DURO DYNE®

AUTOMATIC BULK FEED PINSPOTTER

MODEL FG-1

OWNER'S MANUAL

TABLE OF CONTENTS

INTRODUCTION	2
PARTS LOCATION	3-6
INSTALLATION INSTRUCTIONS	7
OPERATION	7
MAINTENANCE	7
WIRING SCHEMATIC	8
INTERCONNECTIONS	9
THEORY OF OPERATION	9
SERVICING	10
TROUBLE SHOOTING SECTION	11
LIMITED WARRANTY	19
FG PARTS LISTING	20

INTRODUCTION

Duro Dyne is proud to introduce the bulk feed concept of our popular FG-1 pinspotter. It will provide fast and efficient insulation fastening in your shop.

The minimal material handling and utilization of welded clip pins will insure your shop of a cost efficient, quality product.

Trouble free service is the key to optimum production, and the FG-1, with proven solid state components located for easy access, makes preventative maintenance a breeze.

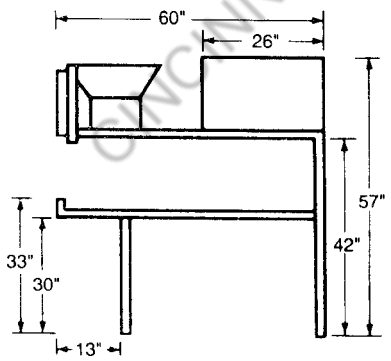
This manual is designed to be a guide to keeping your FG-1 operating at peak performance for years to come.

IMPORTANT

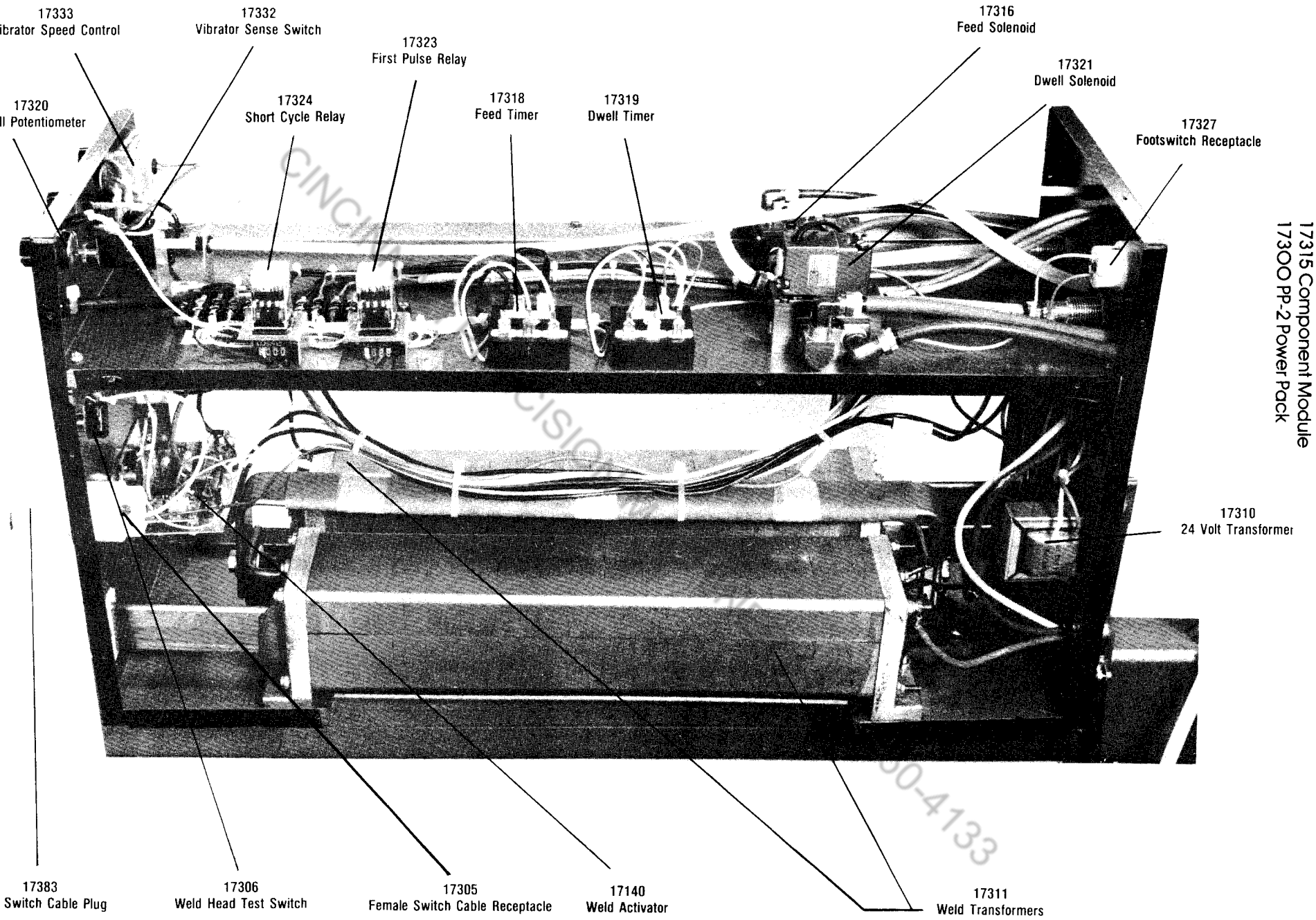
Always follow manufacturer's recommendations for proper safety and handling procedures for all materials used in conjunction with this machine as outlined in Manufacturer's Safety Data Sheet (MSDS) for each product.

