INTRODUCTION

The Rolling Head Mach III 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 III 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 Rolling Head Mach III 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

17391 Actuator Swival Bolt

17283 Trigger Actuator Assembly

17284 Trigger Actuator Switch

17291 Rear Bumper Stop

17278 Steel Track

17395 Lower Ground Bar

Transformer Enclosure
44106 Power Pack Cover

Triangle Enclosure
44117 Component Module

17190 Upper Weld Tip

44118 Trolley

17391 Actuator Swival Bolt

17189 Upper Replacement Plates (5/pkg)

44119 Trolley Cover

17192 Lower Weld Tip

17376 Lower Mandrel

44118 Trolley

17190 Lower Replacement Plates (5/pkg)
PARTS LOCATION

39296 Vibrator Bowl
44088 Flex Link
39298 Vibrator Base
39273 Vibrator Base Plate
44095 Track Sensor
17264 Upper Track Side Rails
44086 Clip Pin Release Spring
44085 Clip Pin Release
44084 Locking Knob Catch
18056 Locking Knob
17265 Lower Track Side Rails
39353 Anti-Friction Strip
17394 Short Shaft Extension
17203 Fiber Insulator
17352 Upper Tip Retainer
17257 Vibrator Support Casting
44120 Weld Cable-Short
17363 Feed Reed Switch
17317 Feed Speed Control
17364 Feed Cylinder
17269 Feed Cylinder Bracket
17351 Pusher With Pawl
17348 Feed Channel Plate
17266 Feed Channel
44013 Feed Channel Spacer (Not Shown)
PARTS LOCATION

44025 LCD Display
17288 Trigger Actuator Plug
44030 Operations Display Board
44033 Vibrator Power Switch
17308 Universal Amber Light
44031 Vibrator Potentiometer
44027 Knob
18065 Vibrator Circuit Breaker (2 Amp)
18066 220V Phase Control
39196 Vibrator Cord
44114 Vibrator Strain Relief
39068 Receiving Board
44024 Main Power Switch
44008 Upper Feed Track Casting
44121 Control Console
44077 Weld Potentiometer
39110 Pin Feed Switch
44029 Head Test Switch
44122 Trolley Mounting Plate
18065 Vibrator Circuit Breaker (2 Amp)
39068 Receiving Board
44114 Vibrator Strain Relief
18066 220V Phase Control
18056 Locking Knob
17277 Lower Bearing
17261 Lower Feed Track Casting
44061 Weld Cable Female Camlock
44082 Bearing Mounting Plate
44083 Locking Knob Spring
44129 Class-1 Laser
17308 Universal Amber Light
17276 Upper Bearing
44122 Trolley Mounting Plate
44071 Feed Cover

CONTROL CONSOLE AND FRONT END ASSEMBLY
44115 High Voltage Terminal Strip

44047 Power Contactor

39308 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
17327 Footswitch Receptacle

44089 Weld Cable-Long

17377 Air Regulator

44070 Weld Cable Lug Connector

44041 Line Cord

44089 Weld Cable-Long

44105 Power Pack Tray

44068 Rubber Air Hose

44069 Wire Harness

44101 Weld Transformer

44042 Line Cord Strain Relief

44067 Flexible Wire Mold

44069 Wire Harness

44042 Line Cord Strain Relief
**OPERATION**

**Mach III 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:** The Rolling Head Mach III 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.

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**INSTALLATION INSTRUCTIONS**

1) For the Mach III—
   Connect the Power Pack to a source of 208-240V 60 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.

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**TECHNICAL SPECIFICATIONS RH MACH III**

**AIR REQUIREMENTS:**
Input pressure 80 PSI.

**ELECTRICAL:**
Input voltage: 208-240 V 60 HZ
single phase. 60 amp service
Fuse for 60 amps. using slow blow fuses
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

The RH Mach III Pinspotters 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 III 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

