrator Speed Control from slow to fast and back. If you feel no change in the intensity on the bowl or see any change in the intensity on the Vibrator Sensor Indicator, replace the Vibrator Speed Control located in the Control Console. If a change in the intensity is present proceed to the next step.
		(B) Vibrator Speed Control.	(B) Turn the power off and remove the Vibrator Bowl. Now remove the Vibrator Shroud and inspect the springs (leaf springs) and the weldments for any damage. If there is no apparent damage proceed to the next step.
		(C) Vibrator adjustment.	(C) To adjust the Vibrator Base loosen the set screws on the side of the Vibrator Base. Now locate the two adjustment bolts under the Vibrator Base. Turn both adjustment bolts in the same direction at very small increments. If the problem does not improve repeat the procedure in the opposite direction. (The top of the Vibrator Coil should be approximately 1/64 of an inch or less from Vibrator Base Top Plate) If this procedure does not improve the problem replace the Vibrator Springs.

NOTES:

1. The Feed Reed Switch is a safety that will not allow the machine to operate if the feed cylinder is not fully retracted. The Feed Reed Switch is located on the Feed Cylinder. To check that the Feed Reed Switch is positioned properly, loosen the set screws and put an Ohm meter on terminals 7 and 9 in the trolley. Slide the Feed Reed Switch back and forth until continuity is indicated, then tighten the set screws.
2. Check that the Air Regulator is set for 80 psi. Mounted on the top of the Trolley are two Adjustable Exhaust Mufflers. The front one adjust the speed of the Dwell Cylinder moving down and the rear one adjust the speed up. These mufflers can become restricted or loose. If machine is sluggish or starts slamming down, adjust these mufflers accordingly.
3. The First Pulse Reed Switch is located in the middle of the Dwell cylinder.
4. To check that the Dwell Reed Switch is positioned properly, loosen the set screws and put an Ohm meter on terminals 6 and 11. Slide the Dwell Reed Switch up and down until continuity is indicated, then tighten the set screws.
5. Mounted on the Feed Cylinder is a Feed Speed Control. The Feed Speed Control adjusts how fast the Pusher with Pawl moves in and out. If adjusted too fast the pins may be tossed past the tip, if adjusted too slow the pins will not be placed on the tip.

PARTS LIST

17079	Vibrator foot	17395	Lower ground bar
17084	Air hose 3/8" natural	18056	Locking knob
17085	Male camlock	27213	Flush mount camlock
17189	Upper weld tip plates	39110	Pin feed switch
17190	Lower weld tip plates	39306	Incoming Voltage Select Switch
17191	Upper weld tip	39353	Anti-friction strip
17192	Lower weld tip	39359	Feed Channel Spacer
17198	Track casting spacers and screws	39691	C Clip
17201	Vibrator bowl spring set	40102	Air hose 3/8" blue
17203	Fiber insulator	40105	Air hose 1/4" yellow
17222	Low Voltage Terminal Strip	40106	Air hose 1/4" blue
17230	Brake cylinder	44001	Vibrator sensor cold
17231	Dwell cylinder	44002	Vibrator sensor
17236	Upper dwell cylinder bracket	44003	Vibrator sensor bracket
17237	Lower dwell cylinder bracket	44005	Vibrator socket
17239	Feed solenoid	44006	Vibrator socket guard
17240	Dwell solenoid	44007	Vibrator fuse and bracket
17250	Vibrator speed control	44008	Upper feed track casting
17255	Vibrator line cord	44009	Upper track side rails
17257	Vibrator support casting	44011	Lower track side rails
17261	Lower track casting	44024	Main power switch
17266	Feed channel	44025	LCD display
17269	Feed cylinder bracket	44027	Weld potentiometer knob
17276	Upper bearing	44027	Vibrator potentiometer knob
17277	Lower bearing	44029	Relay selector switch
17278	Steel track	44030	Troubleshooting LED display
17283	Trigger actuator assembly	44031	Vibrator potentiometer
17284	Trigger actuator switch	44032	Vibrator lamp
17286	Actuator mounting plate	44033	Vibrator power switch
17288	Footswitch plug	44034	Weld lamp
17288	Trigger actuator plug	44037	Power pack cover
17290	Brake pad	44040	Mach II weld transformer
17291	Rear bumper stop	44041	Line cord
17291	Front bumper stop	44042	Line cord strain relief
17302	Weld timer	44047	Power contactor
17317	Feed speed control	44052	12 VDC power supply
17318	Feed timer	44053	Weld relay
17319	Dwell timer	44059	Power bar
17323	Short cycle relay	44060	Weld cable - short
17323	First Pulse relay	44061	Female cam loc
17325	Pressure switch	44062	Trolley mounting plate
17327	Actuator receptacle	44064	Weld cable retainer block
17327	Footswitch receptacle	44065	Control console
17334	Auto/hand gun switch	44066	Mach II power pack
17338	Vibrator base plate	44067	Flexible wire mold
17339	Vibrator base	44068	Rubber air hose
17340	Vibrator bowl	44070	Weld cable camloc
17341	Vibrator coil	44071	Feed cover
17342	Vibrator base springs	44072	Component module
17348	Feed channel plate	44073	High voltage terminal strip
17351	Pusher and pawl	44075	Trolley
17352	Upper tip retainer	44076	Trolley cover
17355	Quick exhaust valve	44077	Weld potentiometer
17356	Adjustable muffler	44080	Power bar bracket
17359	Bracket insulator	44082	Bearing mounting plate
17363	Feed reed switch	44083	Locking knob spring
17363	Dwell reed switch	44084	Locking knob catch
17363	First pulse reed switch	44085	Clip pin release
17364	Feed cylinder	44086	Clip pin release spring
17368	Vibrator bowl for 2 inch pins	44087	Clip pin release stop
17372	Footswitch	44088	Flex link
17376	Lower Mandrel	44089	Weld cable - long
17377	Air regulator	44090	Vibrator Control Relay Board
17391	Actuator swivel bolt	44091	24 volt multi-tap transformer
17394	Short shaft extension		

**MACHINERY DIVISION**

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