PARTS LOCATION

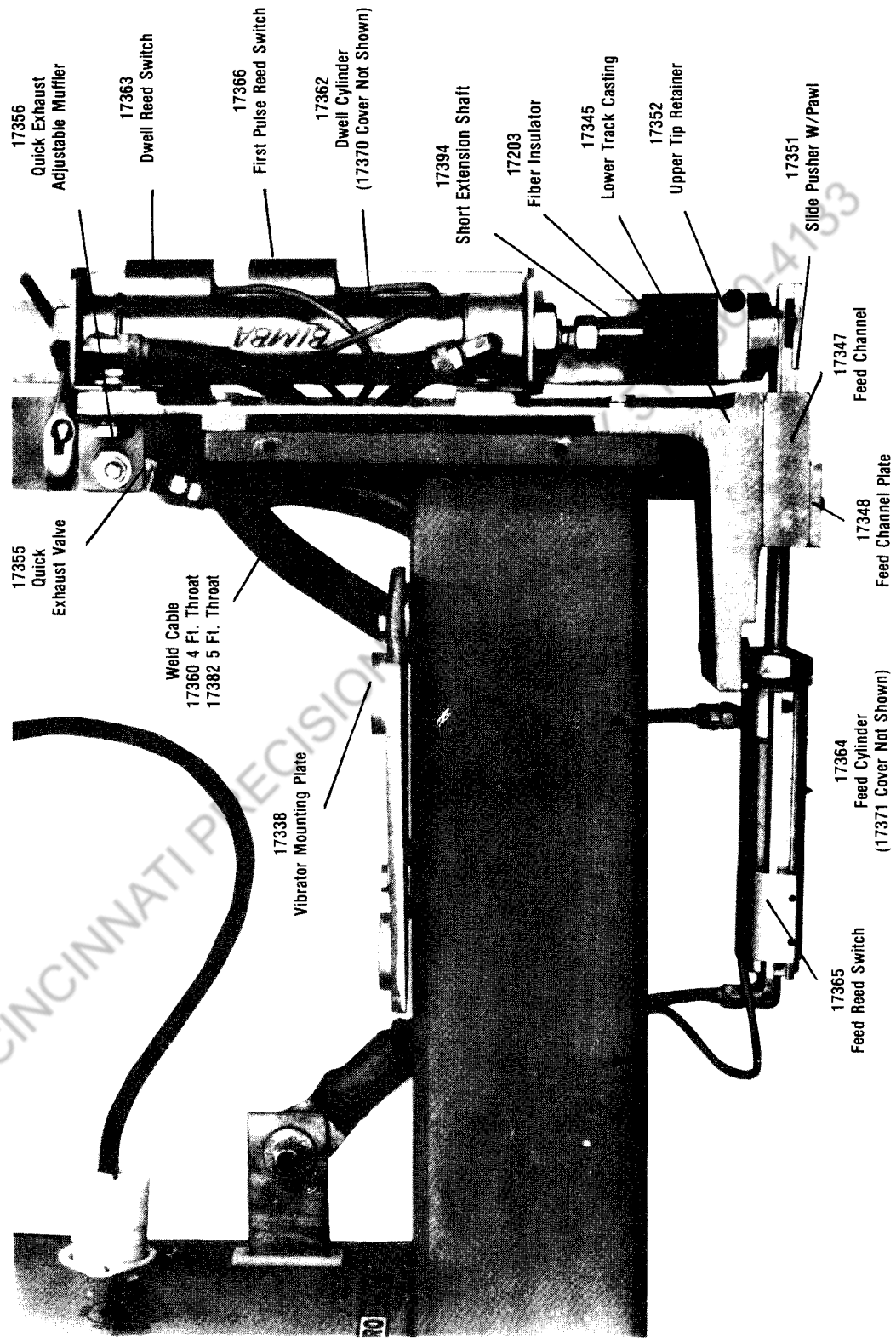
TECHNICAL SPECIFICATIONS



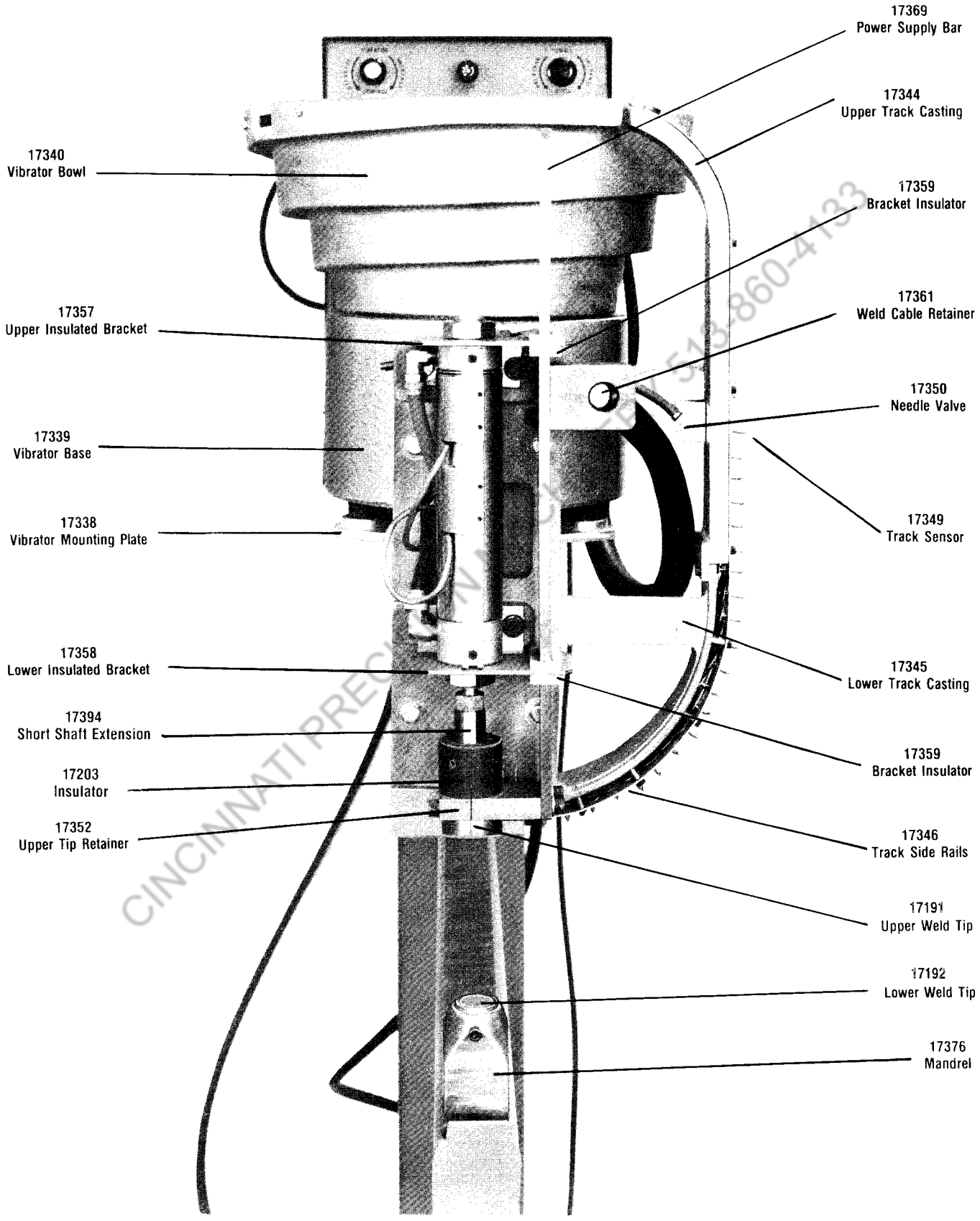
AIR REQUIREMENTS:
Input pressure 80 PSI.
ELECTRICAL:
Input voltage 220 V 60 HZ single phase.
Fuse for 30 amps.


17333
Vibrator Speed Control
17332
Vibrator Sense Switch
17323
First Pulse Relay
17316
Feed Solenoid
17321
Dwell Solenoid
17320
Dwell Potentiometer
17324
Short Cycle Relay
17318
Feed Timer
17319
Dwell Timer
17327
Footswitch Receptacle
17310
24 Volt Transformer
17383
Male Switch Cable Plug
17306
Weld Head Test Switch
17305
Female Switch Cable Receptacle
17140
Weld Activator
17311
Weld Transformers

Feed, Dwell, Tracking Assembly



Feed, Dwell, Tracking Assembly



INSTALLATION INSTRUCTIONS

1) Connect Power Pack to a source of 220 V 30 Amp. power. Power supply line to power pack pigtail should be #8 (or heavier) wire to minimize voltage losses. Black & white wires are power, green is ground.
2) Attach foot switch to foot switch socket on rear of power pack.
3) Connect air line to regulator. Adjust regulator pressure to 80–85 PSI.
4) Plug vibrator power plug into socket-on front of Power Pack.

OPERATION

FG-1 INITIAL ADJUSTMENTS

1) Turn power switch to "ON."
2) Turn vibrator switch to "ON."
3) Add clip pins to hopper (vibrator bowl).
4) With feed track empty, open needle valve until hopper begins to vibrate.
5) Adjust vibrator speed so that clip pins climb spiral track inside vibrator bowl without vibrating off.
6) When clip pins fill track right up to needle valve assembly, vibrator automatically shuts off.
7) Turn HEAD TEST/WELD Switch to "WELD" position.