The Rolling Head Mach III 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.
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CORRECT FUNCTION INDICATOR</th>
<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Power Indicator. No display.</td>
<td>Power Indicator goes on and off with main power switch.</td>
<td>(A) Incoming power supply</td>
<td>(A) Check the incoming power (208-230VAC) L1 and L2 on the Power Contactor in the Triangle Enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Power Contactor</td>
<td>(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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Main Power Switch.</td>
<td>(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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(D) 24VAC Transformer: (for Contactor only) (XSFMR-1).</td>
<td>(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 the 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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(E) 24VAC Transformer: low voltage control (XSFMR-2).</td>
<td>(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 #4 and #5T. If the voltage at terminals #4 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).</td>
</tr>
<tr>
<td>Power Indicator on. Initiate Indicator is not functioning.</td>
<td>Initiate Indicator goes on with Actuator and off after the machine cycles.</td>
<td>Trigger Actuator.</td>
<td>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.</td>
</tr>
<tr>
<td>Power Indicator on. Initiate Indicator is functioning. Weld Timer Indicator is not functioning.</td>
<td>Weld Timer Indicator goes on and off with every cycle.</td>
<td>Weld Timer</td>
<td>Turn the weld time to the highest setting and check the voltage (24VAC approx.) at terminals #8 and #9 in the Trolley. If this voltage reading is not correct replace the Weld Timer. (0 – 24VAC – 0)</td>
</tr>
<tr>
<td>Power, Initiate, and Weld Timer Indicators are functioning. Feed Reed Switch indicator is not functioning.</td>
<td>Feed Reed Switch Indicator goes on and off with every cycle.</td>
<td>Feed Reed Switch.</td>
<td>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 #8 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 #8. 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.</td>
</tr>
<tr>
<td>Power, Initiate, Weld Timer and Feed Reed Switch Indicators are functioning. Dwell Solenoid Indicator is not functioning.</td>
<td>Dwell Solenoid Indicator goes on and off with every cycle. (Stays on 150 ms longer than Feed Reed Switch Indicator)</td>
<td>Short Cycle Relay</td>
<td>Turn the weld time to the highest setting and check the voltage (24VAC approx.) at terminals #7 and #9 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.</td>
</tr>
<tr>
<td>Power, Initiate, Weld Timer, Feed Reed Switch and Dwell Solenoid Indicators are all functioning.</td>
<td>All lights flash in sequence.</td>
<td>(A) Air pressure, Adjustable Exhaust Mufflers and Dwell Cylinder.</td>
<td>(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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Dwell Solenoid.</td>
<td>(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.</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>CORRECT FUNCTION INDICATOR</td>
<td>POSSIBLE PROBLEM</td>
<td>ACTION</td>
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<tr>
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<tr>
<td><strong>Feed Solenoid Indicat</strong>or is not functioning.</td>
<td><strong>First Pulse Indicator</strong> turns on with the first machine cycle. Stays on until main power is turned off.</td>
<td><strong>First Pulse Reed Switch.</strong></td>
<td><strong>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 of the Dwell Cylinder). If the reed switch position is correct replace the First Pulse Reed Switch.</strong></td>
</tr>
<tr>
<td><strong>Feed Cylinder does not retract.</strong></td>
<td><strong>Feed Solenoid Indicator turns on with the first machine cycle.</strong></td>
<td><strong>First Pulse Reed Switch.</strong></td>
<td><strong>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 of the Dwell Cylinder). If the reed switch position is correct replace the First Pulse Reed Switch.</strong></td>
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<tr>
<td><strong>Feed Cylinder does not retract.</strong></td>
<td><strong>Feed Solenoid Indicator turns on with the first machine cycle.</strong></td>
<td><strong>First Pulse Reed Switch.</strong></td>
<td><strong>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 of the Dwell Cylinder). If the reed switch position is correct replace the First Pulse Reed Switch.</strong></td>
</tr>
<tr>
<td><strong>All Indicators are functioning.</strong></td>
<td><strong>Feed Solenoid Indicator turns on with the first machine cycle.</strong></td>
<td><strong>Feed Timer.</strong></td>
<td><strong>The Feed Timer activates the Feed Solenoid. In the Trolley, check the voltage (24VAC approx.) at terminals #1 and #4 on the Feed Timer. The voltage at these terminals should be 24VAC and back to 0 on every cycle. If this voltage reading is incorrect replace the Feed Timer.</strong></td>
</tr>
<tr>
<td><strong>Feed cylinder does not retract.</strong></td>
<td><strong>Feed Solenoid Indicator turns on with the first machine cycle.</strong></td>
<td><strong>Feed Timer.</strong></td>
<td><strong>The Feed Timer activates the Feed Solenoid. In the Trolley, check the voltage (24VAC approx.) at terminals #1 and #4 on the Feed Timer. The voltage at these terminals should be 24VAC and back to 0 on every cycle. If this voltage reading is incorrect replace the Feed Timer.</strong></td>
</tr>
<tr>
<td><strong>All Indicators are functioning.</strong></td>
<td><strong>Feed Solenoid Indicator turns on with the first machine cycle.</strong></td>
<td><strong>Feed Timer.</strong></td>
<td><strong>The Feed Timer activates the Feed Solenoid. In the Trolley, check the voltage (24VAC approx.) at terminals #1 and #4 on the Feed Timer. The voltage at these terminals should be 24VAC and back to 0 on every cycle. If this voltage reading is incorrect replace the Feed Timer.</strong></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>SYMPTOM</th>
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<th>POSSIBLE PROBLEM</th>
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</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
<td>Dwell Reed Switch.</td>
<td>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.)</td>
</tr>
<tr>
<td>Sluggish movement of the Feed. All Indicators are functioning correctly.</td>
<td>All lights flash in sequence.</td>
<td>(A) Feed Speed Control.</td>
<td>(A) Readjust the Feed Speed Control located on the air line going to the Feed Cylinder:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Air Lines.</td>
<td>(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:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Feed Cylinder.</td>
<td>(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:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(D) Feed Solenoid.</td>
<td>(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:</td>
</tr>
<tr>
<td>Feed does not place weld pins on Upper Weld Tip. All Indicators are functioning correctly.</td>
<td>All lights flash in sequence.</td>
<td>(A) Feed Speed Control.</td>
<td>(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:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Upper Weld Tip.</td>
<td>(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:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Pusher With Pawl.</td>
<td>(C) The pawl (hinged part) on the pusher may be damaged or missing. If so replace the Pusher With Pawl:</td>
</tr>
</tbody>
</table>
## Dwell Cylinder Problems

