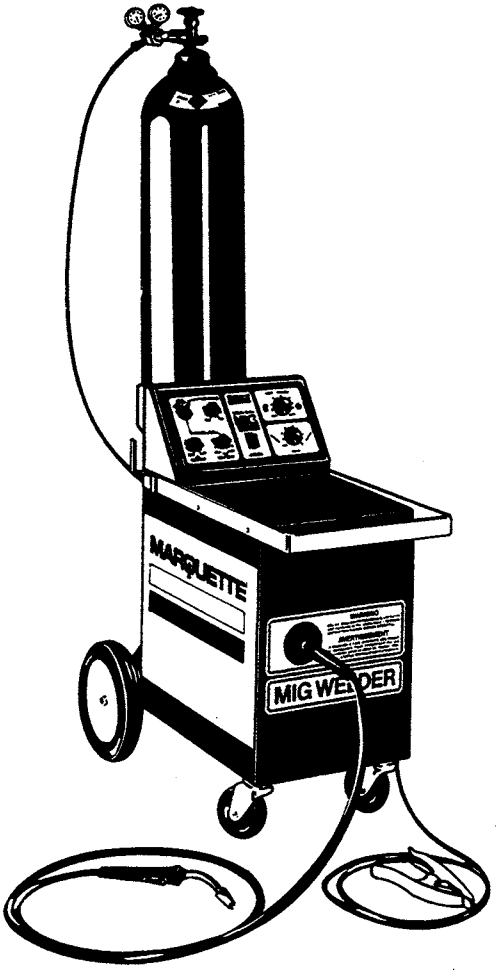
MIG WELDER OPERATING INSTRUCTIONS

M12-185, 83-315, 98261



MARQUETTE®

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FOREWORD

Keep this manual handy for future reference. This manual has been prepared for the new operator as well as the experienced one. READ PAGES 3 TO 14 OF THIS MANUAL COMPLETELY BEFORE SET UP OR OPERATION OF THE WELDER, EVEN IF YOU HAVE WELDED BEFORE.

If a question arises regarding your MIG welder or this manual, please consult us at **1-800-558-4558.**
(In Wisconsin call 414-321-7000)

Your safety and the safety of others around you depends upon your care and judgement when operating this machine. Remember, a careful operator is a safe operator.

All information and specifications contained in this manual are based on the latest product information available at the time of printing. Illustrations in this manual are intended for reference use only and may not depict actual model component parts.

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MACHINE DESCRIPTION

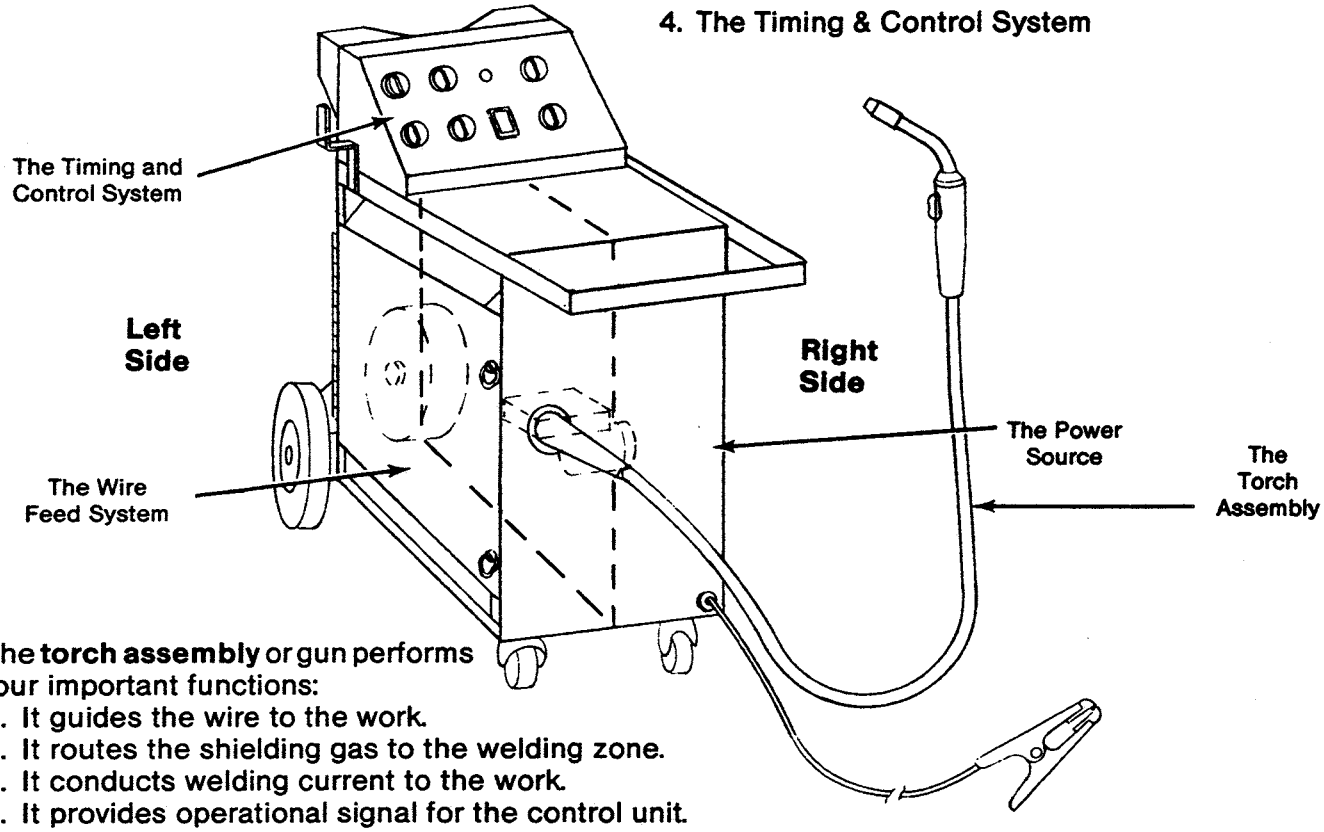
The Metal Inert Gas (MIG) wire feed welder has been designed and built primarily for the professional auto body repair technician. With practice, every person in the shop will be able to use this welder efficiently.

This welder can perform continuous, stitch and spot welds either manually or automatically, as well as molten metal filling and heat shrinking.

PRINCIPLES OF OPERATION

MIG Welding uses a continuous wire automatically fed. The molten metal puddle is shielded from the atmosphere by an inert gas. The MIG welding machine is a direct current constant voltage power source. MIG welding is also referred to as GMAW (Gas, Metal Arc Welding). This particular MIG uses the "dip" or "short arc" transfer method. Short arc transfer is used versus "spray" transfer due to its smaller heat affected zone and adaptability to light gage metal welding. The basic welder consists of four main parts:

1. The Torch Assembly
2. The Wire Feed Unit
3. The Power Source
4. The Timing & Control System

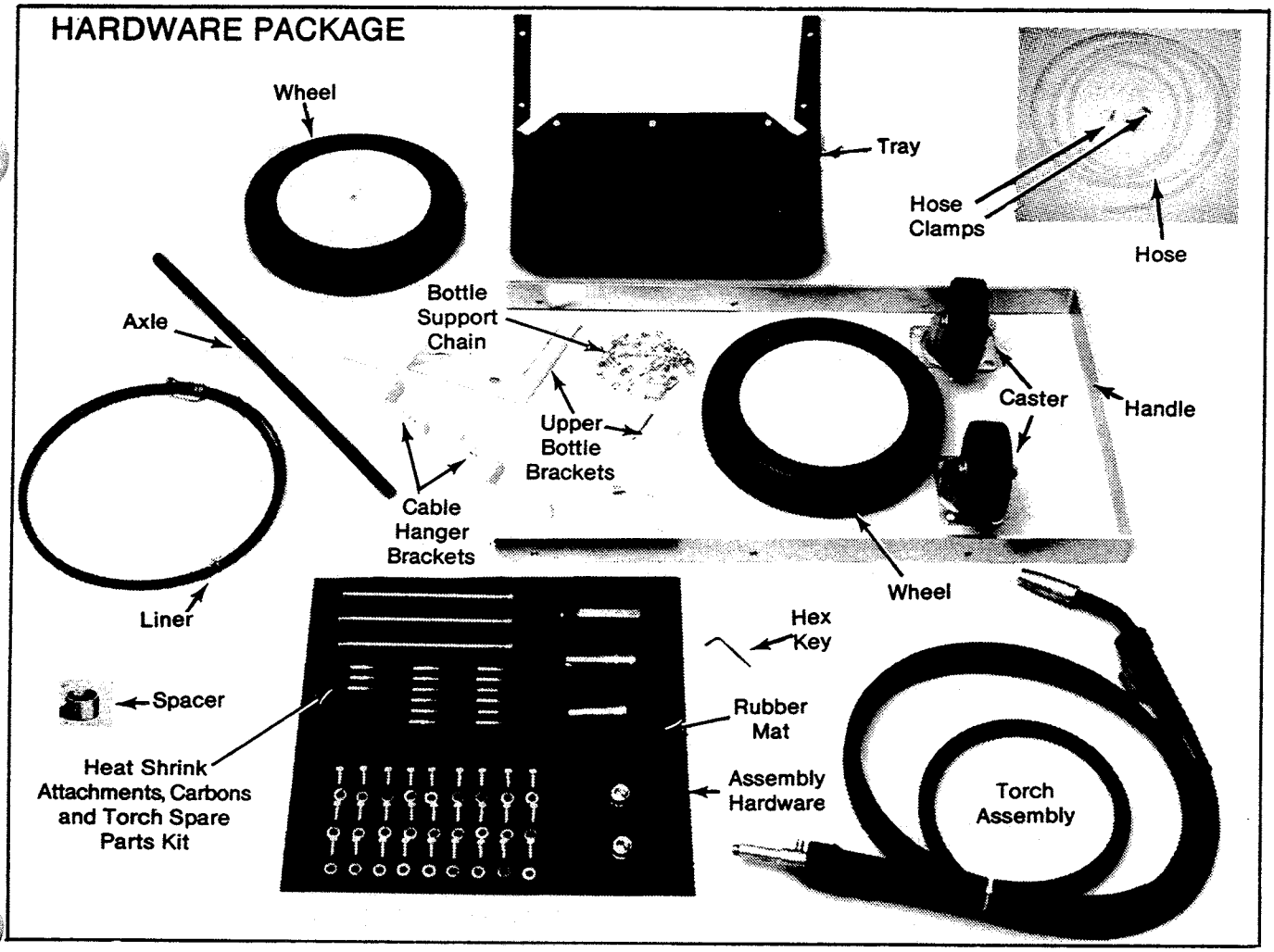


A. The **torch assembly** or gun performs four important functions:
   1. It guides the wire to the work.
   2. It routes the shielding gas to the welding zone.
   3. It conducts welding current to the work.
   4. It provides operational signal for the control unit.

B. The **wire feed unit** drives the wire at a constant adjustable feed rate.

C. The **power source** supplies the direct current necessary for welding. This allows the wire to melt off as it is fed. The heat selector switch determines this voltage level and resulting current for welding. Just a small change in selected voltage level can allow a greater amount of wire to be melted. This results in greater welding current and deposition rate.

D. The **Timing and control system** synchronizes all machine operations according to the dial settings. The timing and control system allows the operator to make the following adjustments:
   1. Proper wire feed rate for selected heat setting.
   2. The mode of welding: continuous, stitch, or spot.
   3. The amount of time for a spot weld.
   4. The amount of "On" time in the stitch mode.
   5. The amount of weld delay or "Off" time in the stitch mode.



SAFETY

M12-185, 83-315, 98261

⚠ IMPORTANT SAFETY NOTICE ⚠

Many welder related accidents are caused by the operator's failure to follow basic safety rules or written precautions. Most accidents can be avoided if the operator is completely familiar with the machine and can see dangerous things before an accident happens.

Improper use and/or care of the welder can be dangerous and could result in damage to the welder, personal injury, or death to you or other persons.

The basic safety rules are outlined in the SAFETY section of this manual. Additional precautions and this symbol ⚠ WARNING will appear next to information which may help prevent personal injury and property damage.

This symbol ⚠ CAUTION will appear next to information which will help keep the machine from being damaged.

The precautions listed in this manual and on the machine are not all inclusive. If an operating procedure, work method, tool or part is not specifically recommended, you must satisfy yourself that it is safe for you and others, and that the machine will not be damaged or made unsafe as the result of your decision.

Understand that your safety and the safety of others around you is a direct result of how you operate and maintain this machine. Read and understand this manual, and make sure that you understand all controls and operating instructions before attempting to operate the welder. Improper operation is extremely dangerous.

Failure to observe the following safety precautions may result in serious personal injury or death to you or other persons. Be sure that this information reaches all operators of this machine.

General Precautions

Be sure the welding area has a good, safe floor. Concrete or masonry is recommended. Wood, plastic tile, or carpeted floors should be avoided to help prevent fires caused by sparks. When working above floor level, protect yourself from a fall should you get a shock.

Never wrap the torch assembly around any part of your body.

Keep work area clean. Cluttered areas and benches invite accidents.

