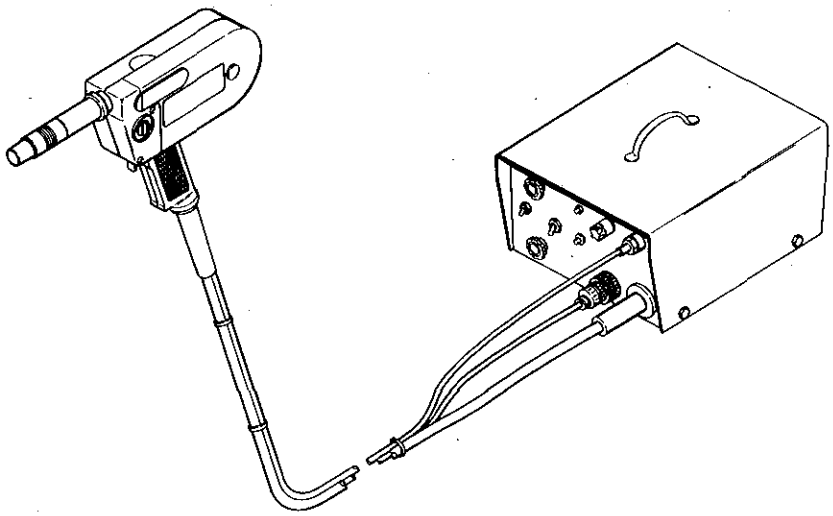
October 1976 FORM: OM-1210

Effective with Serial No. HG000590

MODEL	STOCK NO.
Spoolmatic IC (Gun & Control)	
.030" Wire	000 392
.035"/.045" Wire	000 394
1/16" Wire	000 395
Spoolmatic IC/S (Gun & Control W/Spot)	
.030" Wire	000 405
.035"/.045" Wire	000 406
1/16" Wire	000 407



MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

OWNER'S MANUAL

MILLER ELECTRIC MFG. CO.
APPLETON, WISCONSIN, USA 54911

NWSA CODE NO. 4579

PRINTED IN U.S.A.

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EFFECTIVE: NOVEMBER 1, 1976

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2. Original main power rectifiers . . . . . 3 years
3. All welding guns and feeder/guns . . . . . 90 days
4. All other Millermatic Feeders . . . . . 1 year

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ERRATA SHEET

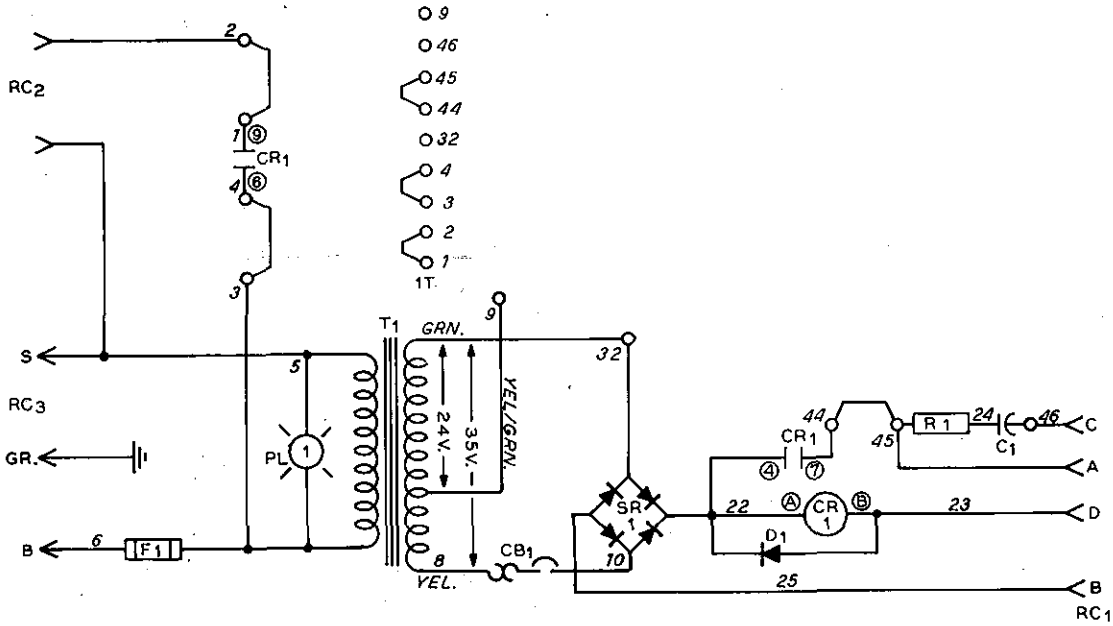
After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 6 – TROUBLESHOOTING

NOTE

The circuit diagram(s) on this supplement replace any other circuit diagram(s) appearing later in this manual.

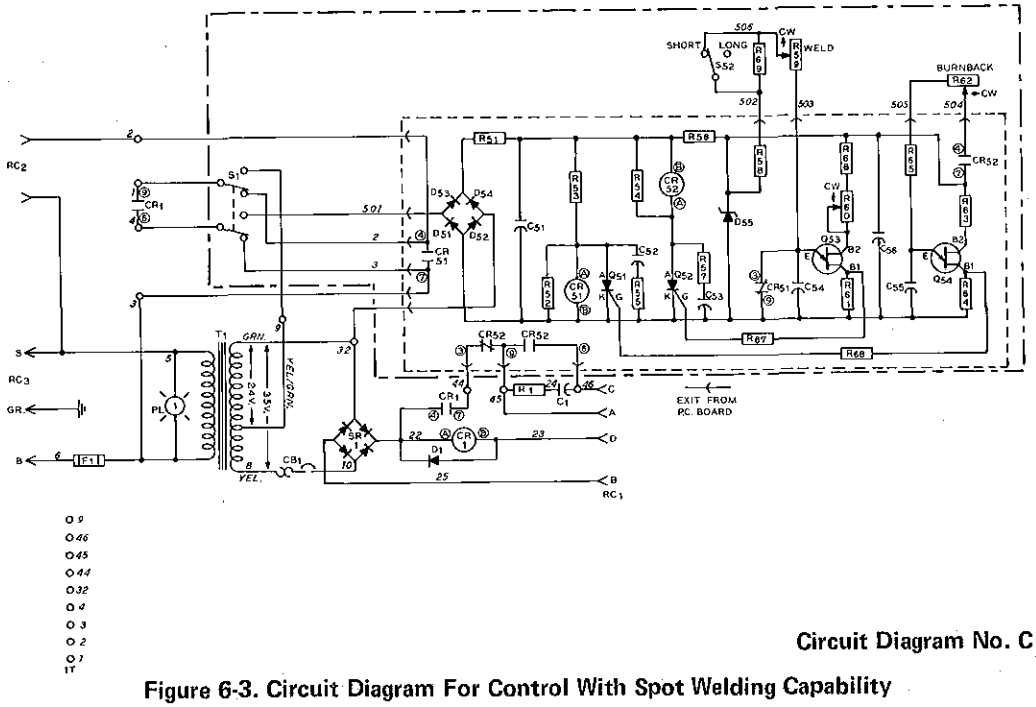
Amend Figure 6-2 as follows:



Circuit Diagram No. CA-000 396-1B1

Figure 6-2. Circuit Diagram For Control Without Spot Welding Capability

Amend Figure 6-3 as follows:



Circuit Diagram No. CB-000 398-1B1

Figure 6-3. Circuit Diagram For Control With Spot Welding Capability

Item No.	Part No. Listed In Parts List	Replaced With Part No.	Description	Quantity Model .8MM .031 .030"	.9/1.2MM .035/.047 .035"/.045"	1.6MM .063 1/16"
45	058 449	009 541	ADAPTER, barrel	1	1	1
46	604 612	604 612	SCREW, set - steel socket hd 8-32 x 1/8 (qty. change)	3	3	3
		604 771	SCREW, set - steel socket hd 10-32 x 1/8	4	4	4
57	005 206	008 837	CASE, right hand (Eff with S/N HH010115)	1	1	1
83	058 474	053 131	ROLL, drive - V - groove knurled 0.030 - 1/16 wire (Eff with S/N HH097788)	1	1	1
88	605 987	008 033	WASHER, flat - felt 15/64 ID x 1/2 OD x 1/8	2	2	2
119	005 177	052 407	STRAIN RELIEF, cable	1	1	1

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

Electrode Wire Dia. Capability	Electrode Wire Feed Speed	Control Circuit Voltage at Gun	Dimensions			Weight (Pounds)	
			Height	Width	Depth	Net	Ship
.030"-1/16"	80-950	35 Volts DC	9-1/2"	2-7/8"	15-7/8"	16	20

Gun/Feeder

Input Voltage	Dimensions			Weight (Pounds)	
	Height	Width	Depth	Net	Ship
115 Volts AC	7-5/16"	10-5/16"	12-1/2"	17	20

Control

Figure 1-1. Specifications

1-1. GENERAL

This manual has been prepared especially for use in familiarizing personnel with the design, installation, operation, maintenance, and troubleshooting of this equipment. All information presented herein should be given careful consideration to assure optimum performance of this equipment.

1-2. RECEIVING-HANDLING

Prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading and freight bill will be furnished by the carrier on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and/or Stock Number and Serial (or Style) Numbers of the equipment be supplied.

1-3. DESCRIPTION

This control and gun/feeder is of the constant wire feed speed type and is designed to be used in conjunction with a constant potential welding power source.

