MICRO PRODUCTS COMPANY

MANUFACTURERS OF
PRECISION WELDING MACHINES

J3, J4 BUTT WELDERS

SERVICE MANUAL

TABLE OF CONTENTS

1.0 SPECIFICATIONS

	Model J3C	**Model J4C**	**Model J3S**	**Model J4S**	**Model J4Sf**
Stock Size Range, Diameter	.032" to .064" (.81mm-1.588mm)	.064" to .128" (1.62mm-3.25mm)	.020" to .080" (.51mm-2mm)	.040" to .160" (1mm-4mm)	.004" sq to .030" Sq (2.58mmsq. to 19.35mmsq) Cross sectional
Material	Copper & EC Aluminum	Copper & EC Aluminum	Steel, Alloy, Stainless	Steel, Alloy, Stainless	Steel, Alloy, Stainless
Standard Operating Voltages	230 Volts 115 Volts	230 Volts 115 Volts	230 Volts 115 Volts	230 Volts 115 Volts	230 Volts 115 Volts
Input Power Cycle	60 Hertz	60 Hertz	60 Hertz	60 Hertz	60 Hertz
Line Demand, 115 volts *	24 amps@100% 77 amps@10%	24 amps@100% 77 amps@10%	9 amps@100% 29 amps@10%	9 amps@100% 29 amps@10%	24 amps@100% 77 amps@10%
Line Demand 230 volts *	12 amps@100% 38 amps@10%	12 amps@100% 38 amps@10%	5 amps@100% 15 amps@10%	5 amps@100% 15 amps@10%	12 amps@100% 38 amps@10%
Heat Selection Switch w/high-low Range Switch	4 Point	4 Point	10 Point	10 Point	4 Point
50% duty cycle rating	4 KVA	4 KVA	1.5 KVA	1.5 KVA	4 KVA
DIMENSIONS AND WEIGHTS					
4-Wheel Truck Mounted	2 Stationary Casters 2 Swivel Casters	2 Stationary Casters 2 Swivel Casters	2 Stationary Casters 2 Swivel Casters	2 Stationary Casters 2 Swivel Casters	2 Stationary Casters 2 Swivel Casters
Floor Space	24" x 24" (61cm x 61cm)	24" x 24" (61cm x 61cm)	24" x 24" (61cm x 61cm)	24" x 24" (61cm x 61cm)	24" x 24" (61cm x 61cm)
Welding Die Height	41" (104cm)	41"(104cm)	41"(104cm)	41"(104cm)	41"(104cm)
Height Overall	53-1/2" (136cm)	53-1/2" (136cm)	53-1/2" (136cm)	53-1/2" (136cm)	53-1/2" (136cm)
Welder Weight	180Lbs(82 Kg)	180Lbs(82 Kg)	180LBs(82 Kg)	180Lbs(82 Kg)	180lbs(82 Kg)

* Other voltages available

2.0 GENERAL HOOK-UP INSTRUCTIONS

2.1 ELECTRICAL

First Determine that available electrical service in your plant corresponds to the nameplate rating located on the welder housing. Electrical wiring to the welder must be of sufficient size to deliver full ampere load with no appreciable loss during the weld cycle. The welder will not operate properly if there is more than a 10% variation in the line voltages. 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 the National Electric 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 5 volts.

2.2 SAFETY PRECAUTIONS

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 servicing welder – high voltages are located within the base of the welder.

2.2.2 MECHANICAL

Safety glasses must be worn by operator while using welder. 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 **WATER**

It is important that if a welder is to be operated for an extended period of time and headpieces heat up, water lines must be connected. On most model J series Micro-Weld welders, water-cooled headpieces are an option, which can be added at our factor. Connect hoses to inlet and outlet provided at the back of the welder. A shut-off should be installed in the inlet line, and the hose from the outlet should run to an open sight drain. Water should only flow during the weld cycle and the temperature of the water at the drain should feel hot to the hand. This will prevent condensation on the welder headpieces, which could drip on the welding transformer and cause it to ground out.

2.4 **AIR**

Air operated model J series Micro-Weld welders are an option. Should you have this option, air operation cylinders require a 90 P.S.I. air source. An air regulator will be provided to set the minimum amount of pressure needed for the material being welded.

3.0 GENERAL OPERATING INSTRUCTIONS
BASIC OPERATING PARTS

3.1 WELD HEAT SELECTION

This setting determines the amount of heat available for welding. Because of considerable variations in voltage and power factors in various plants, and wide variety in material composition, exact heat setting cannot be specified. In general, larger sizes of stock use higher heat settings.

Welding heat is selected by means of a heavy-duty switch and, on some models, a high-low range switch. See tale 1. The heat switch is conveniently located on the left side of the welder. Number 1 indicates high heat, number 4 or 10 indicates low welding heat. Other numbers are equally graduated from high to low to allow just the right amount of voltage for the welding operation. On models with the high-low range switch, it is located on the front right, just below the nameplate. The range switch sets the range of the heat switch with the low range settings picking up where the high range settings leave off.

The heat or range switch should never be changed to a new setting during a welding operation.

Table 1

Model	Heat Switch Settings	H/L Range
J3C	4	Yes
J3S	10	Yes
J4C	4	Yes
J4S	10	Yes
J4SF	4	No

3.2 SPACING MECHANISM

The welder is capable of welding a variety of material sizes, but each major change in material size requires a corresponding change in the open space of the jaws. Spacing is obtained by rotating the space-adjusting knob located on the lower right side of the headpiece housing. The spacing knob determines the amount of weld upset and expelled metal projecting from the weld zone.

3.3 UPSET PRESSURE MECHANISM

Upset pressures are required for all weld operations. The model J series of Micro-Weld welders obtains its pressures form unique spring assemblies located on the clamp arms. The upset pressures are completely adjustable for various sizes and types of materials. Adjustment of the clamp spring pull determines the amount of upset pressure for the weld forging process. This is obtained by adjusting the length of the pull bar by rotating the tension disc on the foot pedal assembly. Number 1 denotes the greatest upset pressure.

3.4 FLASH SPEED MECHANISM

On model J4SF welder, precise flashing speed regulation and final upset drop off is obtained from its unique hydraulic cylinder located on the right of the weld head. Flashing speed is set with the use of the flashing speed adjusting knob, which regulates the speed of the oil passing the internal valve. Number 1 indicates the slowest flashing speed. Turn the knob counterclockwise to increase the flashing speed. Generally, larger stock requires a slower flashing speed. Final upset is obtained when the piston is compressed to a point where the internal valve is bypassed allowing unrestricted movement. This bypass point can be adjusted by rotating the piston cap clockwise causing the unrestricted movement of the piston to begin when the welding dies are closer together. Properly made welds are perfectly sound and have little upset burr. Poor welds usually indicate too low heat or incorrect flashing speeds.

3.5 WELDING DIES AND DIE SHOES

Welding dies serve three purposes: (1) to carry current and voltages for welding, (2) to align material ends, and (3) to prevent slippage during the weld cycle. Small wire must be placed into small grooves and large wire into the large grooves. Flat stock must be placed against the stop in the rear of the dies. The die shoe holds the material securely into the lower welding die during the weld process.

3.6 HAND SHEAR

An accessory hand shear may be affixed to welder to assist in trimming waste materials prior to welding. Several types are available from Micro Products Company.

3.7 FILING VISE

Accessory machinist vises or special Micro-Weld vises are available to assist the operators to hold wire during de-burring operations.

3.8 ANNEALING DEVICES

Three types of annealing devices are available to assist in processing weld zones, which may have become brittle during the weld cycle. They are: (a) Standard anneal, used on non-ferrous types of material or on low carbon steel wire. (b) Front anneal, used on low, mild steel applications, and (c) dial indicating anneal, used on high carbon steel wire.

3.9 FOOT TREADLE MECHANSIM

The model J series Micro-Weld wire and rod welders are activated by using a foot treadle device, which performs the welding sequence. The manual foot treadle may be replaced with an air-activated mechanism so that the operator just has to move his foot slightly to activate the weld process. Some welding advantage is gained in weld quality by using the air-upset mechanism since all activating strokes are exactly the same.

All operations on the Micro-Weld model J series, wire and rod welders are performed by a single down-stroke of the treadle mechanism, when the treadle is released, the operating parts are automatically re-spaced, ready for the next weld operating.

Blind guides can be designed for handicapped people.

4.0 **SUGGESTED SETTINGS**

Size	Stock	Oil Cylinder	Space	Heat	Tension
J4SF Welder (flat stock)					
.021″ x .275″	Steel	7	7	4	1
.042″ x .514"	Steel	4	9	2	1

APPROXIMATE SETTINGS TO AID IN OBTAINING HIGH QUALTY WELDS

Stock	Size	Heat	Space	Grooves	Tension	Range	Type Welder
Steel	.020″	6	5	Front	1	Low	J3S
	.050″	4	7	Middle	1	Low	
	.080″	1	9	Rear	1	Low	
Copper	.032″	4	3	Front	3	Low	J3C
	.040″	3	4	Middle	3	Low	
	.050″	2	5	Middle	3	Low	
	.064″	1	6	Rear	3	Low	
Steel	.040″	10	3	Front	3	High	J4S
	.060″	8	4	Middle	3	High	
	.080″	6	5	Middle	3	High	
	.100″	4	6	Rear	1	High	
	.160″	1	9	Rear	1	High	
Copper	.128″	1	9	Rear	1	High	J4C
	.102″	2	7	Rear	1	High	
	.080″	3	6	Rear	1	High	
	.064″	4	5	Middle	3	High	

Welders used for E.C. aluminum may use approximately the same settings as copper.

5.0 **TYPICAL OPERATING SEQUENCE**

J3C, J4C & J3S, J4S

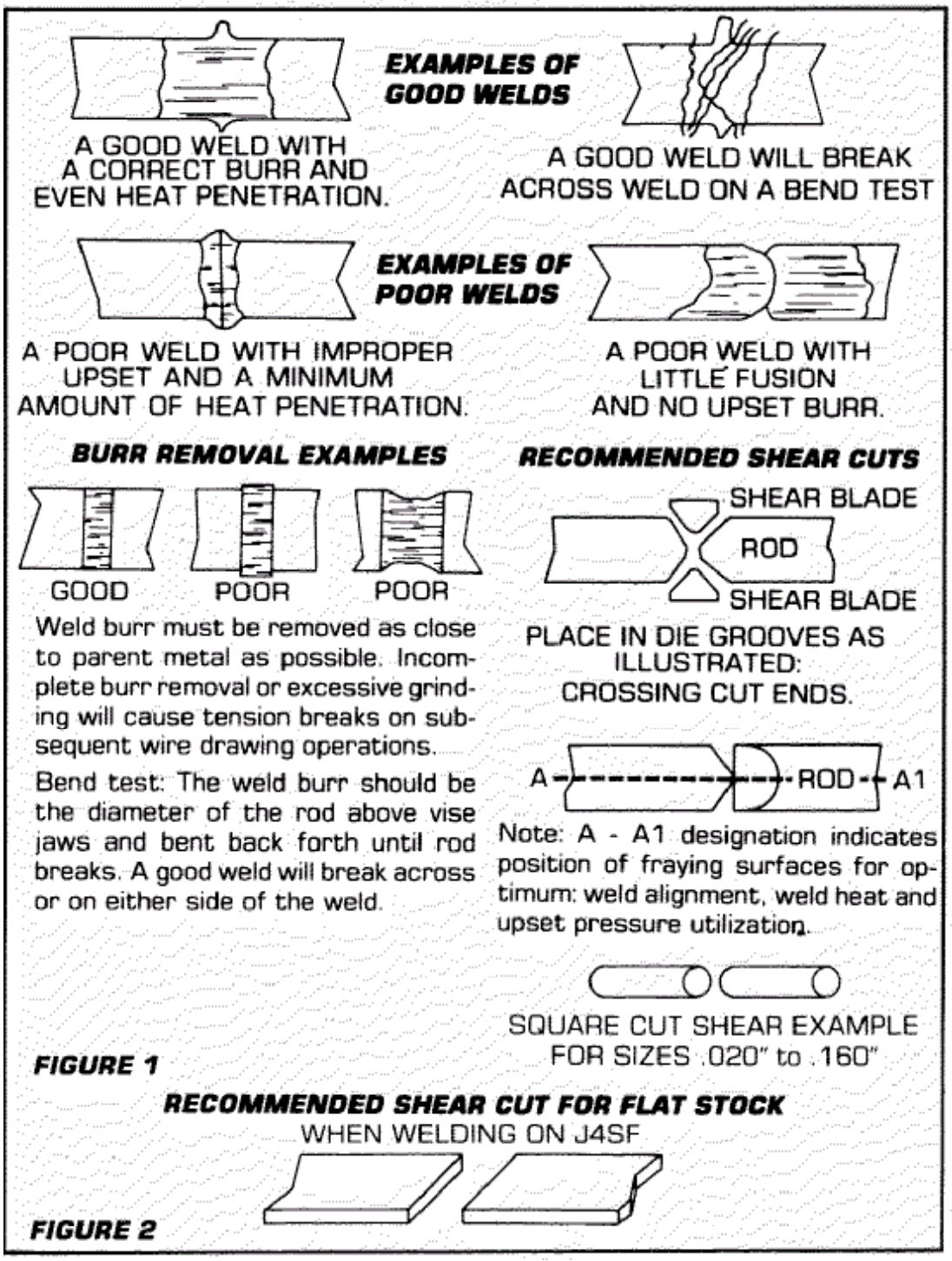
Remember: Material to be joined must be free of rust, corrosion, or other insulating material where it contacts welding dies.

