MICRO WELD

MODEL GP1, GP2

CERAMIC FUSION

BUTT WELDERS

MICRO PRODUCTS COMPANY

SERVICE MANUAL

TABLE OF CONTENTS

1.0 SPECIFICATIONS	**MODEL GP1**	**MODEL GP-2**
Type of Welding Process	Ceramic Fusion	Ceramic Fusion
Welding Range	20ga to 8ga AWG-Copper	12ga to 4ga AWG-Copper
Material Suitability	Strand or Bunched Conductor	Strand or Bunched Conductor
Standard Operating Voltages	115/230 Volts	115/230 Volts
Maximum Line Demand 230 Volt	5amps@100% duty cycle 15amps@10% duty cycle	9amps@100% duty cycle 28amps@10% duty cycle
Maximum Line Demand 115 Volt	9amps@100% duty cycle 29amps@10% duty cycle	18amps@100% duty cycle 56amps@10% duty cycle
Single Phase AC Transformer	1.5 KVA Maximum	3.0 KVA Maximum
Clamp Method	Compound Hand Lever	Compound Hand Lever
Mounting	4-Caster Wheels or Bench	4-Caster Wheels or Bench

Dimensions and Weights

Height Overall	20”-Bench, 51”-Truck	20”-Bench, 53 ½” – Truck
Floor or Bench space	9” x 15” Bench Type 24” x 24” Truck Type	9” x 15” Bench Type 30” x 28 ½” Truck Type
Welding Die Height	11” – Bench Type 42” – Truck Type	11” – Bench Type 44 ½” – Truck Type
Weight	170 LBS – Bench Type 215 LBS – Truck Type	170 LBS – Bench Type 215 LBS – Truck Type

FEATURES OF MICRO-WELD CERAMIC FUSION WELDING EQUIPMENT

- Micro Weld quality and workmanship
- Heavy-duty construction & components
- East to operate controls
- Low maintenance costs
- Easy to set welding parameters
- Safety electrical switch circuits
- Heavy-duty weld heat selection switch
- No-upset burr formation during weld process, all strands locked into weld coalescence
- Sensitive straight slide movable headpiece assembly equipped with ball bearings

2.0 GENERAL OPERATING INSTRUCIONS

2.1 ELECTRICAL HOOK-UP INSTRUCTIONS

First determine that available electrical service in your plant corresponds to the nameplate rating located on welder housing. Electrical wiring to welder must be of sufficient size to deliver full ampere load with no appreciable loss during weld cycle. The welder will not operate properly if there is more than a 10% variation in the line voltage. In general, the welder should be fused with a slow blow fuse of the 100% duty cycle rating. The minimum power cable size to the welder can be obtained by using this same current rating.

Refer to National Electrical Code and local electrical regulations for adequate power sizes; disconnect methods and fusing guidelines.

Remember line voltages to the welding machine are potentially dangerous should the power cords be damaged or severed. The welding voltages at the welding dies will not harm an operator since they do not exceed 10 volts.

2.2 SAFETY PRECAUTIONS
(See section 11.0)

2.2.1 ELECTRICAL

Maintain electrical cable to welder in good repair. Welder must be grounded and connections securely tightened. Heat Switch must not be changed to new position while a weld cycle is in process. Disconnect electrical service before serving welder – high voltages are located within the base of the welder.

2.2.2 MECHANICAL

Operator while using welder must wear safety glasses. Keep all safety guards on welders and use properly. Operators must be instructed on basic operation of unit to prevent injury. Check nameplate rating and keep within material size range for each welder.

2.3 WELDING DIES

The dies and shoes supplied with the welder will handle most size and material types within the range of the welder. For new weld applications consult the factory for special die and shoe sets.

3.0 BASIC OPERATING PARTS

3.1 WELD HEAT SELECTION SWITCH

Weld heat is selected by means of a tap switch with 6 steps of voltage. Number one indicates the highest setting and number 6 the lowest. The switch is located on the top left corner of the machine.

3.2 HEAD CLOSED SPACE SETTING

This adjustment is made by turning lower socket set screw located below the slide shafts on right end of movable headpiece.

3.3 HEAD OPEN SPACE SETTING

This adjustment is made by turning upper socket set screw located below the slide shafts on right end of the movable headpiece.

3.4 LIMIT SWITCH SETTING

The weld limit switch controls the cut-off point of current flow to the welding dies. Turning the socket set screw located on the rear slide shaft on the movable headpiece makes this adjustment.

3.5 OPERATING LEVER

This lever is actually a cam that sets the open (starting) space then, after the stock is clamped, is turned to activate the weld switch.