Be sure all power wiring is correctly installed and maintained. Always be sure your machine is properly grounded.

Your power line should be equipped with a circuit breaker conveniently located near the welder so the power can be shut off quickly. When leaving equipment unattended for any length of time, always shut off and disconnect all power to equipment.

Eye And Body Protection

Never look at welding arc without a helmet or shield. Arc Rays can injure eyes and burn skin. Protect your eyes with a proper welding helmet, eye filter lens and cover plate complying with American National Standards Institute (ANSI) Z87.1. A # 10 glass is recommended for all welder applications.

Wear safety goggles or glasses with side shields underneath the helmet when welding or chipping to protect eyes from flying objects.

To protect your body and avoid burns, wear oil free protective clothing, keep sleeves and collars buttoned, no pockets in front, cuffless trousers, overlapping high shoes, leather gauntlet gloves, and a hat or skull cap under the helmet.

Fumes and gases can be dangerous to your health. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep the fumes and gases from your breathing zone, and the general area. Where this cannot be done, use an air supplied respirator. If welding causes dizziness, nausea or breathing difficulties, ventilation is inadequate and must be increased. See your supervisor. See special precautions in references below when welding on materials containing, or coated with lead, mercury, zinc, beryllium, cadmium, galvanized or other materials with toxic properties. Many of today's automobiles contain zinc coated or galvanized panels.

Do not weld in locations close to chlorinated hydro-carbon vapors coming from degreasing, cleaning, or spraying operations. The ultraviolet rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other gases.

Protection From Electrical Shock

Electric shock can kill. Do not let bare skin or wet clothing come between the following combinations when using the welder:

Welding Gun and Ground Clamp Welding Gun and Work Piece

Welding Gun and Metal Work Table

40 volts exist between these parts when the gun trigger is pressed!

Take special care to insulate youself from ground using dry insulation (such as dry wood) of adequate size when welding in damp locations, on metal floors or grating, and in positions (such as sitting or lying) where parts or large areas of your body can be in contact with possible grounds.

Flammable And Explosive Materials

Remove flammable and explosive materials at least 35 feet from the welding arc to prevent welding sparks or molten metal from starting a fire. Keep a type ABC fire extinguisher within easy reach.

Welding on or near containers which hold combustibles can cause an explosion, even when they have been cleaned. For information, purchase "Safe Practices for Welding and Cutting Containers that Have Held Combustibles" (A6.0-65) from the American Welding Society (AWS), 2501 N.W. 7th Street, Miami, Florida 33125.

Panels touching combustibles on opposite sides should not be welded on. Panels and floors near fuel system components should be protected by heat-resistant covers or shields.

Never connect the work cable or clamp to any object but the work piece or metal work table. Connecting to other objects such as building ground can create a fire hazard.

Never weld anything on or to the welder cabinet, as a burn through may cause transformer failure.

Shielding gas bottles should be handled with utmost care. Never leave a gas cylinder unsecured. The gas in a full cylinder is at extreme pressures.

Remove butane lighters at least 35 feet from the welding arc to prevent an explosion. Never weld with a butane lighter in your pocket.

Preventative Maintenance

Maintain the torch assembly, ground cable, welding cable and welding machine in good safe operating condition.

Remove leaky or defective equipment from service immediately for repair at manufacturer's service center.

Never apply power to the welder with any part of the "cabinet" removed except when aligning wire drive wheel grooves. Position the power switch in "OFF" position and disconnect power supply at the plug or circuit breaker before doing maintenance work inside the machine.

Safety Publications Index

For additional information on safe welding and related practices, refer to the following publications or their latest revision.

1. ANSI Standard Z87.1. SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

2. ANSI Standard Z49.1. SAFETY IN WELDING AND CUTTING obtainable from the American Welding Society, 2051 NW 7th St., Miami, Fl., 33125.

3. American Welding Society Standard A6.0. WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable same as item 1.

4. NFPA Standard 51. OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING, obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Mass. 02210.

5. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable same as item 4.

6. CGA Pamphlet P-1. SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 500 Fifth Avenue, New York, N.Y. 10036.

7. OSHA Standard 29 CFR, Part 1910, Subpart Q, WELDING, CUTTING AND BRAZING, obtainable from OSHA Publications Office, U.S. Department of Labor, Rm. N3644, 200 Constitution Ave., N.W., Washington, D.C. 20210.

⚠ SAFETY PRECAUTIONS ⚠

Read and observe all instructions included in this manual as well as the following specific safety precautions:

EYE AND BODY PROTECTION

WARNING: Never look at welding arc without a helmet or shield. Arc rays are extremely dangerous to the eyes.

1. Use helmet, filter, and cover plate complying with ANSI Z87.1 to protect your eyes and face from sparks and the rays of the arc when welding or observing open arc welding.
2. Always wear safety goggles with side shields complying with ANSI Z87.1 when in a welding area, or when near slag chipping operation.
3. To avoid spatter and ultraviolet ray burns wear oil free woolen clothing, keep sleeves and collars buttoned, no pockets in front, cuffless trousers overlapping high shoes, and leather gauntlet gloves.
4. Protect other near-by personnel with suitable non-flammable screening, and warn bystanders as to the potential hazards in the weld area.
5. Provide adequate ventilation in the welding area, particularly when welding on galvanized, lead or cadmium plated steel, and other metal which produce toxic fumes.
6. When working above floor level, protect yourself from a fall should you get a shock. Never wrap the electrode cable around any part of your body.
7. Do not weld in locations close to chlorinated hydro-carbon vapors coming from degreasing, cleaning, or spraying operations. The ultraviolet rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other gases.

PROTECTION FROM ELECTRICAL SHOCK

1. Do not let bare skin or wet clothing come between the following combinations:

   Welding Gun
   AND
   Ground Clamp, or Work Piece,
   or Metal Work Table

   40 volts exist between these parts when welder is on and gun trigger pressed!

   Wear dry, hole free, clothing and gauntlet type gloves to protect and insulate the body.
2. Take special care to insulate yourself from ground using dry insulation (such as dry wood) of adequate size when welding in damp locations, on metal floors or gratings, and in positions (such as sitting or lying) where parts or large areas of your body can be in contact with possible grounds.
3. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition.

FLAMMABLE AND EXPLOSIVE MATERIALS

1. Remove flammable and explosive material at least 35 feet from the welding arc to prevent welding sparks or molten metal from starting a fire. Keep a type ABC fire extinguisher within easy reach.
2. Welding on or near containers which hold combustibles can cause an explosion, even when they have been cleaned. For information purchase "Safe Practices for Welding and Cutting Containers that Have Held Combustibles" (A6.0-65) from the American Welding Society AWS, 2501 N.W. 7th St., Miami, Florida 33125.
3. Electrodes shall be removed from electrode holders when not in use, and holders shall be so placed that they cannot make electrical contact with persons, conducting objects, flammable liquids, or compressed gas cylinders.
4. Never connect the work cable or clamp to any object but the work piece or metal work table. Connecting to other objects such as building ground can create a fire hazard.
5. Never weld anything on or to the welder cabinet, as a burn through may cause transformer failure.

PREVENTATIVE MAINTENANCE

1. Never apply power to the welder with any part of the "cabinet" removed. Position on-off switch in "Off" position and disconnect power supply at the circuit breaker or fuse box before doing maintenance work inside the machine.
2. Before connecting the welder power cord to the receptacle, check the following:

   a. Inspect the power cord and welding cables for cuts or burns and make sure blades and ground pin on the plug are straight.
   b. Inspect "On-Off"switch lever for cracks or broken parts.
   c. Inspect electrode holder jaw insulators for cracks or broken parts.
   d. For additional safety information, purchase copies of "Practice for Occupational and Educational Eye & Face Protection" (ANSI Z87.1) and "Safety in Welding and Cutting" (ANSI Z49.1) from the American Welding Society or the American National Standards Institute ANSI, 1430 Broadway, New York, New York 10018, and "Code for Safety in Welding and Cutting", (CSA Standard W117.2-1574) from the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3.

MESURES DE SÉCURITÉ

Lisez et respectez toutes les instructions indiquées dans ce manuel ainsi que les mésures de securite suivantes:

PROTECTION DES YEUX ET DU CORPS

ATTENTION: Ne regardez jamais l'arc de soudure sans être équipé d'un casque ou d'un ecran de protection. Les rayons d'arc sont extrêmement dangereux pour les yeux.

1. Portez un casque, un filtre et un protège-lentille, conformément à la norme ANSI Z87.1, pour protéger vos yeux et votre visage des étincelles et des rayons de l'arc pendant que vous faites des soudures ou lorsque vous regardez un soudeur au travail.
2. Portez toujours des lunettes de protection avec des ecrans protecteurs sur les côtés, conformément à la norme ANSI Z87.1, quand vous êtes dans des endroits où on fait des soudures ou près d'opérations d'ébarbage de laitier.
3. Pour éviter d'être brûlé par des projections et les rayons ultraviolets, portez des vêtements de laine sans huile, gardez vos manches et collets boutonnés, portez des vêtements sans poches sur le devant, des pantalons sans revers recouvrant des chaussures montantes et des gants de cuire à crispin.
4. Protégez le personnel qui se trouve à proximité par des écrans en matière ininflammable et mettez tout visiteur en garde contre les dangers que présentent les endroits où l'on fait des soudures.
5. Une ventilation adéquate doit être assurée à l'endroit où l'on fait des soudures, surtout quand il s'agit de soudures sur aciers galvanisés, recouverts de plomb ou de cadmium, ou de tout autre metal qui dégage des vapeurs toxiques..
6. Lorsque vous travaillez au-dessus du niveau du plancher, protégez-vous des chutes en cas de choc. N'enroulez jamais le câble de l'électrode autour d'une partie de votre corps.
7. Ne faites pas de soudage dans un entroit voisin de vapeurs d'hydrocarbure chloriné émanant d'opérations de dégraissage, de nettoyage ou de vaporisation. Les rayons ultraviolets de l'arc peuvent réagir avec les vapeurs de solvant et former du phosgène, un gaz extrêmement toxique, ainsi que d'autres gaz.

PROTECTION CONTRE LES CHOCS ÉLECTRIQUES

1. Ne laissez jamais la peau ou des vêtements humides venir en contact avec les combinaisons suivantes:

   le PORTE-ÉLECTRODE ou
   la BAGUETTE DE SOUDAGE
   ET
   la PINCE DE TERRE, la PIÈCE À SOUDER ou
   la TABLE DE TRAVAIL EN METAL.

   Il y a une tension de 40 V entre ces parties quand le poste de soudage est en marche!

   Portez des vêtements secs, sans trous ainsi que des gants à crispin pour protéger et isoler le corps.
2. Soyez sûr de vous isoler du sol en employant un matériau isolant sec (tel que du bois sec) de taille suffissante quand vous soudez dans des endroits humides, sur des sols metalliques ou des grillages, ou dans des positions où certaines parties plus ou moins grandes de votre corps sont en contact avec le sol (tel que si vous devez être assis ou couché).
3. Assurez-vous que le porte-électrode, la pince, le câble de soudage et le poste de soudage sont toujours en bon état de marche.

MATÉRIAUX EXPLOSIFS ET INFLAMMABLES

1. Éloignez tous les matériaux inflammables et explosifs à au moins 35 pieds (12 mètres) de l'arc de soudage pour éviter que les étincelles de soudage ou le métal en fusion ne mette le feu. Conservez un extincteur du type ABS à portée de main.
2. Des explosions peuvent survenir en soudant sur, ou près de récipients contenant des produits combustibles même si ceux-ci ont été nettoyés. Pour plus d'informations procurez-vous le manuel: *"Safe Practices for Welding and Cutting Containers that Have Held Combustibles", (A6.0-65)* de l'American Welding Society, AWS 2501 N.W. 7th Street, Miami, Florida 33125.
3. Quand elles ne sont pas employées, les électrodes doivent être détachées des porte-électrodes et les porte-électrodes doivent être placés de façon à ne pas pouvoir être mis en contact electrique avec des personnes, des objets conducteurs, des liquides inflammables ou des boutielles de gaz comprimé.
4. Ne reliez jamais le câble ou la pince à un autre objet que la pièce à souder ou la table de travail en métal. La connexion à d'autres objets, tel que le sol du bâtiment, créerait des dangers d'incendie.
5. Ne jamais rien souder au boîtier du poste de soudage car une pénétration totale pourrait causer une panne du transformateur.