1. Cut wire ends to best joint configuration. See figure 1.
2. Set open space for proper die opening.
3. Select proper weld heat and range.
4. Place wire into welding dies so the ends touch midway between the welding dies.
5. Push foot treadle down far enough to hold material in place in dies.
6. Close flashguard.
7. Push foot treadle down to bottom of stroke to finish clamp process and start weld process.
8. Heat is imparted to wire ends through faying surfaces.
9. Movable platen, under upset pressures, moves toward a closed position due to loss of compression yield strength of wire.
10. A weld limit switch terminates electrical power flow through wire.
11. Actual weld is formed after electric power flow stops, and material is hot forged together with remaining upset pressure.
12. Welded material quickly cools under pressure.
13. Remove stock from dies by releasing foot treadle.
14. Anneal weld zone and sections on either side, if applicable.
15. Remove upset burr so the enlarged weld area is equal in diameter to the parent metal size.

J4SF

1. Cut material ends to best joint configuration. See Figure 2.
2. Set open space for proper die opening.
3. Set flashing speed
4. Select proper weld heat.
5. Place material into weld dies so the ends touch midway between the welding dies; also, flat stock should be against the rear stops in the dies.
6. Push foot treadle down far enough to hold material in place in dies.
7. Close flashguard.
8. Push foot treadle down to bottom of stroke to finish the clamping process, and start weld process.
9. Heat is imparted to the material end through faying surfaces.
10. High current flow causes flashing
11. Movable platen, under controlled speed and pressure, moves toward a closed position, due to flashing, until the faying surfaces are covered with molten metal, and a short length of each part reaches forging temperature.
12. When the movable platen reaches a preset point, flashing speed is terminated, and upset pressure is applied.
13. Further movable platen travel then activates the weld limit switch, and electrical power flow through the material is terminated.
14. Actual weld is formed after electric power flow stops, and material is hot forged together with remaining upset pressure.
15. Welded material quickly cools under pressure.
16. Remove stock from dies by releasing foot treadle.
17. Anneal weld zone and sections on either side, if applicable.
18. Remove upset burr so as the enlarged weld area is equal to the parent metal size.

Examples of good welds (picture)



5.1 ANNEALING INFORMATION

An anneal operation will be required on hard drawn or carbon steel wire and rod. Annealing will accomplish tow things: (1) normalize the grain structure in the weld zone, (2) will soften sections on either side of the immediate weld area.

To anneal, follow directions of one of the following methods, which is applicable to your welder.

5.2 STANDARD TYPE ANNEAL DEVICE

With standard type anneal device cam anneal clamps attached directly to movable and stationary welding platens with "L" shaped brackets or similar devices. Used on welders suitable for welding non-ferrous and low carbon steel wire and rod.

A. Close safety flashguard if equipped with interlocking switch.
B. Place welded stock into anneal clamps with upset burr midway between anneal clamps, clamp securely into position.
C. Push annealing switch with a jogging action to heat material to desired temperature.
D. After the material has lost its color, carefully remove the wire from the anneal jaws and remove the upset burr. Be extremely careful not to get burned on the hot metal.

5.3 FRONT OR DIAL INDICATING ANNEAL DEVICES

A cam type clamp anneal located beneath the welding dies. One clamp is stationary and the other is movable clamp which is attached to a unique mechanism which allows the hot, expanding and annealing wire to remain straight without the normal bowing or bending. This feature assists in preventing fractures in weld zone during anneal process. Both type of devices, front or dial type, are suitable for low carbon steel, mild steel, stainless steel and high carbon steel.

5.4 FRONT TYPE ANNEAL, OPERATING PROCEDURES

A. Close safety flashguard, if so equipped.
B. Place welded stock into anneal clamps with upset burr midway between anneal jaws, being careful to push movable clamp jaw against its inward stop. Carefully tighten wire into both jaws.
C. Push anneal switch in a jogging fashion, to evenly heat up weld area to desired anneal temperature.
D. Let annealed are cool.
E. After the wire has lost its color, carefully remove the wire from the anneal jaws and remove the upset burr.
F. Be careful not to get burned on the hot metal.

5.5 DIAL INDICATING ANNEAL DEVICE OPERATING PROCEDURES

A. Proceed as instructed on front type anneal and proceed with the following information.
B. When heat is applied to the wire, the heated wire will expand.
C. The dial indicator will start to move as the wire begins to heat up.
D. When the exact anneal temperature is reached, the rotating needle on the dial indicating device will momentarily stop.
E. In sequence, the needle will drop back slightly, and then start to move forward again.
F. At the start of the second forward movement of the needle, release the anneal switch.
G. Heating the wire beyond this pint, will cause an improperly treated anneal zone.
H. Allow wire to cool down below 1000 degrees F., before removing wire from the anneal clamps. (Loss of coloring to wire)
I. Be extremely careful of hot metal during handling procedures.

5.6 DETERMINING CORRECT ANNEAL TEMPERATURES

The critical temperature of carbon steel wire is also the maximum heating temperature for the annealing process associated with the butt-welding procedures. The critical temperature will vary slightly, but in direct proportion to the wire's carbon content. Since carbon steel is ferromagnetic, the exact annealing temperature can be easily determined by the loss of magnetic qualities at that point.

To expand this process further, a wire that is gradually heated to a point of just beginning to show some color is very close to the correct anneal temperature (about 1000 degrees F). At this point, the jogging off-on of the anneal switch is important, so that when we test the annealing area with a magnet during the off period it will not be drawn to the wire surface due to electrical magnetic flux. When the magnet does not attach to the wire surface, the correct anneal temperature has been achieved. We are looking for the exact point of loss of magnetic qualities, so do not over heat the material beyond this point.

Annealing after welding to enable an operator to draw carbon steel wire is very important for the wire mill and certain techniques have been developed by others which may assist in drawing high carbon steel wire. Possibly the methods described here will be beneficial to your operation.

5.7 ANNEALING ALUMINUM WIRE AND ROD

Annealing aluminum rod and wire can be somewhat difficult since it passes very quickly through the plastic rang and blows apart. Be extremely careful not to get burned from expelled aluminum by poor safety techniques.

A good anneal temperature for aluminum rod and wire is approximately 700 degrees F. Common blue carpenters chalk rubbed on the surface to be annealed will assist in obtaining this temperature. The chalk will turn a straw color at the anneal temperature 700 degrees F.

6.0 SPECIAL ADJUSTMENTS
HEADPIECES
Refer to Figures 4 through 7

6.1 SPACE ADJUSTING KNOB

Determines the amount of open space between the welding dies.

Calibration:

1. Turn space-adjusting knob to the stop or the number 1 setting.
2. Lay a straight edge across the die seats.
3. The die seats should be level and the weld dies should have 1/32” between the closest die edges.
4. If die seats are not level:
   A. Back headpiece close stop screw off of nylon stop pad.
   B. Loosen the setscrew on the space-adjusting knob.
   C. With a pair of pliers, turn the space-adjusting shaft until dies are level and proper clearance between dies exists.
   D. Retighten spacing knob so that the arrow pointer is across from #1.
5. A compression spring and stop pin are located beneath the spacing knob to assure repeatable positions and overthrow protection. Check to make sure spacing knob has pressure applied to it from this spring and pin is not bent or missing hence preventing proper adjustment, replace as required.

6.2 HEADPIECE CLOSED ADJUSTMENT

Prevents welding dies from touching, and prevents possible over travel of movable platen.

Calibration:

1. Turn space-adjusting knob to the stop at the number 1 setting.
2. Adjust closed stop adjusting screw so that when the movable head is pushed by hand, to a closed position, the weld dies will not touch, and there is approximately 1/64” at #1 setting.
3. Tighten locknut.

6.3 WELD LIMIT SWITCH

Determines the timing point of the weld cycle.
Adjustments:

1. The limit switch is adjusted for actuation by a hex-head bolt, which contacts the limit switch plunger. The weld dies will be used as a reference point to obtain the adjustment.
2. Loosen the limit switch adjusting screw locknut.
3. Set open space adjusting knob to approximate #4.
4. Slowly turn space-adjusting knob clockwise toward #1 until the hex-head bolt activates the limit switch.
5. There should be 1/16” between the closest die edges.
6. If the gap is greater than this screw bolt in to activate the switch later. If the gap is less than 1/16” then screw the bolt out to activate the switch sooner. Repeat steps 3 and 4 after making bolt adjustments until step 5 is achieved.
7. Tighten locknut.
8. The limit switch remains the same for all wire sizes, but can be used for a vernier control of heat in extreme cases to add or subtract slight amounts of heat to assure levelness of welded material.

