

# **HTP** America Inc.

180 Joey Dr. Elk Grove Village, IL 60007-1304

847/357-0700 1-800-USA-WELD

FAX: 847/357-0744

web site: [www.usaweld.com](http://www.usaweld.com)

e-mail: [sales@htpweld.com](mailto:sales@htpweld.com)

We congratulate you on your purchase of the new HTP Mini-MIG wire feed welding machine. Your Mini-MIG welder has been designed with the autobody craftsman in mind. It welds both thin sheet metal and 1/8" plate in addition to stainless steel and aluminum. With proper maintenance and care, your new HTP Mini-MIG will deliver years of trouble-free service, however, it is IMPORTANT that you read the following manual COMPLETELY.

## SAFETY SUGGESTIONS

Electric arc welding produces ultra-violet rays which are harmful to skin and eyes. Ultra-violet radiation can penetrate lightweight clothing, reflect from light colored surfaces, and burn the skin and eyes. Wear flameproof welding gloves which are not oily or greasy. The oil or grease on the gloves may ignite. Wear a heavy, pocketless, long sleeve shirt, cuffless trousers, and high-topped work shoes. Wear a full-face helmet with a number eight or darker lens and a cap. These precautions will protect eyes, hair, face, and skin from arc rays and hot metal.

To avoid fire, do not weld on wood, plastic tile or carpeted floors. Concrete or masonry floors are safest.

Do not weld on drums, barrels, tanks or other containers until they have been cleaned as described in AWS Standard A6.01.

Provide adequate ventilation in the welding area at all time. Do not weld on galvanized, zinc, cadmium or lead beryllium materials unless POSITIVE sufficient ventilation is provided. These materials produce toxic fumes.

Do not weld in areas close to degreasing or spraying operations. Chlorinated hydrocarbon vapors may react with the ultra-violet rays and form highly toxic phosgene gas.

If you develop momentary eye, nose or throat irritation during welding, stop welding immediately. This is an indication that ventilation is not adequate. Do not continue to weld until ventilation is improved.

Exposed, electrically hot conductors or other bare metal in the welding circuit or ungrounded electrically hot equipment can fatally shock a person whose body becomes a conductor. Do not stand, sit, lie, lean on or touch a wet surface when welding.

**WIRE FEED WELDERS & ACCESSORIES FOR AUTO BODY REPAIR**

Frequently inspect cables for wear, cracks, and damage. Replace those with excessively worn insulation to avoid a possible lethal shock from bared cable.

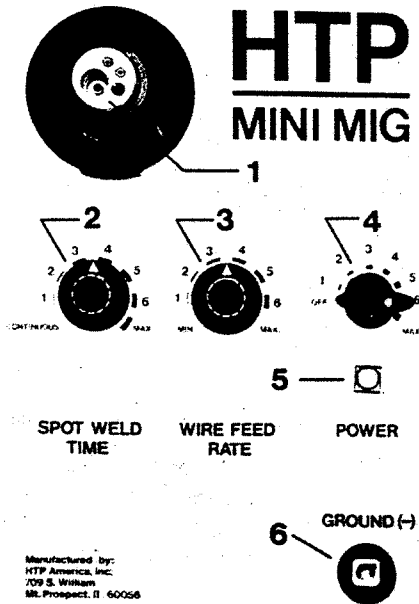
For more information, refer to the following standards and comply as applicable.

1. ANSI Standard Z49.1 SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 2051 NW 7th St., Miami, FL. 33125.
2. 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.
3. American Welding Society Standard A6.0 WELDING AND CUTTING CONTAINERS WHICH HAVE HELD CUMBUSTIBLES, 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 29CFR, Part 1910, Subpart Q, WELDING, CUTTING AND BRAZING.

#### ELECTRICAL CONNECTION

The HTP Mini-MIG is designed to operate on 220 volt single phase service wired for a minimum of 10 amps. All electrical connection should be done by a qualified electrician in accordance with the National Electrical Code and local codes and ordinances. When connecting the machine, the green or yellow-green wire MUST be connected to ground, or serious injury may result.

FRONT PANEL CONTROLS (See Fig.1)



Manufactured by:  
HTP America, Inc.  
709 S. Wilham  
Mt. Prospect, IL 60056

- 1) QUICK DISCONNECT CENTRAL ADAPTOR BLOCK—This is where the welding gun plugs into the machine. This single connection houses the power, wire, shield gas, and trigger wires.
- 2) SPOT WELD TIME—To automatically spot weld, switch the spot weld timer from "CONTINUOUS" to the desired spot weld time. (Pos. 1 is approximately  $\frac{1}{2}$  second, while MAX. is approximately 4 seconds). When the trigger on the welding gun is activated, the machine then welds for the predetermined time and stops. The trigger must then be released before the machine will weld again. Remember to reset the timer back to "CONTINUOUS" when you have completed spot welding.