ENTRETIEN PRÉVENTIF

1. Ne branchez jamais le courant au poste de soudage s'il manque une des pièces du boîtier du poste de soudage. Tournez le bouton à la position "Arrêt" et coupez l'alimentation au coupe-circuit ou à la boîte de fusible avant de faire n'importe quel travail d'entretien sur la machine.
2. Avant de relier le fil électrique du poste de soudage à la prise de courant, vérifiez les points suivants:
   a. Assurez-vous que les fils électriques et les câbles de soudage n'ont ni coupures ni brûlures et assurez-vous que les lames et la tige de terre de la fiche sont bien droites.
   b. Vérifiez que l'interrupteur marche-arrêt ne comporte aucune fissure ni pièce endommageé.
   c. Vérifiez que les isolants des mâchoires du porte-électrode ne comportent aucune fissure ni pièce endommagée.
   d. Si vous voulez obtenir des informations supplémentaires sur les mesures de sécurité, procurez-vous: *Practice for Occupational and Educational Eye & Face Protection" (ANSI Z87.1)* et *"Safety in Welding and Cutting" (ANSI Z49.1)* de l'*American Welding Society* ou de l'*American National Standard Institute,* ANSI, 1430 Broadway, New York 10018, ainsi que la norme W117.2-1974, *Code for Safety in Welding and Cutting,* de l'Association canadienne de normalisation, 178, boul. Rexdale, Rexdale (Ontario) M9W 1R3.

This page is included in compliance with Canadian standards association spec. C22.2 No. 60 for sales and distribution in Canada.

ASSEMBLY AND INITIAL SET-UP

Assembly

Tools Required For Assembly:

7/16" socket and ratchet
1/4" screwdriver
5/8" open end or fitting wrench

1. Power source side is removed by bolts using 7/16" socket and ratchet. The wire drive side is simply opened up by turning finger fasteners ¼ turn. See Figure 1

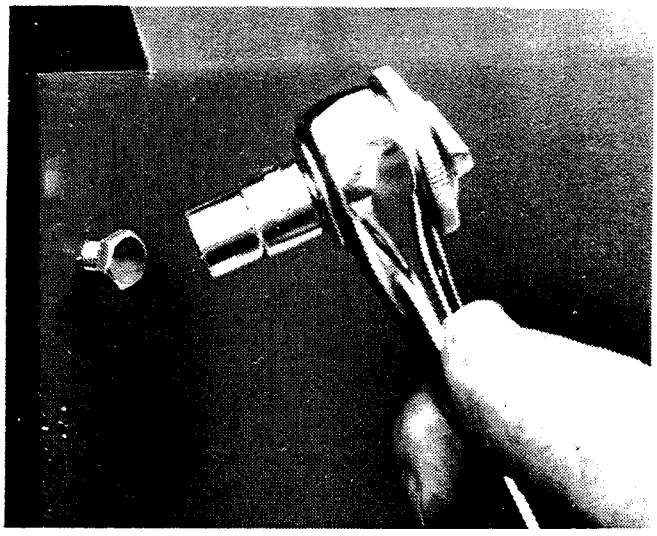


Figure 1

2. Mount the casters, lower cylinder tray and rear wheels. Then mount the upper cylinder bracket, handle, and cable hangers. See figure 2

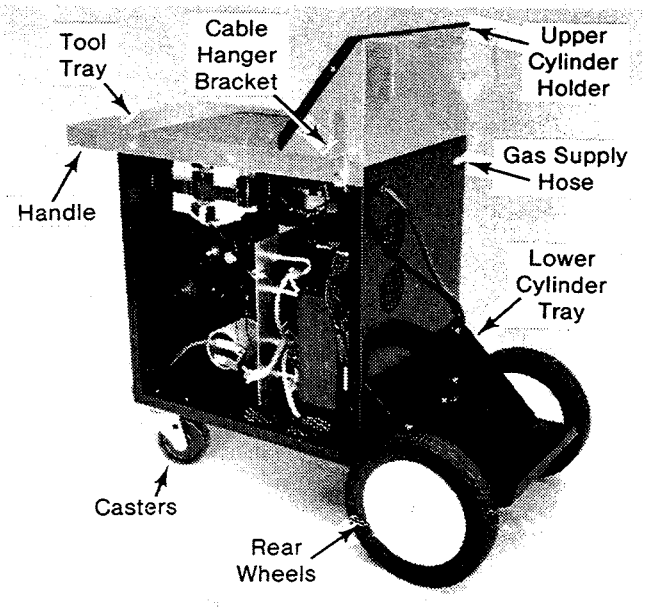


Figure 2

3. Locate the shielding gas hose in wire feed side of the cabinet. Slip the gas hose out of the grommet located at the upper rear of the cabinet. The hose is connected to the regulator. See page 11, "Connecting Gas Regulator"

⚠ CAUTION

This step is very important, as this connection must carry the welding current, wire, gas, and control current.

4. Place the torch switch wires through receptacle grommet at front of welder. Guide boss of torch into the wire drive casting while inserting torch through front. (See Figure 3) Finger tighten torch location screw after boss seats. Slip gas supply hose onto torch inlet nipple. Connect trigger control leads to terminal block located above wire drive unit. See Figure 4

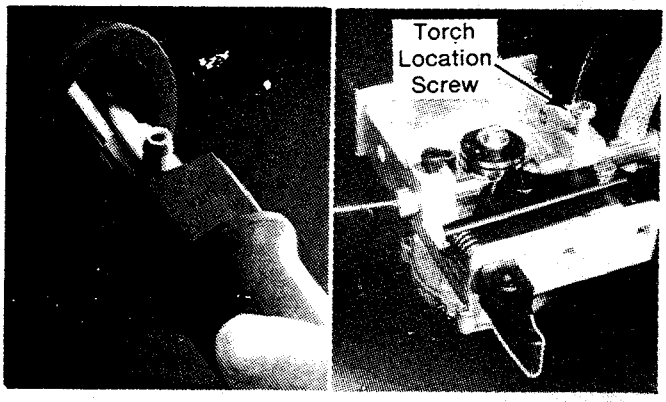


Figure 3

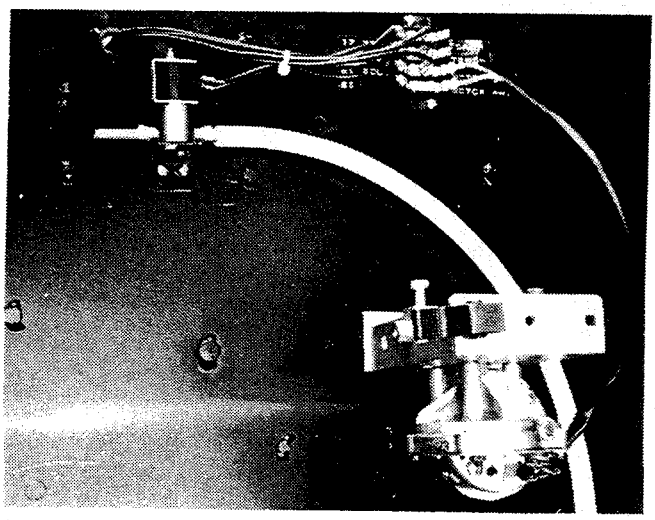


Figure 4

⚠ WARNING

THIS WELDER MUST BE GROUNDED WHILE IN USE TO PROTECT OPERATOR FROM ELECTRICAL SHOCK. IF YOU ARE NOT SURE THAT YOUR OUTLET IS PROPERLY GROUNDED, HAVE IT CHECKED BY A QUALIFIED ELECTRICIAN. DO NOT CUT OFF GROUNDING PRONG OR ALTER PLUG IN ANY WAY.

IMPORTANT Initial Set-Up

Do not plug machine into an outlet until the line voltage has been checked and the machine has been adjusted and grounded accordingly or improper operation may result.

Use a good AC voltmeter to determine the voltage at the outlet. When delivered, the welder is wired to accept 220 volts, AC or above. If line voltage is BELOW 220 volts, move the input wire to 208 VAC position. This terminal block is located in upper right hand corner of right side of cabinet. See Figure 5.

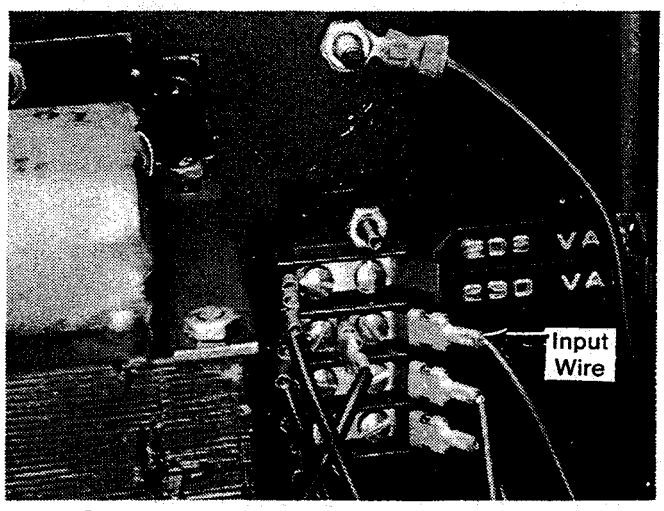


Figure 5

WARNING

HIGH VOLTAGE DANGER FROM POWER SOURCE. CONSULT A QUALIFIED ELECTRICIAN FOR INSTALLATION OF RECEPTACLE AT POWER SOURCE.

EXTENSION CORDS

If extension cord is necessary, use an extension cord of at least 12/3 for distances up to 25 feet. If extension ground cable for welding is necessary, use AWG#4 cable for lengths up to 10 feet.

OPERATING CONTROLS

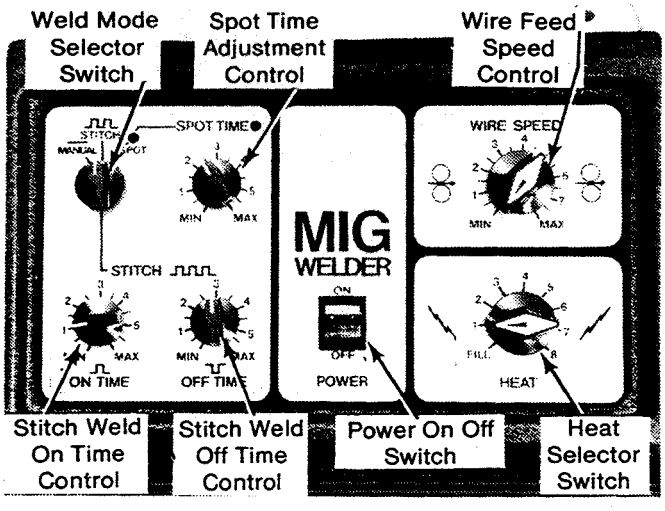


Figure 6

1. POWER ON/OFF SWITCH turns on all power to welder. This switch is illuminated when power is on.

2. HEAT SELECTOR SWITCH marked "Fill — 8" allows selection of heat required for various metal thicknesses.

3. WIRE FEED SPEED CONTROL Marked Min.-Max. provides adjustment for wire feed rate. Fine adjustment is made after selection of welding heat.

4. WELD MODE SELECTOR SWITCH - Three positions manual, stitch, spot ●. Manual is for continuous welding. Stitch is for automatic stitch welding. Spot is for timed spot welding.

5. STITCH "ON" WELDING TIME CONTROL Marked Min.-Max. Controls welding time during automatic stitch welding.

6. STITCH "OFF" INTERVAL TIME CONTROL Marked Min.-Max. Controls welding off time during automatic stitch welding.

7. SPOT WELDING TIME CONTROL ●t Marked Min.-Max. "Controls welding time during automatic spot welding."

8. GUN CONTROL TRIGGER. Located on the welding torch gun, this switch signals the timing & control system to start weld process when operator depresses. See Figure 7

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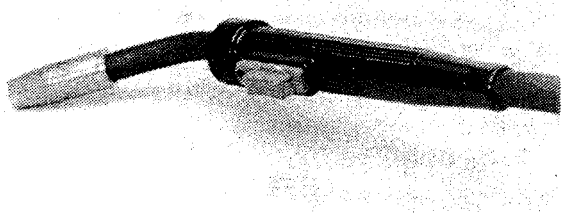


Figure 7

PREPARATIONS BEFORE USING THE MACHINE

Setting Up The Welding Gun

IMPORTANT

The operator must first select the proper liner for the gun. The wire being used determines the type of liner used in the gun. A **TEFLON** liner is used for **ALUMINUM WIRE,** and a **STEEL** liner is used for **ALL OTHER TYPES** of wire. See page 18 for Liner Installation

Selecting the Contact Tip

The wire size determines the size of the contact tip used in the gun. A contact tip that is too small will hinder wire feed. A contact tip that is too large will not provide sufficient electrical contact for the weld wire. See Contact Tip Chart page 10

Each tip is stamped with its proper size for easy identification. To install the contact tip, simply screw it clockwise into the end of the gun and tighten.

CONTACT TIP

Wire Size	Contact Tip Size
.023''	0.6 mm (.023'')
.030''	0.8 mm (.030'')
.035''	0.9 mm (.035")

Selecting The Gas Nozzle

Two gas nozzles are included with your machine, a standard welding nozzle and a spot welding nozzle. The standard nozzle should be used for all applications other than spot welding. (See Figure 8)

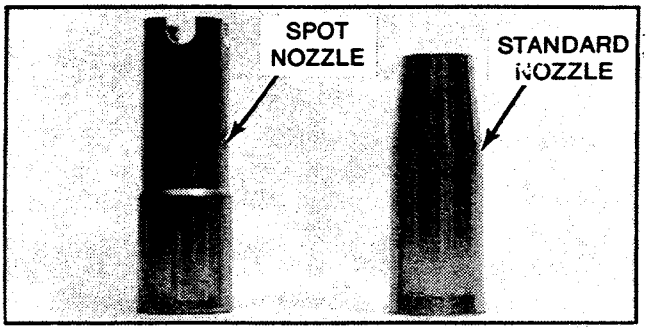


Figure 8

IMPORTANT

Keep the nozzles clean, use a small piece of wood to remove spatter buildup. Anti-spatter spray on the gas nozzle and contact tip before operation will ease removal of spatter. The nozzle threads on and off. **Only hand tighten gas nozzle.**

Selecting The Wire

The type and thickness of the material to be welded determines the type and size of the wire required for the job. This machine comes set up from the factory for 0.6 mm (.023") wire. With minor modifications, the machine will also accept 0.8 mm (.030") and 0.9 mm (.035") wire.