1-4. NOMENCLATURE

The word control will hereafter be used in this manual to designate both the WELD CONTROL and also the SPOT WELD CONTROL. Further distinction between these two models will be made as necessary. The word gun/feeder will hereafter be used in this manual to designate the self-contained feeder-gun combination.

1-5. SAFETY

The following definitions apply to CAUTION, IMPORTANT, and NOTE blocks found throughout this manual:

CAUTION

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may create a hazard to personnel.

IMPORTANT

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may result in damage to equipment.

NOTE

Under this heading, explanatory statements will be found that need special emphasis to obtain the most efficient operation of the equipment.

SECTION 2 - INSTALLATION

CAUTION

Ensure that the 115 volts ac power supply is de-energized before installation procedures are begun.

2-1. LOCATION

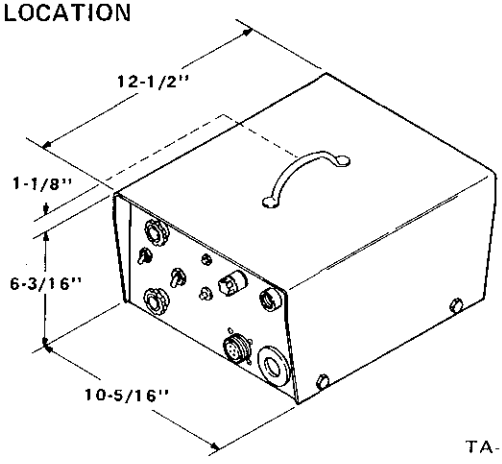


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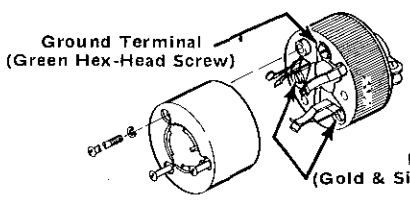
Figure 2-1. Control Dimensional View

Refer to Figure 2-1 for dimensional information on the control. Lead lengths must be considered when installing the control. If the welding power source can be located near the work area, the control can usually be located on top of the welding power source.

2-2. 115 VOLTS AC CONNECTIONS (Figures 2-2 & 2-3)

Attach one end of the 115 volts power cable to the supplied 3 prong female plug as shown in Figure 2-2. It is recommended that a 16/3 conductor cable be used as the 115 volts power cable. After attachment of the 115 volts plug to the 115 volts power cable is complete, insert the 115 volts plug fully into the 115 VOLTS AC receptacle on the rear panel of the control and rotate the 115 volts plug as far as it will turn in a clockwise direction. This rotating action will lock the plug in the receptacle and prevent the plug from pulling out should tension be applied to the 115 volts power cable. Connect the remaining end of the 115 volts power cable to a 115 volts ac 60 hertz power supply.



TA-056 179-10

Figure 2-2. 115 Volts AC Plug Installation

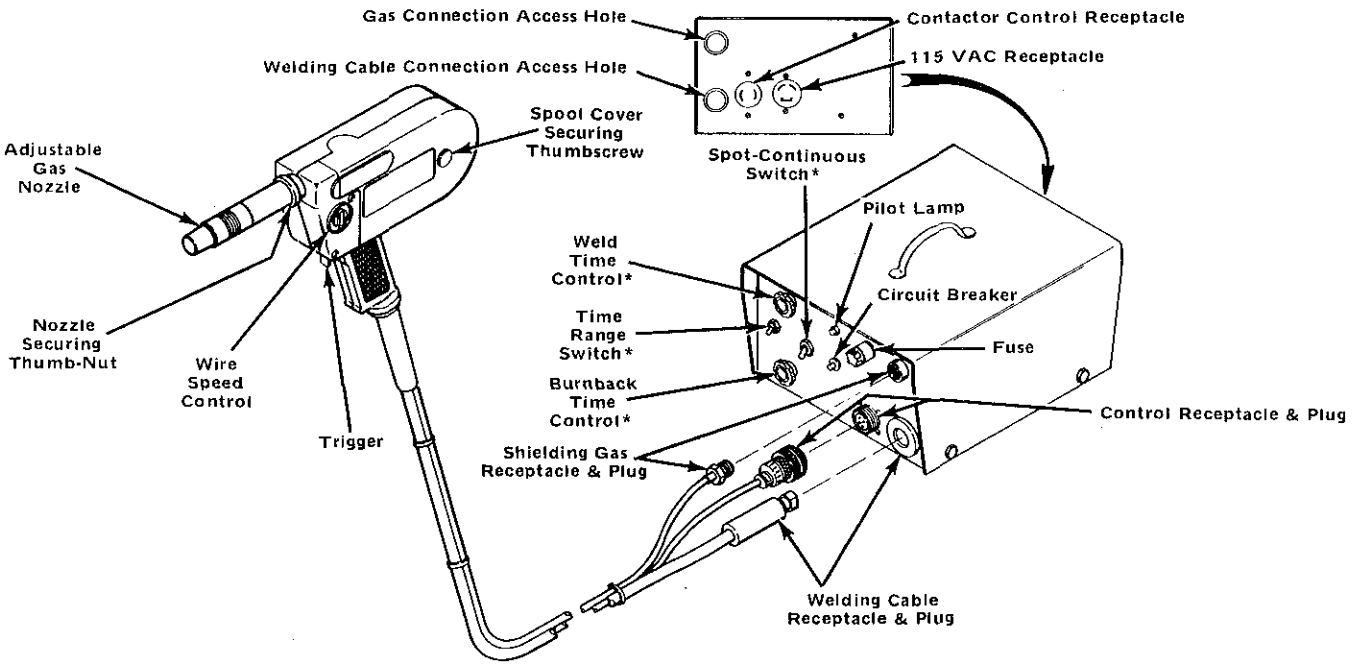


Figure 2-3. Control & Gun/Feeder

2-3. CONTACTOR CONTROL CONNECTIONS (Figure 2-3)

A. Contactor Operation (115 volts ac) From Control

Attach one end of the contactor control cable to the supplied 2 prong male plug. It is recommended that a 16/2 conductor cable be used for the contactor control cable. After attachment of the contactor control plug to the contactor control cable is complete, insert the contactor control plug fully into the CONTACTOR CONTROL receptacle on the rear panel of the control and rotate the contactor control plug as far as it will turn in a clockwise direction. This rotating action will lock the plug in the receptacle and prevent the plug from pulling out should tension be applied to the contactor control cable. Attach the remaining end of the contactor control cable to the contactor control connection point on the welding power source.

B. Contactor Operation (115 volts ac) From Welding Power Source

For a welding power source which requires a continuity set of contacts for Contactor Control, proceed as follows:

CAUTION

The contactor cable must be routed through the access hole on the back of the control. Do not use the Contactor Control receptacle.

1. Models Without Spot Welding Capability

   Remove the jumper links between terminals 1 and 2, and between terminals 3 and 4 on terminal strip 1T. Connect leads from the welding power source Contactor Control cable to terminals 1 and 4 (on terminal strip 1T).

2. Models With Spot Welding Capability

   Remove, adequately tape, and secure lead No. 3 from terminal 3 on terminal strip 1T (side coming from fuse). Connect leads from welding power source Contactor Control cable to terminals 2 and 3 (on terminal strip 1T).

2-4. SHIELDING GAS AND WELD CABLE INSTALLATION

The control cover must be removed to gain access to the weld cable terminal and shielding gas connection. This cover may be removed by removing the four 1/4-20 screws located on the bottom portion of the left and right cover sides. (See Figure 2-3.)

A. Shielding Gas Connections (Figure 2-3)

Determine the distance the control is to be located from the welding power source and then connect a hose from the shielding gas regulator- flowmeter on the shielding gas supply. Insert the other end of the shielding gas hose in the control back panel upper left hole. Install the barbed gas connector onto this end of the shielding gas hose. Secure the threaded portion of the barbed connector to the control gas connector. This connection has a right-handed thread.

The shielding gas hose which comes from the gun/feeder is to be attached to the shielding gas connector, labeled GAS, on the front panel of the control. This connector has right-handed threading.

B. Welding Cable Connections (Figure 2-3)

Insert the welding cable (from the welding power source) in the control back panel lower left hole. Remove the control welding cable terminal hardware. Slip the welding cable connector over the control welding cable terminal stud. To prevent the cable connector from touching any control components, route the cable so that the cable connector is towards the top of the control. Replace the control welding cable terminal hardware and secure the nut.

IMPORTANT

Ensure that the weld cable terminal is kept clean at all times. Also ensure that the nut on this terminal is secure. If either one of the above conditions is not met, erratic weld current could result.

The welding cable from the gun/feeder must be connected to the control welding cable receptacle, located on the control front panel. Insert the welding cable connector fully into the control welding cable receptacle with the flat side of the connector facing the receptacle key. Rotate the connector clockwise one-quarter turn. This rotating action will secure the connector in the receptacle.

Replace the control cover and its associated hardware.

2-5. CONTROL CONNECTIONS (Figure 2-3)

A four-socket receptacle is provided on the front panel of the control for making control connections. When the switch connected across this receptacle is closed, the contactor in the welding power source will energize, shielding gas will flow, and wire will begin to feed.