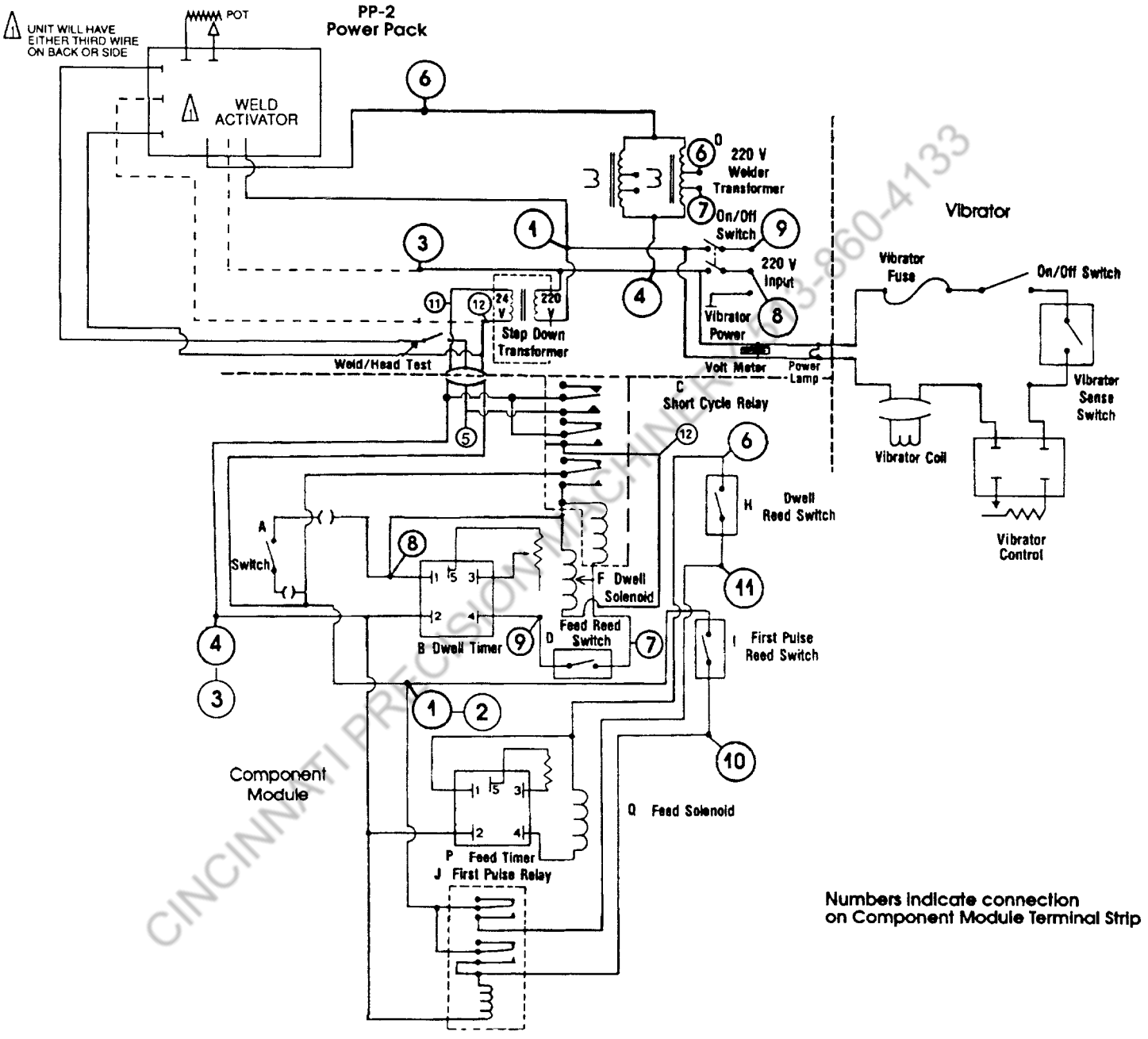
STARTING OPERATION

1) Never actuate unit without metal over ground bar or Mandrel. For maximum weld quality, metal should be in flat contact with mandrel. Adjacent table or roller on which sheet metal rests must either be exactly flush with or slightly below mandrel.
2) Weld Timer and Dwell Timer settings control weld quality of the Pinspotter.
   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 pins. (If pins glow red up to the washer, weld time is set too high.) Always set the weld timer to the minimum time required for a good weld.
   Dwell time is the length of time the welding tip remains in the down position. Always adjust the dwell timer to a setting slightly longer than the weld timer so that the upper weld tip will remain down until the weld cycle has ended and the weld has had time enough to cool.
3) Always "pre-test" a run with smaller pieces of the same gauge sheet metal thickness and liner density you intend to use in final production.
   Different densities and thicknesses of liner may require adjustments of the weld and dwell timer settings. For example: heavier gauge steel, thicker liner, higher density liner and/or longer clip pins may require longer weld and dwell time. To make sure, always pre-test any adjustment before you go into "finished production." But. . .only change weld and dwell timer settings when a change in materials results in poor weld performance or a poor quality weld.

MAINTENANCE

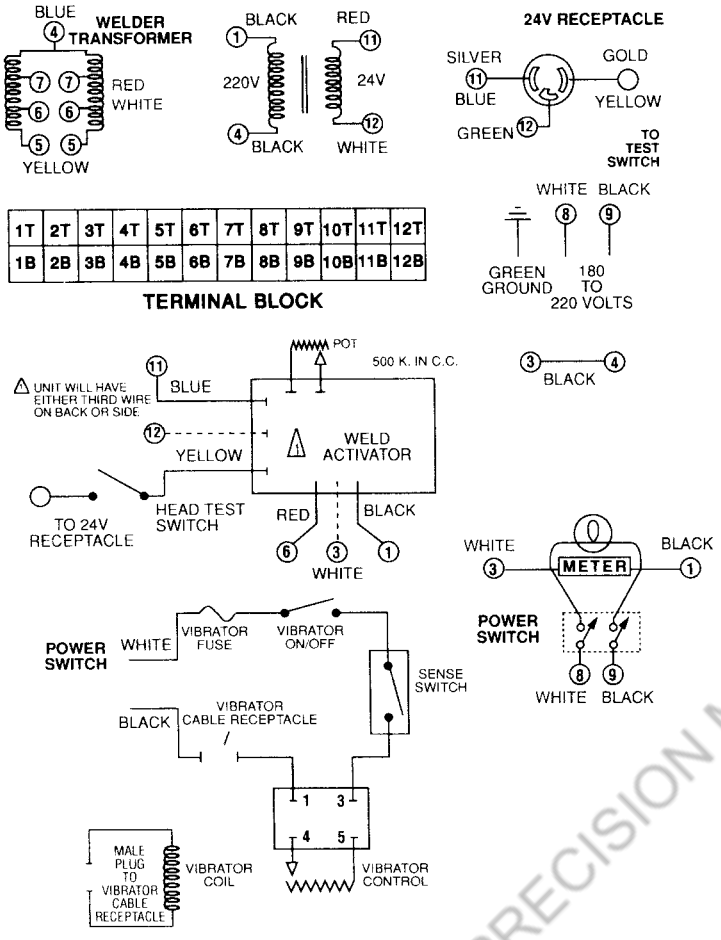
1) To prolong weld tip life and improve weld quality, it is imperative that weld tips always be kept clean. For best results, use a solvent to remove adhesive from tips; a wire brush to remove any galvanizing deposits; and a fine emory cloth to smooth tip surfaces.
2) When lower weld tip becomes worn in one area, loosen the locking cap screw and rotate the point of wear away from the point of contact of the tip. If this cannot be done because the lower weld tip is too badly pitted, simply clean the surface of the plate and turn the plate over and use the other side. Additional lower weld plates can be ordered from your local distributor.
3) Depending on usage and maintenance, 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 plate by loosening three (3) brass screws. Throw away screws and attach new plate to tip using three brass screws supplied. Be sure to match angled section of plate with undercut running parallel to frame, then lock tip in place. Cycle machine to check feeding.
4) If feeding is erratic, re-adjust upper weld tip height by loosening lock nut and then turning weld cylinder shaft clockwise to raise tip; counterclockwise to lower tip. Lock tip in place with locking nut.

WIRING SCHEMATIC

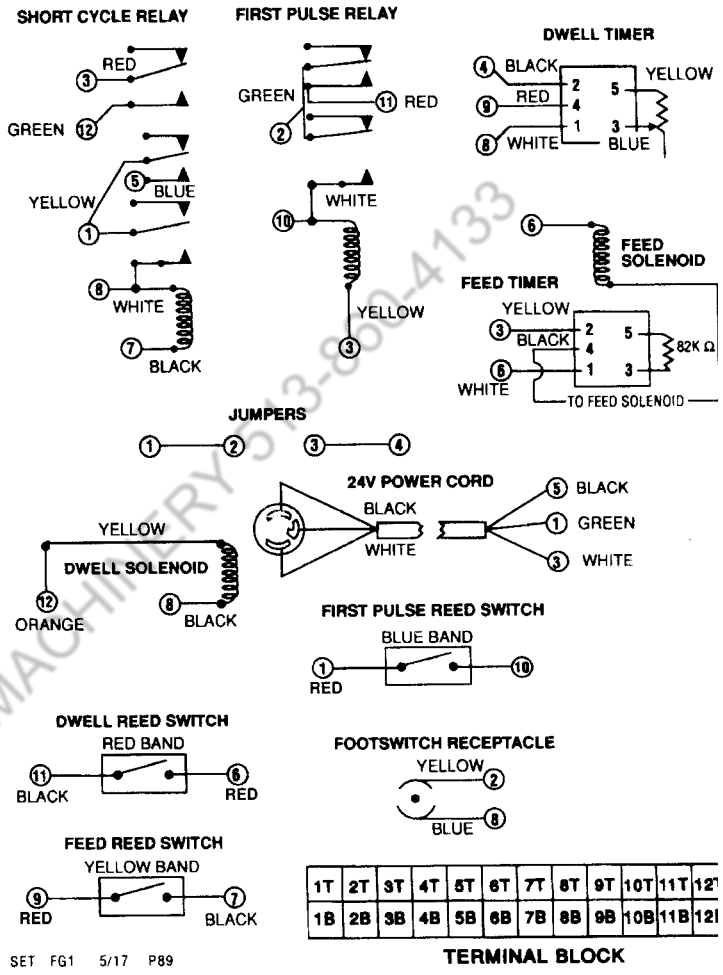


INTERCONNECTIONS

PP-2 (POWER PACK)



COMPONENT MODULE



SET FG1 5/17 P89

THEORY OF OPERATION

When Foot Switch **(A)** is activated, a pulse is sent to dwell timer **(B)** and short cycle relay **(C)**. If feed reed switch **(D)** on feed cylinder is closed, the short cycle relay is locked in activating: 1) dwell solenoid, sending a volume of air to dwell cylinder which moves down. 2) weld activator in power pack. This in turn powers the transformers for the period of time for which timer is set.

When first pulse reed switch **(I)** closes and for as long as unit is on—first pulse relay **(J)** closes, allowing unit to feed after dwell reed switch **(H)** closes.

When dwell cylinder shaft has retraced dwell reed switch **(H)** signals feed timer **(P)**. Feed solenoid **(Q)** is energized for a fixed period of time sending feed cylinder out and back. When feed cylinder has retracted feed reed switch **(D)** closes allowing cycle to re-energize when switch **(A)** is re-activated.

NOTE: Reed switches (D) and (H) act as interlocks between feed cylinder and dwell cylinder. When dwell cylinder is extended, feed cylinder is retracted and vice versa.

SERVICING

A SIMPLIFIED STEP-BY-STEP PROCEDURE

Duro Dyne has called upon its many years of pin-spotting experience in dèsigning the FG-1. Your unit as been rigorously factory tested and inspected to provide many years of dependable service.