Premium wire meeting **AWS spec. A5.18, electrode classification E70-S6** should be used for all automotive steel applications including high strength steel (HSS).

For aluminum welding use Type 5356 Filler Wire - (.035 Recommended).

NOTE

The machine can use most wire spools having a 2" ID spool hole and up to 30 pounds in weight.

Installing The Wire

1. Turn power switch OFF.
2. Open door of left side of cabinet.
3. Flip the wire tension lever out. See Figure 9
4. Remove spool hub flange nut. See Figure 10

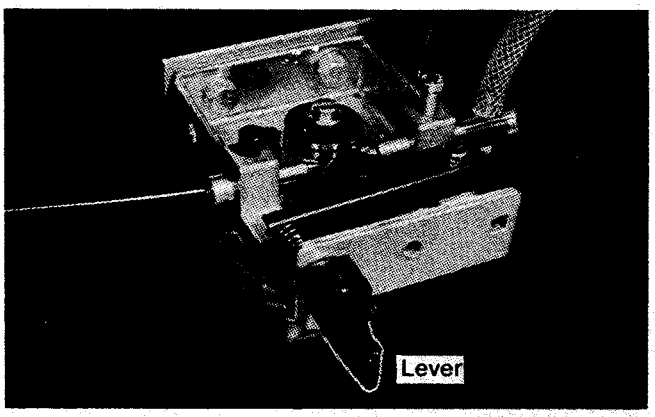


Figure 9

5. Carefully unpack the wire. With narrow spools put the wire on first, then install the spool spacer. Be sure that the wire unwinds from the top in a clockwise direction and that the guide pin on the wire spindle aligns with the hole in the back side of the wire spool. Rock the wire spool back and forth on the spindle to verify that the guide pin is in position. See Figure 10

6. Reinstall spool hub flange nut to hold spool on hub. See Figure 10

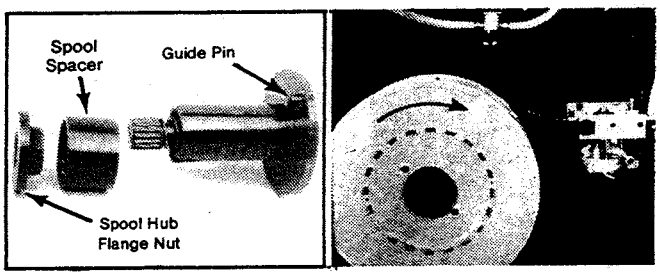


Figure 10

7. Adjust spool hub brake tension as in "Operator Maintenance" Page 20.

8. Carefully loosen the wire from the spool so that it doesn't unravel. Keep a firm grip on the wire during the cutting and threading operation. Straighten the wire and cut clean.

WIRE SIZE SELECTION CHART

MATERIAL THICKNESS		Gage No.	28	22	16	10	4
		Fractional	1/64''	1/32''	1/16''	1/8''	1/4''
		Decimal	.015	.030	.062	.125	.250
		Metric	.4	.8	1	3	6
RECOMMENDED WIRE SIZE	Steel	0.6 mm (.023")	←				
		0.8 mm (.030")		←			
		0.9 mm (.035")		←			
	Aluminum	0.8 mm (.030")		←			
		0.9 mm (.035")		←			

9. **Check the drive wheel groove for proper size.** The small groove is for .023" (0.6 mm) dia. wire; the large groove is for .030" (0.8 mm) and .035" (0.9 mm) dia. wire. 0.6 will read on top of drive wheel when set up for .023" (0.6mm) wire. (See Figure 11)

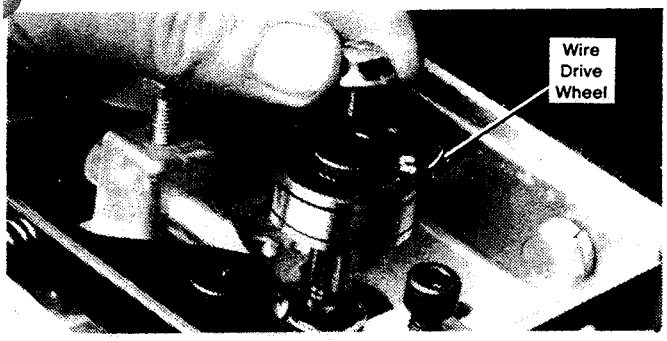


Figure 11

10. Thread the wire through the brass guide tube of the drive assembly past the drive and idler rollers then into the torch end. Make certain the wire is started in the liner of the torch assembly. See Figure 12

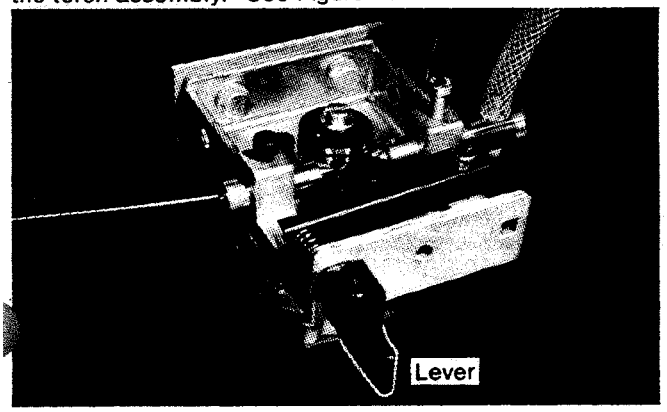


Figure 12

IMPORTANT

NOTE

Be certain that the correct gun liner and contact tip are being used for the selected wire size. See "Setting Up the Welding Gun" on page 9.

11. Close the wire drive pressure wheel assembly by moving the tension lever.

12. Remove the gas nozzle and contact tip from the end of the welding gun to prevent an obstruction to the welding wire end to be fed through the torch assembly.

13. Place the power switch in the "On" position. Set wire feed control to number 4. Pointing the gun away from yourself and the welder, press the gun control trigger until the wire emerges from the torch.

14. Check the wire spool brake tension by holding the spool with your hand. While turning the spool, you should feel a slight amount of resistance. Spool brake tension should be checked frequently as spool is used or wire changed. (See Page 20.) Only enough tension to prevent unraveling of the wire when drive is stopped is necessary.

15. Install the proper contact tip (marked on side) and then the selected gas nozzle. Anti-spatter Spray can be applied to help prevent spatter from sticking.

16. Cut off the extra wire so that the end of the wire extends about ¼" from the tip of the gun. See Figure 13.

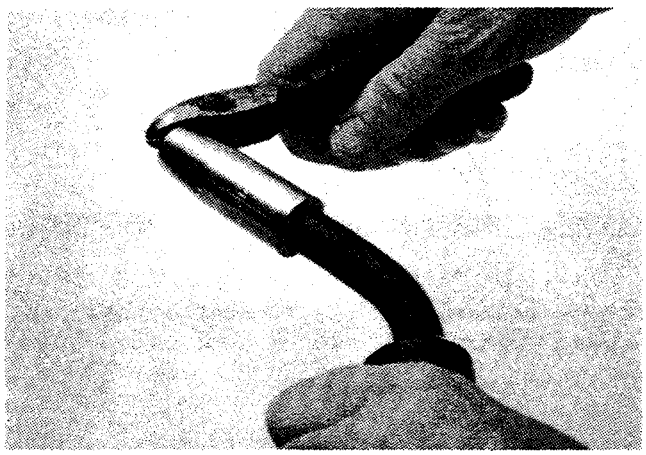


Figure 13

Selecting the Shielding Gas

The type of material being welded determines the type of gas that should be used. For all applications be sure to use Welding Grade Gas. Your local welding supplier can assist you in choosing the correct gas and cylinder size.

SHIELDING GAS

Material	Gas	Flow Rate with gun control trigger depressed
All Steels	75% Argon 25% CO_2 Stargon	12-20 CFH* 12-20 CFH*
Aluminum	100% Argon	16-24 CFH*

* Cubic feet/hour

Connecting Gas Regulator To the Gas Cylinder

WARNING

GAS CYLINDERS SHOULD BE SECURED WITH CHAIN TO THE SUPPORT BRACKET TO PREVENT THE CYLINDER FROM FALLING OVER AND BREAKING THE VALVE.

If you purchase a gas regulator separately, follow the installation instructions included with the regulator.

1. Secure gas cylinder.

WARNING

BE SURE THAT GAS CYLINDER IS SECURED BEFORE PROTECTIVE CAP IS REMOVED.

2. Remove protective cap from cylinder.

WARNING

STAND CLEAR AND WEAR EAR PROTECTION.

3. Crack open the valve on the cylinder momentarily to free the valve of any foreign material.

WARNING

DO NOT USE THE REGULATOR IF IT IS DAMAGED IN ANY WAY, OR IF GREASE OR OIL IS PRESENT.

4. Clean the regulator inlet filter and outlet fitting of dirt and other material. Attach the regulator to the valve and snug-up the connection with a wrench. Keep the regulator vertical so that the faces can be seen at a glance. See Figure 14. Check for leaks with soap water.

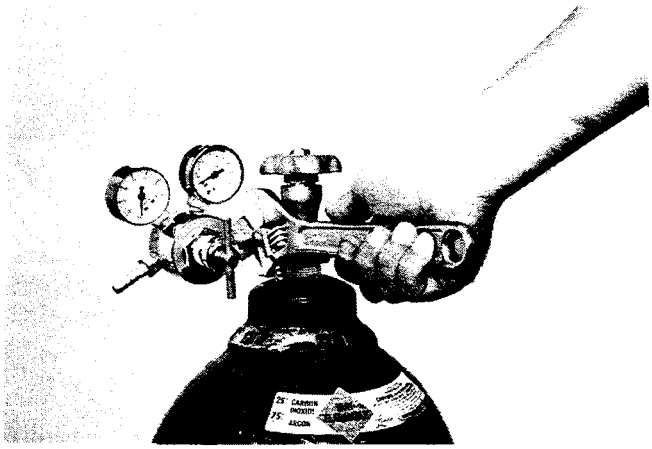


Figure 14

5. Slide the unattached end of the welder gas supply hose over the regulator outlet stem of the regulator. (See Figure 15) Some regulators may require installation of a gas coupling nipple for ¼" I.D. hose, and the other end of the gas hose to the back end of the gas solenoid valve on the wire spool side of the cabinet.

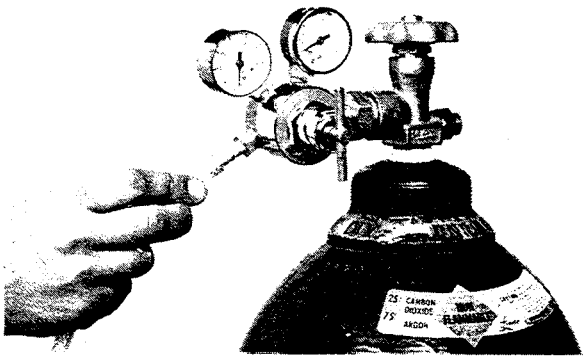


Figure 15

CAUTION

Insure that the rate adjustment handle is turned fully counterclockwise (OUT), but not removed from regulator, before opening the gas cylinder valve. This procedure must be followed at initial installation and each time the gas cylinder is changed to prevent damage to the gas gauge.

6. Turn the regulator flow rate adjustment handle COUNTERCLOCKWISE.

7. Open the gas cylinder valve by turning counterclockwise until seated.

8. Turn on the welder. With gun in a safe direction, press gun control trigger and adjust the regulator flow rate. (See Shielding gas table on page 11.)

Connecting the Ground Clamp

IMPORTANT

A good ground clamp connection is an important part of the welding circuit. A poor connection will waste power and result in poor machine performance.

Remove all paint, rust, scale, oil or other nonconductive or flammable material from the welding area and the area where the ground connection is to be made. Clamp as close to the welding area as possible. See Figure 16.