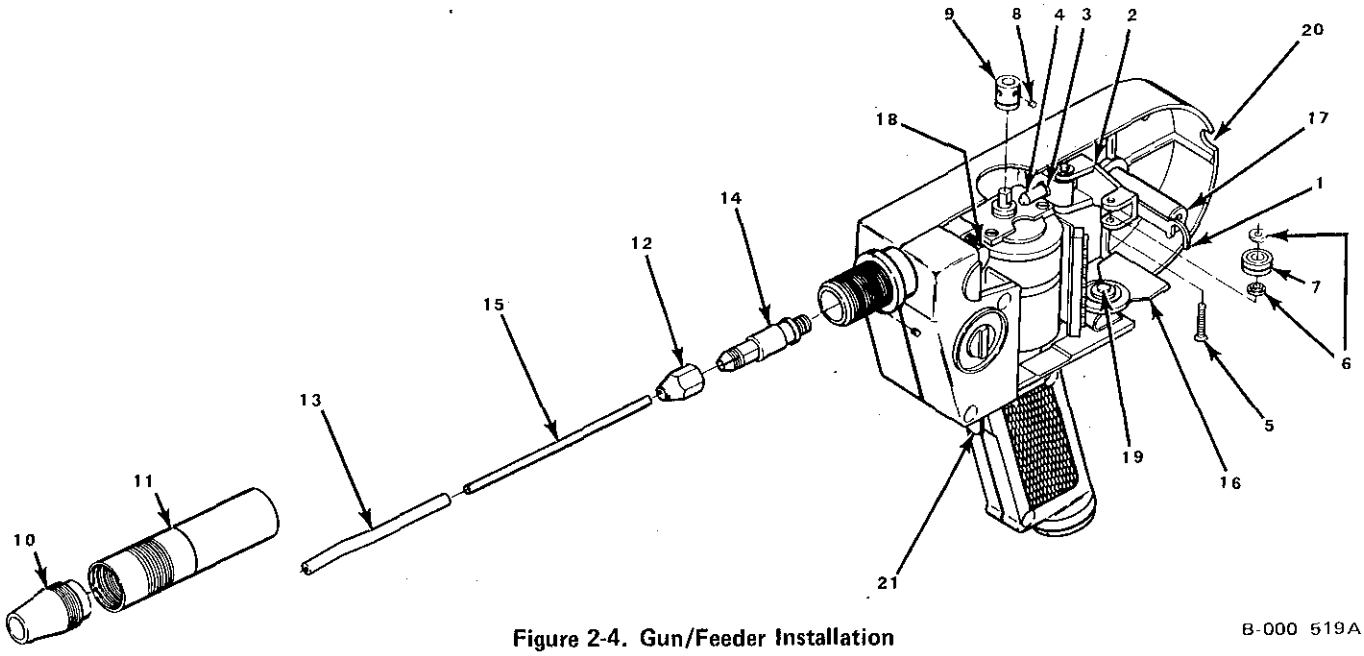


Figure 2-4. Gun/Feeder Installation B-000 519A

Insert the four-pin plug from the gun/feeder into the four-socket receptacle, located on the control front panel. Rotate the plug threaded collar clockwise onto the receptacle threaded body as far as possible. This rotating action will secure the plug in the receptacle.

2-6. INLET WIRE GUIDE & DRIVE ROLL INSTALLATION (Figures 2-3 & 2-4)

As a result of wear, replacement of the gun/feeder inlet wire guide and/or drive rolls with their associated components may become necessary. Having obtained the replacement parts, proceed to the following installation instructions:

A. Disassembly

1. Remove the spool cover by first loosening the spool cover securing thumbscrew. (See Figure 2-3).
2. Pivot the tension arm (Item 1, Figure 2-4) upward and pivot the mounting arm (2) outward.
3. Retract the welding wire onto the welding wire spool.
4. Slip the ring retainer (3) off the inlet guide (4).
5. Remove the inlet guide (4) by pushing the inlet guide towards the rear of the gun/feeder.
6. Remove the screw (5), two shoulder washers (6), and drive roll bearing (7).
7. Loosen the two set-screws (8) in the drive roll (9) and remove the drive roll. The hex-key used for removing the set-screws (8) may also be used as a lever to position the set-screws in a more accessible location.

B. Assembly and Alignment

1. Replace the drive roll (9), but do not tighten the two set-screws (8) at this time.
2. Proceed with assembly by reversing steps A2 thru A6, omitting step A3.
3. Sight through the inlet guide (4) to the drive rolls.
4. Position the drive roll (9) vertically until the drive roll groove aligns with the drive roll bearing (7) groove. Retain the drive roll (9) in this position until the following steps are completed.
5. Pivot the tension arm (1) upward and pivot the mounting arm (2) outward.
6. Tighten the two set-screws (8) in the drive roll (9). Ensure that one of the two set-screws coincides with the flat spot on the drive roll (9) shaft.
7. Ensure that the drive rolls are aligned by again sighting through the inlet guide to the drive rolls. If necessary, repeat steps B4 thru B6.
8. Replace the spool cover and associated thumbscrew.

2-7. CONTACT TUBE, NOZZLE, AND LINER INSTALLATION (Figures 2-3 & 2-4)

As a result of wear or change of welding wire size, replacement of the contact tube, nozzle, and liner, with their associated components, may become necessary. Having obtained the replacement parts, proceed to the following installation instructions:

A. Disassembly

1. Remove the spool cover by first loosening the spool cover securing thumbscrew. (See Figure 2-3.)
2. Pivot the tension arm (Item 1, Figure 2-4) upward and pivot the mounting arm (2) outward.
3. Remove the nozzle (10) and nozzle extension (11).
4. Loosen the contact tube securing compression nut (12) until the contact tube (13) may be pulled out.
5. Manually feed the welding wire out through the contact tube adapter (14). The liner (15) should ride the outgoing welding wire. Remove the liner when the tip of the liner becomes accessible.

B. Assembly

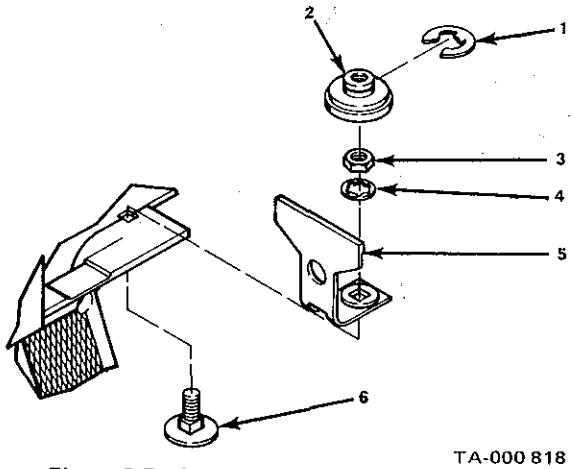
1. Proceed with assembly by reversing steps A1 thru A5. Ensure that the contact tube (13) butts tight against the adapter (14) internal flange.

C. Contact Tube Securing Nut Tool

A tool similar to a screwdriver is included with this unit to aid in the replacement of the contact tube and liner, without having to remove the gas nozzle or the gas nozzle extension. To utilize this tool, follow the instructions given in Section 2-7A, steps 1 thru 5, omitting step 3. In lieu of step 3, insert the tool over the contact tube (Item 13, Figure 2-4) until the tool key engages the contact tube securing compression nut (12) key-way. Rotate the tool counterclockwise until the contact tube (13) is free.

2-8. SPOOL BRAKE INSTALLATION (Figures 2-3, 2-4, & 2-5)

As a result of wear, replacement of the gun/feeder spool brake with its associated components may become necessary. Having obtained the replacement parts, proceed to the following installation instructions:



TA-000 818

Figure 2-5. Spool Brake Installation

A. Disassembly

1. Remove the spool cover by first loosening the spool cover securing thumbscrew. (See Figure 2-3 for location of thumbscrew.)
2. Pivot the tension arm (Item 1, Figure 2-4) upward and pivot the mounting arm (2) outward.
3. Retract the welding wire onto the welding wire spool and remove the spool.
4. Locate the spool brake (Item 16, Figure 2-4).
5. Slip the ring retainer (Item 1, Figure 2-5) off the thumb-nut (2).
6. Remove the thumb-nut (2) by rotating the thumb-nut counterclockwise.
7. Lift the top of spool brake (5) off the bolt (6).
8. Remove the nut (3), star-washer (4), and spool brake (5) off the bolt (6).
9. Remove the bolt (6) by gently tapping on the tip of the bolt shank, if necessary.

B. Assembly

1. Proceed with assembly by reversing steps A5 thru A9 ensuring that the bolt (Item 6, Figure 2-5) square shoulder is mated completely with its associated square hole. The head of this bolt may be tapped gently, if necessary, to assure that the bolt butts completely against the gun/feeder body. Ensure also that the spool brake (5) square hole mates properly with the bolt (6) square shoulder and that the wide portion of the spool brake (5) is toward the front of the gun/feeder prior to slipping it over the bolt (6) shank.

2-9. WELDING WIRE SPOOL INSTALLATION & WELDING WIRE THREADING (Figures 2-3 & 2-4)

For various reasons it will become necessary to install the gun/feeder welding wire spool and thread the welding wire through the gun/feeder. Ensure that the liner (Item 15, Figure 2-4) and contact tube (13) corresponds with the size welding wire that is on the welding wire spool to be installed. If replacement of the liner (15) and contact tube (13) is deemed necessary, refer to Section 2-7; otherwise proceed with the following instructions:

A. Disassembly

1. Remove the spool cover by first loosening the spool cover securing thumbscrew. (See Figure 2-3.)
2. Pivot the tension arm (Item 1, Figure 2-4) upward and pivot the mounting arm (2) outward.
3. Retract the welding wire (if any) onto the welding wire spool and remove the welding wire spool (if any).