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Correct Function Indicator</th>
<th>Possible Problem</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>All lights flash in sequence.</td>
<td>Weld Timer</td>
<td>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.</td>
</tr>
<tr>
<td>Dwell Cylinder does not retract and weld stays on. Initiate, Dwell Solenoid and Weld Signal Indicators are all on constantly.</td>
<td>All lights flash in sequence.</td>
<td>Short Cycle Relay</td>
<td>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.</td>
</tr>
<tr>
<td>Dwell Cylinder does not retract. Dwell Solenoid and Dwell Delay Indicators are on constantly.</td>
<td>Dwell Solenoid Indicator goes on and off with every cycle. Stays on 150ms longer than Feed Reed Indicator.</td>
<td>Dwell Timer</td>
<td>Remove the push-on connector from terminal #4 of the Dwell Timer. If the Dwell Cylinder retracts replace the Dwell Timer.</td>
</tr>
<tr>
<td>Dwell Cylinder does not retract. All Indicators are functioning correctly.</td>
<td>All lights flash in sequence.</td>
<td>(A) Dwell Solenoid.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Dwell Cylinder</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Quick Exhaust Valve.</td>
<td>(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).</td>
</tr>
<tr>
<td>Sluggish movement of the Welding Tip. All Indicators are functioning correctly.</td>
<td>All lights flash in sequence.</td>
<td>(A) Air Regulator.</td>
<td>(A) Adjust the Air Regulator (80psi).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(B) Air Lines and Adjustable Exhaust Mufflers.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Dwell Cylinder.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(D) Dwell Solenoid.</td>
<td>(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.</td>
</tr>
</tbody>
</table>
## POOR WELD QUALITY

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CORRECT FUNCTION INDICATOR</th>
<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwell Delay Indicator is not functioning.</td>
<td>Dwell Delay Indicator comes on when the Dwell Timer Indicator goes off and then goes off when the Dwell Solenoid Indicator goes off</td>
<td>(A) Short Cycle Relay or First Pulse Relay.</td>
<td>(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 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.</td>
</tr>
<tr>
<td>All Indicators are functioning.</td>
<td>All lights flash in sequence.</td>
<td>(B) Dwell Delay Timer.</td>
<td>(B) If procedures in (A) test correctly, check the voltage (24VAC approx.) at terminals #1 and #4 on Dwell Delay Timer. The voltage at terminals #1 and #4 should go from 0 to 24VAC and back to 0 every machine cycle. If this voltage reading is incorrect replace the Dwell Timer.</td>
</tr>
<tr>
<td>All lights flash in sequence.</td>
<td>All lights flash in sequence.</td>
<td>(A) Weld Cable.</td>
<td>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 <strong>clean, bright and tight</strong>. 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.</td>
</tr>
<tr>
<td>Dwell Timer is not functioning.</td>
<td></td>
<td>(B) Upper and Lower Welding Tips.</td>
<td>Clean and Retighten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(C) Upper Tip Retainer.</td>
<td>Clean and Retighten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(D) Female Camlock.</td>
<td>Clean and Retighten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(E) Flush Mount Camlock.</td>
<td>Clean and Retighten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(F) Power Supply Bar.</td>
<td>Clean and Retighten</td>
</tr>
</tbody>
</table>