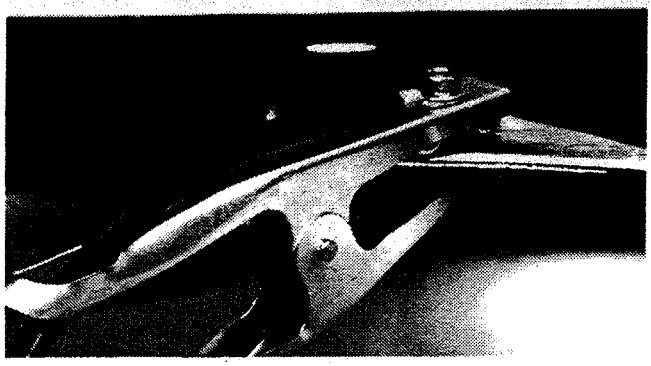


Figure 16

BASIC OPERATING TECHNIQUES

Learning To Weld

Teaching yourself to weld is not difficult, but it takes regular practice and a lot of trial and error. The best way to learn is by making practice welds on scrap metal — never by making repairs on a car. Become confident in your ability to make neat welds, with good penetration and no burning through.

For your practice welds it is easiest to learn on 1/16" (16 gauge) scrap metal, free of paint, rust, dirt, oil or other nonconductive or flammable material. The beginner should start in the flat position since it is the easiest welding position to learn.

When you have mastered good welds on 16 gauge material, continue practicing with thinner gauge as well as heavier material until you are satisfied with your results.

Before Welding Checklist

1. Place the power switch in the ON position.
2. Open the gas cylinder valve fully.
3. Adjust heat and wire speed control base settings. See Page 14 Setting Controls
4. Move weld selector switch to the manual weld position.
5. Adjust regulator flow rate.
6. Connect ground cable to work.
7. Extend wire approximately ¼" beyond contact tip.
8. Take necessary safety precautions. Place torch in position. Press trigger to weld.

Welding Positions

MIG welding can be done in any of the four basic positions: flat, horizontal, vertical and overhead. Flat welding is usually easier, faster and allows for better penetration. Overhead welding is the most difficult and may require many hours of practice to perfect.

If possible, position the work piece so that the bead will run on a flat surface, especially if the operator has little or no MIG welding experience.

Clamp work pieces in position and tack weld to prevent accidental shifting of pieces while welding.

Holding The Gun

The gun, held in either hand, should be held so that the nozzle is at a 45 to 60 degree work angle. See Figure 17

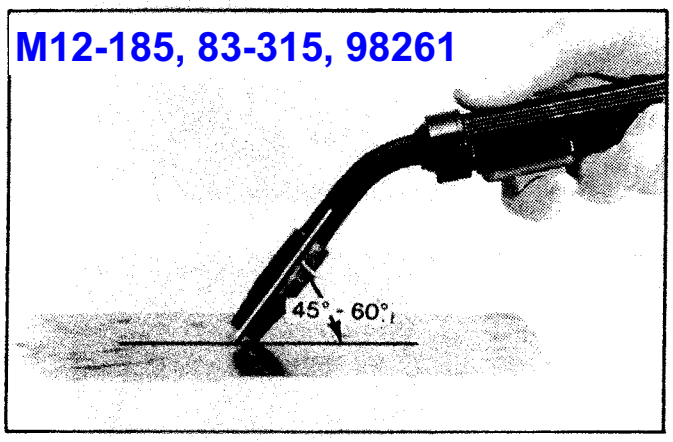


Figure 17

The wire is not energized until the gun control trigger is pressed. This allows the wire to be placed "on target" before you bring the shield to your face.

⚠ WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN. PROLONGED EXPOSURE CAN CAUSE BLINDNESS AND BURNS. NEVER BEGIN WELDING UNLESS YOU ARE ADEQUATELY PROTECTED. WEAR FLAME-PROOF WELDING GLOVES, HEAVY LONG SLEEVED SHIRT, CUFFLESS TROUSERS, HIGH TOP SHOES AND A WELDING HELMET.

The gun should be held so that the contact tip is about ¼" from the work. To help maintain this distance, extend the wire ¼" from the gas nozzle tip before initiating the arc. Too much or too little distance will result in poor welds, increased spatter and erratic sound. See Figure 18

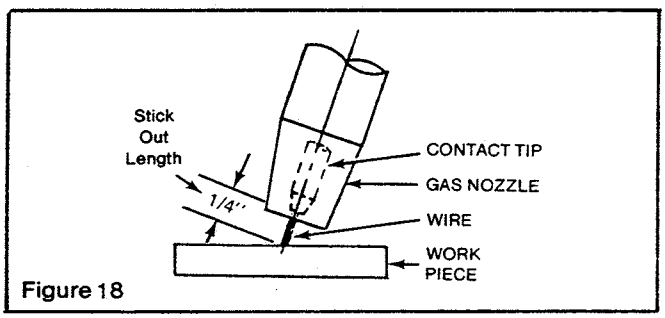


Figure 18

Initiating The Arc

NOTE

A short stick out length allows better starts and better penetration. Too short of a stick out will destroy the contact tip. A long stick out is less likely to burn through work. Proper stick out length will be found with experience.

Place the wire on target. Bring weld shield to face. Press the trigger.

Adjusting The Wire Speed

Whenever the heat control setting is changed, the wire speed should be fine tuned. It is recommended that fine tuning be done welding on a scrap piece of metal similar to work being done. Knowing when the arc is just right is a matter of experience. A good arc can be recognized by a crisp, steady "sizzling" sound.

Travel Speed

The speed of travel is regulated by the type of weld bead required. While learning how to weld, travel at a speed that allows you to maintain a constant weld width.

As a rule of thumb: Do not allow bead width to be less than metal thickness. Yet too wide of a bead is more likely to destroy the properties of the base metal. Observation of the back side of practice welds will help determine proper travel speed.

An acceptable bead requires steady gun movement along the weld seam. Moving the gun rapidly or straying off the seam will prevent proper metal-to-metal fusion and result in a poor looking, uneven weld bead.

Setting The Controls

BASE SETTING CHART

MATERIAL THICKNESS							
	Gage No.		28	22	16	10	4
	Fractional (in.)		1/64	1/32	1/16	1/8	1/4
	Decimal (in.)		.015	.030	.062	.125	.250
	Metric (mm)		.4	.8	1	3	6
SETTINGS*	.023" WIRE	Heat	2-3	3-4	5-7	7-8	NOT RECOMMENDED USE .030" WIRE
		Wire	2-4	2-5	3-5	4-6	
	.030" WIRE	Heat	NOT RECOMMENDED USE .023" WIRE	3-5	5-6	6-7	8
		Wire		1-3	4-5	3-5	3-6
ALUMINUM .030		Heat	NOT RECOMMENDED	3-4	4-5	5-6	NOT RECOMMENDED USE .035" ALUMINUM
		Wire		4-5	5-7	7-Max	

*Your settings may vary depending on the input voltage, material used and operator preference.

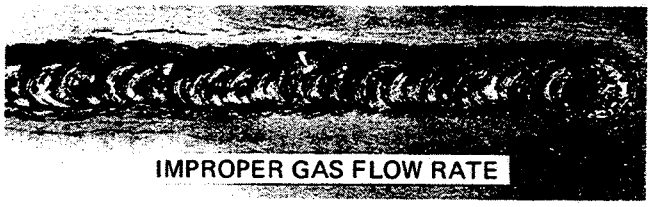
The heat selector switch on the machine has nine positions. Generally, the thicker the material, the higher the setting.

The wire speed control is the variable for fine tuning. An increase in heat does require an increase in wire feed speed. The above chart has been prepared to help you with the base settings of the machine. Use them as a starting point and adjust as needed to obtain the correct "sizzling sound." This is similar to the sound of tearing a linen sheet. Too little wire feed, and a "hiss" will develop with wire burning to a ball. Too much wire feed, and the wire will push torch away with corresponding arc crack.

Continuous (seam) welds are better for thicker materials. For thin materials, where warpage must be controlled, use stitch or spot welding only. It is desirable to weld aluminum with a continuous weld when possible. A continuous weld is likely to have less contamination imperfections.

Weld Defects

INCONSISTENT TRAVEL SPEED

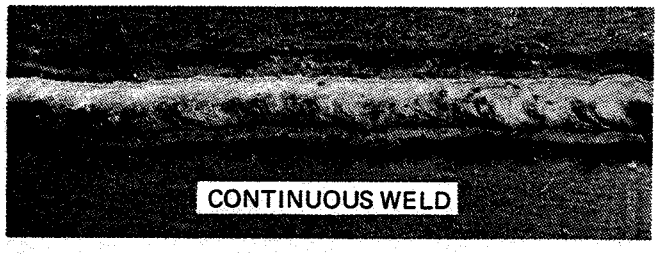


IMPROPER GAS FLOW RATE

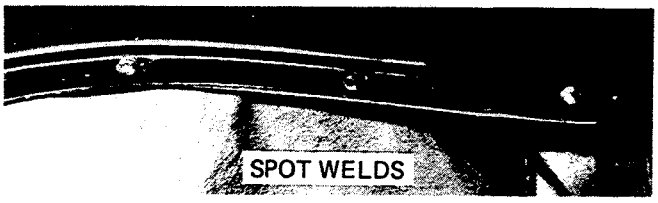
EXCESSIVE PENETRATION

INSUFFICIENT PENETRATION

Three Modes of Welding



CONTINUOUS WELD



SPOT WELDS

ADVANCED OPERATING TECHNIQUES

Spot/Plug Welding

Spot/Plug welding is very useful on today's unitized body cars since welds can be made at the identical factory locations. (See Figure 22) Spot/Plug welds can be made through two different thicknesses of material. Whenever possible, the lighter gauge material should be welded to the heavier material. The two pieces must be in good contact with each other. The surface to be joined must be clean. Use scrap steel of the exact type to determine the heat and wirespeed setting before spot welding the intended work.

The spot weld is a small, localized weld penetrating through one piece of material and into the other. A plug weld is much like a spot weld except that a hole is punched in the top piece. (See Page 21 "Optional Tools".) This produces the strongest welds even when gaps are present between the panels. For best results, use plug welds instead of spot welds especially when replacing structural panels.

Spot/Plug welds can be made manually or automatically, with or without the spot welding gas nozzle. Manual welding should be used when only a few welds are made or when welding materials that vary in thickness. Automatic welding should be used when making many welds on the same material.

Automatic Spot/Plug Welding Procedures

1. Attach spot weld nozzle to gun. (See Figure 19) It is recommended you apply anti-spatter spray to nozzle and contact tip.

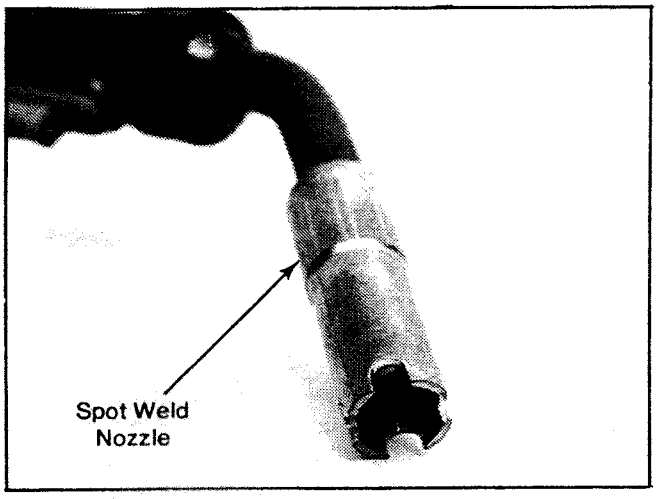


Figure 19

2. Adjust heat and wire speed control base settings. When using base setting chart, figure combined metal thicknesses. See Page 14

3. Fine tune the control settings by making manual welds on similar scrap material.

4. Move the weld selector switch to the spot weld position. (See Figure 20.)

5. Once the proper heat and wire speed have been selected, the spot weld time control will allow consistant weld size and penetration. Adjust for best results. Fine tune spot welding time control by making welds on similar scrap material. The ideal spot weld is small in diameter but shows penetration on the back side.