Your Owner's Manual is designed to help you quickly and systematically isolate, identify and correct most problems. Trouble-shooting procedures are grouped according to symptoms in three functional areas: Feed and Dwell, Vibrator, and Weld Quality.

AS EASY TO USE AS 1-2-3!

To use the manual properly, you simply:

1) Identify symptom(s)
2) Turn to the appropriate guide section
3) Follow the test procedures in that section in sequence

With the help of this guide, you should be able to correct most problems that occur. However, if you feel that a particular problem is beyond your capability, by all means, contact your Duro Dyne distributor, your Duro Dyne sales engineer, or the nearest Duro Dyne facility.

WHAT TO DO BEFORE YOU BEGIN TROUBLE SHOOTING

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, before you refer to Trouble-shooting, 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 FG from its power supply—and carefully check 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 SYMPTOMS

By weld we mean that the Power Pack is energized, sending a pulse of electricity through the clip pin, causing it to begin to fuse to the sheet metal.

To properly trouble-shoot weld quality problems, you must first pinpoint the symptom **by test welding clip pins to bare sheet metal**. The symptom will then show up in one of four categories:

1) Pins weld to bare metal but not on lined work.
2) Pins weld to bare metal but can easily be removed.
3) Pins weld to bare metal but remain on weld tips as it retracts.
4) Pins do not weld at all.

Before performing any trouble-shooting steps in the Weld Quality Section, always check:

1) Air Pressure for minimum 80 PSI during usage of unit.
2) Input Voltage for minimum 220V.
3) Weld and Dwell timer for correct settings; see **Owner's Manual** "Operation" section.
4) Upper and Lower Weld Tips for extreme wear.

It may be necessary to use a voltmeter and/or ohmmeter to perform the simple servicing procedures. Follow the instructions for reading resistance and voltage.

MEASURING RESISTANCE (OHMMETER)

1) Disconnect the power supply.
2) Set the ohmmeter at RX 1000 scale.
3) Touch two probes together and "zero" the ohmmeter.
4) If the meter reads as shown in Diagram A, there is infinite resistance across the terminals.
5) If the meter reads as shown in Diagram B, there is no resistance across the terminals.

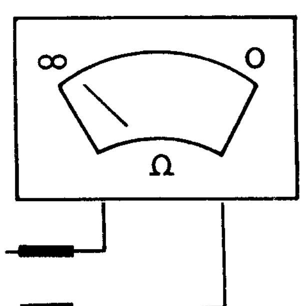


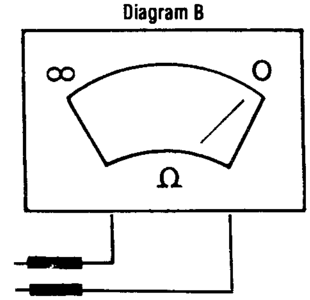
Diagram A

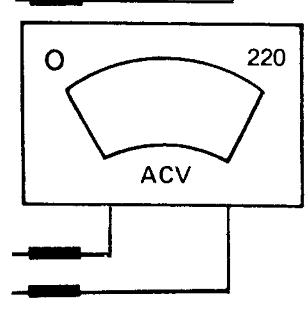
MEASURING AC VOLTAGES (VOLTMETER)

1) Set the voltmeter at the nearest scale above (never below) voltage you wish to read.

For all servicing, refer to the parts call out enclosed in this manual.

Diagram B





TROUBLE-SHOOTING SECTION

SYMPTOM I
Nothing Happens When Foot Switch is Depressed
SYMPTOM II
Welding Tip Does Not Retract
SYMPTOM III
Sluggish Movement of Welding Tip
SYMPTOM IV
Slide Pusher Does Not Move — **FEED AND DWELL**
SYMPTOM V
Slide Pusher Does Not Retract
SYMPTOM VI
Slide Pusher Hits Upper Weld Tip
SYMPTOM VII
Slide Pusher Throws Clips Past Upper Weld Tip
SYMPTOM VIII
Slide Pusher Does Not Place Pins on Upper Weld Tip
SYMPTOM IX
Sluggish Slide Pusher

SYMPTOM X
Vibrator Does Not Vibrate at All — **VIBRATOR**
SYMPTOM XI
Vibrator Vibrates But Not Enough to Move Pins Up Hopper
SYMPTOM XII
Vibrator Does Not Shut Off

SYMPTOM XIII
Pins Weld to Bare Metal But Not Through Liner
SYMPTOM XIV
Pins Weld to Bare Metal But Can Easily Be Removed — **WELD QUALITY**
SYMPTOM XV
Pins Weld to Bare Metal But Remain on Weld Tip as it Retracts
SYMPTOM XVI
Pins Do Not Weld at All.

PROTECT YOURSELF AND THE EQUIPMENT AT ALL TIMES

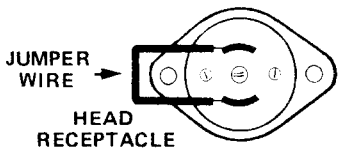
When troubleshooting, always remember that:
1) The FG has 220 V input. When taking voltage readings, be extremely careful not to touch or brush against any 220 V connections.
2) Solid state timers have a long life expectancy and no moving parts, however, they are extremely sensitive. Be extra careful when taking readings. Timers can easily be shorted out.
3) When reading troubleshooting guide:
CM=Component Module
PP-2=Power Pack

FEED AND DWELL SECTION

SYMPTOM I

Nothing Happens When Foot Switch is Depressed

1) Check power.
Make sure air and electricity are both ON.
2) Foot Switch Test
Air/Electricity ON. Disconnect Foot switch from receptacle at rear of CM. Insert one end of jumper wire into each receptacle opening as shown.
IF UNIT CYCLES: Check for bad connection in Foot Switch Plug; If connection is OK, replace Foot Switch.
IF NOTHING HAPPENS: Reconnect Foot Switch and proceed to step 3.

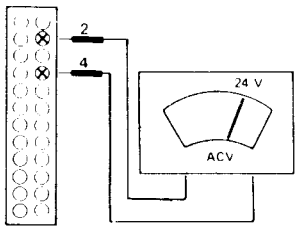


3) Power Pack (PP-2) Test Sequence:

A) CM Input Test:
Set voltmeter to nearest scale above 24V. remove CM Cover. Air/Electricity ON. Read AC voltage across 2 & 4 of CM terminal block.

If meter reads as shown (24V): PP-2 is OK; proceed to Step B.

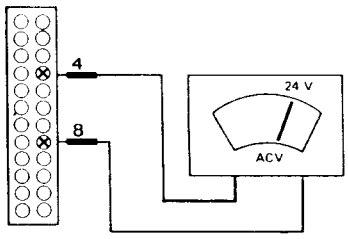
If meter reads "0" V: CM is not receiving 24V from PP-2; proceed to Step 4.



B) Foot Switch Receptacle to Terminal Test:
Air/Electricity ON. Depress and hold down actuator while reading AC voltage across 4 and 8 on CM terminal block.

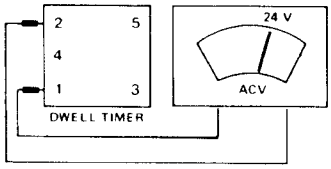
If Meter reads as shown (24V): Connections between Foot Switch receptacle and Terminal Blocks are OK; proceed to Step C.

If Meter reads "0" V: problem is bad connection from Foot Switch receptacle to terminals 2 and 8 on Terminal Block.



C) Dwell Timer Input Test
Air/Electricity ON. Depress and hold down Foot Switch while reading AC voltage across 1 and 2 of dwell timer.

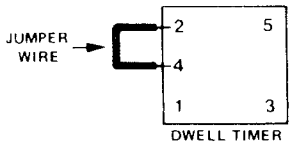
If Meter Reads as Shown (24V): connections between Dwell Timer terminals 1 and 2 and CM Terminal Block OK; proceed to Step D.



If Meter Reads "O" V: problem is bad connection from 1 and 2 of Dwell Timer and 4 and 8 of CM Terminal Block.

D) Dwell Timer Test.
Air/Electricity ON. Jump a wire from terminal 2 on dwell timer to terminal 4 on Dwell Timer. Depress and hold down Foot Switch.

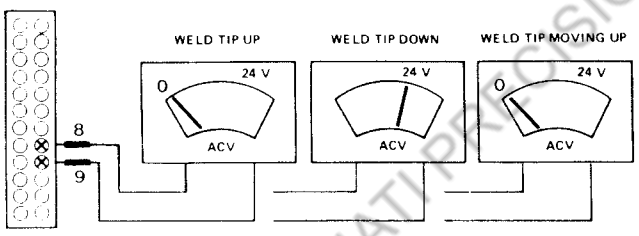
If Upper Weld Tip Moves Down and Stays Down Until Jumper is Removed: replace Dwell Timer.