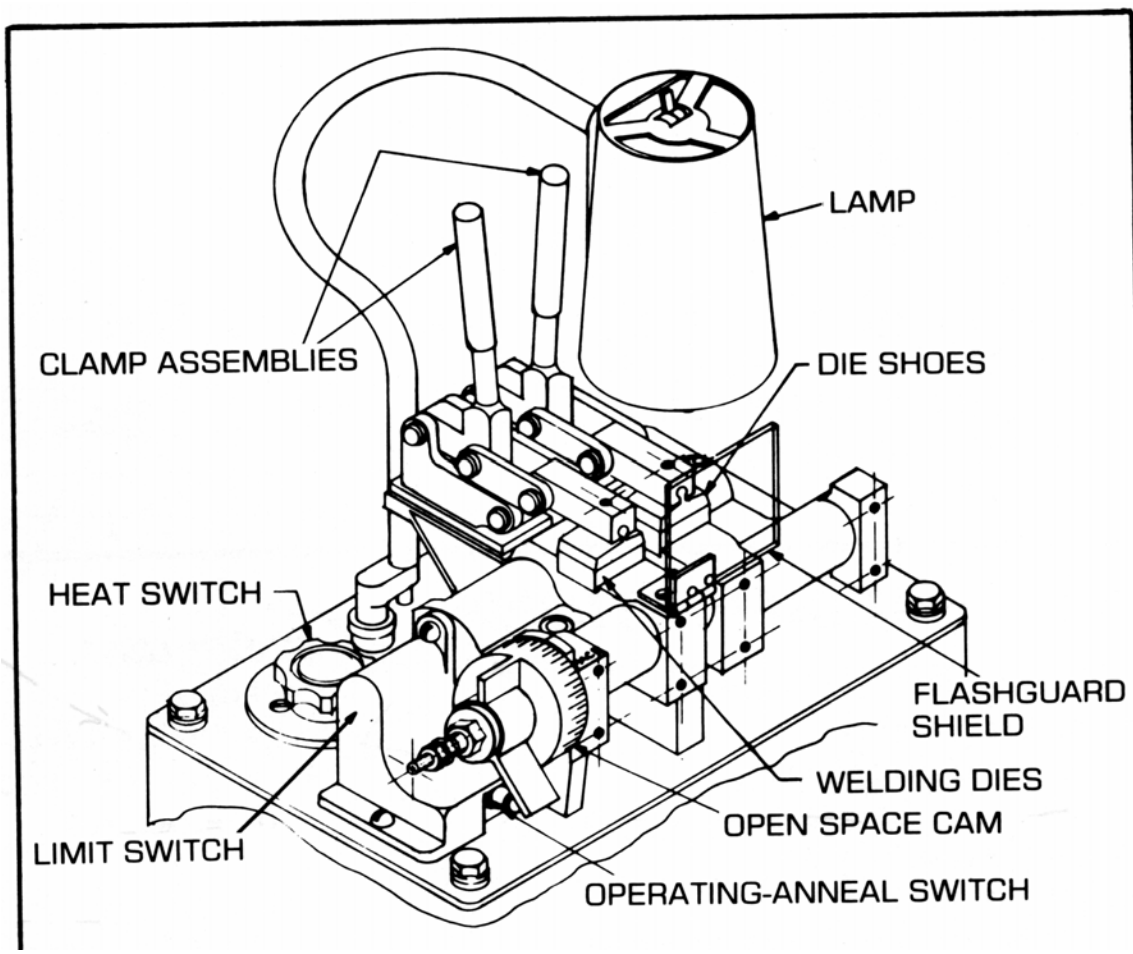
3.6 UPSET PRESSURE

Upset pressure is required for each weld and is obtained by an internal coil spring. A knurled knob is located on the front slide shaft on the movable headpiece.

3.7 CLAMPING SYSTEM

This is a dual system consisting of left and right clamping devices. The welding dies and shoes, the replaceable portion of the clamping mechanism, hold the wire to be joined during the weld cycle. A forward motion of the clamping mechanism facilitates the clamping operation.

4.0 BASIC OPERATING PARTS LOCATION



5.0 TYPICAL OPERATING SEQUENCE

5.1 All insulating materials must be removed from conductors where they contact lower welding dies.
5.2 Set weld head selection switch to recommended chart settings.
5.3 Set upset pressure to recommended chart settings.
5.4 Rotate spacing cam to proper chart settings.
5.5 Twist end of conductor in direction of natural lay, pulling outward.
5.6 Carefully square cut conductor end so no individual wires extend beyond cut. Note: Use sharp scissors, because end preparations are important.
5.7 Select correct ceramic sleeve or tool for wire to be welded.
5.8 Thread conductor into ceramic sleeve so that the wire ends are midway through sleeve. Rotating ceramic sleeve in direction of lay will assist threading procedures.
5.9 Clamp preset conductor and sleeve into welding die set, so that the ceramic sleeve is centered between open welding dies.
5.10 Thread other prepared conductor into sleeve and allow the conductor to gently but firmly contact first conductor. Positive contact to wire ends is important for a good weld. Clamp that conductor into welding die.
5.11 Rotate and center ceramic sleeve to assure free movement of conductors during the weld process.
5.12 Rotate spacing lever until it contacts and depresses the operation switch, hold for 1 to 3 seconds to assure a complete weld cycle.
5.13 Unclamp welded conductors and remove ceramic sleeve. Fracture expendable type and disassemble reusable type.
5.14 The inside diameter of ceramic sleeve slightly exceeds the nominal conductor size; therefore the weld zone is lightly larger than conductor diameter.
5.15 An additional sizing operation, swaging, may be required should weld zone exceed tolerances on subsequent processing operations. Micro Products has a special swage tool with exchangeable tooling available to assist with this sizing operation.

6.0 SPECIAL ADJUSTMENTS

6.1 STEP #1

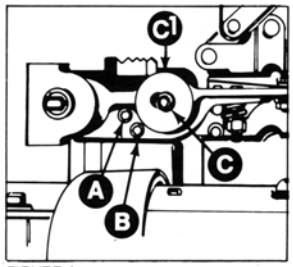


FIGURE 1

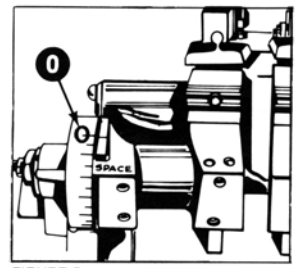


FIGURE 2

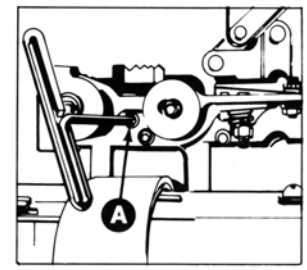


FIGURE 3

FIGURE 1 IDENTIFICATION

A. Spacing cam calibrating screw
B. Headpiece closed adjusting screw
C. Limit switch adjusting screw
C1. Locking screw, limit switch
See figure #1.

FIGURE 2 SPACE CAM CALIBRATION

1. Place space cam on number "O"
2. Adjust space cam calibrating screw "A", so that when cam is rotated toward a higher number, the movable platen will just start to open.
See Figures #2 and #3.