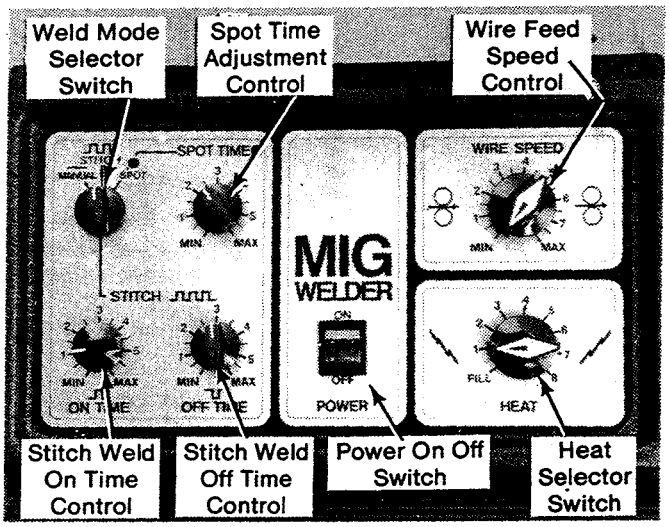


Figure 20

6. Extend or cut the wire so that it is flush or within the end of the nozzle. See Figure 21

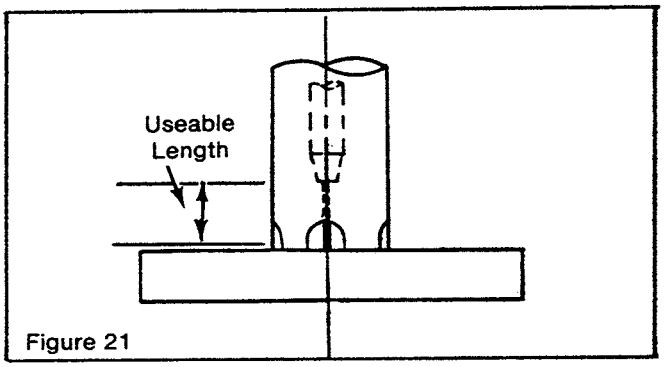


Figure 21

7. Hold the nozzle perpendicular to the work with the nozzle resting on the work; if you are welding into a punched hole, aim the wire at the center of the hole. See Figure 22

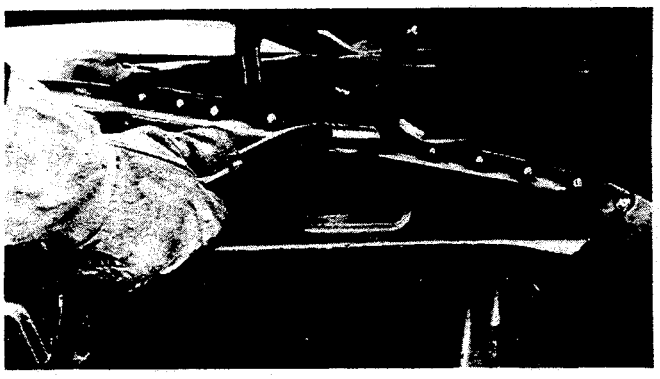


Figure 22

8. Bring the shield to your face and press the gun trigger, the machine will stop automatically when the weld is complete. Release the trigger. Move to the next weld area and press the trigger again to weld.

Stitch Welding

Stitch welding is especially helpful when welding thin or rusty material where warpage or burn-through is a problem. Stitch welding produces the quality and penetration of a continuous weld with less heating of the material. Stitch welding is basically a series of spot welds which overlap slightly and which have time to cool between each weld. Stitch welding allows metal to cool between short beads.

Stitch welds can be made manually or automatically. Manual welding should be used when only a few welds are to be made or when welds are made on materials that vary in thickness. Automatic welding should be used when many welds are to be made on the same material.

Skip welding further reduces distortion problems. Skip welding requires a stop and restart further up the seam. Skip welding can be used where spot welding is not enough but distortion is a problem.

Manual Stitch Welding

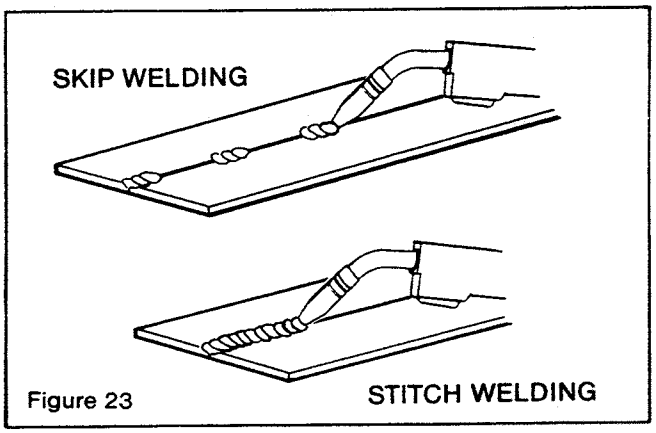


Figure 23

1. Follow Basic Operating Technique. (Page 12) With manual stitch welding the operator determines the start and stop of short weld with trigger actuation. See Figure 24

2. When stitch welding, wait until the orange color of the previous weld disappears, continue with the next weld slightly overlapping the previous weld.

Figure 24

AUTOMATIC STITCH WELDING

1. Follow basic operating techniques. Beginning on Page 12

2. Move the weld selector switch to the stitch weld position.

3. Start with a time base setting of 2 on both the stitch **on time** and **off time** controls. Then test weld. The orange color of the weld should disappear before the next weld cycle. Adjust weld **on time** to get desired puddle size and adjust stitch weld **off time** control to get the proper cool down period.

Minimizing Overheating and Burn-Through

Overheating material, especially large, thin gauge panels, will cause the material to warp. Burn-through is usually caused by local overheating of the material.

To reduce burn-through, stop the seam occasionally as in stitch welding and let the material cool until the orange color disappears, then start again. If burn-through is a problem, go to lower heat setting.

1. Tack the panel at each end and in the middle. See Figure 25

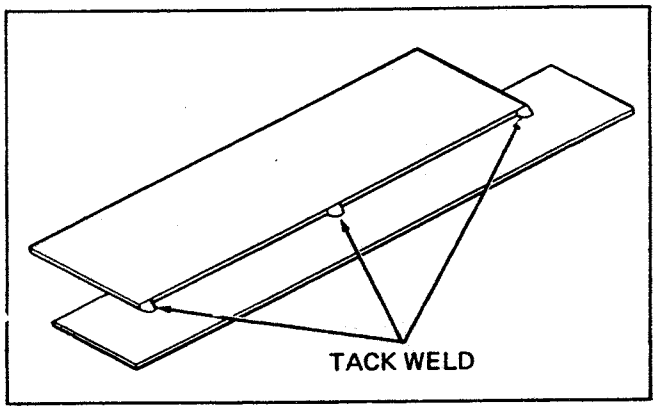


Figure 25

2. Tack between each of the first tacks. Continue doing this until the distance between each tack is 3 inches or less. See Figure 26

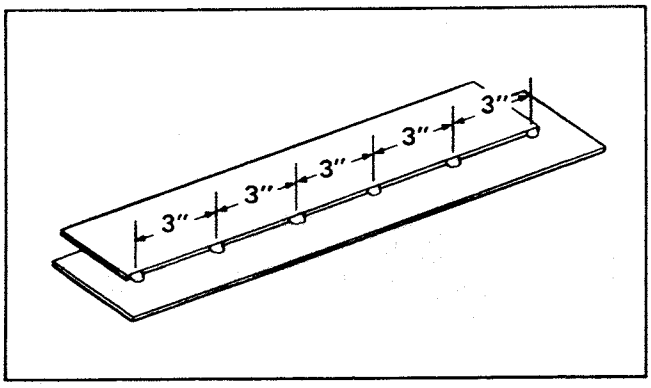


Figure 26

3. Flatten any panel gaps between the tacks with a hammer.

4. Stitch, skip, or spot weld between the tacks, alternating from one end of the panel to the other. See Figure 27

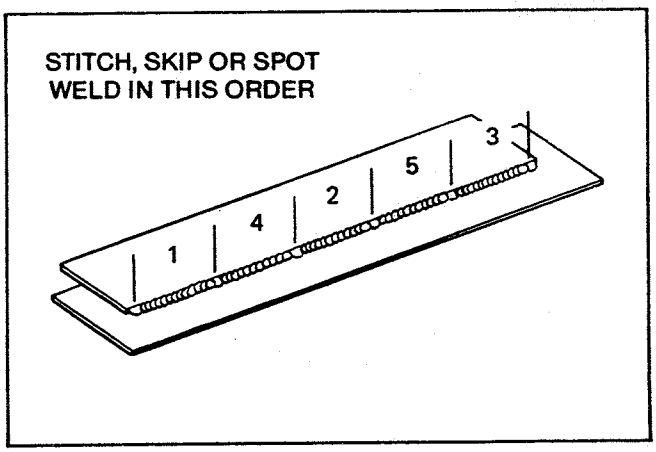


Figure 27

Seam Welding Tears Or Gaps

Tears or gaps in panels can be seam welded using the following steps.

1. Reduce the heat setting one or two steps lower than for continuous welding.

2. Bridge across the gap at intervals approximately ½" apart by making short tack welds on each side of the gap and letting each one cool before proceeding. See Figure 28

3. Fill in the holes by using the hole filling technique.

4. For a smoother appearance, stitch weld over the patch at the normal heat setting.

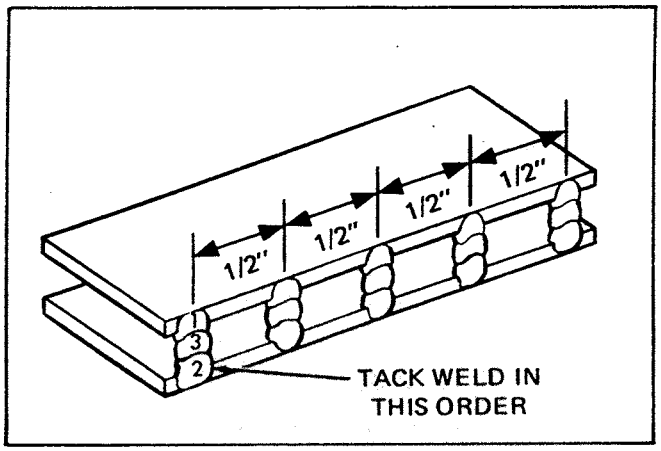


Figure 28

Filling Holes

Small holes in panels can be filled easily using the following steps.

1. Reduce the heat setting one or two steps lower than for continuous welding.

2. Make a short tack weld on the far edge of the hole and let it cool until the orange color diappears. See Figure 29

3. Make another short, tack weld on each side of the first and let them cool. See Figure 30

4. Continue making short tack welds alternating from side to side until the hole is filled. See Figure 31

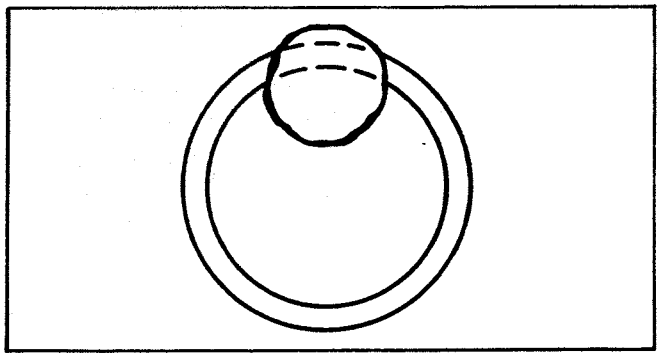


Figure 29

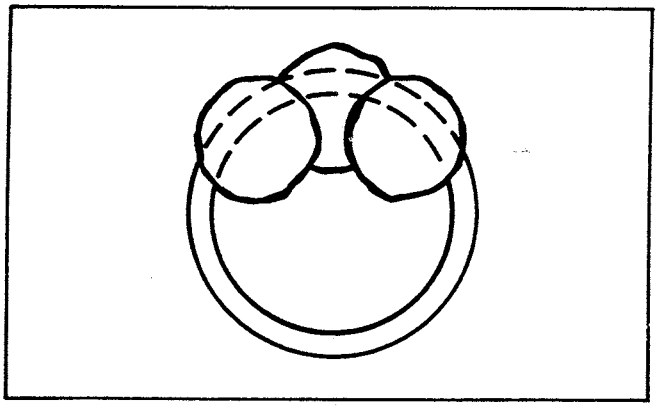


Figure 30

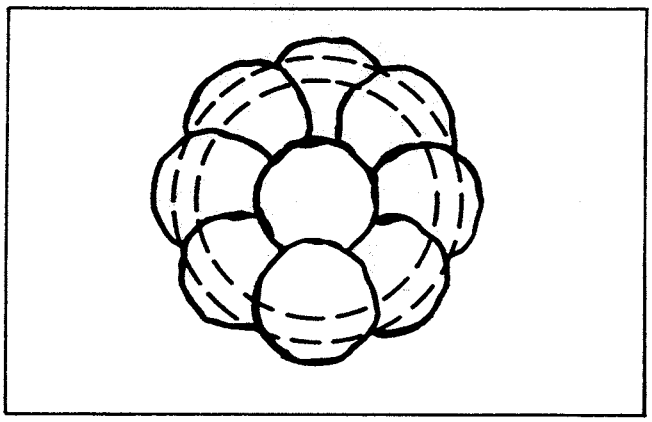


Figure 31

Filling Areas With Molten Metal

Large areas and holes can be filled with molten metal easily using the following steps.

1. Set the heat control to "Fill."

2. Set the wire feed control near maximum to allow wire to transfer without an arc.

3. Extend the wire ½" from the tip to the work. This has to be greater than the ¼" recommended in Operator Techniques.

4. Keeping a firm grip on the gun, touch the work with the wire as trigger is pressed. The wire will be transferred in **plastic-like** molten state. Fill the desired area by constantly moving the gun back and forth over the fill area. See Figure 32

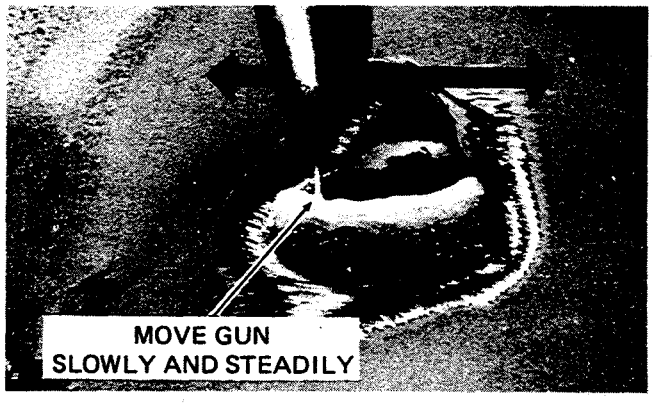


Figure 32

NOTE

Hold the gun so that the gas nozzle is almost parallel to the hole to allow the wire to transfer to the edge of the material. A small piece of copper can be used to back-up the weld for larger holes as the plastic state metal will not stick to it.