If Upper Weld Tip Does Not Move: proceed to Step E.

E) Dwell Timer to Terminal Test.
Air/Electricity ON. Increase dwell time to maximum. Cycle unit, reading AC voltage across 8 and 9 on CM Terminal Block.

NOTE: This is a timed voltage reading in which meter response is more important than precise voltage measurement.



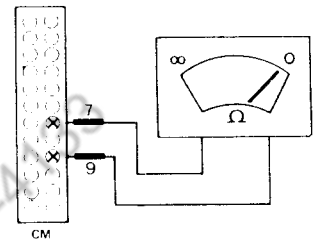
If Meter Reads as Shown (O-24-O V) During Cycle: Connections between Dwell Timer Terminal 4 and CM Terminal Block OK; proceed to Step F.

If Meter Reads "O" V During Cycle: problem is bad connection from terminal 4 on Dwell Timer to terminal 9 on Terminal Block.

F) Feed Reed Switch Test.
Remove Feed Cylinder cover. Air ON/Electricity OFF. Connect ohmmeter and read resistance across 7 and 9 on Terminal Block.

If Meter Reads as Shown ("O"Ω): Feed Reed Switch OK; proceed to Step G after replacing Feed Cylinder cover.

If Meter Reads " ∞ ": perform the following steps
1) Loosen Allen locking screws on Feed Reed Switch and slightly shift switch in either direction until meter reads "O". When ohmmeter reads "O" lock switch in place.
2) If you cannot get a "O" reading above, replace Feed Reed Switch.

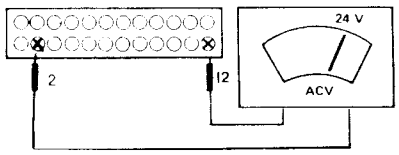


G) Short Cycle Relay Test.
Air/Electricity ON. Increase dwell time to maximum cycle unit reading AC voltage across terminals 2 and 12 on Terminal Strip.

NOTE: This is a limited voltage reading in which meter response is more important than precise voltage measurement.

If Meter Reads 24 Volts: short cycle relay is OK, proceed to Step H.

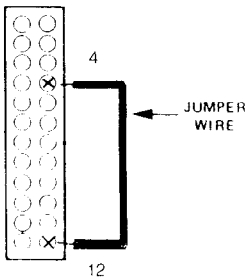
If Meter Reads "O" Volts: replace short cycle relay.



H) Dwell Solenoid Test.
Air/Electricity ON. Jump a wire from terminal 4 to terminal 12 on CM Terminal Block. Depress and hold down actuator switch.
*PLEASE NOTE: On older machines, Dwell Solenoid may be wired to terminal 7 instead of terminal 12. If your unit is so wired, jump 4 to 7 instead of 4 to 12.

If Upper Weld Tip Moves Down and Stays Down Until Jumper is Removed: problem is bad connection or faulty component overlooked in Steps 3A through 3H.

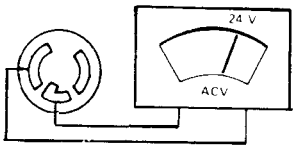
If Nothing Happens: replace Dwell Solenoid.



4) Switch Cable Receptacle Test.
Air OFF/Electricity ON. Remove male Switch Cable plug from Switch Cable Receptacle. Set voltmeter to nearest scale above 24V. Read AC voltage as shown at Switch Cable Receptacle.

If Meter Reads as Shown (24V): problem is bad connection between Switch Cable plug and CM Terminal Block. After correcting, reconnect male Switch Cable plug.

SWITCH CABLE RECEPTACLE

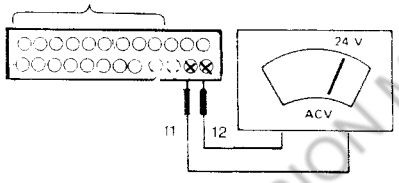


If Meter Reads "O" V: Switch Cable Receptacle is not receiving 24V; reconnect male Switch Cable plug and proceed to Step 5.

5) 24V Transformer Output Test.
Remove PP-2 Cover. Air OFF/Electricity ON. Read AC voltage across 11 and 12 on PP-2 Terminal Block.

If Meter Reads as Shown (24V): problem is bad connection between Switch Cable Receptacle and 11 or 12 on PP-2 Terminal Block.

220 VOLT TERMINALS

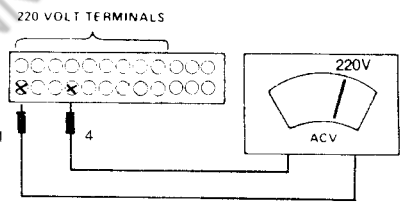


If Meter Reads "O" V: no output from 24V Transformer; proceed to Step 6.

6) 24V Transformer Input Test.
Air OFF/Electricity ON. Set voltmeter to nearest scale above 220V. Read AC voltage across 1 and 4 of PP-2 Terminal Block.

If Meter Reads as Shown (220V Min.): replace 24V Transformer.

220 VOLT TERMINALS

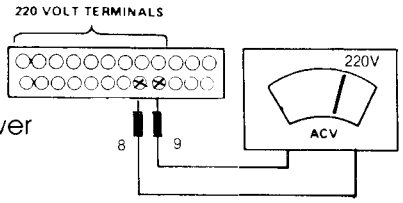


If Meter Reads "O" V: 24V Transformer not receiving 220V from On/Off Switch; proceed to Step 7.

7) Input Voltage Test.
Air OFF/Electricity ON. Read AC voltage across 8 and 9 of PP-2 Terminal Block.

If Meter Reads as Shown (220V Min.): replace On/Off Switch.

220 VOLT TERMINALS



If Meter Reads "O" V: problem is either power supply output or bad connection between power supply and PP-2.

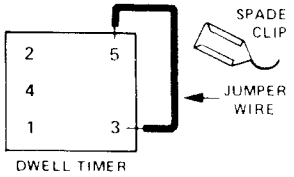
SYMPTOM II

Welding Tip Does Not Retract

1) Dwell Potentiometer/Dwell Timer Test.
Remove CM cover. Air/Electricity ON. Disconnect spade clip at terminal 5 of Dwell Timer. Cycle unit so that Dwell Cylinder shaft does not retract. Place jumper wire across 3 & 5 of Dwell Timer.

If Shaft Retracts: replace Dwell Potentiometer.

If Shaft Does Not Retract: replace Dwell Timer.



SYMPTOM III

Sluggish Movement of Welding Tip

1) Check Air Pressure.
Air pressure must be minimum 80 PSI during usage. If trouble persists, proceed to Step 2.

2) Check for excess oil or water in lines. If there is excess oil or water in lines, disconnect and blow out all air lines. Remove and clean exhaust mufflers. Reconnect air lines. Cycle unit repeatedly to remove excess oil. Reconnect exhaust mufflers. If trouble persists, proceed to Step 3.

3) Check Dwell Cylinder Shaft for Binding
Shaft should be able to move freely. If trouble persists, proceed to Step 4.

4) Check for Air Leakage
Replace cut or pinched air lines. If air leakage occurs from pressure switch in component module, replace pressure switch. If trouble persists proceed to Step 5.

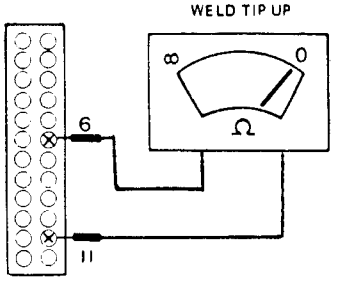
5) Replace Dwell Solenoid.

SYMPTOM IV

Slide Pusher Does Not Move

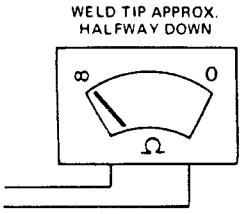
1) Dwell Reed Switch Test
Remove front cover; remove CM cover. Air/Electricity OFF. Connect ohmmeter across 6 & 11 on CM Terminal Block and take resistance readings with Upper Weld Tip UP, and Upper Weld Tip DOWN.

If Meter Reads As Shown: Dwell Reed Switch OK; proceed to Step 2.

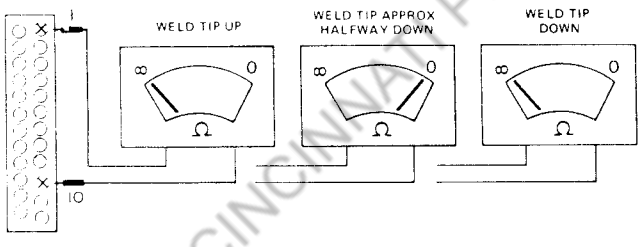


If Meter Reads "O" In Both Up & Down Positions: replace Dwell Reed Switch.

If Meter Reads " ∞ " with Tip Up: loosen locking screws on Dwell Reed Switch and while holding Dwell Cylinder up, slightly switch until meter reads "0" Ω . If you cannot get a "0" Ω reading by shifting switch position, replace Dwell Reed Switch.