Figures 4-5-6-7-8-9-9A-10

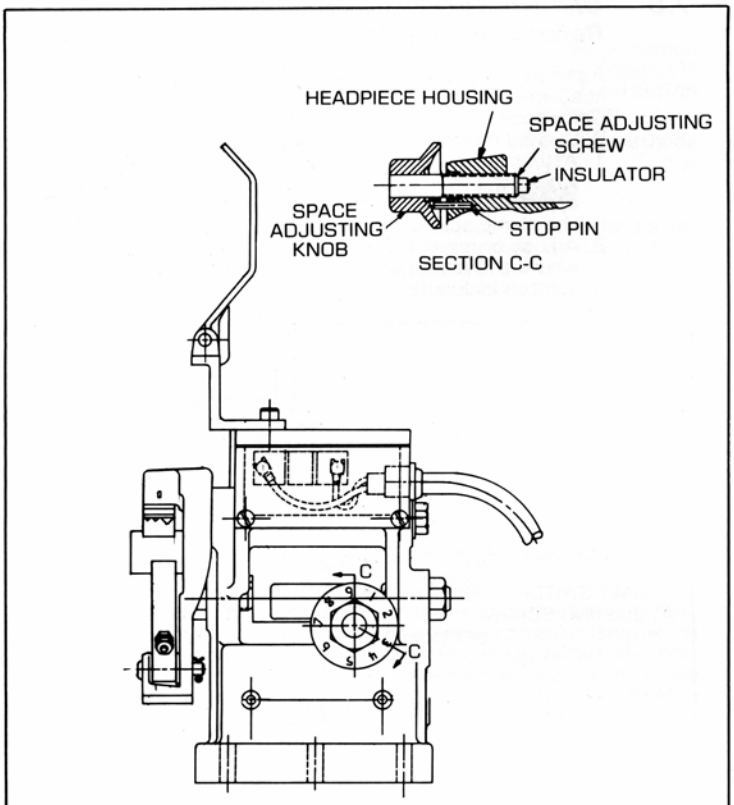
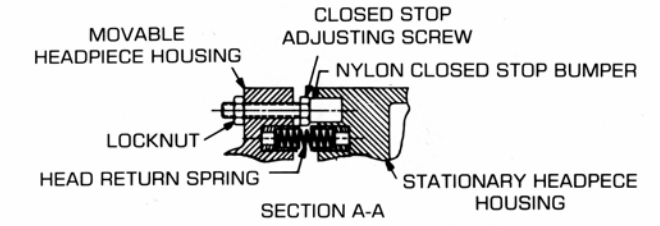


FIGURE 6



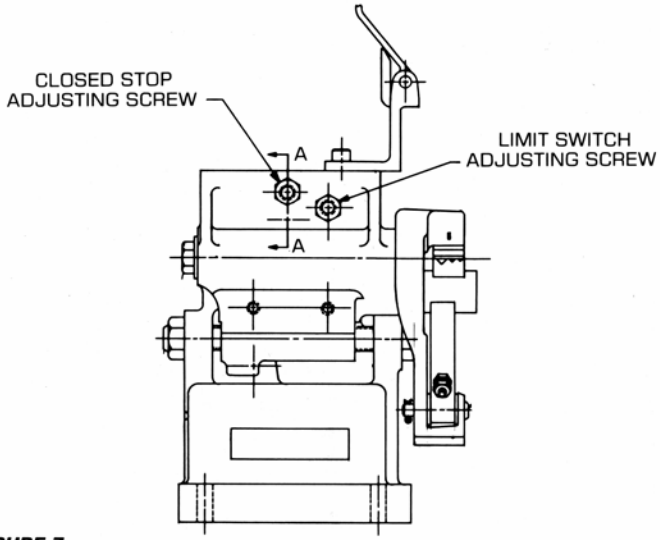
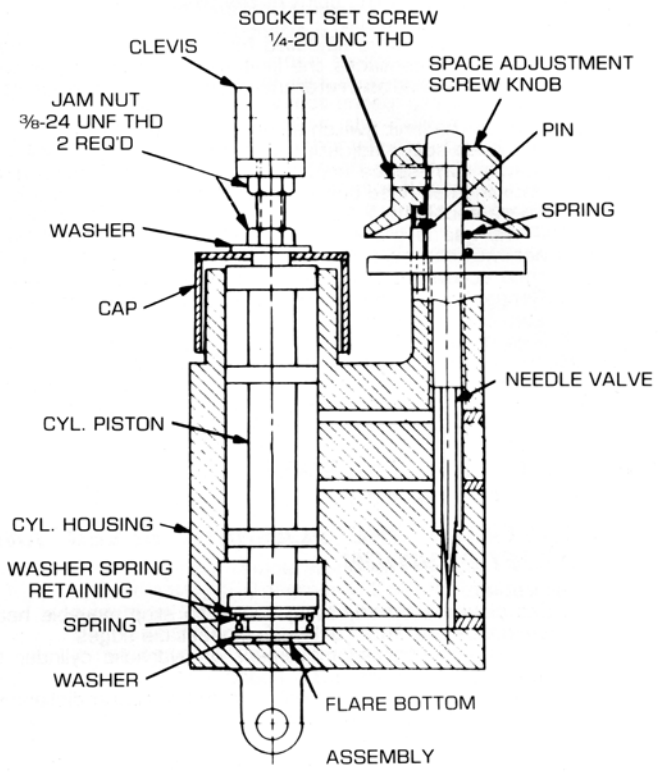


FIGURE 7

6



NOTE A: CLEVIS MUST BE INSULATED ELECTRICALLY FROM SCREW IN PISTON AND FROM ARM EXTENDING FROM MOVABLE HEADPIECE OF WELDER.

NOTE B: CAP KEYED TO PISTON LOOSEN LOCK NUT AND ROTATE CAP CLOCKWISE TO MAKE UNRESTRICTED MOVEMENT OF PISTON TO BEGIN WHEN WELDING DIES ARE CLOSER TOGETHER.

NOTE C: FLASHING SPEED ADJUSTMENT KNOB. NO. 1 ON KNOB IS SLOWEST FLASHING SPEED. TURN KNOB COUNTER CLOCKWISE TO INCREASE FLASHING SPEED.

NOTE D: BUTTERFLY VALVE CLOSES IN DOWNWARD MOVEMENT - OPENS FOR FREE RETURN OF PISTON.

NOTE E: STEP-OFF ALLOWS HYDRAULIC OIL TO BYPASS PISTON GIVING UNRESTRICTED MOVEMENT.

NOTE F: OIL USED SHOULD BE SINCLAIR DURO-150 OR EQUIVALENT.

FIGURE 8

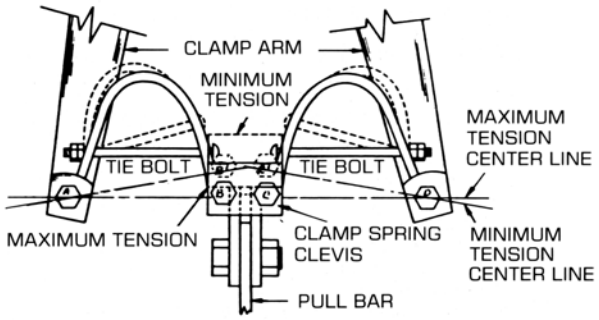


FIGURE 9

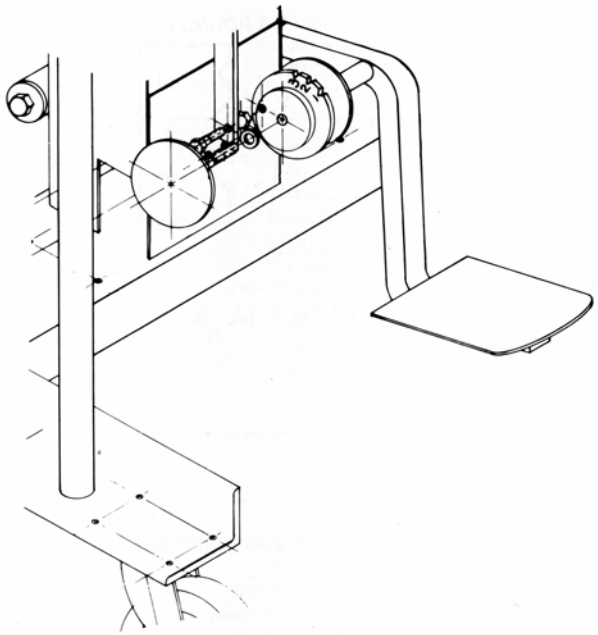


FIGURE 9A

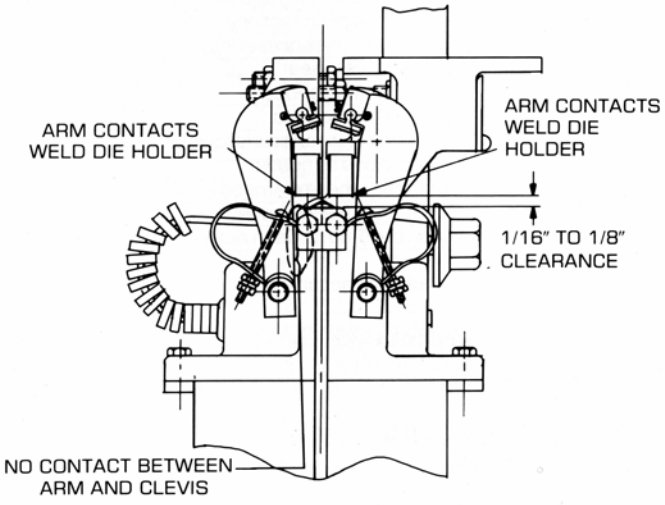


FIGURE 10

6.4 HYDRAULIC CYLINDER

Refer to Figures 8. For new type cylinder see addendum.

CONTROLS THE FLASHING SPEED AND UPSET POSITION

Calibration:

1. Set closed stop adjusting screw to stop movable head when dies are 1/32" between closest die edges.
2. To set unrestricted movement of hydraulic cylinder to begin when dies are 3/32" apart;
   A. If unrestricted movement starts at a greater distance:
      1. Loosen lock nut on piston cap.
      2. Rotate cap clockwise to make unrestricted movement of piston to begin when welding dies are closer together.
      3. Tighten locknut on piston cap.
   B. If unrestricted movement starts at a lesser distance:
      1. Loosen lock nut on piston cap.
      2. Rotate cap counterclockwise to make unrestricted movement of piston begin when welding dies are further apart.
      3. Tighten lock nut on piston cap.
3. Set limit switch to cut-off weld current 1/32" after unrestricted movement has begun.

6.5 CLAMP SPRING AND UPSET PRESSURES

Refer to Figure 9

UPSET PRESSURE

Determines the amount of clamping and upset pressure available for weld process, by making pull bar longer or shorter.

Calibration:

1. With nothing in welding dies, depress foot treadle.
2. With a straight edge, determine that bolts A,B,C and D are all in alignment. Lengthen or shorten pull bar to attain this setting. This alignment sets the welder for maximum pressures.
3. Should you require lesser pressures for smaller wire sizes, the pull bar can be lengthened to decrease pressure as per the following:
   (See figure 9A)
   A. Loosen hand wheel on the foot pedal assembly.
   B. Rotate disc so number on disc lines up with notch on back-up plate.
   C. Tighten hand wheel.
4. Lesser pressures are indicated when center bolts; B and C are above the centerline.

5. Do not shorten the pull bar to such a position so that the center bolts B and c are below the centerline. Clamp spring breakage could occur.
6. Pressures should not be increased or decreased by cross bolt adjustments.

Important: Do not turn or remove the front center pivot screw and nut. To remove the movable half of the weld head as specified in the preventive maintenance techniques, loosen and remove the rear center pivot only.

6.6 CLAMP SPRING CROSS BOLT

Refer to Figure 10

Assures maximum die shoe opening and non-shorting of weld head when annealing.

Calibration:

1. Adjust cross bolt on clap arm on the stationary head to where the clamp arm just contacts the weld die seat and approximately 1/16” to 1/8” clearance is evident between the clamp spring clevis and weld die seat.
2. Adjust cross bolt on clamp arm on the movable head to where the clamp arm just contacts the weld die seat.
3. Tighten lock nuts.

7.0 PREVENTATIVE MAINTENANCE

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 AS REQUIRED

1. Remove flashings and loose particles from welding headpieces to prevent accumulation. Use a soft brush and a soft metal scraper.
2. Check condition of welding dies and welding die shoes, replace as required.
3. Check condition of clamp spring assemblies and replace all broken springs, springs that have taken a set as well as worn fiber bushings and washers.

7.2 QUARTERLY

1. Repeat above items.
2. Check anneal dies and replace all worn parts.
3. Check for worn bearings and elongated holes on foot treadle assemble and pull rod parts.
4. General lubrication of all moving parts.