NOTE:
Should welder be extremely maladjusted, adjustment points "B" and "C" may have to be turned counter-clockwise to attain adjustments noted above.
Preceed to step #2

6.2 STEP #2

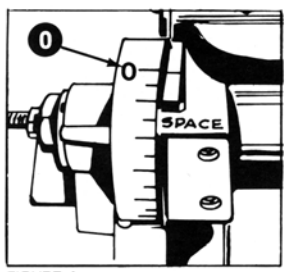


FIGURE 4

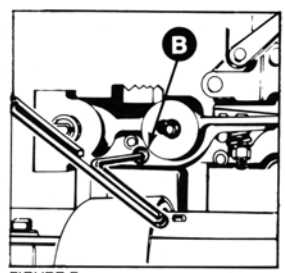


FIGURE 5

FIGURE 6

HEADPIECE CLOSED ADJUSTMENT

1. Place spacing cam on "O".
See figure 4.
2. Use adjusting screw "B" for this adjustment.
See figure 5.
3. Adjust screw "B" so that the span between the closest inner edges of the welding dies, (B-2, figure 6), is measured as follows:
Model GP-1 and GP-2
B-2 = 13.5mm to 14.3mm (17/32" to 9/16")
See figure 6.

NOTE:
This is an initial adjustment to prevent welding dies from closing against ceramic tool therein preventing the weld process from completing its cycle.

Furthermore, an excessive span between welding dies may cause heating conductors to bend outside the ceramic tool during weld process and also preventing the completion of the weld cycle.
Proceed to step 3.

3

6.3 STEP #3

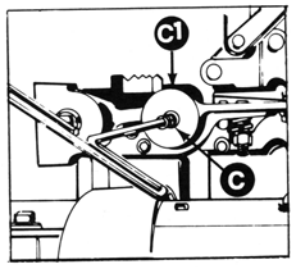


FIGURE 7

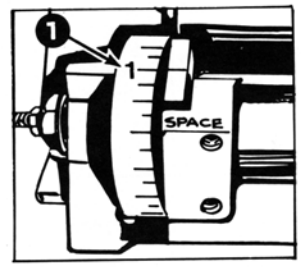


FIGURE 8

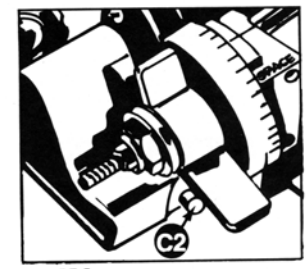


FIGURE 9

LIMIT SWITCH TIMING POINT ADJUSTMENTS

1. Use adjusting screw "C" for this adjustment. Locking screw "C-1" will have to be loosened and retightened prior to and after adjustments. See figure 7.
2. Position spacing cam on #1. See figure 8.
3. Push and hold operating switch "C-2" located below spacing cam. Do not move spacing cam, just push switch extension only. See figure 9.
4. Adjust limit switch adjusting screw "C" so that the welding power cuts-off when using the #1 on the space cam as a reference point. This cut-off can be easily identified by either of the two below listed methods.
   A. Connect a volt meter set on a 10 volt scale between the welding dies. You may use the welding die shoes also since the meter leads may quickly be attached to them. If meter shows a voltage, turn adjusting screw "C" clockwise, until pointer on meter just drops off. Should the meter not show a voltage turn adjusting screw "C" counter-clockwise until pointer on meter just starts to show and reading on the dial.
   B. If a volt meter is not available, after pushing operating switch "C-2" listen for relay within the housing cutting in or off.

NOTE:
In some cases, by allowing the timing point to hold-on or cut-off slightly longer or slightly sooner than the standard adjustments, weld quality may be improved on critical applications. This refinement will be less than a full revolution of adjusting screw "C".

7.0 PREVENTIVE MAINTENANCE TECHNIQUE

Keep in Mind that these welders are precision built to last many years, but will require good maintenance procedures. They are designed to be as automatic as possible with a minimum dependence on the ability of the operator. Adjustments must be made by those thoroughly familiar with the operating principles of the welders.

7.1 WELDING DIE NOTES

7.1.1 Welding dies and die shoes in poor condition are the primary caused of bad welds.
7.1.2 Check die sets for excessive wear and replace if necessary.
7.1.3 Clean weld die bottoms to remove oxides with emery cloth placed on a flat surface.
7.1.4 Clean die seats with emery cloth to brighten contact areas.
7.1.5 After cleaning of dies be sure to wipe off with soft clean cloth.
7.1.6 Completely tighten dies into seats to assure a good contact.
7.1.7 Worn die shoes will not hold stock during a weld cycle, change steel faces or replace complete shoes.

7.2 WEEKLY

7.2.1 Tighten all loose parts.

7.3 QUARTERLY

7.3.1 Repeat above service items.
7.3.2 Check grease requirements on clamp arms pivot shafts and lubrication points.
7.3.3 Check anneal parts and replace all worn or broken assemblies
7.3.4 Check contacts on magnetic contactor for worn contacts.
7.3.5 Clean heat switch contacts with low residue cleaner and recoat with petroleum jelly.

7.4 ANNUALLY

7.4.1 Repeat previously noted items.
7.4.2 Check for wear in clap arm pivots.
7.4.3 Clean inside and outside of welder.
7.4.4 Check grease requirements on headpiece slide shafts, grease lightly.
7.4.5 Caution: make sure that power supply is disconnected before servicing welder in anyway!

7.5 WELDING DIES AND DIE SHOES INFORMATION

Description:

Welding dies – Lower conducting electrode and clamp jaw.

Welding die shoes – Upper clamping member.

Welding dies and die shoes in poor condition are the main causes of bad welds.

Care of die sets:

7.5.1 Use a brass or fiber blade to remove particles of flashings that build-up on die sets. Excessive flash build-up causes die burns on material and shorting of die sets.