2) First Pulse Reed Switch Test
Air/Electricity OFF. Remove male Switch Cable plug from female Switch Cable Receptacle. Connect ohmmeter across 1 & 10 on CM Terminal block and read resistance as you move Upper Weld Tip from up to down position.

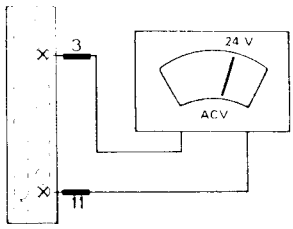


If Meter Reads As Shown (∞ - "O" - ∞): First Pulse Reed Switch OK; reconnect male Switch Cable plug and proceed to Step 3.

If Meter Reads Otherwise: replace First Pulse Reed Switch and reconnect male Switch Cable plug.

3) First Pulse Relay Test.
Air/Electricity ON. Set voltmeter to nearest scale above 24 V. Cycle unit once. Do not turn PP-2 off. Read AC voltage across 3 & 11 of CM Terminal Block.

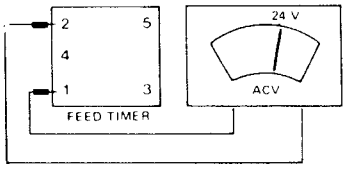
If Meter Reads As Shown (24V): First Pulse Relay OK; proceed to Step 4.



If Meter Reads "O" V: replace First Pulse Relay.

4) Feed Timer Test Sequence.
A) Feed Timer Test Sequence.
Air/Electricity ON. Cycle unit once, then read AC voltage across Feed Timer terminals 1 & 2.

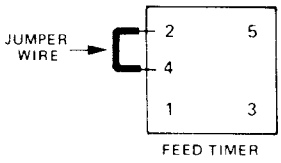
If Meter Reads As Shown (24V): connections between 1 & 2 and CM Terminal Block OK; proceed to Step B.



If Meter Reads "O" V: problem is bad connection from CM Terminal Block terminals 3 & 6 to Feed Timer terminals 1 & 2.

B) Feed Timer Output Test.
Air/Electricity ON. Jump a wire from terminal 2 to terminal 4 on Feed Timer.

If Slide Pusher Extends and Does Not Retract Until Jumper is Removed: replace Feed Timer.



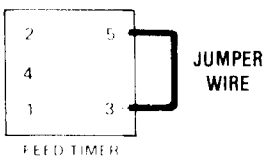
If Nothing Happens: replace Feed Solenoid.

SYMPTOM V

Slide Pusher Does Not Retract

1) Feed Timer Resistor Test.
Remove CM cover. Air/Electricity ON. Cycle unit so that slide pusher does not retract. Place a jumper wire across Feed Timer terminals 3 & 5.

If Slide Pusher Retracts and Remains Retracted After Jumper is Removed: replace resistor.



If Slide Pusher Does Not Retract: replace Feed Timer.

SYMPTOM VI

Slide Pusher Hits Upper Weld Tip

1) Upper Weld Tip Height Adjustment
Air OFF/Electricity OFF. Loosen lock nut on Dwell Cylinder shaft; screw shaft clockwise to raise Upper Weld Tip. Lock in position. Air/Electricity ON. Cycle unit. Repeat as necessary to get proper adjustment.

SYMPTOM VII

Slide Pusher Throws Clips Past Upper Weld Tip

1) Check Upper Weld Tip for Magnetism
Place a clip pin under the Upper Weld Tip. If tip does not retain pin: replace Upper Weld Tip.
2) Check Slide Pusher for Binding

SYMPTOM VIII

Slide Pusher Does Not Place Pins on Upper Weld Tip

1) Check for Binding
Air/Electricity OFF. Hold Upper Weld Tip UP. Move Slide Pusher into extended position. Check that Pusher is aligned with Upper Weld Tip and that neither it nor clip pins bind under Upper Weld Tip. If trouble persists, proceed to Step 2.
2) Check Slide Pusher Pawl
Air/Electricity OFF. With Slide Pusher in extended position, check that pawl is free.

SYMPTOM IX

Sluggish Slide Pusher

1) Check Air Pressure
Air pressure must be minimum 80 PSI during usage. If trouble persists, proceed to Step 2.

2) Check for excess oil or water in lines. If there is excess oil or water in lines, disconnect and blow out all air lines. Remove and clean exhaust mufflers. Reconnect air lines. Cycle unit repeatedly to remove excess oil. Reconnect exhaust mufflers. If trouble persists, proceed to step 3.

3) Check Slide Pusher or Feed Cylinder Shaft for Binding.
Both should be able to move freely. If trouble persists, proceed to Step 4.

4) Replace Feed Solenoid.

VIBRATOR SECTION

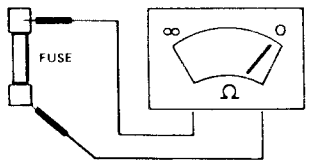
SYMPTOM X

Vibrator Does Not Vibrate at All

NOTE: Remove clip pins from feed track on all vibrator test procedures.

1) Perform Initial Check
a) Air ON.
b) On/Off Switch ON.
c) Vibrator On/Off Switch ON.
d) Check that bolt holding Vibrator Bowl to base is tight.
e) Track Sensor Needle Valve OPEN.
f) Vibrator Base Line cord plug attached to Vibrator Receptacle at back of Control Console.
g) Vibrator Speed Control at MAXIMUM setting.
2) Track Sensor Cleanout
Air ON/Electricity OFF. Temporarily disconnect, reverse and reconnect air hoses at Track Sensor fitting on Feed Track. After blowing out any deposits from sensing device, reconnect air hoses in proper positions. Test cycle unit. **If problem persists**, re-perform Initial Check (Step 1) and then proceed to Step 3.
3) Fuse Test
Air/Electricity OFF. Remove Fuse from Fuse Holder in Component Module. Place ohmmeter probes at each end of Fuse, as shown.

If Meter Reads As Shown ("O" Ω) Fuse OK; reinsert Fuse and proceed to Step 4.

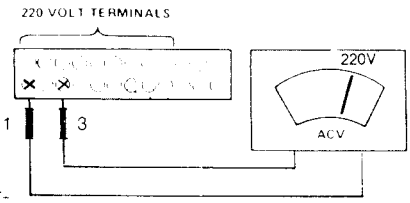


If Meter Reads ∞: replace Fuse. (Fuse rated 250V, 1 amp)

4) Power Pack (PP-2) Test
A) PP-2 ON/OFF Switch Output Test.
Remove PP-2 cover. Air OFF/Electricity ON. Read AC voltage across 1 and 3 of PP-2 Terminal Block.

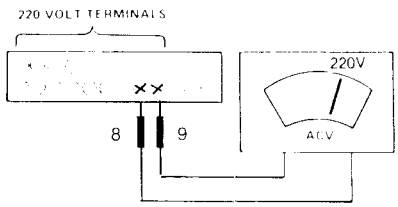
If Meter Reads as Shown (220V Min.): PP-2 OK; proceed to Step 5.

If Meter Reads "O" V: proceed to Step B.



B) PP-2 Input Test.
Air OFF/Electricity ON. Read AC voltage across 8 and 9 of PP-2 Terminal Block.

If Meter Reads as Shown (220V Min.): replace On/Off Switch.



If Meter Reads "O" V: PP-2 OK; problem is in PP-2 to power supply connections or power supply.

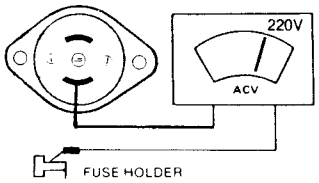
THE FOLLOWING CONDITIONS APPLY TO ALL PROCEDURES IN VIBRATOR TEST STEPS 5 THRU 9:

- On/Off Switch ON.
- Vibrator On/Off Switch ON.
- Track Sensor Needle Valve OPEN.
- Vibrator Base Line cord plugged into vibrator receptacle.
- Vibrator Speed Control at MAXIMUM setting.

5) Vibrator Cable Receptacle Connection Test
Read AC voltage from slot of Vibrator Cable Receptacle to terminal at rear of Fuse Holder as shown.

If Meter Reads as Shown (220V MIN.): connections OK to lower slot of Vibrator Receptacle; proceed to Step 6.

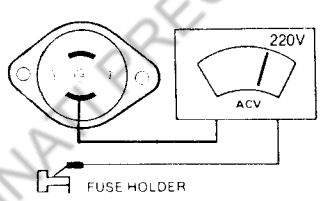
If Meter Reads "O" V: problem is bad connection or broken wire between upper contact of Vibrator Cable Receptacle or Fuse Holder terminal and Power Switch.



6) Fuse Holder Test
Read AC voltage from lower slot of Vibrator Receptacle to terminal of Fuse Holder connected to Vibrator On/Off switch.

If Meter Reads as Shown (220V MIN.): Fuse Holder OK; proceed to Step 7.