B. Assembly & Threading

1. Install the welding wire spool onto the spool hub (Item 17, Figure 2-4). The spool brake (16) will have to be deflected somewhat by the welding wire spool lip to effect spool installation. Ensure that the welding wire spool is oriented such that the welding wire protrudes over the top of the welding wire spool. (When the welding wire spool is oriented thusly, the manufacturer's spool label will usually be visible.)
2. Cut off any piece of the welding wire that is not straight or is deformed.
3. Route the welding wire into the inlet guide (4), through the drive rolls (7 & 9), into the liner (15), into the contact tube (13), and out past the contact tube tip to a suitable welding wire length.
4. Pivot the mounting arm (2) inward and pivot the tension arm (1) downward over the drive roll tension adjustment thumb-nut (18). Ensure that the welding wire lies between the drive rolls (7 & 9) grooves.
5. Replace the spool cover and its associated securing thumbscrew.

SECTION 3 - FUNCTION OF CONTROLS

3-1. GUN/FEEDER CONTROL

A. Pilot Lamp (Figure 2-3)

The PILOT lamp will be illuminated whenever 115 volts ac is applied to the control via the 115 VAC cord, plug, and receptacle.

B. Circuit Breaker (Figure 2-3)

A circuit breaker (CB1), located on the control front panel, provides protection to the control and gun/feeder. In the event the control or gun/feeder should be placed in an overload condition, the breaker would trip and suspend all welding operations. It should be noted, however, that the PILOT lamp will be illuminated and that the contactor control circuitry will be active despite this breaker being tripped. Should this breaker trip, the reset button would have to be manually depressed in order to reset the circuit breaker.

C. Fuse (Figure 2-3)

A five ampere fuse (F1) protects the control and gun/feeder circuitry by interrupting the incoming 115 VAC current should an overload condition develop. Should this fuse open, both the control and the gun/feeder would be completely inoperative. To replace this fuse, depress and rotate counterclockwise the fuse holder cover. Pull out the fuse when the fuse holder cover is free.

IMPORTANT

When replacing fuse (F1), ensure that the fuse being used as a replacement is one of proper size and rating. A fuse of larger rating will permit overloading of the 115 volts circuitry and thereby may cause damage to the welding power source, control, or gun/feeder.

D. Spot Continuous Switch (Spot Models Only) (Figure 2-3)

By placing this switch in the CONTINUOUS position, the control and gun/feeder will operate in a manner conducive to continuous welding. By placing this switch in the SPOT position, the control and gun/feeder will operate in a manner conducive to spot welding.

E. Time Range Switch (Spot Models Only) (Figure 2-3)

The TIME RANGE switch provides selection of two spot weld time ranges. In the upper position, this switch provides an adjustable spot weld time range of .2 to 2.5 seconds through the setting of the WELD TIME control. In the lower position, this switch allows the WELD TIME control to select a spot weld time range of between 2.5 to 5 seconds.

F. Weld Time Control (Spot Models Only) (Figure 2-3)

The WELD TIME control provides for adjustable spot weld times in two ranges (.2 to 2.5 seconds and 2.5 to 5 seconds) through selection of the TIME RANGE switch.

G. Burnback Time Control (Spot Models Only) (Figure 2-3)

The BURNBACK TIME control provides a means of adjusting the time period (up to a maximum of .25 second) that the welding wire remains electrically energized after the welding wire has stopped. This is to permit proper separation of the welding wire from the spot weld puddle.

NOTE

The scales surrounding the BURNBACK TIME and WELD TIME controls are calibrated in percentage and should not be misconstrued as an actual time period.

3-2. GUN/FEEDER

A. Wire Speed Control (Figure 2-3)

The WIRE SPEED control provides a means of determining the rate at which welding wire will be fed into the weld. Rotating the WIRE SPEED control in a clockwise direction will increase the rate of the wire feed.

The scale surrounding the WIRE SPEED control is calibrated arbitrarily and should not be misconstrued as an amperage or voltage reading. It is recommended that the meters be read whenever it is necessary to know the amperage or voltage output.

NOTE

The contacts of the WIRE SPEED control are of the continuous type, thereby making it possible to adjust this control while welding.

B. Shielding Gas Nozzle Adjustment (Figure 2-3)

Rotating the nozzle extension either clockwise or counterclockwise will yield various degrees of contact tube protrusion or recession as compared to the nozzle. Full counterclockwise rotation will yield about 1/4" contact tube recession beneath the nozzle. Full clockwise rotation will yield about 1/16" contact tube protrusion beyond the nozzle. Rotate the nozzle extension locking collar counterclockwise against the nozzle to lock the nozzle in the desired position and also to provide an insulating cover over the nozzle extension.

CAUTION

Ensure that the nozzle extension locking collar is always butted against the nozzle extension and that the nozzle extension is not rotated too far counterclockwise, lest the nozzle extension adapter should become exposed.

C. Spool Brake Adjustment (Figure 2-4)

Rotating the spool brake adjustment thumb-nut (Item 19, Figure 2-4) counterclockwise (as viewed from the top) will increase the braking pressure on the welding wire spool. Similarly, rotating the spool brake adjustment thumb-nut clockwise will decrease the braking pressure on the welding wire spool. Adjust this thumb-nut just so that the welding wire spool has no backlash in operation.

IMPORTANT

Excessive brake pressure on the spool may cause the premature wear of gun/feeder components.

D. Drive Roll Tension Adjustment (Figure 2-4)

Rotating the drive roll tension adjustment thumb-nut (Item 18, Figure 2-4) clockwise will increase the drive roll tension on the welding wire. Similarly, rotating the drive roll tension adjustment thumb-nut counterclockwise will decrease the drive roll tension on the welding wire. Adjust the drive roll tension on the welding wire just until drive roll slippage on the welding wire ceases.

IMPORTANT

Excessive drive roll tension may result in premature gun/feeder component wear and also welding wire deformation.

E. Welding Wire Spool Sight Hole (Figure 2-4)

By sighting through the welding wire spool sight hole, the supply of welding wire on the welding wire spool may be observed.

F. Trigger (Figure 2-4)

When the trigger (Item 21, Figure 2-4) is depressed fully the welding power source contactor will be energized, shielding gas flow will commence, and welding wire will begin to be fed to the weldment. Shielding gas pre-flow and post-flow may be obtained by not depressing the trigger fully, but rather only partially, at the beginning and end of the welding operation.

SECTION 4 - SEQUENCE OF OPERATION

4-1. GAS METAL-ARC (GMAW) WELDING—CONTINUOUS

1. Make all connections as instructed in Section 2.
2. Place the control SPOT/CONTINUOUS switch in the CONTINUOUS position. (Spot Models Only).
3. Rotate the gun/feeder WIRE SPEED control to the desired setting.
4. Energize the welding power source and control.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

5. Hold the tip of the gun approximately 1/2 inch from the workpiece.
6. Depress the gun/feeder trigger. Gas will start to flow and wire will start to be fed if drive roll pressure is properly adjusted to prevent slippage. If wire slippage is noticed, tighten the drive roll tension adjustment thumb-nut 1/2 turn clockwise. Repeat until slippage stops. Do not tighten thumb-nut too much.

CAUTION

The welding wire and all metal parts in contact with it are energized while welding. Do not touch the welding wire or any metal part making contact with it.

4-2. GAS METAL-ARC (GMAW) WELDING—SPOT (Spot Models Only)

1. Recheck to assure proper connections have been made in accordance with Section 2.

2. Place the control SPOT/CONTINUOUS switch in the SPOT position.

3. Position control TIME RANGE switch to appropriate time range desired.

4. Adjust control WELD TIME control to setting desired within time range selected by TIME RANGE switch.

5. Adjust control BURNBACK TIME control to proper burnback setting.

6. Rotate the gun/feeder WIRE SPEED control to the desired setting.

7. Install the appropriate shielding gas spot welding nozzle on the gun/feeder as instructed in Section 2-7.

8. Energize the welding power source and control.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

9. Position the gun/feeder on the workpiece.

10. Depress the gun/feeder trigger. Gas will start to flow and wire will start to be fed if drive roll pressure is properly adjusted to prevent slippage. If wire slippage is noticed, tighten the drive roll tension adjustment thumb-nut 1/2 turn clockwise. Repeat until slippage stops. Do not tighten thumb-nut too much.

CAUTION

The welding wire and all metal parts in contact with it are energized while welding. Do not touch the welding wire or any metal part making contact with it.

NOTE

Once the gun/feeder trigger is closed, and the WELD TIME control is activated, the gun/feeder trigger may be released, as it has no further influence until the control has completed a spot weld cycle and has reset itself for the next spot weld application. Should the gun/feeder trigger be released before the WELD TIME control is activated, however, the control will reset itself to the beginning of the spot weld sequence and the spot weld at the workpiece will have to be attempted once again.

11. Readjust the control TIME RANGE switch, WELD TIME control, BURNBACK control, and gun/feeder WIRE SPEED control as necessary.

    If the welding wire freezes in the weld puddle, the BURNBACK TIME control setting should be increased, thereby keeping the welding wire electrically energized for a longer period of time after wire feed has stopped. This, in turn, will permit the welding wire to burn free of the weld puddle. (See Figure 4-1.)