7.3 ANNUALLY

1. Repeat above noted items.
2. Check for worn or poorly aligned contacts within magnetic contactor. (Some older Model J3 and J4 series units do not have contactors.)
3. Clean weld transformer secondary strap connects to movable headpiece. Emery cloth works well to bring all surfaces in this area to a bright and shiny condition. Retighten completely.
4. Check for excessive wear in clamp arm assemblies, where die shoes fit into clamp arm openings. Replace as required.
5. Remove movable welding headpiece by loosening rear pivot centers. Check the condition of the pivot center surfaces, polish and thoroughly clean. Re-lubricate and re-install movable headpiece and adjust so that the movable headpiece do not have any side play. Headpiece must be free to pivot and die seat surfaces must be in good alignment.
6. Check headpiece castings, if worn, replace. Should the welders be used in a corrosive atmosphere, clean off oxides and repaint as required.

8.0 WELDING DIES AND DIE SHOES INFORMATION

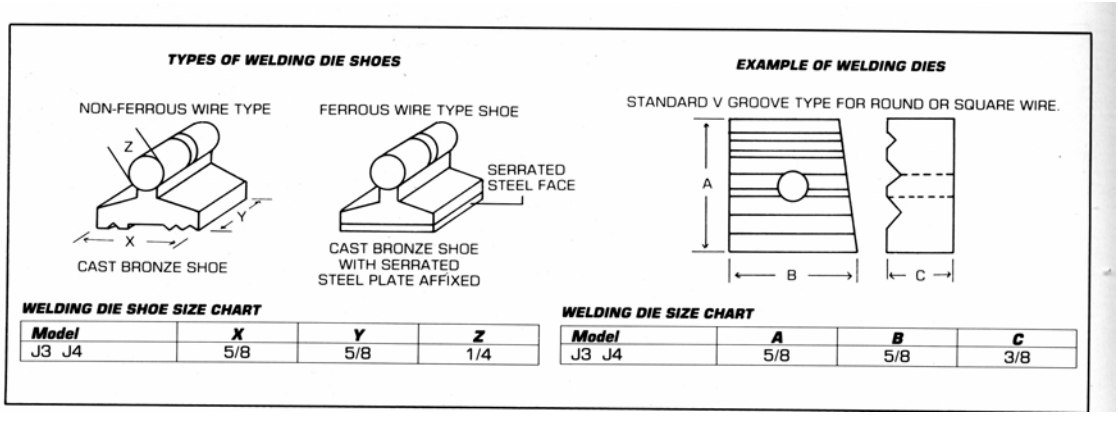
Description:
Welding dies – Lower conducting electrode and clamp jaw
Weld die shoes – Upper clamping member

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

Care of die sets:

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.
2. Do not attempt to clamp material that is not suited for welder into die sets. Undersized materials will slip and burn die grooves. Oversized materials will overstress clamping parts.
3. Do not use welding die sets for a vise. These parts will not withstand the mechanical abuse.
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 and oxidize surface will insulate the welding dies and reduce effective welding voltage.
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.
6. Welding die set will wear with use and must be changed occasionally for good welding results. Keep an 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.

Types of welding die shoes picture



9.0 DIAGNOSTIC CHART FOR TROUBLE-SHOOTING

WELDING ACTION	CAUSE	REMEDY
Weld action normal but weld burr doesn't extend beyond wire	Lack of open space	Increase open space until desired burr is obtained
Molten metal is blown out and ends not joined	Weld heat too high Weld limit switch Stock is too small Weak clamp spring	Lower heat settings Set limit switch properly Check size rating of welder Replace clamp springs
Weld area heats up but weld is not complete	Low heat Secondary transformer connections Loose or dirty welding dies Starting space adjust	Increase weld heat Clean and tighten transformer connections Clean welding dies and surfaces Decrease starting space
Weld has complete burr but is dry and breaks off below surface of wire	Upset pressure too great Limit switch settings High carbon steel wire	Lower upset pressure Reset limit switch to specifications Carbon-steel wire often appears like this, process wire by annealing weld before removing burr
Welds good but poorly aligned	Welding dies & die shoes Starting space Loose pivot centers	Replace worn dies and shoes Decrease starting space Return heads to factory
Ends of wire buckle and may not weld	Upset pressure too great Low weld heat	Decrease upset pressure Increase weld heat
Varying weld results	Stock slipping Varying weld voltages Rod condition variations Dies and die shoes Flashings Rod cuts Weld contactor	Worn dies and shoes Check electric lines Clean and tighten transformer connections to heads Clean rod where clamped in dies Replace dies and shoes Clean build-up of flash materials Check contactor for poor contacts

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 and 9.1.4)

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 test valid. The electrical schematic (section 10) furnished for these tests shows the table test points. This 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 MODEL J3 & J4 - 115 VOLT TABLE – Use Schematic B3275B

TEST LEAD CONNECTION	METER READING	PROBLEM IF NO READING	PRESS OPERATING SWITCH	WELD LIMIT SWITCH ACTUATED	PRESS ANNEAL SWITCH
L2 FU1-1	115 VAC	Bad fuse connection			
L2 FU1-2	115 VAC	Open fuse			
L2 FS1-1	115 VAC	Open wire to operating switch			
L2 FS1-2	115 VAC	Bad operating switch	X		
L2 FS2-1	115 VAC	Open wire to anneal switch			
L2 FS2-2	115 VAC	Open anneal switch			X
L2 LS1-1	115 VAC	Open wire to weld limit switch	X		
L2 LS1-2	115 VAC	Bad 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		
L2 CR2-2	Line voltage	Bad contactor			X

9.1.4 MODEL J3 & J4 – 230 VOLT TABLE – Use Schematic B5741A

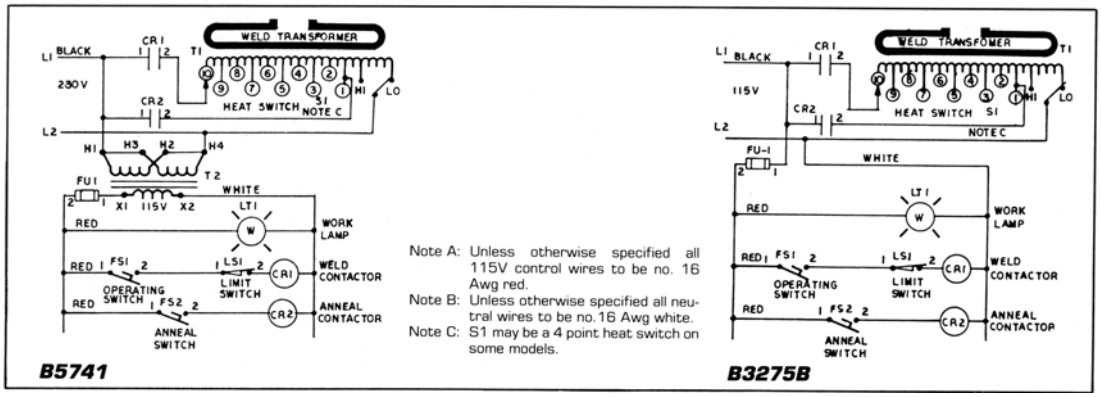
X1 X2	115 VAC	Bad control transformer(T2)			
X2 FU1-1	115 VAC	Bad fuses connection			
X2 FU1-2	115 VAC	Open fuse			
X2 FS1-1	115 VAC	Open wire to operating switch			
X2 FS1-2	115 VAC	Bad operating switch	X		
X2 FS2-1	115 VAC	Open wire to anneal switch			
X2 FS2-2	115 VAC	Open anneal switch			X
X2 LS1-1	115 VAC	Open wire to weld limit switch	X		
X2 LS1-2	115 VAC	Bad 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		
L2 CR2-2	Line voltage	Bad contactor			X

Note: to perform repairs consult section 13 for parts identification

10.0 ELECTRICAL SCHEMATIC

Note: To perform repairs consult section 13 for parts identification

10.0 ELECTRICAL SCHEMATIC



Note A: Unless otherwise specified all 115V 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 4 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. Prior to using equipment, an operator must be instructed on basic operation and malfunction methods, by qualified personnel.
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 weld nameplate located on weld housing.
5. Check nameplate ratings and keep within capacities and material categories stated therein.
6. Adjustment 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.
8. Reduce air supply pressures or disconnect from air source, for pneumatically equipped welders, prior to maintenance or repair procedures.
9. Welders equipped with water cooling accessories must have water supply turned off during idle periods and allow only enough water to flow to cool heated components during weld operation.

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 ground 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 weld 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 operating is in process.

12.0 BUYERS GUIDE

HOW TO ORDER PARTS:

You must provide

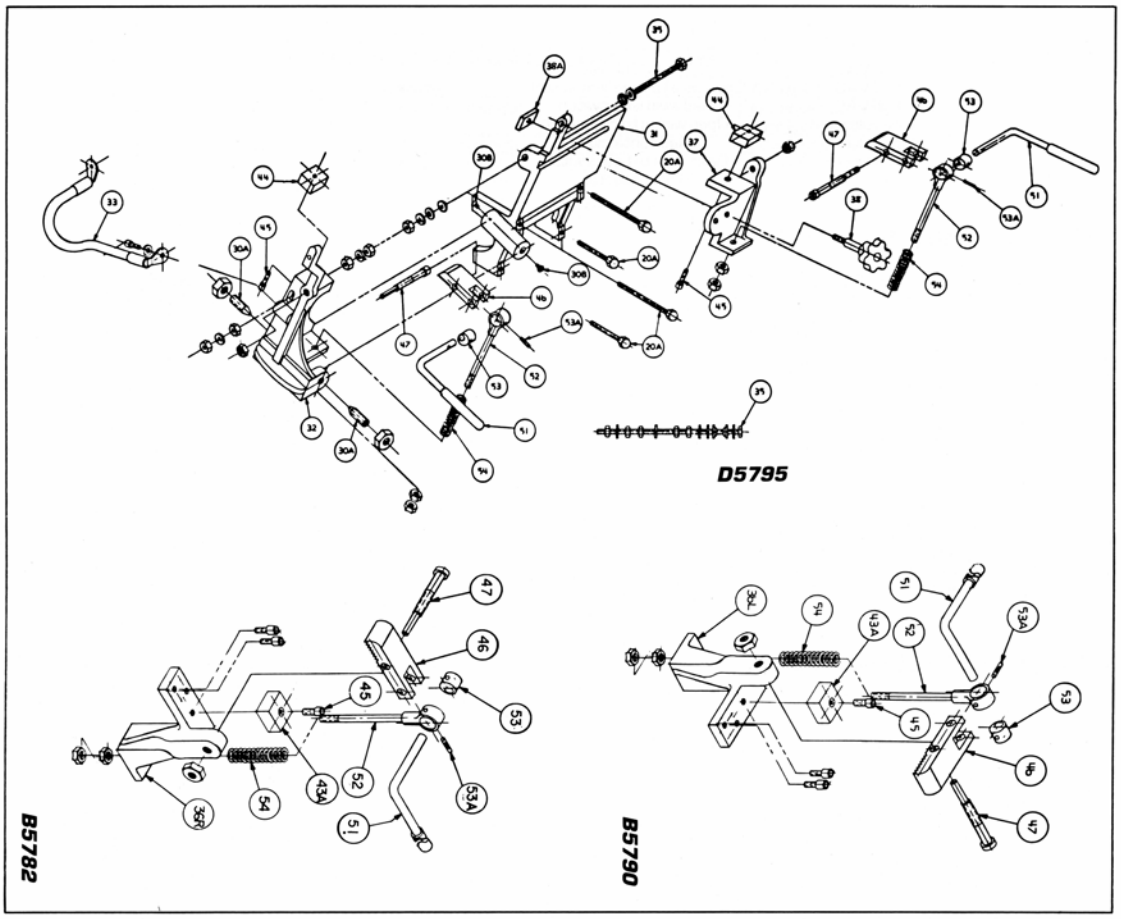
1. Machine Model
2. Machine Serial Number
3. Voltage