Mini-MIG Front Panel (Fig.1)

- 3) Wire Feed Rate—The wire feed rate is infinitely adjustable and controls the wire speed. Minimum is the slowest and maximum is the fastest.

The wire feed rate will depend on the wire diameter and the power switch position. The wire speed setting is tuned in to the proper welding sound. A hissing, blowing sound with a ball of molten wire forming at the end of the wire and then dropping off indicates the wire feed rate is too slow. A loud cracking noise with the wire pushing the nozzle away from the work indicates the wire feed is too fast. The proper wire feed rate is obtained when a steady buzzing noise is heard while welding.

- 4) POWER—With the power switch in the "OFF" position, the welding machine is off. With the power switch in any other position, the indicator light will be illuminated, signaling the machine is on. The following chart gives approximate amperages and no-load voltages at each switch position.

Switch Position	Approximate Amperage (.023" Wire)	Approximate No-Load Voltage
1	25	21
2	32	22
3	40	23
4	45	25
5	55	27
6	70	29
Max.	100	32

**WARNING:** Do not change switch position while welding. This will cause arcing and may damage contacts.

- 5) INDICATOR LAMP-The indicator lamp will come on when the power switch is in any position other than off. Should the duty cycle of the machine be exceeded, the thermoswitch will kick in, and the machine will shut itself down. The indicator lamp will then go off. When the machine cools off, the thermoswitch will automatically reset itself (usually 10 to 15 minutes).

During the first few uses it is not unusual for the machine to emit some smoke. This is normal and will stop once the machine is broken in.

- 6) GROUND CLAMP RECEPTACLE-Insert the end of the ground cable into to ground receptacle. Secure the ground cable by twisting it clockwise  $\frac{1}{2}$  turn. It is important that the ground clamp be connected to a good, clean surface on the vehicle. Failure to do so will cause poor quality welds.

### SHIELD GAS

Since no flux is used in MIG welding, the proper shield gas must be used. Different metals require different shield gases.

Material	Shield Gas	Flow Rate
Steel	75% Argon - 25% CO <sub>2</sub> also 100% CO <sub>2</sub>	10-15 liters/min. (5-8 ft <sup>3</sup> /hr.)
Aluminum	100% Argon	25-30 liters/min. (13-16 ft <sup>3</sup> /hr.)
Stainless Steel	90% Helium + 7.5% Argon + 2.5% CO <sub>2</sub>	10-15 liters/min. (5-8 ft <sup>3</sup> /hr.)

Use a gas regulator such as HTP part # 12020 which is compatible with both Argon and C-25 gas Cylinders and has a barbed fitting for the delivery hose. Connect the gas hose to the brass fitting at the rear of the machine and to the barbed fitting on the regulator.

When setting the flow rate, you will notice there are two scales on the gas regulator. Use the red scale for 100% Argon and 75% Argon-25% CO<sub>2</sub>. Use the black scale for 100% CO<sub>2</sub>.

## WELDING WIRE

HTP has a wide variety of welding wire available. For autobody repair, we strongly recommend the following wires:

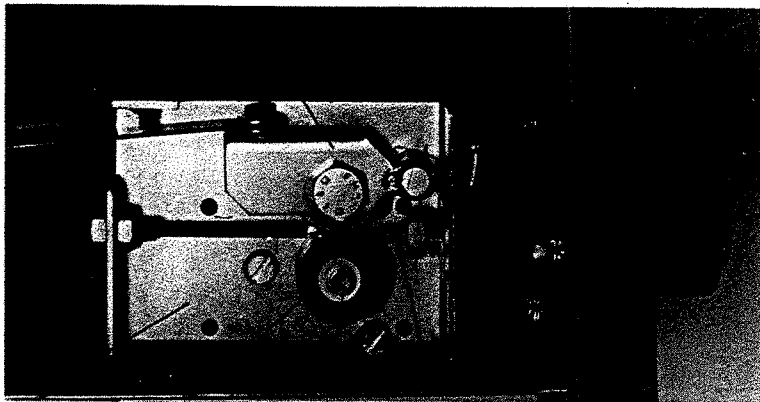
APPLICATION	PART #	DESCRIPTION
Steel	12023	.023" Steel Wire
Aluminum	12130	.030" Aluminum Wire

We are typically finding body panels being made from 22 gauge (.0299" thick), 24 gauge (.0239" thick) and 26 gauge (.0179" thick) steel. When welding this thin metal, the secret to minimizing distortion and burn through is by using a wire which will require the least amount of heat to melt. This would be the thinnest wire available, .023" diameter in steel and .030" diameter in aluminum.