    If the welding wire freezes in the contact tube, the BURNBACK TIME control setting should be decreased. Decreasing the setting will permit the welding wire to be electrically energized for a lesser period of time thus permitting the welding wire to protrude from the contact tube at the conclusion of the weld. (See Figure 4-1.)

4-3. SHUTTING DOWN

1. Turn off the shielding gas at the source.
2. Remove the 115 volts ac plug from the source.
3. Turn off all associated equipment.

CAUTION

If welding is performed in a confined area, failure to turn off the shielding gas supply could result in a build-up of gas fumes, thereby endangering personnel reentering the welding area.

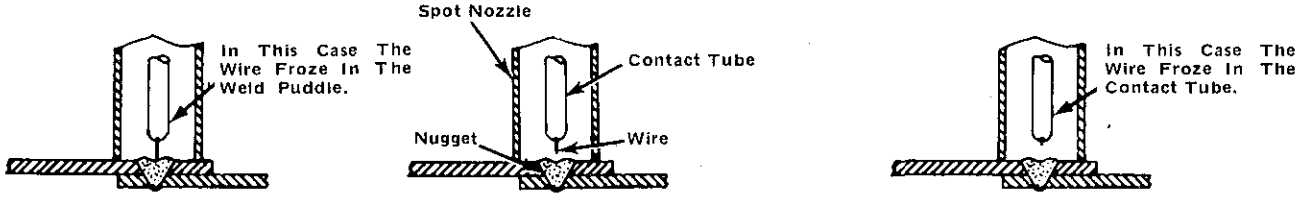


Figure 4-1. Burnback Settings

SECTION 5 - MAINTENANCE

CAUTION

Ensure that the 115 volts ac plug is disconnected from the control before attempting any inspection or work on the inside of the control or gun/feeder.

5-1. INSPECTION AND UPKEEP

Usage and shop conditions will determine the frequency and type of maintenance. Inspect equipment as follows:

1. Inspect control and gun/feeder for broken areas, cracks and loose parts: tighten, repair, and replace as required.
2. Carefully remove any weld spatter or foreign matter which may accumulate around the gun/feeder nozzle orifice. Use a hardwood stick, never a metal tool.
3. Repair or replace, as required, all hose and cable; give particular attention to frayed and cracked insulation and areas where it enters equipment.
4. Remove grease and grime from components; moisture from electrical parts and cable.
5. Blow out the gun/feeder wire guide liner with compressed air when changing wire. This will remove any metal chips and dirt that may have accumulated.

SECTION 6 - TROUBLESHOOTING

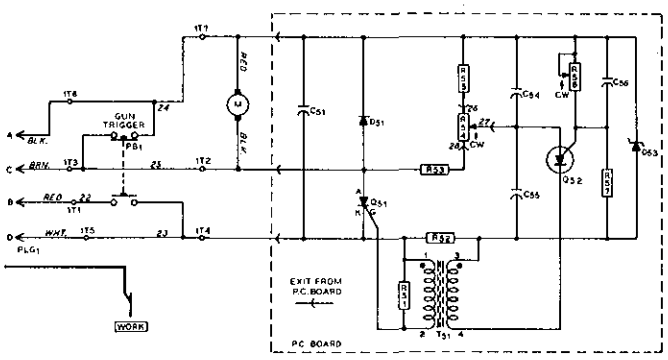
The following chart is designed to diagnose and provide remedies for some of the common troubles that may develop in this control and gun/feeder.

It is assumed that proper installation has been made, according to Section 3 of this manual, and that the control and gun/feeder has been functioning properly until this trouble developed.

Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly followed.

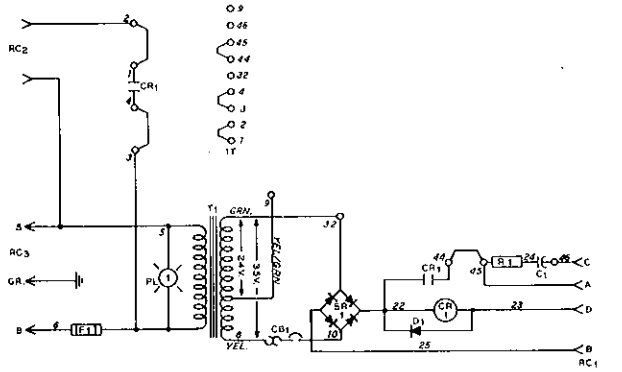
TROUBLE	PROBABLE CAUSE	REMEDY
Depressing gun/feeder trigger (PB1) will not energize feeder. Welding wire is not energized. Shielding gas does flow.	Circuit breaker (CB1) tripped.	Manually reset circuit breaker (CB1) by depressing the red button on the front panel of the control.
	Plug from gun/feeder trigger is not secure in control receptacle on control.	Secure plug in control receptacle.
	115 volts ac input plug is not secure in receptacle.	Insert plug fully into 115 vac receptacle and rotate plug 1/2 turn clockwise.
	115 volts input *fuse (F1) open.	Replace fuse, if open.
Wire feeds, shielding gas flows, but welding wire is not energized.	115 vac contactor control plug is not secure in contactor receptacle on welding power source.	Insert plug fully into receptacle and rotate plug 1/2 turn clockwise.
	Contactor control cable leads not secure on contactor plug terminals.	Secure leads to plug terminals.
	Defect in welding power source.	See Troubleshooting Section in welding power source instruction manual.
Wire feeds erratically.	Pressure on drive rolls is insufficient.	Rotate tension adjustment thumb-nut clockwise in 1/4 turn increments until wire slippage stops. (See Section 3-2D.)
	Worn drive roll.	Replace drive roll. (See Section 2-6.)
	Dirt in drive roll.	Clean drive roll. (See Section 2-6.)
	Excessive spool brake pressure.	Decrease spool brake pressure. (See Section 3-2C.)

*If it becomes necessary to replace any fuse in the control and gun/feeder, ensure that a fuse of the proper size is used.



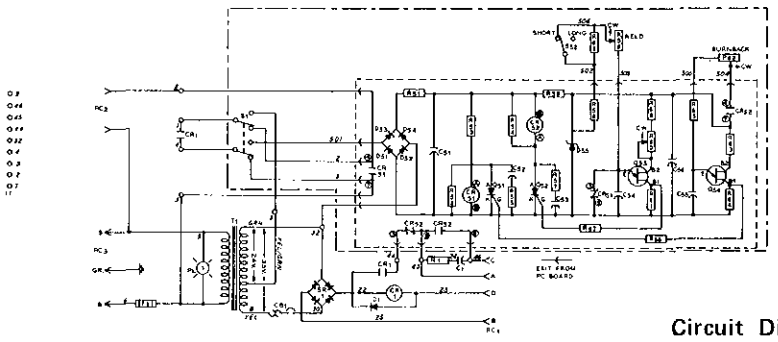
Circuit Diagram No. CA-000 259-1B

Figure 6-1. Circuit Diagram For Gun/Feeder



Circuit Diagram No. CA-000 396-1B

Figure 6-2. Circuit Diagram For Control Without Spot Welding Capability



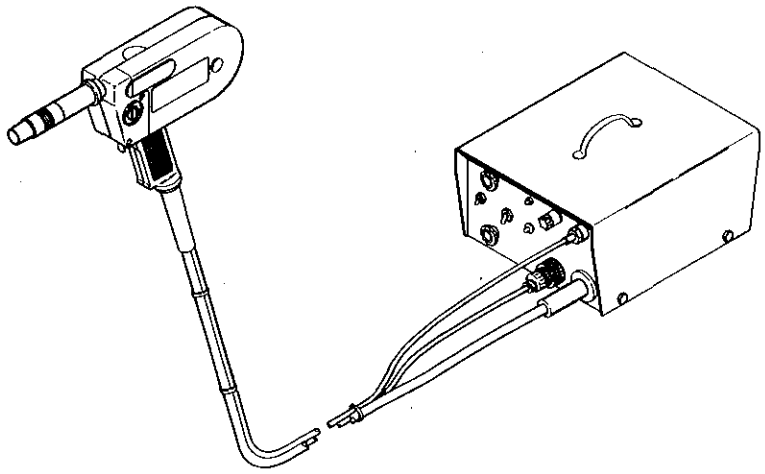
Circuit Diagram No. CB-000 398-1B

Figure 6-3. Circuit Diagram For Control With Spot Welding Capability

October 1976 FORM: OM-1210

Effective with Serial No. HG000590

MODEL	STOCK NO.
Spoolmatic IC (Gun & Control)	
.030" Wire	000 392
.035"/'045" Wire	000 394
1/16" Wire	000 395
Spoolmatic IC/S (Gun & Control W/Spot)	
.030" Wire	000 405
.035"/'045" Wire	000 406
1/16" Wire	000 407



MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

PARTS LIST

millerMatic®

MILLER ELECTRIC MFG. CO.
APPLETON, WISCONSIN, USA 54911

NWSA CODE NO. 4579

PRINTED IN U.S.A.