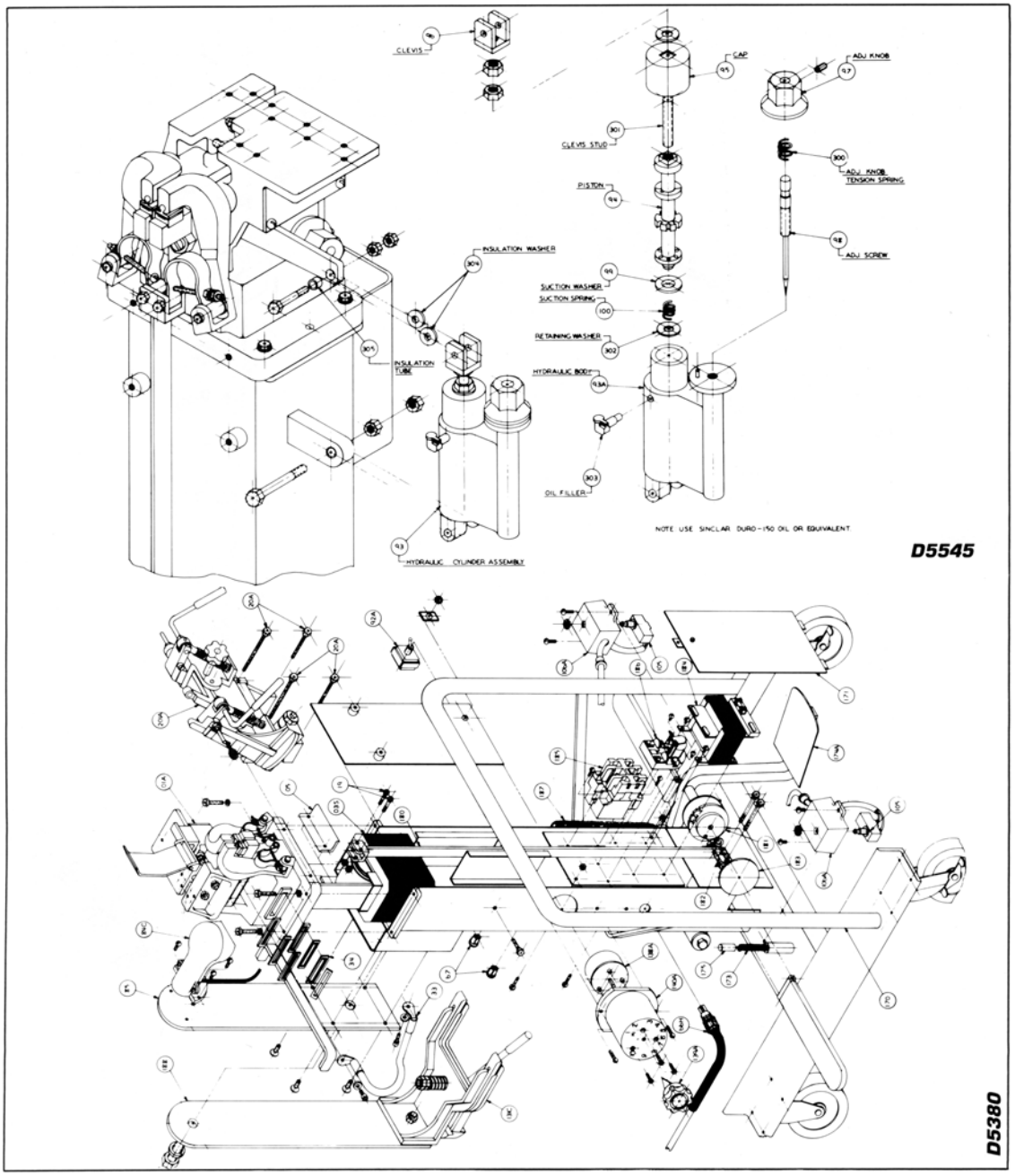
Then identify part(s) on part list (last page in book) and provide MICRO with the circled number

CALL MICRO at 800-872-1068

Provide MICRO with your company name, address and purchase order number.

13.0 PARTS LIST




CLEVIS
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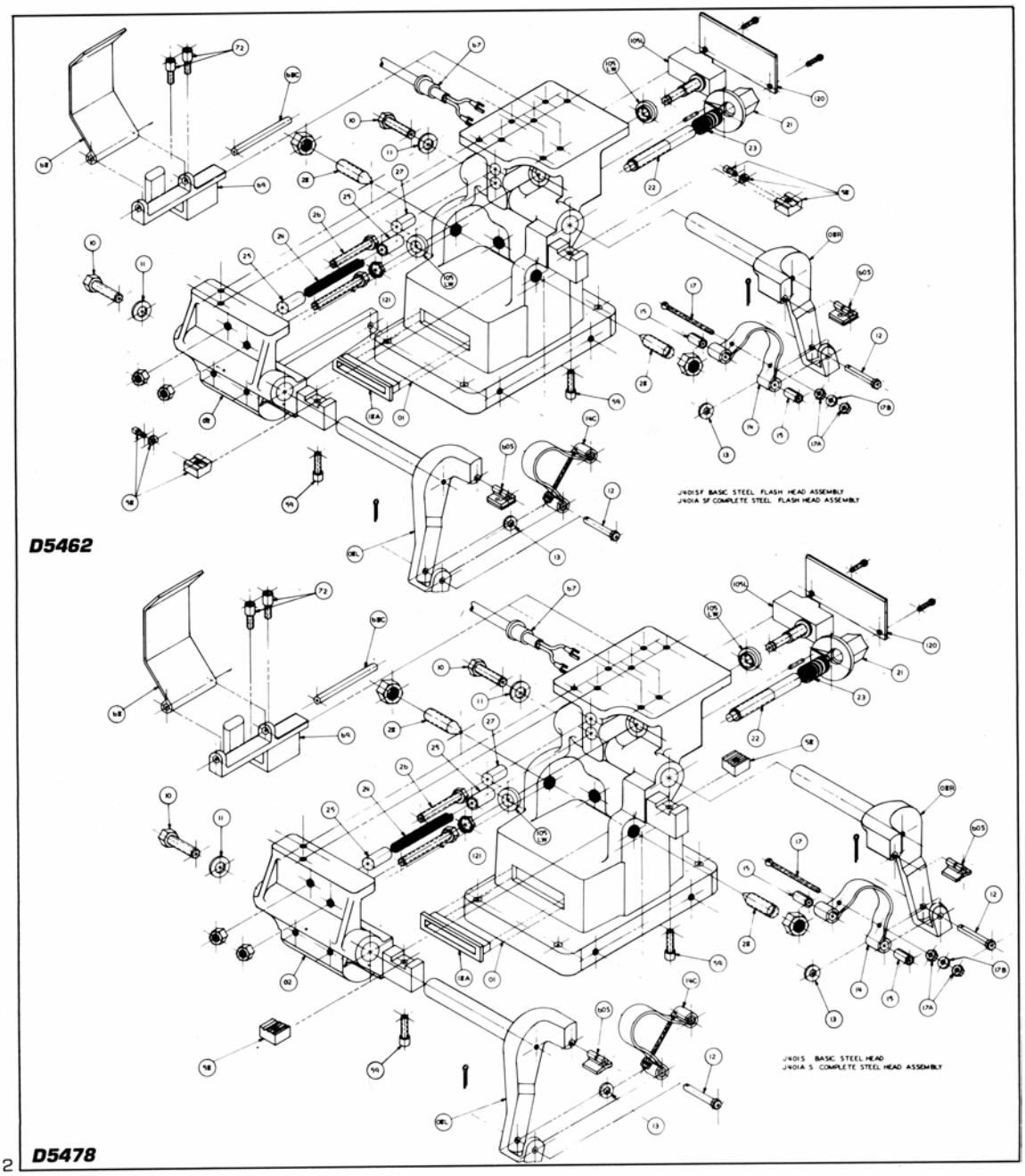
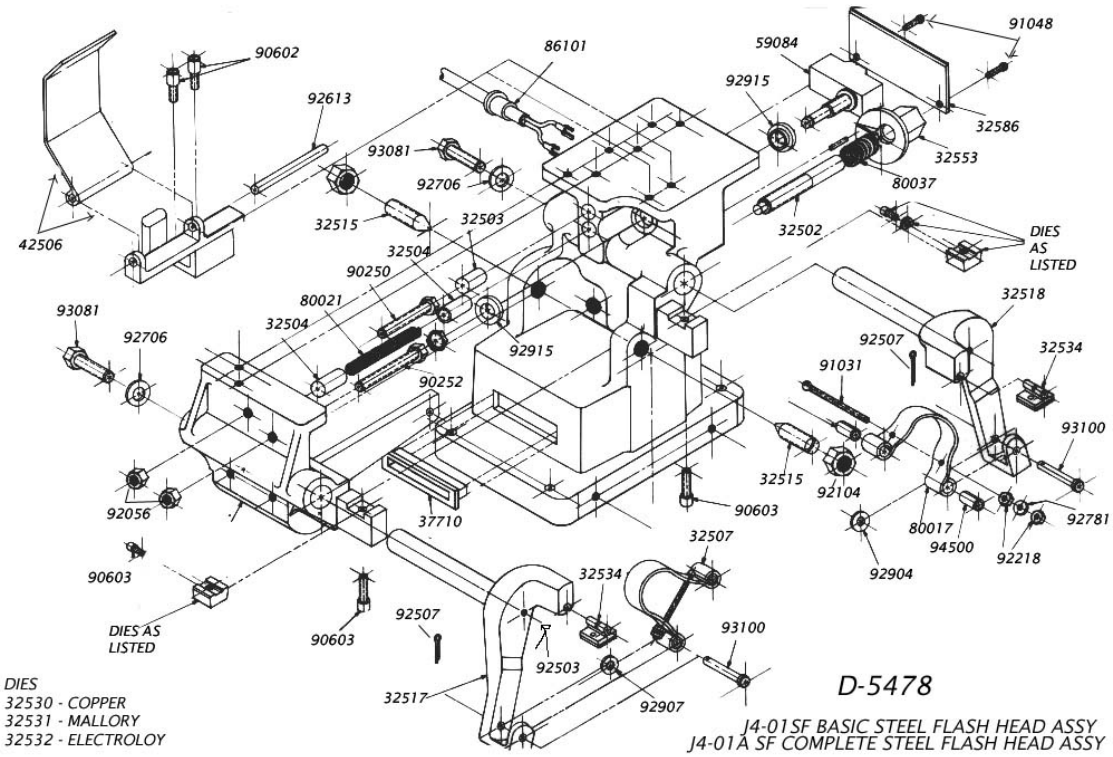
ADJ KNOB
CLEVIS STUD
ADJ KNOB TENSION SPRING
PISTON
ADJ SCREW
INSULATION WASHER
SUCTION WASHER
SUCTION SPRING
RETAINING WASHER
INSULATION TUBE
HYDRAULIC BODY
OIL FILLER
HYDRAULIC CYLINDER ASSEMBLY
NOTE USE SINCLAIR DURO-150 OIL OR EQUIVALENT
D5545
D5380


JN015F BASIC STEEL FLASH HEAD ASSEMBLY
JN01A SF COMPLETE STEEL FLASH HEAD ASSEMBLY
D5462
JN015 BASIC STEEL HEAD
JN01A S COMPLETE STEEL HEAD ASSEMBLY
D5478

12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32586
93081
32553
92706
80037
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32503
32502
DIES AS LISTED
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32504
90250
32518
80021
93081
32504
92915
92507
92706
32534
91031
90252
93100
32515
92104
90603
92056
37710
80017
92781
94500
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92904
90603
32507
32534
DIES AS LISTED
90603
92507
93100
92503
32517
92907
D-5478
DIES
32530 - COPPER
32531 - MALLORY
32532 - ELECTROLOY
J4-01SF BASIC STEEL FLASH HEAD ASSY
J4-01A SF COMPLETE STEEL FLASH HEAD ASSY