5. Finish weld over the area for a smooth appearance and strength. See Figure 33

Figure 33

Using The Heat Shrinking Attachment

The heat shrinking attachment is used for removing stretch damage from thin gauge panels. Heat shrinking is done without gas or weld wire.

1. Remove the gas nozzle from the gun and attach the carbon rod to the supplied attachment. See Figure 34

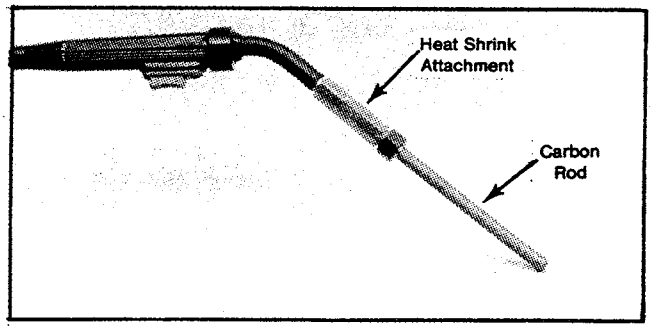


Figure 34

2. Set the heat control between 1 and 4 depending on material thickness, and move the weld selector switch to the manual weld position. DO NOT SET HEAT CONTROL SETTING OVER 4.

3. Place the tip of the carbon rod on the outside edge of the area, bring the shield to your face and press the trigger.

4. Working in a circular pattern, work your way to the center of the damaged area in a slow, steady motion. Stop when the area starts to turn in color. (See Figure 35). Do not exceed the continuous two minute duty cycle, overheating of the unit may occur.

5. Quench the area with a cold, wet rag.

6. Do a small area at a time. There is a limit as to how much a given sheet will contract.

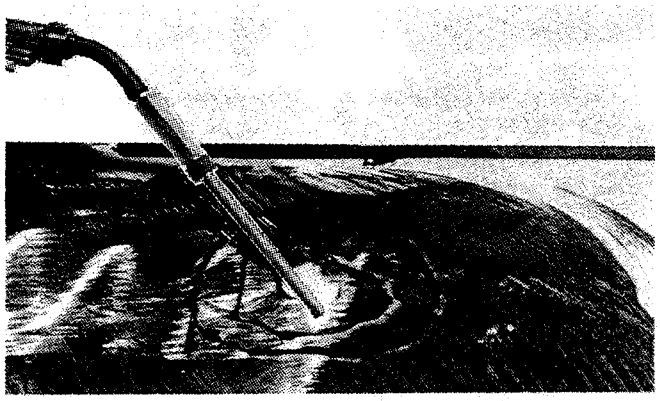


Figure 35

Liner Change Installation

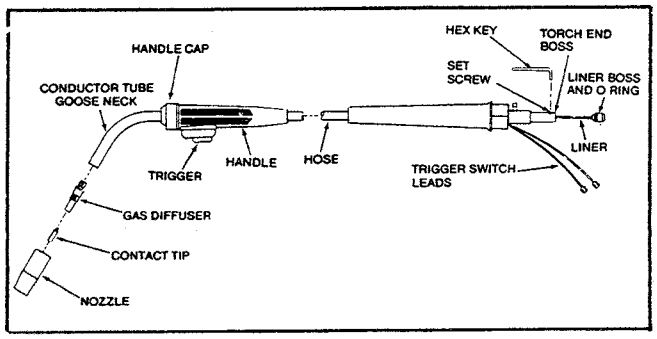


Figure 36.

NOTE

Teflon liner is installed same as steel liner. However, the teflon liner may need to be trimmed so it's length allows it to stop inside the gas diffuser.

1. Disconnect machine from power source.

2. Remove tension from drive idler roll and remove any wire remaining in machine.

3. With left side of cabinet open, disconnect gas hose from torch. Disconnect torch trigger leads from terminal block. Loosen wire drive to torch lock bolt. Remove gun assembly from machine.

4. Remove the gas nozzle from the gun by turning it counter clockwise.

5. Remove the gas diffuser along with the contact tip using a 7/16" open end wrench at the base of the gas diffuser.

6. Loosen the hex key screw with 5/64" allen wrench. This set screw will allow liner to be removed from the torch end boss.

7. Remove the original liner by pulling the liner from the mounting end of the torch assembly.

8. Lay the gun assembly straight out. Feed the new liner into the mounting end until the "O" ring of the liner boss contacts the torch.

9. Retighten the liner lock set screw.

10. Reinstall the torch assembly. See Page 8 instruction number 4

11. Reinstall the gas diffuser, proper contact tip, and gas nozzle.

Aluminum Welding

The set up for aluminum welding is very much like that for steel welding with the following exceptions.

1. Suitable aluminum wire must be used. See Page 10

2. A Teflon liner should be used in the torch assembly. See Figure 36 The liner allows the aluminum wire to slide easily through the torch assembly. Steel particles will contaminate an aluminum weld.

3. The wire spool brake tension should be nearly free. See page 20

4. Pure Argon gas **ONLY** should be used at 16-24 CFH flow rate. See page 11

⚠ WARNING

THE WELDING AREA MUST BE DRY OF ALL SOLVENT BEFORE WELDING IS STARTED OR AN EXPLOSION COULD OCCUR.

ALUMINUM WELDING PREPARATIONS

IMPORTANT

Surface preparation is **extremely** important when aluminum welding. Clean the weld area thoroughly with a suitable solvent such as lacquer thinner or enamel reducer. Wire brush the area with a clean stainless steel brush to remove any surface oxidation **just before welding.**

Contamination from dirt, grease, water and other foreign material is the biggest enemy of aluminum welding. For this reason it is best to use new, unopened wire spools. Since you cannot keep an opened spool very long, purchase the smallest spools possible from your welding supplier.

NOTE

Follow instructions under "After Welding" and "Connection of Gas Regulator" (Page 11) when changing over to pure Argon for aluminum.

ALUMINUM WELDING TECHNIQUE

SEE BASIC OPERATING TECHNIQUES ON PAGE 12.

These techniques should be followed, although there are some differences:

A. Stick-out length can be increased to 5/16".
B. Travel speed will be faster for aluminum.
C. Base setting of wire feed speed will be higher per heat setting than for steel.
D. The work area should be free of drafts while welding aluminum.

AFTER WELDING

1. Turn the gas cylinder valve OFF (clockwise). See Figure 37

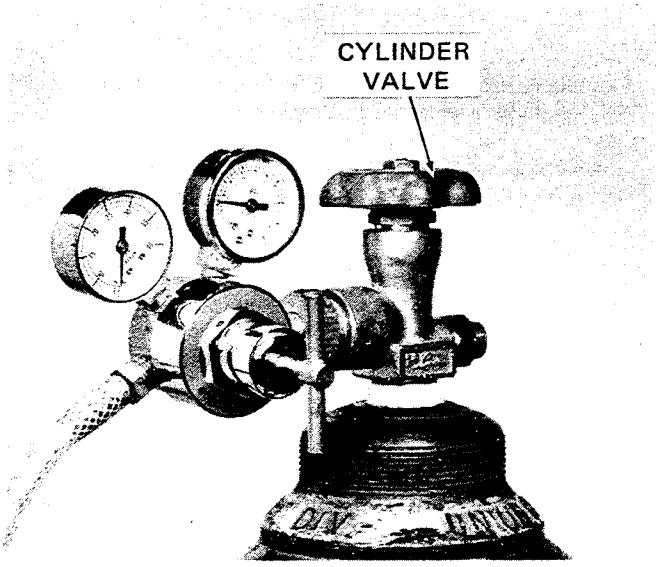


Figure 37

2. Pointing the gun away from the machine, press the gun trigger and release any gas in the system.

3. Turn the regulator adjustment handle counterclockwise. Turn only to relieve tension. Do not remove.

4. Place the power switch in the "Off" position.

5. Disconnnect the ground cable from the work.

6. Remove the power cable from the outlet or open the circuit breaker.

7. Clean nozzle and contact tip thoroughly.

8. Clean work area as required.

9. Check the amount of wire left on the spool and carry out maintenance as required.

OPERATOR MAINTENANCE AND ADJUSTMENTS

Maintenance

As with any other fine piece of equipment, regular maintenance and adjustments are needed to keep the machine in top operating condition. With proper care and maintenance, this MIG welder will provide years of trouble free service.

IMPORTANT

The gun and torch assembly is the most important part of your machine, it must be properly cared for!

1. **Never** make sharp bends with the gun hose. Check the hose frequently for signs of abrasion and other damage.

2. **Always** keep the gas nozzle and contact tip free of spatter. Use a wooden stick to scrape away spatter. Clean the gas nozzle and contact tip. It is recommended anti-spatter spray be used before and after each operating period.

3. Replace the contact tip with a new one of the proper diameter. A dirty contact tip will cause eratic operation. Replacement is necessary when hole is too large or when there is excess dirt build up. A rule of thumb is every ⅓ spool of wire.

4. Replace the gas nozzle with a new one when insulator begins to get brittle or when it does not provide even shielding.

5. The wire conduit or liner should be checked occasionally for free wire movement. To clean the liner, remove it from the torch assembly and soak the liner in solvent, and blow dry with compressed air. See page 18 for liner installation

6. To clean inside of cabinet, use vacuum cleaner and soft brush.

7. Check and adjust wire spool brake tension at least every ⅓ spool of wire.

ADJUSTMENTS

WIRE SPOOL BRAKE TENSION — Proper brake tension is necessary for correct machine operation. To adjust:

1. Adjust wire feed control near maximum.

2. Turn machine on and press the gun control trigger. When trigger is released, the spool should stop.

3. Adjust the tension nut clockwise to increase or counter-clockwise to decrease the spool braking. Start with it loose and tighten ¼ turn each try. When correctly adjusted, spool will stop without wire unravelling nor without overload. Be sure to adjust whenever spool is changed. (See Figure 38)

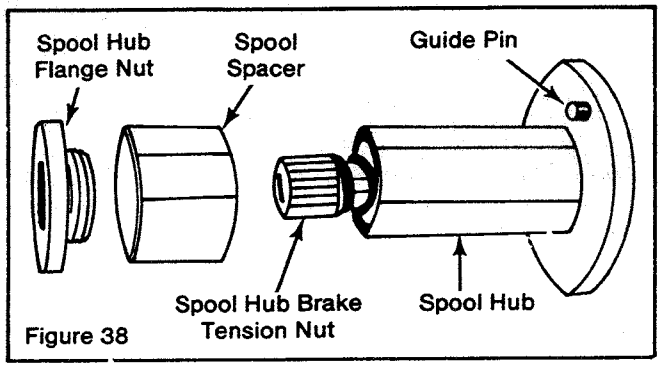


Figure 38

GUN NOZZLE DIRECTION ADJUSTMENT — At times it is desirable to have the goose neck point in a different direction. (See Figure 39) To adjust:

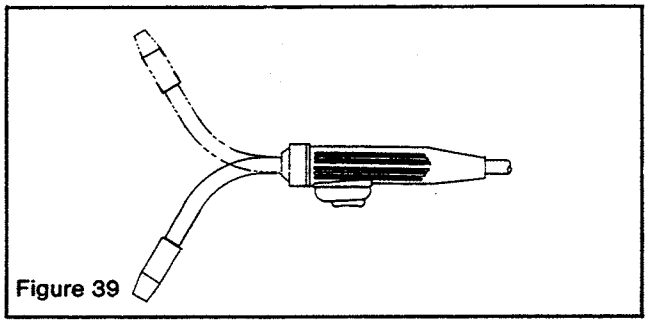


Figure 39

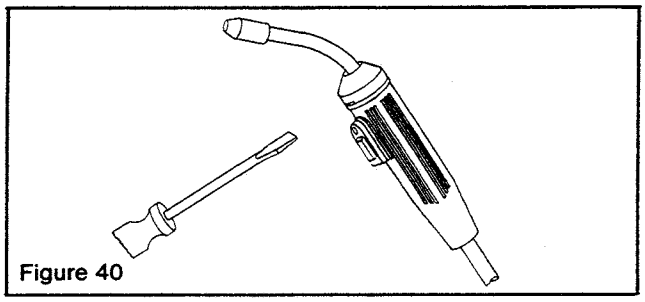


Figure 40

1. Unsnap handle cap with wide blade screwdriver. See Figure 40

2. Hold gooseneck and loosen the jam nut with a ⅝" wrench. (See Figure 41) Rotate gooseneck to desired position. Retighten jam nut.