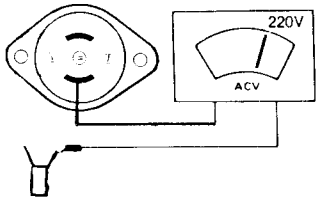
If Meter Reads "O" V: recheck Fuse (Step 3). If Fuse OK, replace Fuse Holder.



7) Vibrator On/Off Switch
Read AC voltage from lower slot of Vibrator Receptacle to terminal of Vibrator On/Off Switch not connected to fuse holder.

If Meter Reads as Shown (220V MIN.): Vibrator On/Off Switch OK: proceed to Step 8.

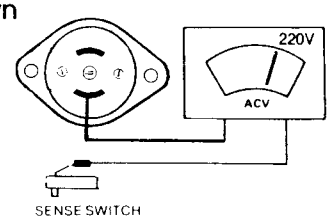
If Meter Reads "O" V: replace Vibrator On/Off Switch.



8) Vibrator Sense Switch Test
Read AC voltage from lower slot of Vibrator Receptacle to Sense Switch terminal with lead to Vibrator Speed Control.

If Meter Reads as Shown (220V MIN.): Vibrator Sense Switch OK; proceed to Step 9.

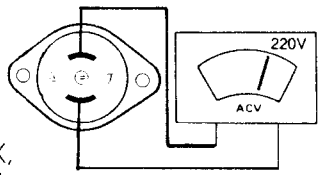
If Meter Reads "O" V: replace Sense Switch.



9) Vibrator Receptacle Test
Read AC voltage from upper slop of Vibrator Receptacle to lower slot of Vibrator Receptacle.

If Meter Reads as Shown (220V MIN.): Vibrator circuit in control module OK; proceed to Step 10.

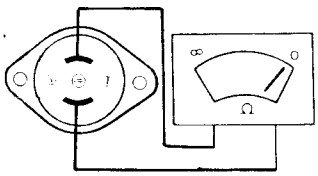
If Meter Reads "O" V: check for bad connection at center slot of Vibrator Receptacle; if connection appears OK, replace Vibrator Speed Control.



10) Vibrator Test
Air OFF/Electricity ON. Place ohmmeter leads on top two prongs of 220 V Vibrator Supply Line plug that fits into Vibrator Receptacle.

If Meter Reads as Shown ("O" Ω): Vibrator coil and plug OK; refer to Section XI of this guide.

If Meter Reads Otherwise: problem is either bad Vibrator Coil or bad connection between Vibrator Coil and plug.



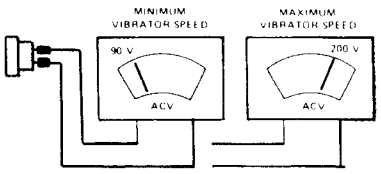
SYMPTOM XI

Vibrator Vibrates But Not Enough to Move Pins Up Hopper

1) Check that Bolt Attaching Vibrator Bowl to Base is Tight. If trouble persists, proceed to Step 2.
2) Vibrator Speed Control Test
Set voltmeter to nearest scale above 220 V. Control Console opened. Air/Electricity ON. Track Sensor Needle Valve OPEN. Vibrator On/Off Switch ON. Vibrator Base Line cord

plugged into Vibrator Receptacle. Feed Track empty of pins. Connect voltmeter (as shown) across Vibrator Power Receptacle contacts inside control console and take AC voltage readings as you vary Vibrator Speed Control.

If Meter Reads as Shown (From 90V to 220V MIN.): Vibrator Speed Control OK; proceed to Step 3.



If Meter Does Not Show Significant Voltage Change as Vibrator Speed Control is Varied from High to Low: replace Vibrator Speed Control.

3) Vibrator Tuning Adjustment
Consult your Duro Dyne Vibrator Operation Bulletin for adjusting the vibratory feeder on your FG-1. If problem persists or bulletin is not available, call the Duro Dyne Service Department at 800-899-DURO.

If trouble persists after this turning adjustment, and vibration is still not enough to move pins up hopper, turn Air/Electricity OFF, remove vibrator base cover and inspect for broken spring and/or loose spring screw.

SYMPTOM XII

Vibrator Does Not Shut Off

1) Replace Sense Switch.

WELD QUALITY SECTION

SYMPTOM XIII

Pins Weld to Bare Metal But Not Through Liner

1) Check Air Pressure
Air pressure must be minimum 80 PSI during usage. If trouble persists, proceed to Step 2.

2) Check for excess oil or water in lines. If there is excess oil or water in lines, disconnect and blow out all air lines. Remove and clean exhaust mufflers. Reconnect air lines. Cycle unit repeatedly to remove excess oil. Reconnect exhaust mufflers. If trouble persists, proceed to Step 3.

3) Check Dwell Cylinder Shaft for Binding
Shaft Should be able to move freely. If trouble persists, proceed to Step 4.

4) Increase Weld/Dwell Times
Slightly increase both Weld and Dwell Timer settings. (Refer to FG Owner's Manual: "Operation"). The upper Weld tip should not begin to retract until weld cycle is completed. If trouble persists, proceed to Step 5.

5) Check Clip Pin Points
Clip pin points must be sharp enough to penetrate liner.

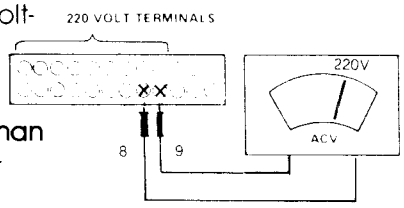
SYMPTOM XIV

Pins Weld to Bare Metal But Can Easily be Removed

1) Increase Weld/Dwell Times
Slightly increase both Weld and Dwell Timer settings. (Refer to FG Owner's Manual: "Operation"). The upper Weld Tip should not begin to retract until weld cycle is completed. If trouble persists, proceed to Step 2.

2) Input Voltage Test
Set voltmeter to nearest scale above 220V. PP-3 cover off. Air/Electricity ON. Read AC voltage across 8 and 9 on PP-2 Terminal Block.

If Meter Reads as Shown (220V MIN.): Input Voltage OK; proceed to Step 3.



If Meter Reads Less Than 220V: Follow instructions inside PP-2 side panel for changing transformers taps. Consult your Duro Dyne Distributor or representative for information on installation of Model BBT Boosting Transformer.

3) PP-2 to Weld tips Connections Test
Reset voltmeter to nearest scale above 6 V. Air/Electricity ON. Weld/Head Test Switch on WELD. Remove clip pins from Feed track and Upper Weld Tip. Increase Weld time to MAXIMUM. Cycle unit reading AC voltage across copper bars on ends of PP-2.

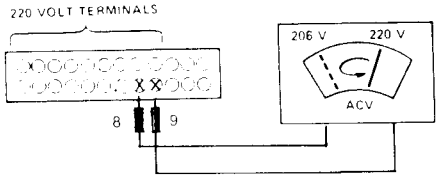
If Meter Reads as Shown (5.5V MIN.): Remove upper & lower Tips and break all connections between PP-2 and tips. With emory cloth, lightly clean connections, tips, upper tip retainer and inside of Mandrel. Then reassemble and retighten all connections. Replace tips. Make a test weld and if still unsatisfactory proceed to Step 4.

If Meter Reads Less Than 5.5V: Recheck Step 1 and consult your Duro Dyne distributor or representative for information on installation of Model BBT Boosting Transformer.

) Voltage Drop Test
Reset voltmeter to nearest scale above 220V. Air/Electricity ON. Weld/Head Test Switch on WELD. Weld pin to bare metal reading AC voltage drop across 8 and 9 of PP-2 Terminal Block.

If Meter Reads as Shown (Less Than 20% V Drop): problem has been overlooked in Steps 1, 2, or 3.

If Meter Shows Drop Greater Than 20%: problem could be either poor wiring from unit to power source, or, too many machines on one line. Isolate your FG-1 on separate line to main power box. Check that power supply wire to FG is #8. Move FG as close as possible to power box.



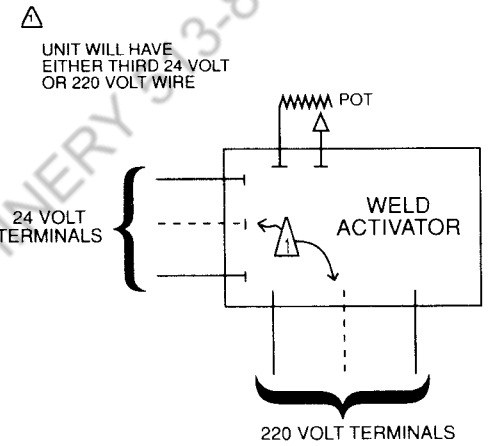
SYMPTOM XV

Pins Weld to Bare Metal But Remain on Upper Weld Tip as It Retracts

If the Clip Pin Glows Red Up to the Washer: decrease Weld time.* The dwell time should always allow the weld to cool slightly before the weld tip retracts.