13.0 PARTS LIST

Butt Welders J3, J4

Model/ Part No	Description	Item #
J4-01	Headpiece stationary and movable Match machined w/adjustable centers	32584
J4-01A	Headpiece assembly complete w/all Operating parts, state model & serial Number	32585
J4-08R	Clamp arm, standard, right	32517
J4-08L	Clamp arm, standard, left	32518
J4-10	Clamp arm retaining screw	93081
J4-11	Clamp arm retaining screw washer	92706
J4-18A	Weld transformer strap insulator	37710
J4-21	Space adjusting knob	32553
J4-22	Space adjusting screw	32502
J4-23	Space knob tension spring	80037
J4-24	Return spring, movable head	80021
J4-25	Return spring, insulating bushing, 2 required	32504
J4-26	Headpiece closed, adjusting screw and Nut	90250
J4-27	Headpiece closed, adjusting screw Insulated stop	32503
J4-28	Center, adjusting, rear	32515
J4-30	Center adjusting, front	32516
J4-12	Clamp spring retaining pin and key, outer	93100
J4-13	Clamp spring insulating washers, 4 req'd	92904
J4-14	Clamp spring standard, 1/16"	80017
J4-14C	Clamp spring assembly with all Operating parts	32507
J4-15	Clamp spring metal bushing 2 required, inner	85055
J4-16	Clamp spring fiber bushing, 2 required, outer	85055
J4-17	Clamp spring cross bolt, nuts and Washer set	32609
J4-19	Clamp spring attaching bolt, inner	42504
J4-03S	Welding transformer, steel Specify: 120 or 240 volts, 60 hertz	
J4-03C	Welding transformer, copper or Aluminum, 240volts, 60 hertz	
J4-04	Heavy-duty step-down transformer, Specify line and welder voltages	
J4-04A	Step-down transformer mounting plate	42582
J4-05	Welding transformer secondary clamp plate	42642
J4-06	Clamp plate attaching screw, 2 req'd	90605

Model/ Part No	Description	Item #
J4-07	Screw, secondary strap attaching, Stationary head	90605
J4-184	Control circuits, step-down transformer	57601
J4-185	Contactor, welding, 25 ampere	57613
J4-186	Relay, anneal circuits, 15 amperes	57660
J4-92A	High-off-low heavy-duty switch	57843
J4-138A	Heat switch, 10 point type, 25 ampere	57802
J4-138B	Heat switch, 4 point type, 25 ampere	57801
J4-139A	Heat switch knob for 25 ampere switch	48215
J4-140A	Heat switch housing for 25 ampere Switch, specify: 4 point or 10 point	32524
J4-105A	Operating switch short stem	57810
J4-106A	Operating switch housing	32523
J4-105A	Anneal switch, short stem	57810
J4-106A	Operating switch housing	32523
J4-105L	Limit switch, long stem	59084
J4-120	Limit switch cover w/attaching screws	32586
J4-121	Limit switch adjusting screw & locknut	90252
J4-58C	Welding dies, pair, copper	32530
J4-58M	Welding dies, pair, copper alloy, class #2	32531
J4-58E	Welding dies, pair, copper alloy, class #4	32532
J4-59	Welding die attaching screw, 2 required	90603
J4-60S	Welding die shoes, upper, pair, steel face Affixed	32534
J4-60SA	Replacement serrated steel face, each	32533
J4-60SB	Rivets, steel faced per (100) pieces	93051
J4-60B	Welding die shoes, upper, bronze	32535
J4-20A	Anneal frame-mounting screws, set	32614
J4-30A	Bearing center, adjustable, front or rear	62046
J4-30B	Nylon center insulator	37713
J4-31	Anneal frame, stationary	62055
J4-32	Anneal frame, movable	62065
J4-33	Anneal frame, power shunt cable	62157
J4-35	Anneal frame, space-adjusting screw set	32610
J4-36L	Anneal die carrier bracket, left hand, Top anneal	62053
J4-36R	Anneal die carrier bracket, right hand, Top anneal	62054
J4-37	Anneal die carrier bracket, slide type, Front anneal	62107
J4-38	Slide bracket adjusting knob, screw/nut	62101
J4-39	Shunt cable lug	86171
J4-44	Anneal block, flat, pair	32525
J4-45	Anneal attaching screw, 2 required	90603
J4-46	Anneal die shoe, each, 2 required	62062
J4-47	Anneal die shoe, pivot mounting stud	62059
J4-51	Handle, anneal clamping	62063
J4-52	Eccentric carrier strap and nut	62060

Model/ Part no.	Description	Item #
J4-53	Eccentric, anneal clamping	62061
J4-53A	Pin, eccentric attaching	92602
J4-54	Spring, anneal clamping	80022
J4-61	Dial indicator assembly	77851
J4-62	Dial indicator contact button	62012
J4-200	Complete front anneal device with Dial indicator	62168
J4-201	Complete front anneal device less dial	62067
J4-172S	Caster, swivel	48100
J4-172R	Caster, rigid	48101
J4-172W	Wheel only, 5”	
J4-173	Return spring, anneal or operating Switch levers	80049
J4-174A	Pedal, operating lever	42563
J4-175	Plunger, operating switch lever	42576
J4-178	Plunger, anneal switch lever	42576
J4-180	Pull bar with clevis	42626
J4-181	Pull bar tension adjusting disc	42503
J4-182	Pull bar attaching screw	90233
J4-183	Pull bar adjusting knob	42578
J4-187	Foot pedal return spring, new style Extension type	
J4-151	ETS wire shear, stationary housing	64013
J4-152	ETS wire shear, movable housing	64006
J4-153	ETS wire shear, handle	64008
J4-154	ETS wire shear, cutter, pair	64043
J4-155	ETS wire shear, pivot bolt and nut	90624
J4-156	ETS wire shear, complete	64007
J4-84C	Lamp complete	52539
J4-86	Lamp, 25 or 40 watt standard base	58151
J4-87	Lamp receptacle	58166
J4-68A	Flashguard, O.S.	42506
J4-68C	Flash guard complete, o.s.	
J4-68	Flash guard flap,o.s.	
J4-69	Flash guard mounting bracket, o.s.	
J4-71	Flash guard attaching bolt and washer	90601
J4-131C	Filing vise complete	60009
J4-131	Filing vise, movable half	60013
J4-132	Filing vise, stationary half	60012
J4-133	Filing vise, handle	60007
J4-134	Filing vise, sliding block	60008
J4-135	Filing vise, spring	80024
J4-136	Filing vise, cap screw and nut	90300
J4-09R	Clamp arm, special for hand clamp type, Right	32511
J4-09L	Clamp arm, special for hand clamp type, Left	32510
J4-14F	Clamp spring, special 3/32” thickness, Also used for hand clamp	80019

Model/ Part No.	Description	Item #
J4-55	Hand clamp, locking handle	32563
J4-56	Hand clamp, mounting bracket, movable head	32562
J4-57	Hand clamp, mounting bracket, Stationary head	32561
J4-58EA	Welding die set, 4 pieces, 2 or 3 radius grooves	32611
J4-58EB	Welding die set, 4 pieces, flat stock Type, capacity to 5/8”	32612
J4-58EC	Welding die set, 4 pieces, flat stock Type, capacity to 3/4"	32613
J4-225A	Air conversion kit complete, state model	APPL
J4-226C	Replacement air cylinder, type 12 comp	77700
J4-226D	Replacement diaphragm, type 12	77708
J4-226E	Replacement boot, type 12	77715
J4-228A	Foot pedal lever assembly, J4 series	42603
J4-232	Air regulator and filter assembly	77800
J4-233	Pressure gauge	77822
J4-234	3-way foot valve, complete	77860
J4-235	Flow control valve	77862
J4-236	Quick exhaust valve	77857
J4-90A	Grinding wheel, 2” X 3/8” hole	78511
J4-102	Heat switch, 10 amp steel type welders,o.s.	57800
J4-103	Heat switch, 10 amp, knob	48214
J4-104	Heat switch, 10 amp, housing,10-point o.s.	32608
J4-122	Limit switch fiber push rod, o.s.	52526
J4-123	Anneal switch old, style	57827
J4-S80	Limit switch o.s.	56520
J4-176	Foot pedal return spring, Compression type o.s.	80025
J4-177	Foot pedal return spring plunger o.s.	
J4-1400	Conversion kit, old style housing mounted Limit and operating switch to current Safety approved type. Model J3C and J4C	

NOTE: Model J3 and J4 parts are interchangeable
Except for die sets: J4-58C, J4-58M and
J4-58E; for these parts indicate for J3

Welders: J3-58C, J3-58M or J3-58E

ADDENDEM HYDRAULIC CYLINDER

Refer to Figures 12

CONTROLS THE FLASHING SPEED AND UPSET POSITION

Calibration:

1.Set closed stop adjusting screw to stop movable head when dies are 1/32" between closest die edges.

2.To set unrestricted movement of hydraulic cylinder to begin when dies are 3/32" apart;

A. If unrestricted movement starts at a greater distance:

1.Loosen lock nut on cylinder.

2.Rotate cylinder counterclockwise to make unrestricted movement of piston to begin when welding dies are closer together.

3.Tighten locknut.

B. If unrestricted movement starts at a lesser distance:

1. Loosen lock nut on cylinder

2. Rotate cylinder clockwise to make unrestricted movement of piston begin when welding dies are further apart.

3. Tighten lock nut.

3.Set limit switch to cut-off weld current 1/32" after unrestricted movement has begun.

Updated Cylinder Replacement Directions

Remove the current cylinder along with the arm insulator bushing. Remove both right side head bolts that fasten the head to the truck. Place the cylinder plate direct on top of the head lining up the boltholes. Using the bolts provided, bolt down the plate to the head making sure that the bolt insulators are still intact on the plate.

While compressing the cylinder down, attach the arm pivot to the head arm. The speed of the cylinder retraction has been preset at the factory. However, adjustments may be needed to establish the correct upset cutoff. Loosening the cylinder nut and then turning the cylinder itself up or down will alter the location of the weld upset. See welder manual for correct machine setup.