7.5.2 Do no attempt to clamp material that is not suited for welder into die sets. Undersize materials will slip and burn die grooves, oversize materials will overstress clamping parts.

7.5.3 Do not use welding die sets for a vise. These parts will not withstand the mechanical abuse.

7.5.4 Whenever welding dies are replaced, clean bottoms of dies and corresponding die seats to a bright and clean condition before bolting them tightly into place. An oxidized surface will insulate the welding dies and reduce effective welding voltage.

7.5.5 Welding die shoes must swivel freely within the clamp arm pivots to prevent cracking of die shoes. File down die shoe boss if necessary.

7.5.6 Welding die set will wear with use and must be changed occasionally for good welding results. Keep and adequate supply of replacement parts available. Wire and rod slippage is a problem caused by poor die sets and a major cause of wire breaks.

8.0 SUGGESTED SETTINGS

RECOMMENDED SETTINGS FOR MODEL GP-1 AND GP-2 MICRO WELD WELDERS

STOCK SIZE	HEADPIECE OPEN	WELD HEAT	UPSET PRESSURE
MODEL GP-1			
20GA	3	3	1
18Ga	3 ½	3	1
16Ga	4	2	2
14Ga	4 ½	2	3 ½
12Ga	5 ½	1	3 ½
10Ga	6	1	3 ½
9Ga	6	1	4
8GA	6	1	4-4 ½
MODEL GP-2			
12Ga	3	5	2
10Ga	3 ½	4	2 ½
9Ga	3 ½	4	3
8Ga	4	4	3
6Ga	5	3	4 ½
4Ga	6	1-2	4 ½

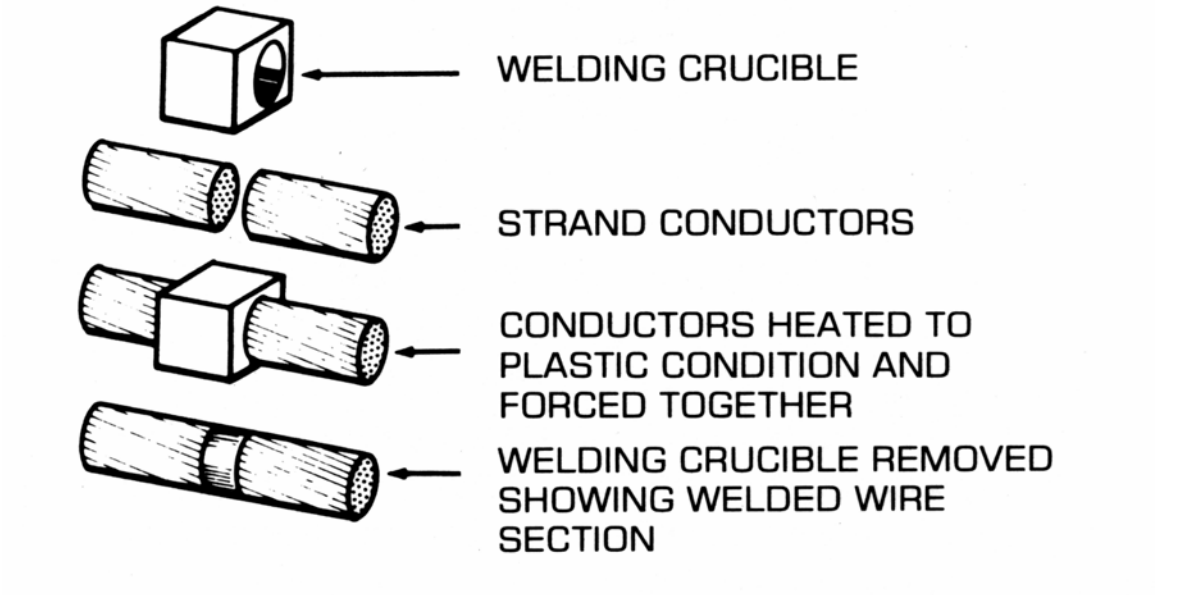
NOTE: These settings are approximate and may be varied to obtain the best weld.

8.1 WELDED STRAND OR BUNCHED COPPER AND ALUMINUM WIRE INDUCTORS

Theory: Welds are formed within a ceramic tube or block and no filler materials are needed.

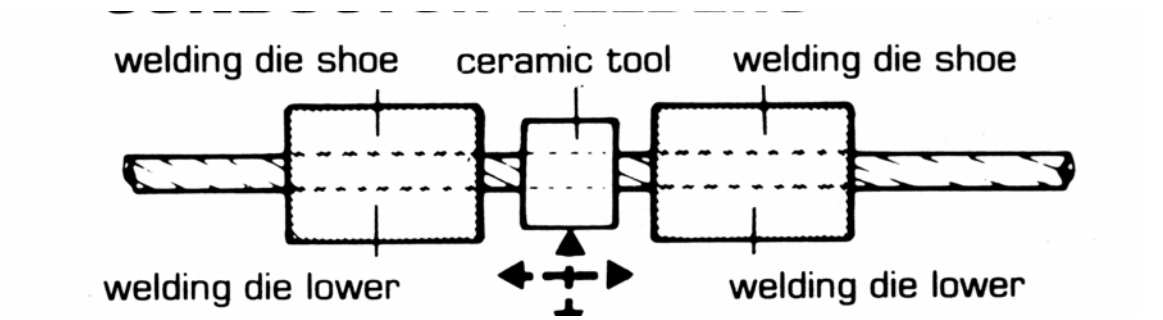
Wire ends are resistance heated to a plastic condition and hot forged together within a ceramic tool, which acts as a crucible. The resultant coalescence (weld) locks all single filaments into a solid weld zone…Since strand conductors have configuration voids on the faying surfaces, the plastic material normally forced to the outside on a normal weld, is forced into the voids eliminating the upset burr common with standard upset weld. (This type of weld is not suitable for solid wire.)