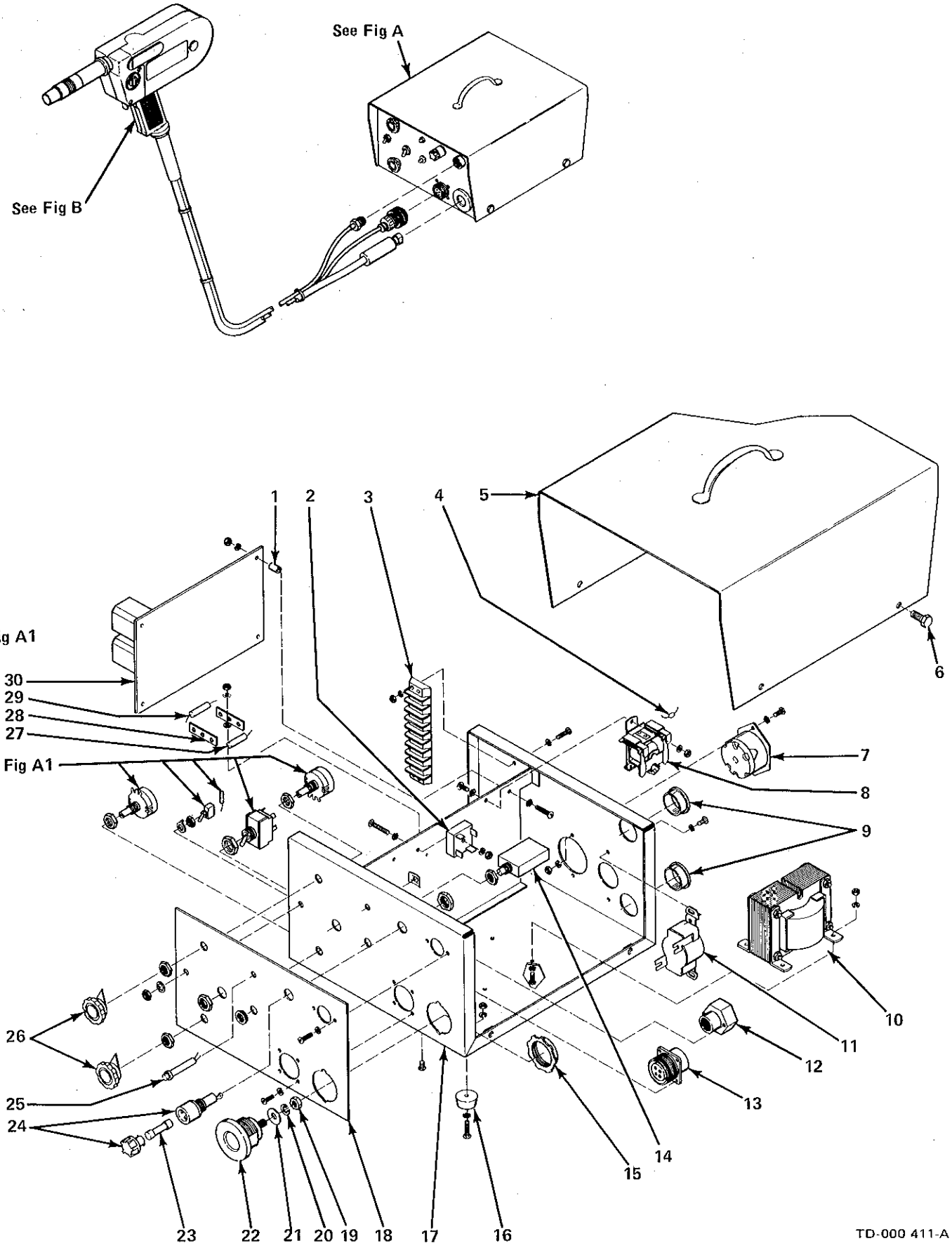


Figure A — Control Box

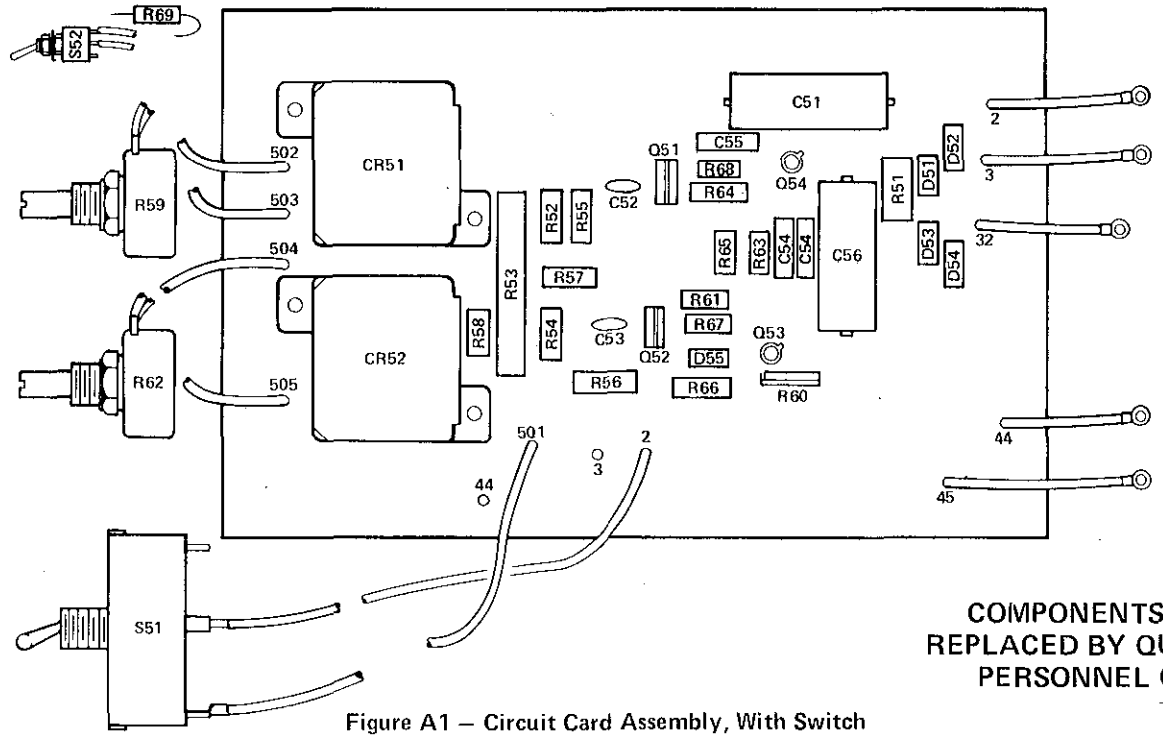
Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model WC-I 000 396	Quantity Model WC-I/S 000 398
Figure A			**Control Box**		
1		073 756	SPACER, hex 1/4 x 5/8 x 6-32 thread		4
2	SR1	035 914	RECTIFIER, integrated 25 amp 400 volts (attaching hardware H,N,P & R)	1	1
3	1T	038 832	BLOCK, terminal 20 amp 9 pole (attaching hardware E,L,M & U)	1	1
		601 219	LINK, jumper - terminal block	3	
4	D1	026 202	DIODE, 1 amp 400 volts straight polarity	1	1
5		000 439	WRAPPER, control box	1	1
6		601 925	SCREW, cap - steel hex hd 1/4-20 x 1/2	4	4
7	RC3	056 665	RECEPTACLE, male - flanged grounded twistlock 2P3W (attaching hardware A,J, K & Q)	1	1
8	CR1	034 601	RELAY, 24 volts dc DPDT (attaching hardware A,J,K & Q)	1	1
9		057 357	BUSHING, snap 15/16 ID 1.12 mounting hole	2	2
10	T1	000 336	TRANSFORMER, control 115 volts pri 35 volts sec 24 volts tap (attaching hardware G,N,P & R)	1	1
11	RC2	039 602	RECEPTACLE, twistlock 2P2W (attaching hardware A & J)	1	1
12		000 434	FITTING, gas (attaching hardware G & P)	1	1
13	RC1	073 326	RECEPTACLE, 4 socket 97-3102-18-4S (attaching hardware D & M)	1	1
14	CB1	*011 244	CIRCUIT BREAKER, manual reset 2 amp 240 volts ac/24 volts dc	1	1
15		010 907	NUT, locking 1 inch	1	1
16		025 590	MOUNT, resilient (attaching hardware E,L,M & U)	4	4
17		000 431	CHASSIS	1	1
18			NAMEPLATE (order by stock, model, and serial numbers)	1	1
19		601 837	NUT, brass - hex jam 3/8-16	1	1
20		602 213	WASHER, lock - steel split 3/8	1	1
21		010 910	WASHER, flat - steel SAE 3/8	1	1
22		039 638	RECEPTACLE, twistlock - insulated	1	1
23	F1	*012 618	FUSE, miniature - glass 5 amp	1	1
24		012 617	HOLDER, fuse - miniature	1	1
25	PL	027 645	LIGHT, indicator 115 volts ac red lens	1	1
26		024 366	KNOB, pointer		2
27	R1	604 288	RESISTOR, WW fixed 10 watt 2 ohm	1	1
28		038 785	STRIP, terminal 3 pole (attaching hardware A,K & Q)	2	2
29	C1	000 339	CAPACITOR, electrolytic 200 uf 400 volts dc	1	1
30		004 208	CIRCUIT CARD ASSEMBLY, with switch (See Fig. A1 Page 3) (attaching hardware C, L, M & U)		1
		039 618	CAP, twistlock 2P2W	1	1
		056 442	BODY, connector - grounded twistlock 2P3W	1	1
		010 603	NIPPLE, brass - ball & barbed stem 1/4	1	1
		010 606	NUT, brass - swivel 5/8-18 right hand	1	1
			Attaching Hardware		
A		602 070	SCREW, machine - steel truss hd 6-32 x 3/8		
B		602 143	SCREW, self tapping - round hd 6-32 x 3/8		
C		602 072	SCREW, machine - steel truss hd 6-32 x 5/8		
D		602 080	SCREW, machine - steel round hd 8-32 x 3/8		
E		602 082	SCREW, machine - steel round hd 8-32 x 1/2		
F		602 086	SCREW, machine - steel round hd 8-32 x 1		
G		602 109	SCREW, machine - steel round hd 10-24 x 1/2		
H		602 110	SCREW, machine - steel round hd 10-24 x 3/4		
J		602 199	WASHER, lock - steel extend tooth No. 6		
K		602 198	WASHER, lock - steel split No. 6		
L		602 201	WASHER, lock - steel external tooth No. 8		
M		602 200	WASHER, lock - steel split No. 8		
N		602 204	WASHER, lock - steel external tooth No. 10		
P		602 203	WASHER, lock - steel split No. 10		
Q		601 859	NUT, steel - hex 6-32		
U		601 860	NUT, steel - hex 8-32		
R		601 861	NUT, steel - hex 10-24		

*Recommended Spare Parts

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

CERTAIN NON CRITICAL PARTS LISTED BELOW MAY DIFFER FROM THOSE USED ON THE CIRCUIT CARD IN YOUR UNIT, BUT WILL SERVE AS SUITABLE REPLACEMENTS.

Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure A1	**004 208**	**Circuit Card Assembly, With Switch (See Fig. A Page 2 Item 30)**	
S51	011 611	SWITCH, toggle DPDT 15 amp 125 volts	1
	**004 207	CIRCUIT CARD ASSEMBLY (consisting of)	1
C51,56	031 633	. CAPACITOR, electrolytic 80 uf 25 volts dc	2
C52,53	031 643	. CAPACITOR, ceramic 0.01 uf 500 volts dc	2
C54	032 943	. CAPACITOR, tantalum 4.7 uf 35 volts dc	1
C54	032 820	. CAPACITOR, electrolytic 2.2 uf 35 volts dc	1
C55	032 943	. CAPACITOR, tantalum 4.7 uf 35 volts dc	1
CR51	032 944	. RELAY, 12 volts dc DPDT	1
CR52	032 945	. RELAY, 24 volts dc DPDT	1
	032 946	. SOCKET, relay	2
D51-54	026 202	. DIODE, 1 ampere 400 volts straight polarity	4
D55	037 243	. DIODE, zener 18 volts 1 watt	1
Q51,52	022 135	. THYRISTOR, 4 amp 200 volts	2
Q53,54	037 289	. TRANSISTOR, unijunction 50MA 35 volts	2
R51	030 055	. RESISTOR, carbon 2 watt 10 ohm	1
R52,54,65	030 024	. RESISTOR, carbon 0.5 watt 1000 ohm	3
R53	030 630	. RESISTOR, WW fixed 11 watt 100 ohm	1
R55,57	030 937	. RESISTOR, carbon 0.5 watt 10 ohm	2
R56	030 709	. RESISTOR, carbon 1 watt 150 ohm	1
R58	030 004	. RESISTOR, carbon 0.5 watt 10K ohm	1
R59	030 738	. POTENTIOMETER, carbon 1 turn 2 watt 500K ohm	1
R60	030 145	. POTENTIOMETER, carbon 1 turn 0.25 watt 2000 ohm	1
R61,64	030 025	. RESISTOR, carbon 0.5 watt 100 ohm	2
R62	030 131	. POTENTIOMETER, carbon 1 turn 2 watt 50K ohm	1
R63	030 853	. RESISTOR, carbon 0.5 watt 2200 ohm	1
R66	030 024	. RESISTOR, carbon 0.5 watt 1000 ohm	1
R67,68	030 025	. RESISTOR, carbon 0.5 watt 100 ohm	2
R69	032 819	. RESISTOR, carbon 0.5 watt 390K ohm	1
S52	011 770	. SWITCH, toggle SPDT 5 amp 125 volts	1



COMPONENTS TO BE REPLACED BY QUALIFIED PERSONNEL ONLY

TA-058 704-A

Figure A1 – Circuit Card Assembly, With Switch

**Circuit Card Assembly is available on an exchange basis. Contact Factory Service Department for details.

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity / Model .8MM .031 .030" 000 259	.9/1.2MM .035/.047 .035"/.045" 000 260	1.6MM .063 1/16" 000 261
Figure B			**Exploded View Of Gun Assembly**			
36		†050 116	NOZZLE, 13/16 orifice x 1-5/8	1	1	1
37		†050 115	NOZZLE, 1/2 orifice x 1-5/8	1	1	1
38		050 622	NOZZLE, 5/8 orifice x 1-5/8	1	1	1
39		†000 442	NOZZLE, spot	1	1	1
40		†000 443	NOZZLE, spot - inside corner	1	1	1
		†004 466	NOZZLE, spot	1	1	1
41		000 526	BARREL, extension - nozzle	1	1	1
42		050 638	TUBE, contact .030" wire	5		
42		050 626	TUBE, contact .035"/.045" wire		5	
42		050 637	TUBE, contact 1/16" wire			5
43		058 676	NUT, brass - compression	1	1	1
44		058 685	NUT, jam - nozzle extension	1	1	1
45		058 449	ADAPTER, nozzle - barrel	1	1	1
46		604 612	SCREW, set - steel socket hd 8-32 x 1/8	7	7	7
47		058 678	ADAPTER, tube contact	1	1	1
48		058 282	O-RING, .489 ID x .070 wide	5	5	5
49		058 453	TUBE, head	1	1	1
50		058 459	VALVE, gas	1	1	1
51		058 681	LINER, nylon .030" to .045" wire	1	1	
51		058 682	LINER, nylon 1/16" wire			1
52		058 410	GUIDE, wire	1	1	1
53		000 426	SCREW, machine - steel oval hd 10-24 x 2-1/2	1	1	1
54		000 419	SCREW, machine - steel flat hd 4-40 x 1-1/4	4	4	4
		602 196	WASHER, lock - internal tooth No. 4	8	8	8
		601 858	NUT, steel - hex 4-40	12	12	12
55		000 425	SCREW, machine - steel flat hd 4-40 x 3/8	2	2	2
56		006 900	SCREW, machine - steel oval hd 1/4-20 x 3/4	3	3	3
57		005 206	CASE, right hand	1	1	1
58		058 419	POST, spool - support	1	1	1
59		000 366	RING, retainer E	1	1	1
60		058 404	HOUSING, wire drive components	1	1	1
61		605 970	BUSHING, shoulder .252 ID x 3.10 OD x .064 thick	2	2	2
62		602 209	WASHER, lock - steel internal tooth 1/4	3	3	3
63		601 865	NUT, steel - hex full 1/4-20	2	2	2
64		058 549	GUIDE, wire - inlet	1	1	1
65		605 798	BUSHING, flanged .168 ID x 3/8 OD x 3/32	2	2	2
66		058 409	BEARING, drive roll	1	1	1
67		058 411	PIN, hinge	1	1	1
68		058 968	RING, retainer E	4	4	4
69		058 667	ARM, pressure - drive roll	1	1	1
70		605 972	WASHER, shoulder .254 ID x 1/2 OD x 5/16	1	1	1
71		058 412	SPRING, tension - adjustment drive roll	1	1	1
72		605 973	WASHER, teflon 1/4 ID x 9/16 OD x .047 thick	1	1	1
73		000 418	SCREW, cap - steel hex hd 1/4-20 x 1/2 self locking	1	1	1
74		605 971	BUSHING, shoulder .195 ID x .236 OD x .042	2	2	2
75		605 684	SCREW, machine - steel flat hd 8-32 x 3/4	1	1	1
76		000 449	CLAMP, head tube (consisting of)	1	1	1
77		000 416	. SCREW, machine - steel flat hd 10-24 x 7/8	1	1	1
78		058 403	. CLAMP, head tube	1	1	1
79		057 544	. SPRING, compression	1	1	1
80		058 413	. THUMB NUT, knurled 10-24	1	1	1
81		602 178	SCREW, set - steel socket hd 1/4-20 x 3/8	2	2	2
82		000 417	SCREW, cap - steel socket hd 10-24 x 1	4	4	4
83		058 474	DRIVE ROLL, 1/2 dia V groove	1	1	1
84		602 090	SCREW, machine - steel flat hd 10-32 x 3/8	2	2	2