J4SF N.S. HYDRAULIC CYLINDER ASSEMBLY – 62205

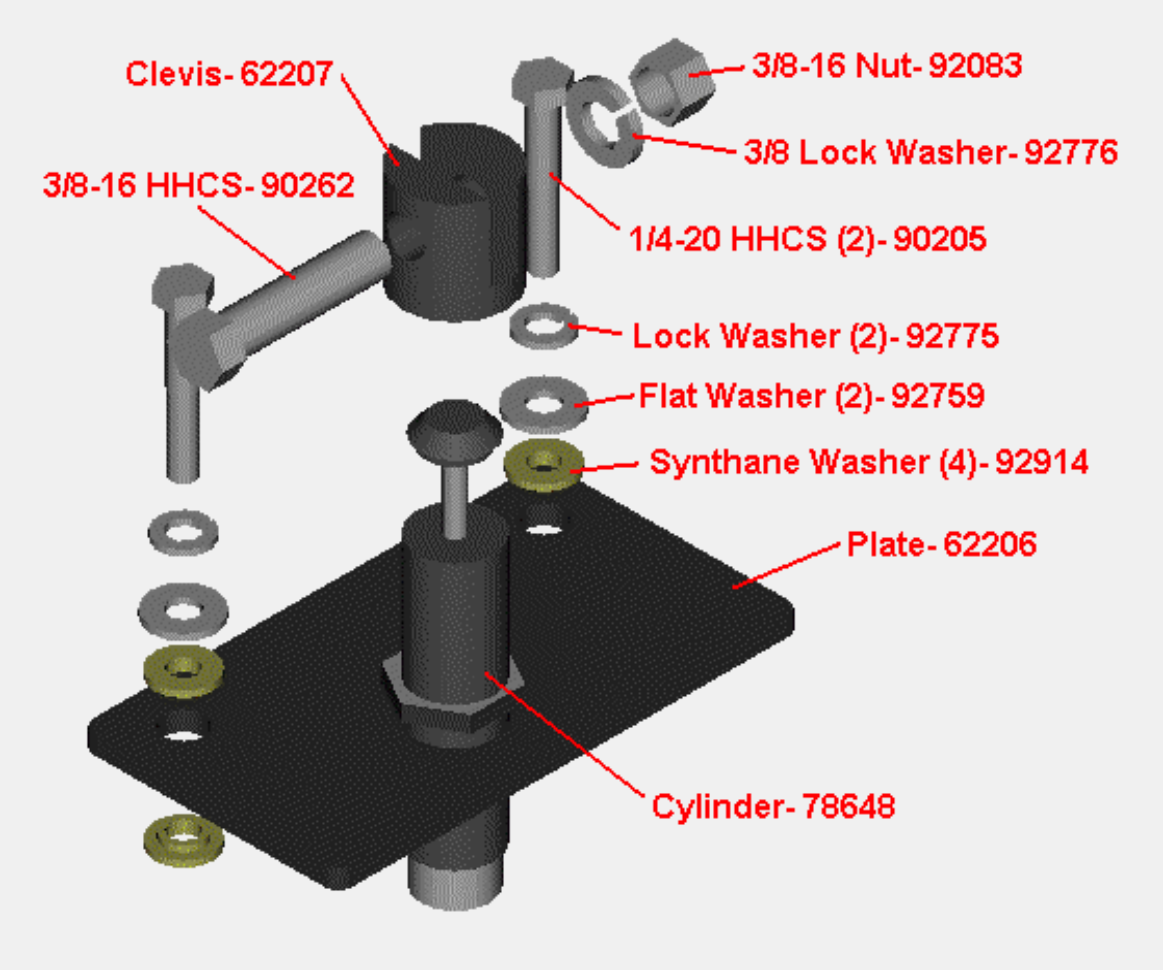
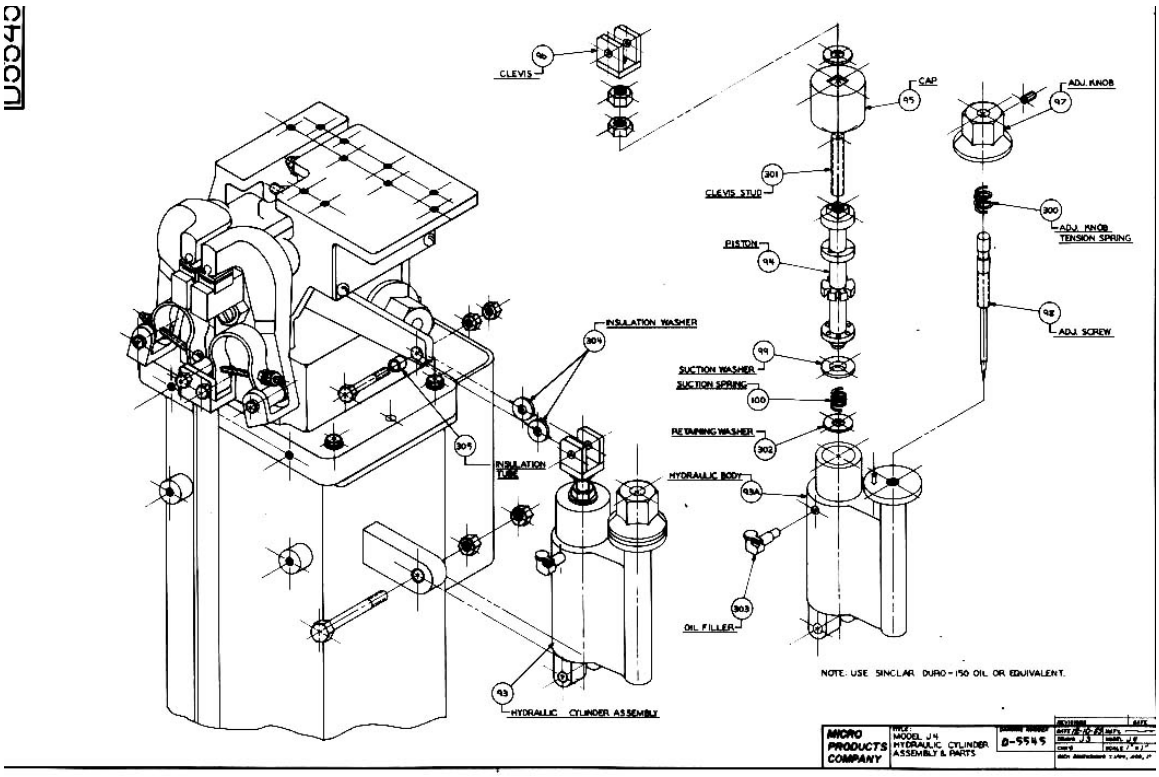
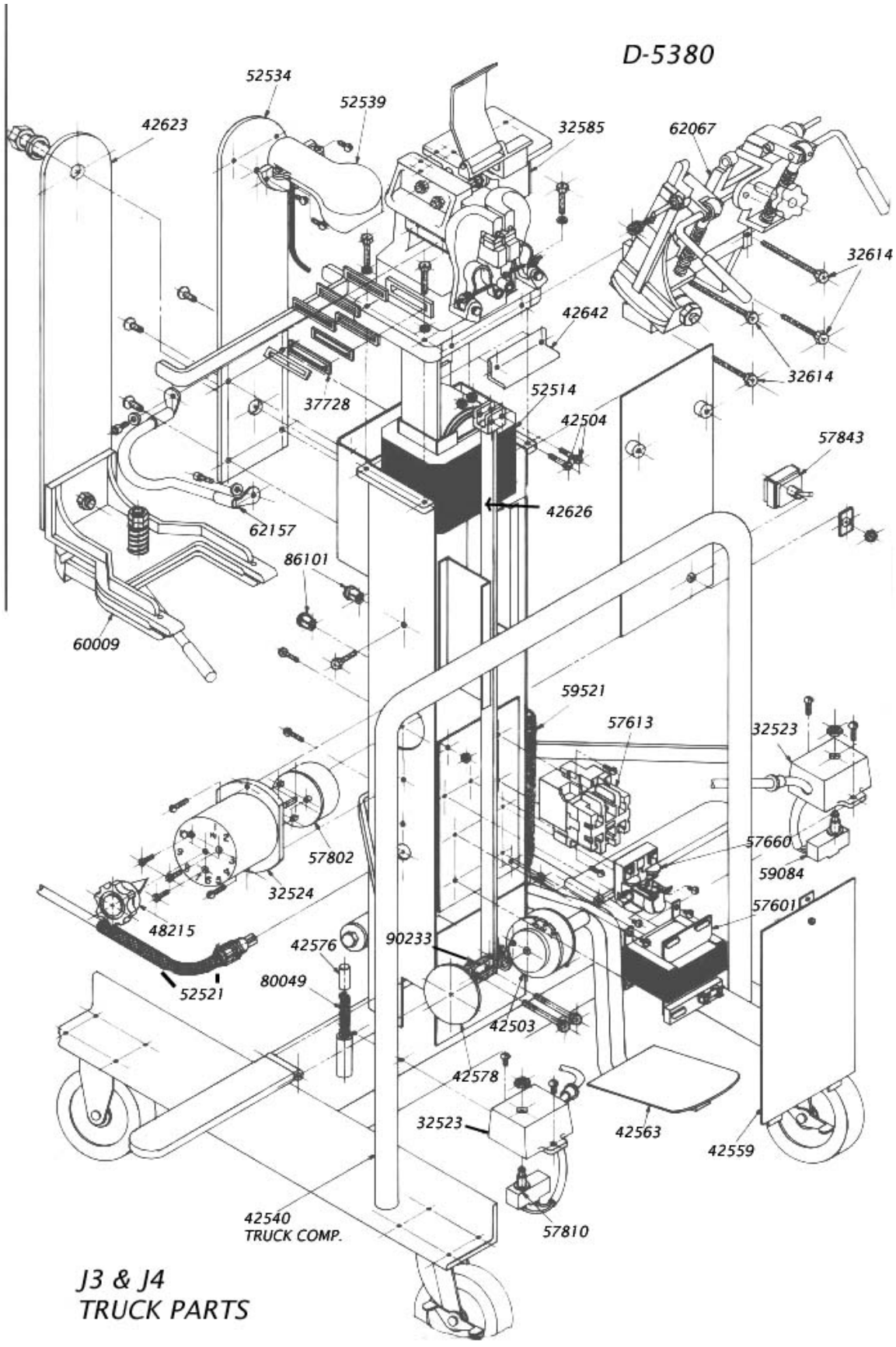


FIGURE 12


CLEVIS
CAP
ADJ. KNOB
CLEVIS STUD
PISTON
ADJ. KNOB TENSION SPRING
ADJ. SCREW
INSULATION WASHER
SUCTION WASHER
SUCTION SPRING
RETAINING WASHER
INSULATION TUBE
HYDRAULIC BODY
OIL FILLER
HYDRAULIC CYLINDER ASSEMBLY
NOTE: USE SINCLAIR DURO-150 OIL OR EQUIVALENT.
MICRO PRODUCTS COMPANY
MODEL J-4 HYDRAULIC CYLINDER ASSEMBLY & PARTS
D-5545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60009
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32523
57802
57660
59084
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48215
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TRUCK COMP.
57810
J3 & J4
TRUCK PARTS