If the Clip Pin Does Not Glow Red Up to the Washer: increase Dwell time.*

*Refer to FG Owner's Manual: "Operation."



NOTE: REFER TO ABOVE DIAGRAM OF WELD ACTIVATOR FOR TERMINAL OF WELD ACTIVATOR FOR FOLLOWING TESTS.

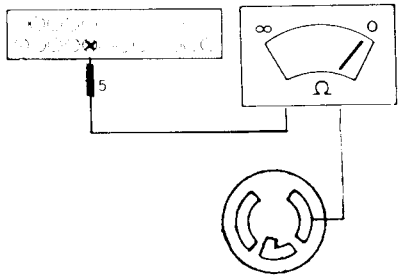
SYMPTOM XVI

Pins Do Not Weld at All (Transformers Do Not Go On)

1) Check Air Pressure
Air pressure must be minimum 80 PSI during usage. If trouble persists, proceed to Step 2.
2) Check Weld/Head Test Switch for Weld Position.
If trouble persists proceed to Step 3.
3) Clean Upper and Lower Weld Tips and Tip Holders
If trouble persists proceed to Step 4.
4) 24 Volt Cable Test
Air/Electricity OFF. Place ohmmeter on terminal 5 of CM and gold colored terminal of Female Receptacle in PP-2.

If Meter Reads "O" : proceed to Step 5.

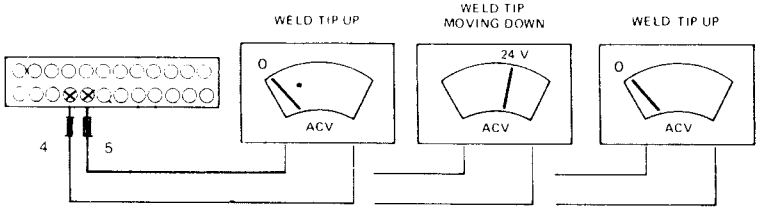
If Meter Reads "∞": check connections in plug and receptacle if good replace 24 Volt cable.



5) Short Cycle Relay
Remove PP-2 cover. Set voltmeter to nearest scale above 24V. Air/Electricity ON. Weld/Head Test Switch on HEAD TEST. Increase Dwell Timer to MAXIMUM setting. Cycle unit reading AC voltage across 4 of CM Terminal Block and Terminal 5 of CM Terminal Block.

If Meter Reads as Shown During Cycle (O-24-O V): Short Cycle Relay OK; proceed to Step 5.

If Meter Reads "O" V During Entire Cycle: replace Short Cycle Relay.



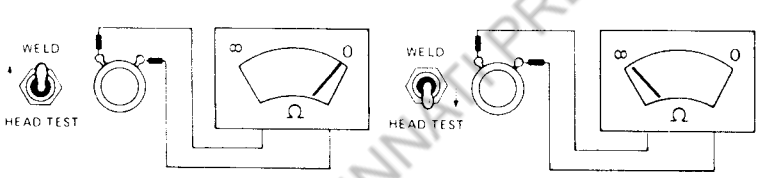
6) Weld/Head Test Switch Resistance Test
Air/Electricity OFF. Unplug 24 volt cable from PP-2 Connect ohmmeter across switch contacts (as shown) and take resistance readings with switch in WELD position and then in HEAD TEST position.

If Meter Reads as Shown: Weld/Head Test Switch OK; reconnect wire to switch terminal, proceed to Step 7.

If Meter Reads "O" In Both Positions: replace Weld/Head Test Switch and proceed to Step 8.

If Meter Readings are Reversed ("O" On Head Test, on Weld): switch is physically "upside down". Reverse it, reconnect wire to switch terminal & test unit. If problem persists, proceed to Step 8.

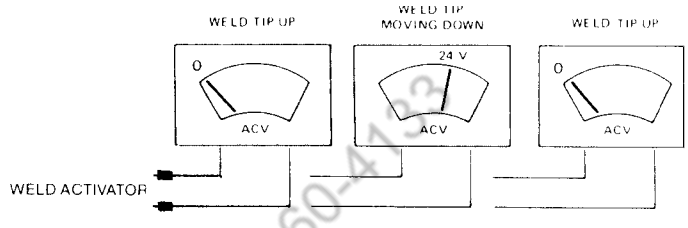
If Meter Reads In Both Positions: replace Weld/Head Test Switch.



7) Weld Activator Input Test
Remove PP-2 cover. Air/Electricity ON. Weld/Head Test Switch on WELD. Cycle unit reading AC voltage across 24 volt weld activator terminals on side of weld activator.

If Meter Reads as Shown During Cycle (O-24-O V): connections between Weld Activator and Terminal Block OK; proceed to Step 5.

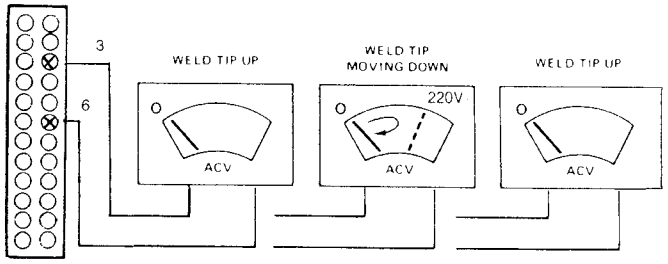
If Meter Reads "O" V; problem is broken wire or broken connection between Weld Activator and Terminal Block, or CM.



8) Weld Activator Test
Air/Electricity ON. Weld/Head Test Switch on WELD. Increase weld time to MAXIMUM setting. Cycle unit reading voltage across terminals 3 and 6 in PP-2. **This is a timed voltage reading in which meter response is more important than precise voltage measurement.**

If Meter Reads as Shown During Cycle (220-O V): Weld Timer OK; check main transformers and connection to PP-2 terminal block.

If Meter Reads "O" V During Entire Cycle: replace Weld Activator.



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

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

All warranty claims must be accompanied by serial number, date of purchase and distributor purchased from.

ITEM#	DESCRIPTION
17300	FG-1 POWER PACK PP-2
17140	Weld Activator
17198	Track Casting Spacers & Screws Set
17303	Potentiometer
17305	Switch Cable Receptacle
17306	Weld/Head Test Switch
17307	Voltmeter
17308	Pilot Light
17309	On/Off Switch
17310	24 Volt Transformer
17311	220 Volt Transformer
17312	Mercury Relay
17313	Terminal Block
17314	220 Volt Receptacle
17315	FG-1 COMPONENT MODULE CM
17316	Feed Solenoid
17317	Feed Speed Control
17318	Feed Timer and Resistor
17319	Dwell Timer
17320	Dwell Potentiometer
17321	Dwell Solenoid
17322	Component Module Terminal Block
17323	First Pulse Relay
17324	Short Cycle Relay
17326	Exhaust Muffler
17327	Footswitch Receptacle
17328	24 Volt Component Supply Line
17329	Vibrator Fuse
17330	Vibrator Fuse Holder
17331	Vibrator Receptacle
17332	Vibrator Sense Switch
17333	Vibrator Speed Control
17334	Vibrator On/Off Switch
17335	220 Volt Vibrator Supply Line
17336	Male Reed Switch Plug
17337	Female Reed Switch Plug
17338	Vibrator Mounting Plate
17339	Vibrator Base
17340	Vibrator Hopper
17341	Vibrator Coil (Duro Dyne Type)
17342	Vibrator Spring

ITEM#	DESCRIPTION
17343	FEED DWELL TRACKING ASSEMBLY (without reed switches)
17344	Upper Track Casting
17345	Lower Track Casting
17346	Track Side Rails (pair)
17347	Feed Channel
17348	Feed Channel Plate
17349	Track Sensor
17350	Needle Valve
17351	Slide Pusher w/Pawl
17352	Upper Tip Retainer
17191	Upper Welding Tip
17192	Lower Welding Tip
17189	Upper Replacement Plate Package
17190	Lower Replacement Plate Package
17357	Upper Insulated Bracket
17358	Lower Insulated Bracket
17359	Bracket Insulator w/Set Screw
17362	Dwell Cylinder
17364	Feed Cylinder
17394	Short Shaft Extension
17203	Insulator
17355	Quick Exhaust Valve
17356	Quick Exhaust Adjustable Muffler
17360	Weld Cable (4 ft. throat)
17361	Weld Cable Retainer
17363	Dwell Reed Switch
17365	Feed Reed Switch
17366	First Pulse Reed Switch
17367	Transformer Side Covers (2)
17369	Power Supply Bar
17370	Front Cover
17371	Feed Cover
17372	Footswitch w/Guard
17373	Footswitch only
17374	Footswitch Guard
17375	Component Tray top Cover
17376	Mandrel
17377	Air-Regulator
17378	Air-Regulator Bracket
17379	Air Bowl
17380	Filter Bowl
17381	Hand Gun and Cables
17382	Weld Cable (5 ft. throat)

DURO DYNE® MACHINERY DIVISION

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