8.2 CERAMIC FUSION TECHNIQUE

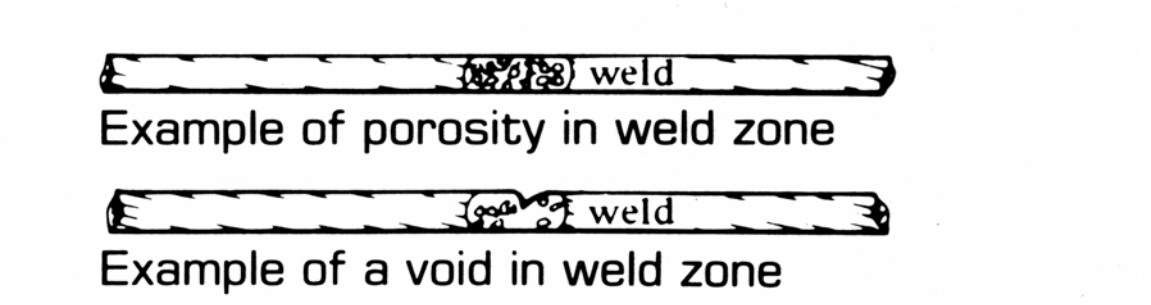


9.0 DIAGNOSTIC CHART FOR TROUBLE-SHOOTING

9.0.1 SERVICE HINTS FOR STRAND CONDUCTOR WELDERS



Conductors must be able to slide freely within ceramic tools during weld cycle, therefore rotate and move ceramic tool side to side prior to welding. Be sure to center ceramic tool between die sets.



Porosity and voids in weld zone may be corrected by using one or more of the following suggestions.

1. Increase upset pressure.
2. Decrease weld heat
3. Readjust timing point of weld heat cut-off, limit switch adjustment, to allow heat to cut-off slightly sooner.
4. Check to make sure conductor is not binding in ceramic tool.

Example of poorly fused weld nugget because of small solid area.

Example of properly fused weld nugget (approximate solid area of two times diameter of conductor).

Amount and length of weld nugget (solid portion of weld) can be varied by one or more of the following suggestions.

1. Increase starting space between die sets when weld nugget is small.
2. Decrease space between die sets when weld nugget is too large.
3. Adjusting limit switch to hold on or cut-off current at a different position.

Fracturing of ceramic tools and bent conductors can be corrected by one or more of the following methods.

1. Decrease weld heat to prevent excessive softening of conductors on either side of sleeve.
2. Decrease starting space so as to decrease length of upset and amount of conductor exposed to heat.
3. Decrease upset pressure and still maintain a fused area.
4. A few of the very small stranded and bunched conductors just do not have enough mechanical strength to be processed by this process.

9.1 ELECTRICAL TROUBLE-SHOOTING OF WELDER

(Caution!! Extreme care should be exercised when making these tests. Dangerous voltages are present in the welder. Only persons familiar with electrical safety precautions should perform these tests.)

9.1.1 TROUBLE-SHOOTING TABLE
(See section 9.1.3)

This electrical trouble-shooting table is furnished as a suggested method of trouble-shooting the welder. The individual steps of the table should be performed in the order given, to make the tests valid. The electrical schematic (section 10) furnished for these tests show the table test points. The table may be used for welders with a different but closely related wiring by using corresponding test points. During all tests, line voltage should be connected to L1 & L2 of the welder. The heat switch should be set to the #1 position.

9.1.2 FINAL ELECTRICAL CHECKS

Set the heat switch to the number 1 position, connect the voltmeter across the welding dies. Press the operating switch. The meter reading will typically be less than 10 VAC. Consult the weld specification sheet for this value. Rotate the heat switch through all settings. If the voltage is not read at any setting, the heat switch may be defective. Actuate the weld limit switch; observe the reading goes to zero. Release the weld limit and operating switches, the reading should remain at zero.

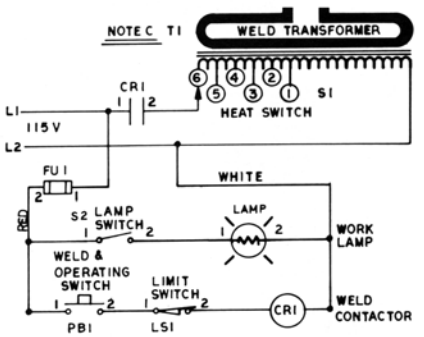
9.1.3

TEST LEAD CONNECTION	METER READING	PROBLEM IF NO READING	PRESS OPERATING SWITCH	WELD LIMIT SWITCH ACTUATED	PRESS ANNEAL SWITCH
115 VOLT ONLY.USE SCHEMATIC B-5474A.REFERENCE TO 9.1.1.					
L2 FU1-1	115 VAC	Bad fuse connection			
L2 FU1-2	115 VAC	Open fuse			
L2 PB1-1	115 VAC	Open wire to operating switch			
L2 PB1-2	115 VAC	Bad operating switch	X		
L2 LS1-1	115 VAC	Open wire to weld limit switch	X		
L2 LS1-2	115 VAC	Open weld limit switch	X		
L2 CR1-1	115 VAC	Open wiring to contactor			
L2 CR1-2	115 VAC	Bad contactor	X		
L2 S1-1	115 VAC	Open wire to heat switch	X		
230 VOLT ONLY.USE SCHEMATIC B-5553A.REFERENCE TO SECTION 9.1.1					
X1 X2	115 VAC	Bad control transformer			
X2 FU1-1	115 VAC	Bad fuse connection			
X2 FU1-2	115 VAC	Open fuse			
X2 PB1-1	115 VAC	Open wire to operating switch			
X2 PB1-2	115 VAC	Bad operating switch	X		
X2 LS1-1	115 VAC	Open wire to weld limit switch	X		
X2 LS1-2	115 VAC	Open weld limit switch	X		
L2 CR1-1	Line Voltage	Open wiring to contactor			
L2 CR1-2	Line Voltage	Bad contactor	X		
L2 S1-1	Line Voltage	Open wire to heat switch	X		

NOTE: To perform repair consult section 13 for parts identification.