## PINS DO NOT WELD

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CORRECT FUNCTION INDICATOR</th>
<th>POSSIBLE PROBLEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Indicators are functioning except: Weld 1 Signal, Weld #1 and Weld #2 do not function.</td>
<td>Weld Signal Indicator goes on and off with every cycle.</td>
<td>(A) Short Cycle Relay.</td>
<td>(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.</td>
</tr>
<tr>
<td>All Indicators are functioning, Welding Indicator on the frame is not functioning.</td>
<td>Weld Relay #1 or Weld Relay #2 Indicator should correspond with Weld Signal Indicator. Goes on and off with every cycle.</td>
<td>Head Test Switch.</td>
<td>(B) To test the Pressure Switch place a jumper between terminals #5 and #8 in the Trolley. If the machine does not weld replace the Short Cycle Relay.</td>
</tr>
<tr>
<td>All Indicators are functioning.</td>
<td>All lights flash in sequence.</td>
<td>Weld Transformer.</td>
<td>To test the primary of the Weld Transformer check the voltage to the primary of the Weld Transformer. To check the Weld Relays, 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 every cycle. If this voltage reading does not correspond, check the Head Test Switch.</td>
</tr>
<tr>
<td>All lights flash in sequence.</td>
<td>All lights flash in sequence.</td>
<td>Weld Transformer.</td>
<td>Designate the correct Weld Relay. The Weld Relay controls the voltage to the primary of the Weld Transformer.</td>
</tr>
<tr>
<td>All lights flash in sequence.</td>
<td></td>
<td>(B) Pressure Switch.</td>
<td>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.</td>
</tr>
</tbody>
</table>

Note: The 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.)
# Vibrator Problems

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Correct Function Indicator</th>
<th>Possible Problem</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibrator does not vibrate at all.</td>
<td>N/A</td>
<td>(A) Vibrator Circuit Breaker</td>
<td>(A) Check the Vibrator Circuit Breaker (Located on the rear of the Control Console.) (208-230VAC approx.) If Circuit Breaker reads 208-230V, Circuit Breaker is open. If so, push in Circuit Breaker to reset. If 0V, go to Step B.</td>
</tr>
<tr>
<td>Vibrator Power Switch.</td>
<td>(B) Vibrator Power Switch.</td>
<td>(B) Check the Vibrator Power Switch in the Control Console. (208-230VAC approx.) Between Switch Term 4B-2A, then 3B-1A.</td>
<td></td>
</tr>
<tr>
<td>Vibrator Sensor and Receiver Board</td>
<td>(C) Vibrator Sensor and Receiver Board</td>
<td>(C) The Track Sensor controls the Receiver Board which controls the Vibrator Control Relay. Check the Track Sensor for the red LED. If the LED is not on, check the terminals G and H on the Receiver Board in the Control Console (top rear) for the 12V dc. If the voltage is not present, replace the Track Sensor. If the voltage is not present at G and H, check for 24 V ac at terminals A and B. If the voltage is present at A and B, replace Receiver Board. If the LED is on, jump C and D on the Receiver Board. This should make the vibrator run. If the vibrator runs, check the line of sight through Track Casting. If the line of sight is good, replace the Track Sensor. If the vibrator still does not run, jump A and F on the Receiver Board. If the vibrator now runs, replace Receiver Board. If the vibrator still does not run, proceed to next step.</td>
<td></td>
</tr>
<tr>
<td>Vibrator Control Relay (Relay-3)</td>
<td>(D) Vibrator Control Relay (Relay-3)</td>
<td>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. If this voltage reading is correct, check the voltage (208-230VAC approx.) at terminals #T1 and #T11 on the relay board. If 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.</td>
<td></td>
</tr>
<tr>
<td>Vibrator Phase Control.</td>
<td>(E) Vibrator Phase Control.</td>
<td>(E) In the Control Console, check for voltage (208-230VAC approx.) at terminals #1 and #3 on the Vibrator Phase Control. If there is 208-230VAC at terminals #1 and #3 replace the Vibrator Phase Control.</td>
<td></td>
</tr>
<tr>
<td>Vibrator Coil.</td>
<td>(F) Vibrator Coil.</td>
<td>(F) Measure the resistance at the plug (two outside pins) of the Vibrator Base. The resistance reading should be approximately 9 ohms. If this reading is not correct replace the Vibrator Coil.</td>
<td></td>
</tr>
</tbody>
</table>