For heavier materials, HTP has the following wire available.

APPLICATION	PART #	DESCRIPTION
Steel	12030	.030" Steel Wire
Steel	12035	.035" Steel Wire
Aluminum	12135	.035" Aluminum Wire

## FEEDING THE WIRE (See Fig.2)



<u>NO.</u>	<u>DESCRIPTION</u>
1	Pressure Release Handle
2	Pressure Roller Adjusting Screw
3	Pressure Roller
4	Adaptor Plug
5	Central Adaptor Block
6	Guide Tube
7	Drive Roll Retaining Screw
8	Drive Roll
9	Wire Drive Mounting
10	Inlet Wire Guide

Wire Feed Mechanism (Fig. 2)

- 1) Place the wire spool on the wire mechanism so that the spool rotates in a counter-clockwise direction as it unrolls. Make sure that the guide pin in the wire brake mechanism is inserted in the small hole in the wire spool.
- 2) Loosen the pressure roller adjusting screw (2) and lift up on the pressure release handle (1). Swing the pressure roller (3) out of the way.
- 3) Loosen the wire from the wire spool. Be **EXTREMELY CAREFUL** not to let the end of the wire go. Cut off the bent end of the wire to expose a short piece of straight wire.

- 4) Feed the wire into the inlet wire guide (10), across the drive roll (8), and into the guide tube (6). Continue to feed the wire into the guide tube until two or three inches of straight wire protrudes from the central adapter block (5).
- 5) Swing the pressure roller (3) back into position. Make sure that the wire is positioned in the upper groove of the drive roll (8). Tighten the pressure roller adjusting screw (2) just enough to keep the wire in the groove. DO NOT OVERTIGHTEN.
- 6) Insert the wire protruding from the central adapter block (5) into the end of the welding gun. Plug the welding gun into the central adapter block and tighten the adapter nut clockwise until tight.
- 7) Remove gas nozzle and contact tip from welding gun. Turn Wire Feed Rate control to maximum. Depress trigger on welding gun. At this point, no wire should be feeding because the pressure roller (3) should not be tight enough to feed the wire. Slowly tighten the pressure roller adjusting screw (2) until the wire feeds evenly without slipping. Then tighten an additional  $\frac{1}{4}$  turn for steel. For Aluminum no additional tightening is necessary. DO NOT OVERTIGHTEN! Continue feeding the wire until it appears at the tip of the welding gun. Check your wire size and install the correct contact tip and drive roll groove (See "Changing the drive roll"). Install gas nozzle.
- 8) Bend welding wire 90° and hold welding gun perpendicular to a non-conductive surface (concrete floor) so that the wire will not feed. While looking at the wire feed mechanism, momentarily depress trigger. The drive roll should slip. If not, the drive roll will push the wire out the top of the wire drive mechanism. This is known as "bird nesting". If "bird nesting" occurs, the pressure roller has been adjusted too tightly. When properly adjusted, the drive roll will slip, and "bird nesting" will never occur.

## Adjusting the Welding Machine

In order to operate properly, the welding machine must be adjusted properly. Your Mini-MIG is very simple to adjust, and with a few minutes practice, adjusting the controls will become instinctive.

There are two control points which have to conform: the power setting and the wire feed rate. The power setting is determined by the thickness of the material which is being welded and the wire feed rate is then "tuned in" to the power setting (See Table 1). The correct setting of the power and wire feed rate can be seen in an even and calm arc and heard as a steady frying noise.

A hissing, blowing sound with a ball of molten wire forming at the end of the wire and then dropping off indicates the wire feed rate is too slow. A loud cracking noise with red hot wire coming out of the gun and the wire pushing the gun away from the work indicates the wire feed is too fast.

<u>Material Thickness</u>	<u>Power Setting</u>	<u>Approximate Wire Feed Rate</u>
24(.024")-26(.018") gauge	1-2	1-4
20(.036")-22(.030") gauge	3-4	3-5
16(.060")-18(.048") gauge	5-6	4-6
1/8"	Max.	5-Max.
Spot Welding	5-Max.	4-Max.

Please Note: Values in this table are approximate and will vary with input voltage and welder experience.