10.0 ELECTRICAL SCHEMATIC

B-5474A

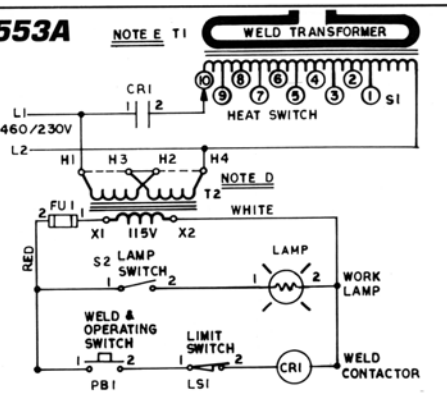


NOTE A: UNLESS OTHERWISE SPECIFIED ALL 110 V CONTROL WIRES TO BE NO. 16 AWG RED.

NOTE B: UNLESS OTHERWISE SPECIFIED ALL NEUTRAL WIRES TO BE NO.16 AWG WHITE.

NOTE C: S1 MAY BE A 10 POINT HEAT SWITCH ON SOME MODELS.

B-5553A



NOTE A: UNLESS OTHERWISE SPECIFIED ALL 110 V CONTROL, WIRES TO BE NO. 16 AWG RED. 1.30mm DIA.

NOTE B: UNLESS OTHERWISE SPECIFIED ALL NEUTRAL WIRES TO BE NO.16 AWG WHITE.

NOTE C: WHERE POSSIBLE USE ORANGE WIRE ON HIGH VOLTAGE WIRING (ABOVE 200 V).

NOTE D: FOR 460 VAC OPERATION USE SOLID JUMPER AS SHOWN; FOR 230 VAC OPERATION USE DASHED JUMPERS AS SHOWN.

NOTE E: S1 MAY BE A 6 POINT HEAT SWITCH ON SOME MODELS.

11.0 SAFETY REMINDERS

The following accident prevention information is presented to eliminate potential hazards while operating, inspecting or repairing Micro-Weld electric resistance welding equipment.

Important safety compliance information for Micro-Weld Welders.

GENERAL

1. Qualified personnel, prior to using equipment, must instruct an operator on basic operation and malfunction methods.
2. Safety eyeglasses must be worn by all personnel operating or servicing welders.
3. Use safety equipment properly and keep safety equipment on welders.
4. Determine that both operating voltages and hertz (cycles) of power supply correspond to ratings listed on welder nameplate located on welder housing.
5. Check nameplate ratings and keep within capacities and material categories stated therein.
6. Adjustments or repairs must be made by persons thoroughly familiar with operating principles of welder.
7. Welder must be disconnected from power supply prior to maintenance or repair procedures.

ELECTRICAL

1. Refer to National Electrical Code and local regulations for adequate electrical wiring to power welder. Do not operate welder with inadequate electrical power supply cords or cable.
2. All welders must be grounded through power supply and welder ground connection terminal securely tightened.
3. All welders must be able to be disconnected from power source either by a double breaking disconnect switch or unplugged by standard rated plugs.
4. All welders must be fused to prevent injury should an electrical malfunction occur. Welders must never be fused for an ampere load that exceeds the ratings stated on welder nameplate. Normally welders are fused using the nameplate rated load; time lag parameters functional to standard fuses allow this specification.
5. Electric power cords to welder must be kept in good condition. Report any damage or potential hazards to maintenance personnel.
6. The weld heat selection switch, potentiometer or range selection devices must not be changed to a new position while a weld operation is in process.

12.0 BUYERS GUIDE

HOW TO ORDER PARTS:

You must provide
1. Machine Model
2. Machine Serial Number
3. Voltage

Then identify part(s) on part list (last page in book) and provide MICRO with the circled number.

CALL MICRO at 800-872-1068
OR FAX MICRO at 630-787-9360

Provide MICRO with your company name and purchase order number.

"G" SERIES BUTT WELDERS
PARTS LIST
GP1,GP2,GS,GT,GC

MODEL/ PART NO.	DESCRIPTION	ITEM #
G-01A	Headpiece assembly, stationary and movable Castings, matched machined, with bushings And shields, state for which model req'd	35598
G-01B	Headpiece assembly, complete with all Operating parts less welding dies and Die shoes, state for which model required	35530
G-04	Bushing, ball bearing,(2) required	48401
G-05	Stroke limit screw and nut, nylon	93157
G-06	Shield, shaft,(2) required	35515
G-17	Limit switch adjusting screw with nylon inserts	35601
G-18	Open headpiece adjusting screw with nylon insert	
G-19	Felt wipes, slide shafts	35572
G-30	Spacing cam	35512
G-31	Bushing, spacing cam	35513
G-32	Stud, space cam mounting	35521
G-33	Screw and nut, tension adjusting, nylon	35516
G-34	Nut and washer, space cam attaching	92750
G-40	Tension spring, models GT,GS and GC	80027
GP-40	Tension spring, models GP1 and GP2	80027
G-41	Worm, tension adjusting	35568
G-42	Knob, tension adjusting	35564
G-66	Bolt, headpiece to top plate mounting, 4 req'd	90231
G-140	Guide, wire lift	35585
G-141	Screw, wire lift mounting 2 req'd	90601
G-143	Flashguard with mounting screws	35523
G-08L	Clamp assembly, complete, left	35542
G-08R	Clamp assembly, complete, right	35555
G-09	Spring, clamp tension	80026
G-10	Bolt, nut and washer, clamp mounting, front	90628
G-11	Bolt, nut and washer, clamp mounting, rear	90635
G-12	Dowel pin, clamp mounting	92553
G-13	Grip, handle insulating	48326
GT-58V	Welding dies, .020" to .150" capacity	35560
GS-58V	Welding dies, .050" to .128" capacity	35560
GC-58V	Welding dies, .035" to .225" capacity	35561
GP-58R1	Welding dies, radius grooves, 20ga to 14ga	35559
GP-58R2	Welding dies, radius grooves, 12ga to 8ga	35558
GP-58R3	Welding dies, radius grooves, custom fitted	35579
GP-58R4	Welding dies, radius grooves, 6ga to 4ga	35586
G-59	Screw, welding die attaching, for models: GT, GS and GC	90603
GP-59	Screw, welding dies attaching, for models: GP-1 and GP-2	90603