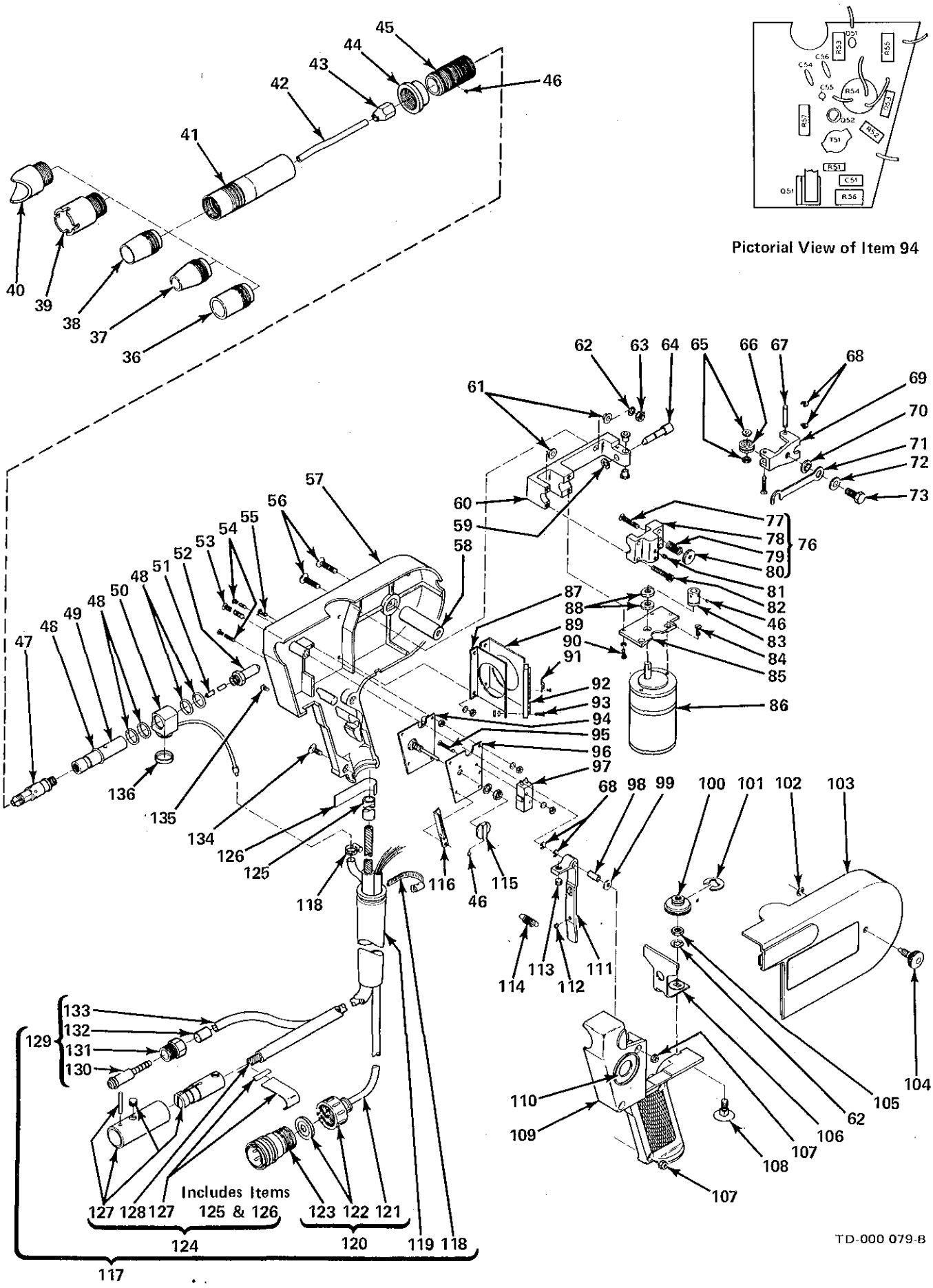


Figure B -- Exploded View Of Gun (Listing Of Parts Begins On Page 4)

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity / Model .8MM .031 .030"	.9/1.2MM .035/.047 .035"/.045"	1.6MM .063 1/16"
Figure B			**Exploded View Of Gun Assembly (Cont'd)**			
85		058 669	BRACKET, mounting - motor	1	1	1
86	M	000 438	MOTOR, with terminals	1	1	1
87		000 444	BRACKET, mounting - terminal block	1	1	1
88		605 987	WASHER, flat - felt 15/64 ID x 1/2 OD x 1/16 thick	2	2	2
89		004 209	INSULATOR, bracket - mounting terminal block	1	1	1
90		602 080	SCREW, machine - steel round hd 8-32 x 3/8	3	3	3
		602 200	WASHER, lock - steel split No. 8	3	3	3
91		000 368	LINK, jumper - terminal block	3	3	3
92		000 367	BLOCK, terminal 5 amp 8 pole	1	1	1
93		602 062	SCREW, machine - steel round hd 4-40 x 3/8	2	2	2
94		032 600	CIRCUIT CARD ASSEMBLY (See pictorial view)(consisting of)	1	1	1
	C51	000 349	. CAPACITOR, ceramic 0.068 uf 100 volts	1	1	1
	C52	000 339	. CAPACITOR, electrolytic 200 uf 40 volts dc	1	1	1
	C53	000 348	. CAPACITOR, tantalum 0.47 uf 35 volts	1	1	1
	C54,56	000 340	. CAPACITOR, ceramic 0.01 uf 50 volts	2	2	2
	C55	000 347	. CAPACITOR, tantalum 0.33 uf 35 volts	1	1	1
	D51	026 202	. DIODE, 1 amp 400 volts straight polarity	1	1	1
	D53	037 203	. DIODE, zener 6.8 volts 1 watt	1	1	1
	Q51	000 341	. THYRISTOR, 2 amp 100 volts	1	1	1
		000 450	. HEAT SINK, diode	1	1	1
	Q52	039 355	. TRANSISTOR, 0,15 amp 40 volts	1	1	1
	R51	605 919	. RESISTOR, carbon 0.25 watt 47 ohm	1	1	1
	R52	035 826	. RESISTOR, carbon film 0.25 watt 6.8K ohm	1	1	1
	R53	039 333	. RESISTOR, carbon film 0.25 watt 18K ohm	1	1	1
	R54	000 337	. POTENTIOMETER, miniature 1 turn 0.5 watt 15K ohm	1	1	1
	R55	000 344	. RESISTOR, carbon film 0.25 watt 1.8K ohm	1	1	1
	R56	000 342	. POTENTIOMETER, cermet 1 turn 0.5 watt 5K ohm	1	1	1
	R57	039 331	. RESISTOR, carbon film 0.25 watt 4700 ohm	1	1	1
	T51	000 350	. TRANSFORMER, pulse 700 volts	1	1	1
95		000 420	SCREW, machine - steel flat hd 3-48 x 3/4	2	2	2
		000 421	WASHER, lock - steel internal tooth No. 3	2	2	2
		000 422	NUT, steel - hex 3-48	2	2	2
96		058 421	COVER, printed circuit board	1	1	1
97	PB1	000 369	SWITCH, limit 10 amp 125/250 volts ac SPDT	1	1	1
98		058 462	BUSHING, trigger - pivot	1	1	1
99		602 238	WASHER, flat - steel 3/16	1	1	1
100		058 451	THUMB NUT, knurled 1/4-20	1	1	1
101		000 365	RING, retainer E	1	1	1
102		000 364	RING, retainer E	1	1	1
103		058 278	COVER, spool	1	1	1
104		058 420	THUMB SCREW, knurled 1/4-20	1	1	1
105		601 867	NUT, steel - hex jam 1/4-20	1	1	1
106		058 463	BRAKE, spool	1	1	1
107		000 428	NUT, steel - hex 10-24 self locking	4	4	4
108		000 429	BOLT, step - steel 1/4-20 x 3/4	1	1	1
109		005 205	CASE, left hand	1	1	1
110		000 515	LABEL, speed control indicator	1	1	1
111		058 407	TRIGGER	1	1	1
112		000 424	SCREW, set - steel socket hd 8-32 x 1/4	1	1	1
113		005 464	SCREW, set - steel socket hd 1/4-20 x 3/8	1	1	1
114		058 466	SPRING, extension	1	1	1
115		058 416	KNOB, speed control	1	1	1
116		058 465	BRACKET, mounting - spring	1	1	1
117		005 203	CABLE, combination (consisting of)	1	1	1

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model .8MM .030"	.9/1.2MM .035/.047 .035"/.045"	1.6MM .063 1/16"
Figure B			**Exploded View Of Gun Assembly (Cont'd)**			
118		023 562	. CLAMP, hose 5/16-7/8 inch dia	2	2	2
119		005 177	. STRAIN RELIEF	1	1	1
120		000 524	. CABLE, control (consisting of)	1	1	1
121		605 156	. . CORD, portable 18 ga 4 conductor (order by foot)	32 ft.	32 ft.	32 ft.
		605 174	. . TERMINAL, ring tongue No. 2 stud 22-16 wire	4	4	4
122		073 331	. . CLAMP, cable 97-3057-10-6	1	1	1
123	PLG1	073 329	. . RECEPTACLE, 4 pin 97-3106A-18-4P	1	1	1
124		000 525	. CABLE, power (consisting of)	1	1	1
125		604 738	. . TUBING, heat shrink - black 1/2 inch (order by foot)	1 ft.	1 ft.	1 ft.
126		019 833	. . STRIP, copper .010 x 2-1/2 x 3/4	1	1	1
127		039 629	. . PLUG, male - twistlock insulated	1	1	1
128		600 318	. . CABLE, weld - copper stranded No. 3 (order by foot)	31 ft.	31 ft.	31 ft.
129		000 447	. HOSE, gas (consisting of)	1	1	1
130		056 851	. . FITTING, hose - brass barbed nipple 3/16 TBG	1	1	1
131		010 606	. . NUT, brass - swivel 5/8-18 right hand	1	1	1
132		056 112	. . FERRULE, .475 ID x 23/32 lg	1	1	1
133		604 550	. . HOSE, whippet 3/16 x 1 (order by foot)	31 ft.	31 ft.	31 ft.
		073 476	. CLAMP, rubber 5 hole 3/8 x 4-5/8	14	14	14
134		000 427	SCREW, machine - steel oval hd 10-24 x 1	2	2	2
135		006 459	SCREW, pivot - trigger	1	1	1
136		058 262	CAP, valve	1	1	1
		050 960	WRENCH	1	1	1

†Optional Equipment

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.