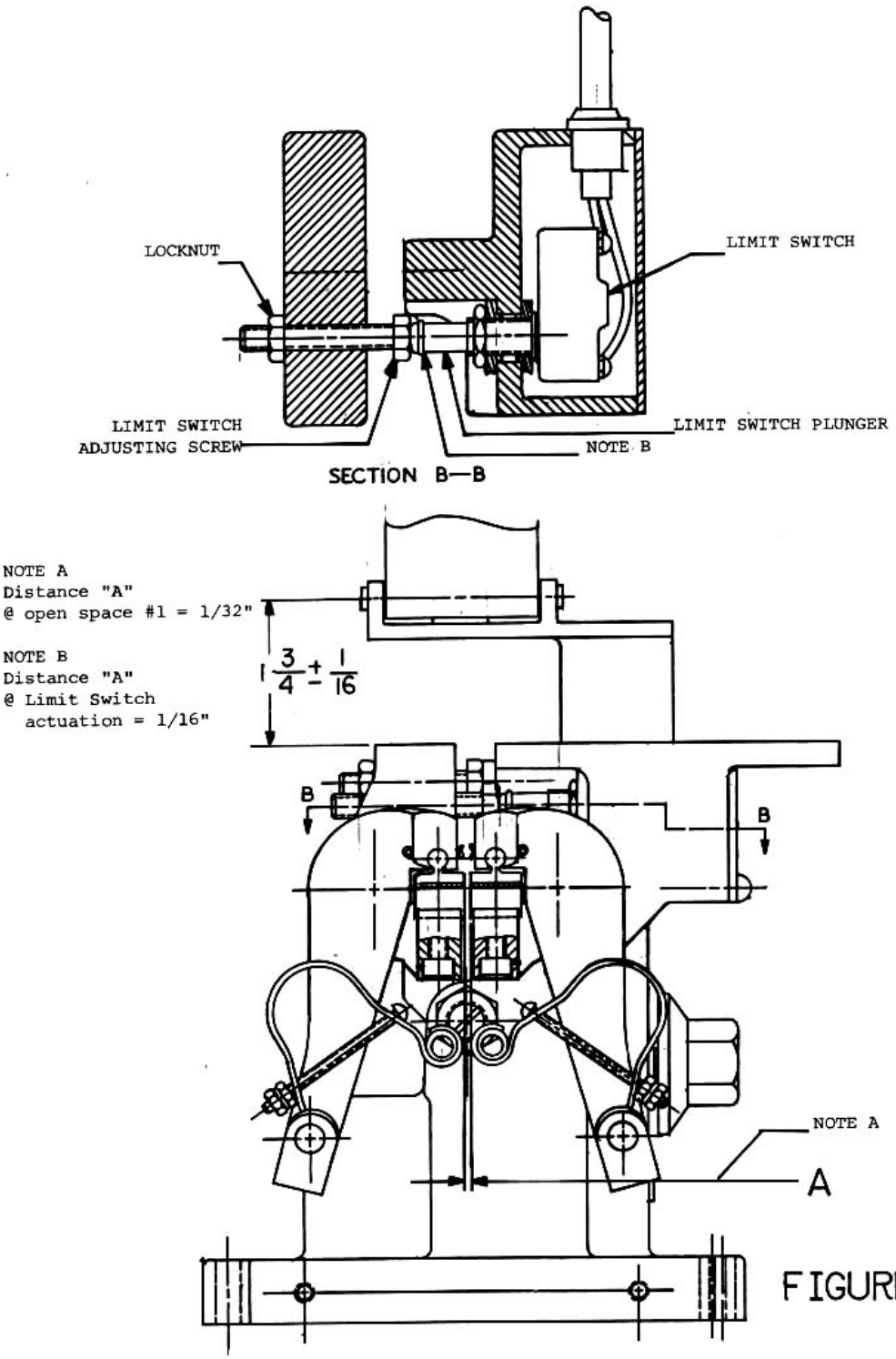

LOCKNUT
LIMIT SWITCH
LIMIT SWITCH ADJUSTING SCREW
LIMIT SWITCH PLUNGER
NOTE B
SECTION B—B
NOTE A
Distance "A"
@ open space #1 = 1/32"
NOTE B
Distance "A"
@ Limit Switch
actuation = 1/16"
1 3/4 ± 1/16
B
B
NOTE A
A

FIGURE 4

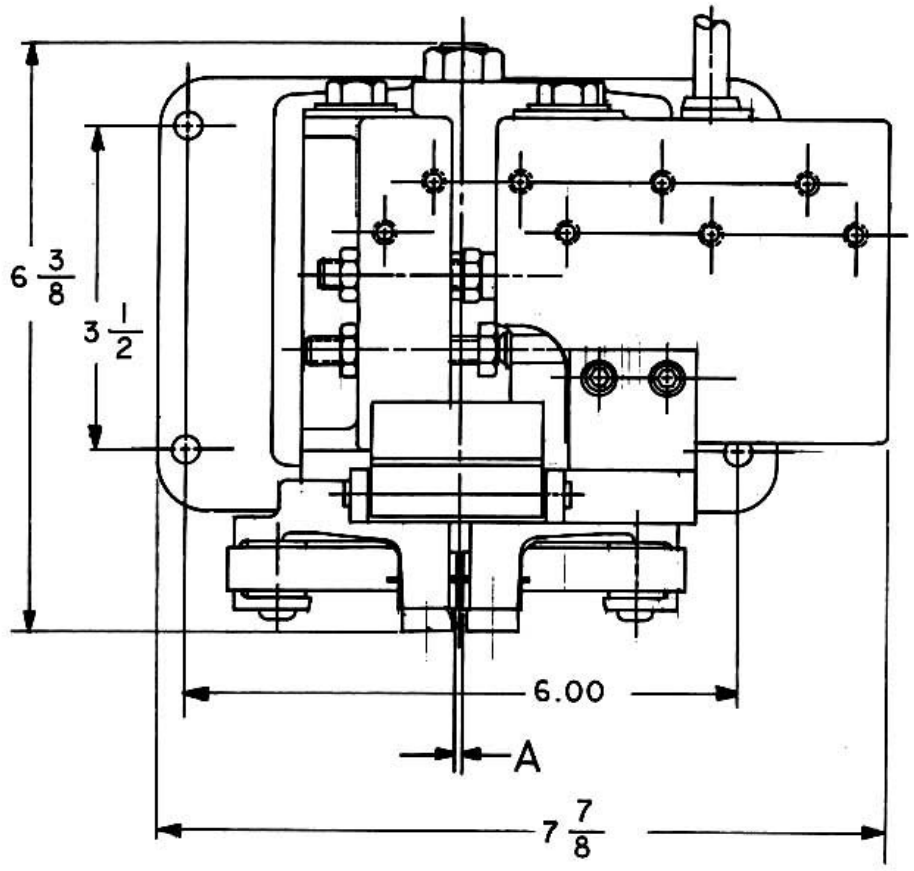
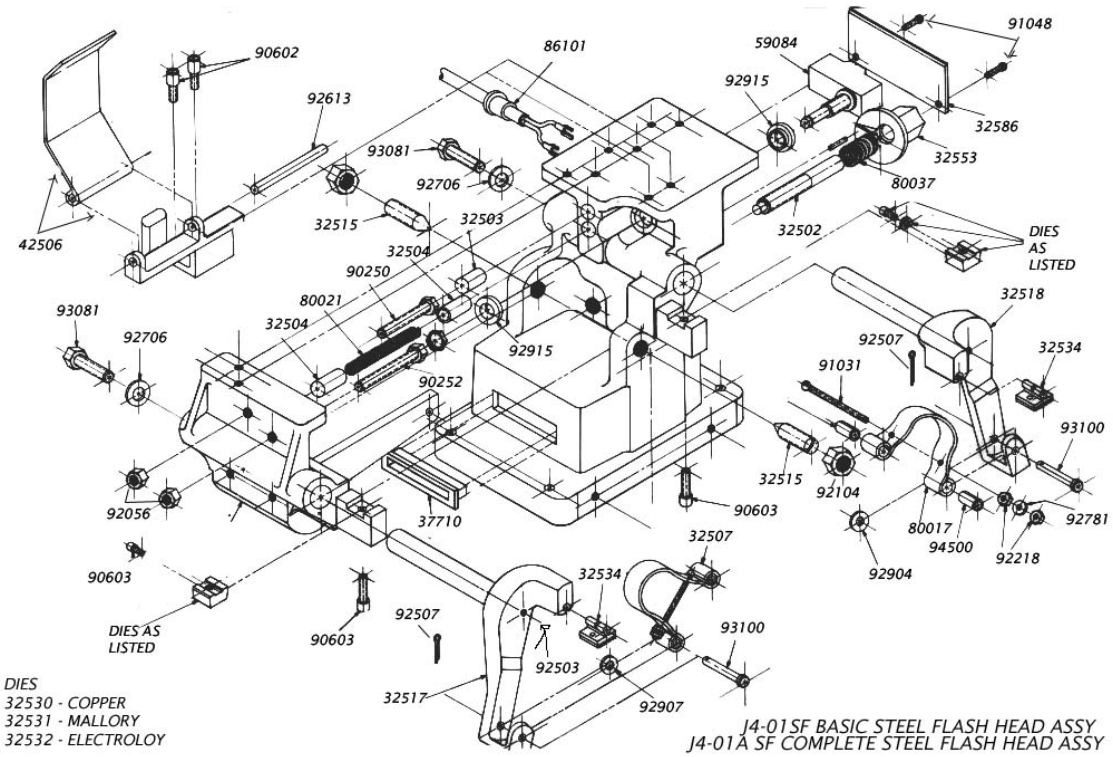
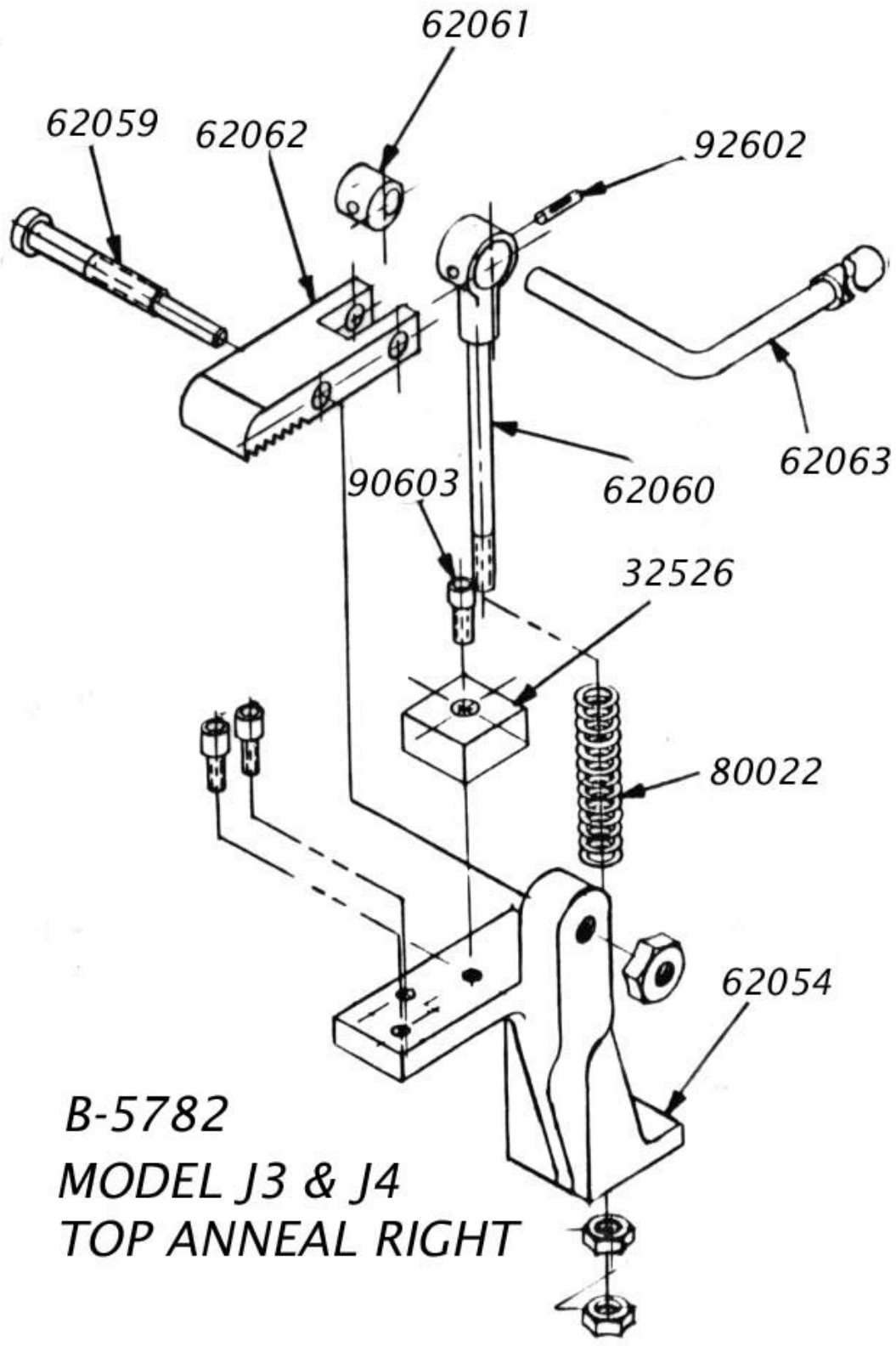


FIGURE 5



DIES
32530 - COPPER
32531 - MALLORY
32532 - ELECTROLOY

J4-01SF BASIC STEEL FLASH HEAD ASSY
J4-01A SF COMPLETE STEEL FLASH HEAD ASSY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MODEL J3 & J4
TOP ANNEAL RIGHT