"G" SERIES BUTT WELDERS
PARTS LIST
GP1,GP2,GS,GT,GC

MODEL/ PART NO.	DESCRIPTION	ITEM #
G-60T	Welding die shoes, pair, tapered For models: GT, GS and GC	35525
GP-60F	Welding die shoes, pair, tapered For models: GP-1 and GP-2	35524
G-61	Screw, welding die shoe attaching	90704
G-50	Slot type anneal jaw, right	62032
G-51	Slot type anneal jaw, left	62031
G-51A	Screws, quick type anneal mounting 4 req'd	90802
G-52	Screws, quick action type mounting 4 req'd	90601
G-53	Movable anneal jaw with handle and grip	62171
G-54	Spring, anneal jaw tension	80029
G-55	Screw, anneal jaw tension adjusting	90206
G-56L	Stationary anneal jaw, left	62091
G-56R	Stationary anneal jaw, right	62091
G-57L	Quick action anneal assembly, complete left	62094
G-57R	Quick action anneal assembly, complete right	62094
G-15	Limit switch	35562
G-16	Screw and nut, limit switch mounting	90816
G-20	Operating switch	57810
G-25	Bracket, limit switch mounting	35510
G-26	Screw, limit switch bracket mounting	91033
G-27	Cover, limit switch	35511
G-28	Screw, cover mounting, 2 required	91035
G-80	Tap switch, weld heat selection, 25 amp type	57802
G-81	Knob, tap switch, 25 amp type	48215
G-82	Number plate, sequence: No 1 thru No 10	55510
G-82A	Number plate, sequence: No 1 thru No 6	55508
G-83	Screw, tap switch mounting	90826
G-85	Contactor	57614
G-90	Power cord, per foot price	86006
G-91	Cord grip	86155
G-93	Control circuit transformer, 110/120 coil	57601
G-138	Lamp assembly, complete	58164
G-145	Fuse holder	58117
G-146	Fuse	58100
G-69	Bushing, transformer secondary insulating	37710
G-70GP1	Transformer weld, 120 volts with 6 taps Model GP1	55519
G-70GP2	Transformer weld, 240 volts with 6 taps Model GP2	55518
G-70GS	Transformer weld, 240 volts with 10 taps Model GS	55535

"G" SERIES BUTT WELDERS
PARTS LIST
GP1,GP2,GS,GT,GC

MODEL/ PART NO.	**DESCRIPTION**	**ITEM #**
G-70GC	Transformer weld, 240 volts with 10 taps Model GC	55517
G-70GT	Transformer weld, 120 volts with 10 taps Model GT	55516
G-73	Ring, transformer mounting	55505
G-74	Long screw and nut, transformer mounting 4 req'd	55511
G-75	Screw with washer, transformer strap mounting Movable head	90602
G-76	Screw with washer, transformer strap mounting Stationary head	90602
G-62	Housing assembly, for models: GS, GC and GT	45506
GP-62	Housing assembly, for models: GP-1 and GP-2	45506
GP-63	Tray, debris, for models GP-1 and GP-2	45504
GP-64	Anvil, for models GP-1 and GP-2	45524
G-68	Top plate	35586
G-150	Caster, swivel	48100
G-151	Caster, rigid	48101
G-135	Wrenches, "T" type, welder adjusting	48202
G-136	Wrench, allen type, welder adjusting, 1/8	48200
G-136	Wrench, allen type, welder adjusting, 3/32	48201