## 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.
17084 Air hose 3/8" natural
17085 Male camlock
17189 Upper weld tip plates (5/pkg)
17190 Lower weld tip plates (5/pkg)
17191 Upper weld tip
17192 Lower weld tip
17198 Track casting spacers and screws
17203 Fiber insulator
17222 Low Voltage Terminal Strip
17230 Brake cylinder
17236 Dwell Cylinder Bracket
17239 Feed solenoid
17240 Dwell solenoid
17257 Vibrator support casting
17261 Lower track casting
17264 Upper track side rails
17265 Lower track side rails
17266 Feed channel
17269 Feed cylinder bracket
17276 Upper bearing
17277 Lower bearing
17278 Steel track
17283 Trigger actuator assembly
17284 Trigger actuator switch
17286 Actuator mounting plate
17288 Footswitch plug
17289 Trigger actuator plug
17290 Brake pad
17291 Rear bumper stop
17291 Front bumper stop
17302 Weld timer
17308 Universal Amber Light
17317 Feed speed control
17318 Feed timer
17319 Dwell timer
17323 First Pulse relay
17325 Pressure switch
17327 Actuator receptacle
17327 Footswitch receptacle
17334 Auto/hand gun switch
17348 Feed channel plate
17351 Pusher and pawl
17352 Upper tip retainer
17355 Quick exhaust valve
17356 Adjustable muffler
17359 Feed reed switch
17363 Dwell reed switch
17363 First pulse reed switch
17364 Feed cylinder
17372 Footswitch
17376 Lower Mandrel
17377 Air regulator
17391 Actuator swivel bolt
17394 Short shaft extension
17395 Lower ground bar
18056 Locking knob
18065 2Amp Circuit Breaker
18066 220V Phase Control

27213 Flush mount camlock
29068 Receiving Board
39110 Pin feed switch
39273 Vibrator Base Plate
39286 Vibrator Bowl
39288 Vibrator Base
39308 Incoming Voltage Select Switch
39353 Anti-friction strip
39359 Feed Channel Spacer
39691 C Clip
40102 Air hose 3/8" blue
40105 Air hose 1/4" yellow
40106 Air hose 1/4" blue
44008 Upper feed track casting
44024 Main power switch
44025 LCD display
44027 Weld potentiometer knob
44027 Vibrator potentiometer knob
44029 Relay selector switch
44030 Troubleshooting LED display
44031 Vibrator potentiometer
44033 Vibrator power switch
44041 Line cord
44042 Line cord strain relief
44047 Power contactor
44052 12 VDC power supply
44053 Weld relay
44061 Female cam loc
44062 Trolley mounting plate
44064 Weld cable retainer block
44065 Control console
44067 Flexible wire mold
44068 Rubber air hose
44070 Weld cable camloc
44071 Feed cover
44072 Component module
44073 High voltage terminal strip
44077 Weld potentiometer
44082 Bearing mounting plate
44083 Locking knob spring
44084 Locking knob catch
44085 Clip pin release
44086 Clip pin release spring
44087 Clip pin release stop
44088 Flex link
44089 Weld cable - long
44090 Vibrator Control Relay Board
44091 24 volt multi-tap transformer
44095 Track Sensor
44105 Power Pack Tray
44101 Weld Transformer
44115 Hi Voltage Terminal Strip
44117 Component Module
44118 Trolley
44119 Trolley Cover
44120 Weld Cable - Short
44121 Control Module
44122 Trolley Mount Plate
44129 Class-1 Laser
44130 Laser/Control PC Board
44131 Laser/Control PC Board Kit