3. Snap torch handle cap back in place.

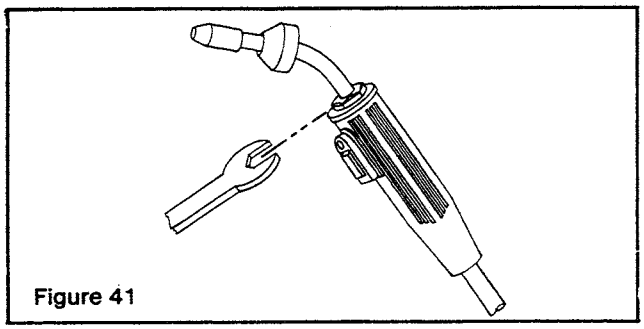


Figure 41

OPTIONAL TOOLS

THE HOLE PUNCHING TOOL

The hole punch is used when plug welding through 18 gauge material or thinner. Holes punched in material should be no closer than 1/8" from the edge of the material. The tool is adjustable for consistent edge to hole distance. See Figure 42

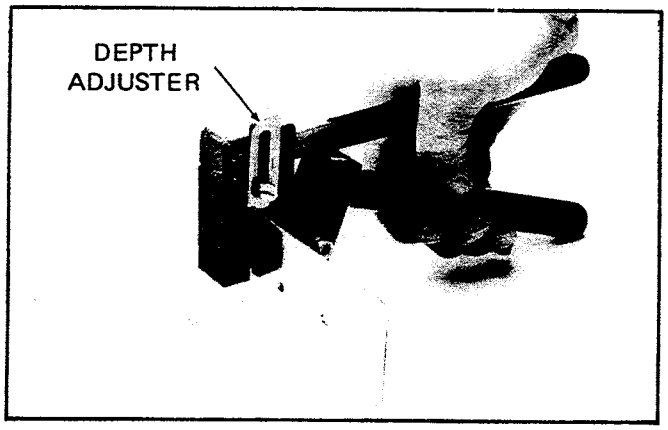


Figure 42

THE FLANGING TOOL

The flanging tool is particularly useful for sectioning and other jobs where the weld area must be flush with the base material. The flanging tool can be used on panels 18 gauge or thinner. See Figure 43

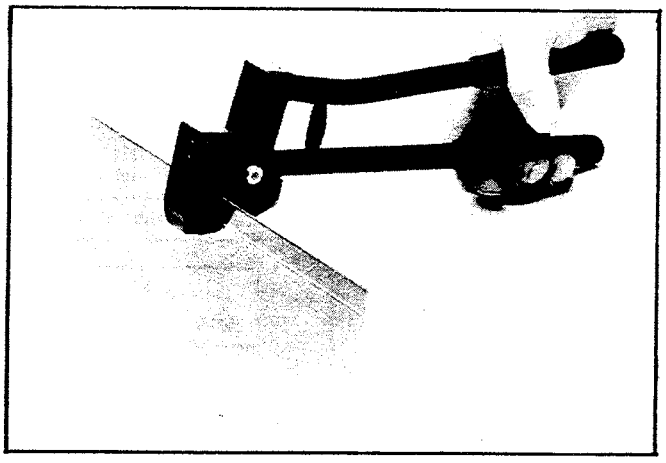


Figure 43

OPERATOR TROUBLESHOOTING

PRECHECKS **Before going into specific troubleshooting procedures these general preliminary pre-checks should be made**

I General welding difficulties

Check
- Ground clamp electrical contact with work.
- That all machine connections are clean and tight.
- Regulator valve for proper flow setting
- For good supply of proper gas in cylinder.
- That nozzle is clean and free from spatter.
- For usable proper sized contact tip.

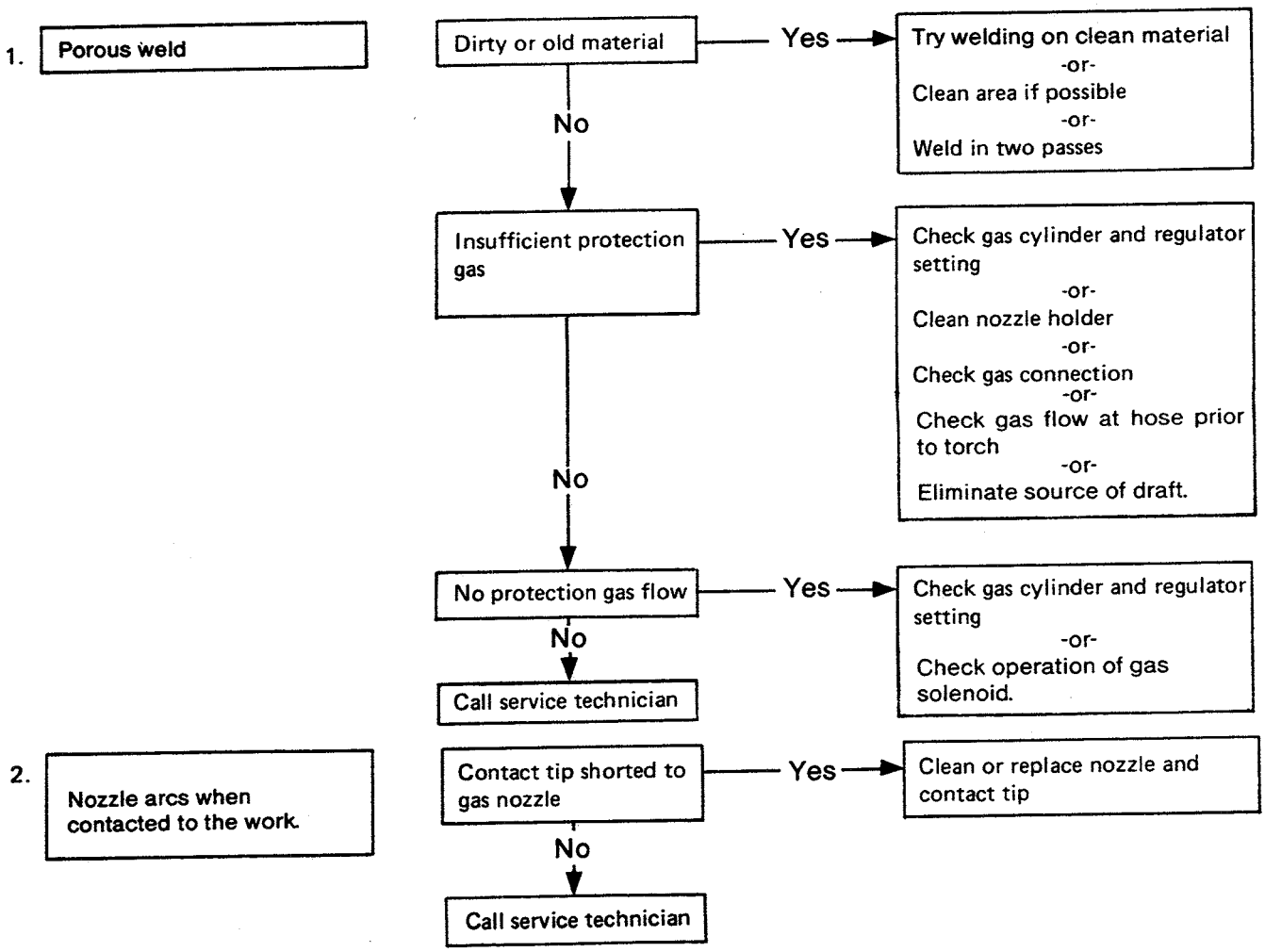
II Welder inoperative or operates intermittently

Check
- Main circuit operability
- Cable connections to wall plugs
- Torch cable for damage

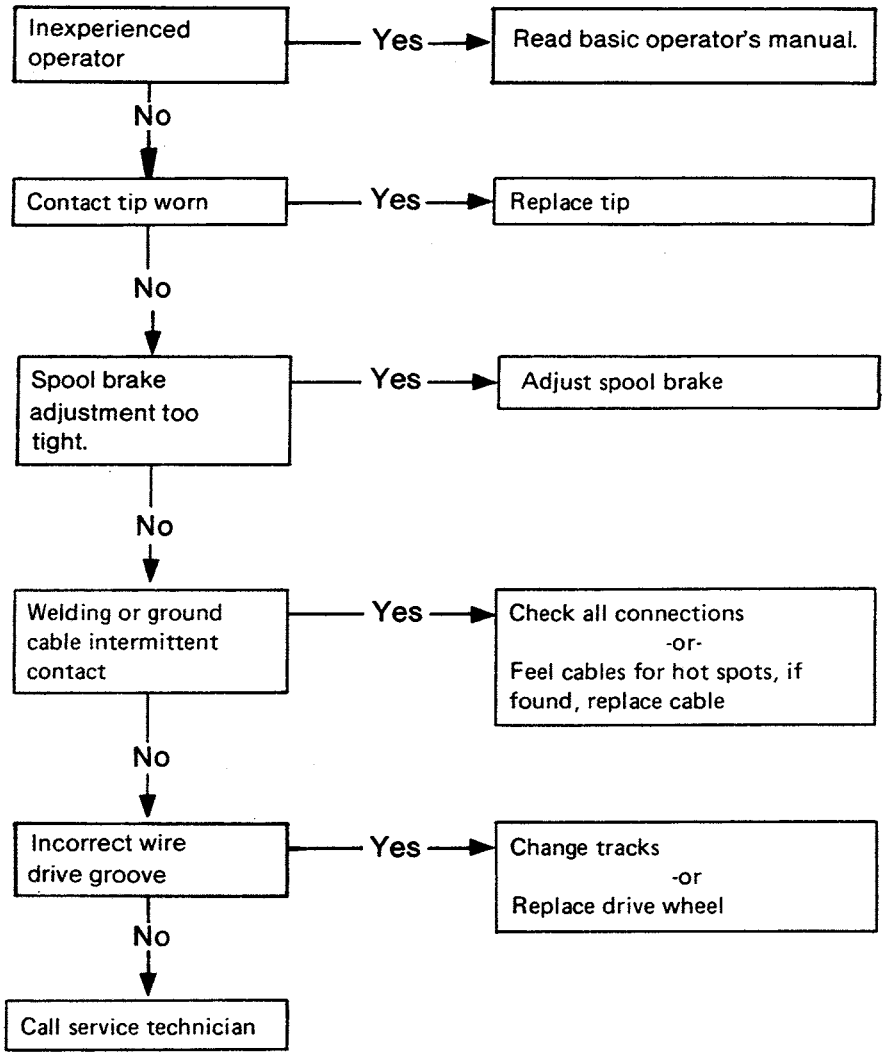
Specific troubleshooting is divided into (2) parts:

WELD PROBLEMS
MACHINE PROBLEMS

WELD PROBLEMS



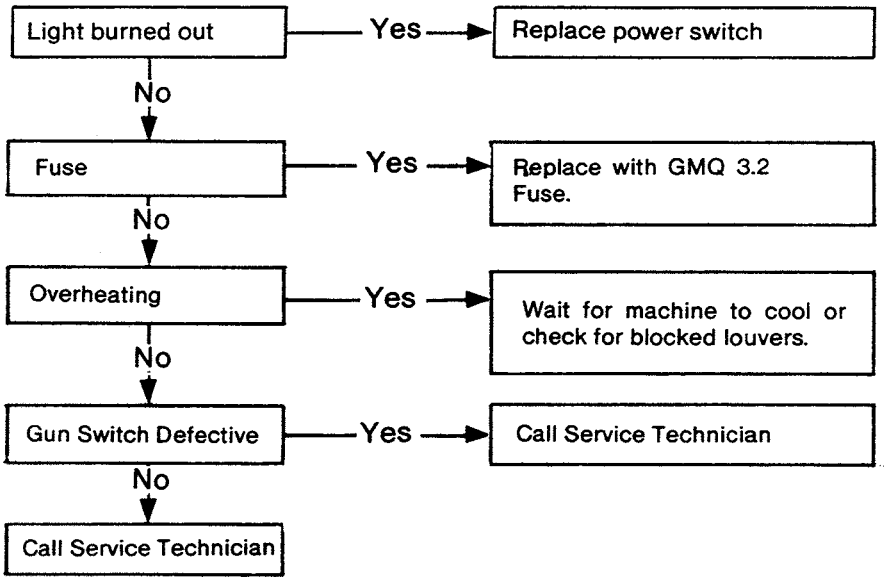
3. Irregular or inconsistent welds



MACHINE PROBLEMS

1. Machine operates o.k., but power switch light not lit

2. Power Light on — no other indication when trigger depressed.



M12-185, 83-315, 98261

4. Wire drive runs but no welding current one or more heat switch positions

Defective heat switch — Yes → Call service technician

5. Wire drive runs erratically at low wire speeds

Clogged liner — Yes → Clean or replace liner

No ↓

Wire drive groove incorrect or worn — Yes → Use correct wire drive groove -or- Replace if worn

6. Machine operates continuously or not at all in spot weld mode or stitch weld mode

Defective timing circuit board — Yes → Call service technician

7. Weld sound is spitting and popping. Welding wire glows red, sticks to work.

Work is dirty — Yes → Work must be free of contaminations.

No ↓

Wire speed too fast — Yes → Adjust wire speed control

No ↓

Welding ground bad — Yes → Reposition Ground or Repair Ground Clamp

No ↓

Call service technician