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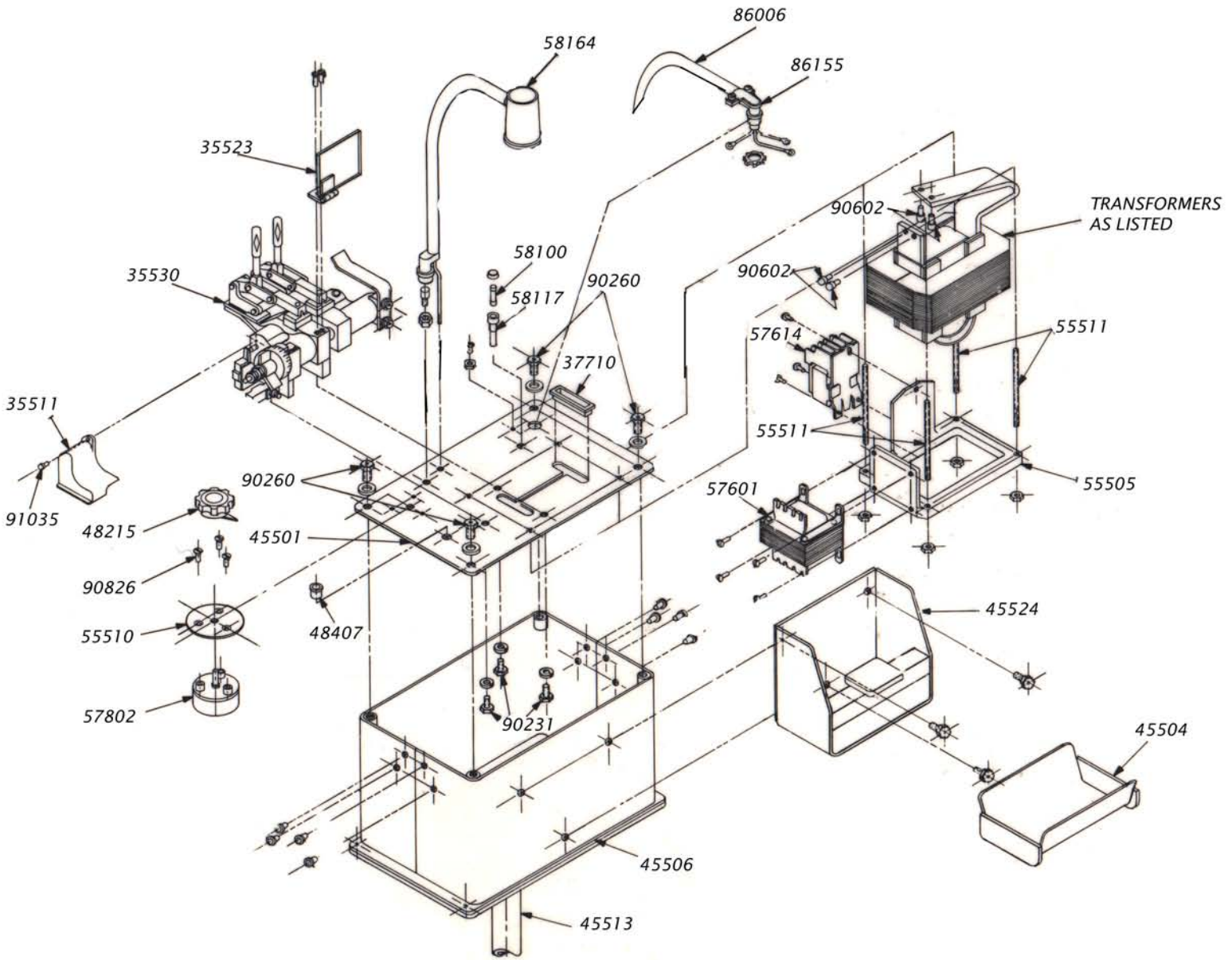
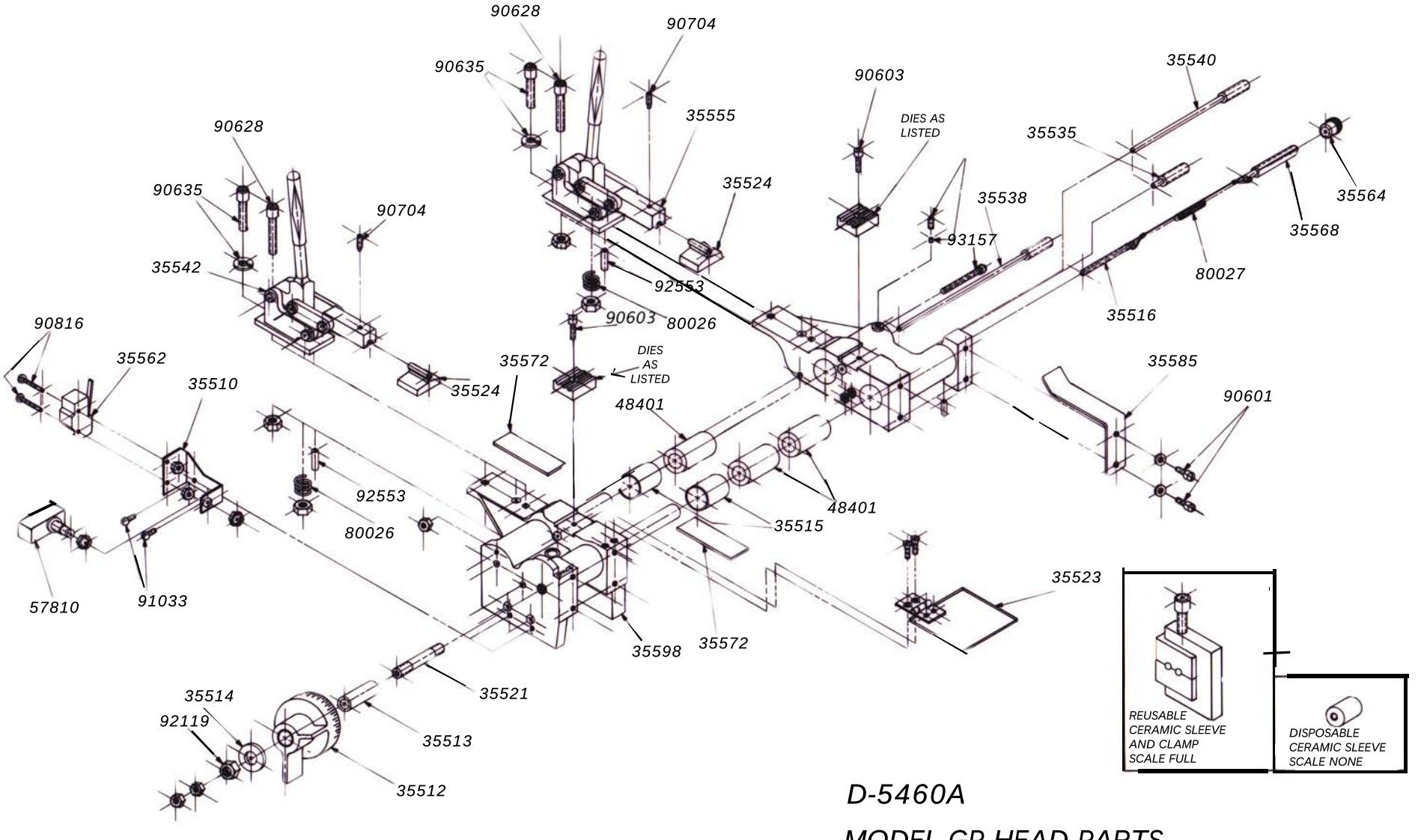
MODEL GP WELDER PARTS





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MODEL GP HEAD PARTS