## Welding Techniques

### Seam Welding

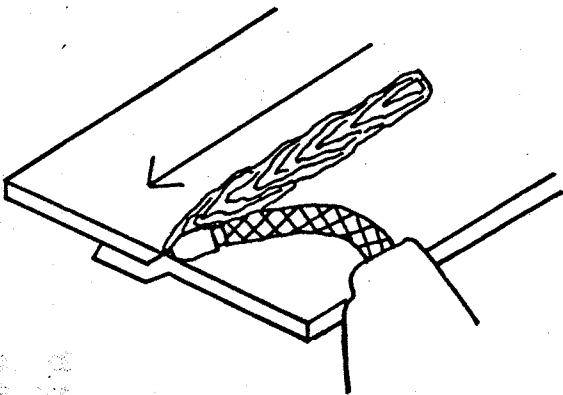
Install the conical nozzle (Part #15005) on the welding gun. The conical nozzle is used because it is much easier to see the welding process due to the taper in the nozzle. Have  $\frac{1}{4}$ " to  $\frac{1}{2}$ " of welding wire protruding from the end of the gas nozzle.

Prior to running a seam weld, it is recommended that tack welds be placed every 2 to 3 inches along the seam, even closer for extremely thin panels. Tack welds will help to hold the panel in place while welding, as well as to prevent panel separation caused by warpage.

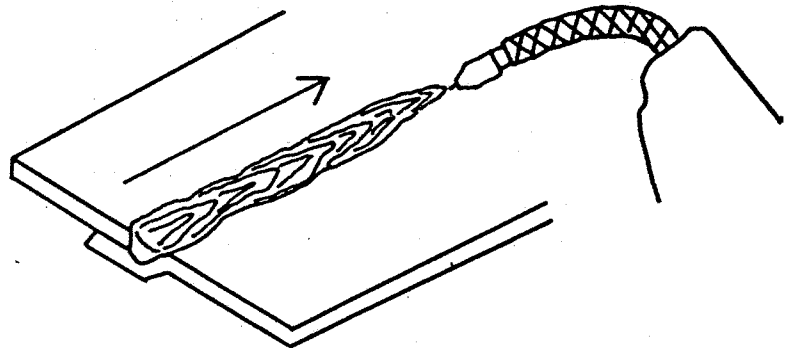
With the welding gun inclined at a  $45^{\circ}$  angle and using the edge of the gas nozzle to hold the two panels together, aim the welding wire at the spot to be tacked. Momentarily press the trigger (approximately 1 second) and tack the two panels together. Do not lift up the welding gun until the weld has set. Tack welding is done at the same power setting at which seam welding is done. (1,2, or 3 for sheet metal, 5,6, or Max. for heavier metal).

Now that you have the panel tacked into place, you are ready to seam weld. Once again, have  $\frac{1}{4}$ " to  $\frac{1}{2}$ " of welding wire protruding from the gas nozzle. The welding gun is generally held at a  $45^\circ$  angle to the work piece. It may also be tilted at a  $45^\circ$  angle to the side. Rest the gas nozzle on the work piece and have the wire pointing at the spot where the welding is to begin. Press the trigger and begin welding. It is important that the welder can see the welding wire coming out of the gas nozzle and the small halo formed at the end of the welding wire where it is melting. This halo will provide the light necessary to see when welding.

The direction in which the welder travels will affect the characteristics of the weld. When "pushing the weld," the welding gun is tilted away from the direction of travel (See Fig. 3). When "pulling the weld," the welding gun is tilted towards the direction of travel (See Fig. 4).



(Fig. 3) "Pushing the Weld"



(Fig. 4) "Pulling the Weld"

"Pushing the weld" will produce a wider, flatter bead having slightly less penetration. "Pulling the weld" will produce a narrower, taller bead with slightly better penetration. When welding sheet metal, penetration is never a problem; therefore, use whichever technique feels the most comfortable with. However when welding thicker materials, it is recommended that you use the "pulling" technique to insure maximum penetration.

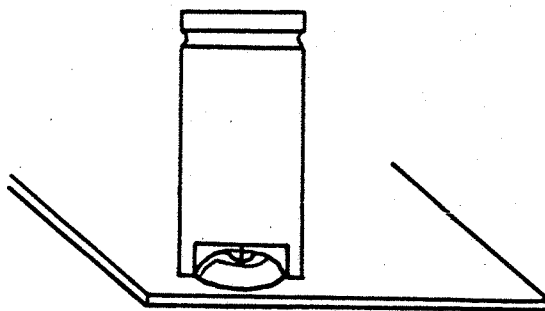
As you gain expertise with your welder, you will find that it is possible to reduce warpage when welding sheet metal by welding at a higher power setting and moving faster along the seam. In this way, you are reducing the amount of time welding, therefore reducing the amount of heat which is put into the panel.



## SPOT WELDING

Install the spot weld nozzle (part # 15006) on the welding gun. Using the Punch & Flange Tool (part # 12005) punch holes in the upper panel to be spotted on. Feed some welding wire out past the end of the spot weld nozzle. Using sidecutters, clip the welding wire off flush with the end of the spot weld prongs. This will aid you in centering the gas nozzle over the punched hole.

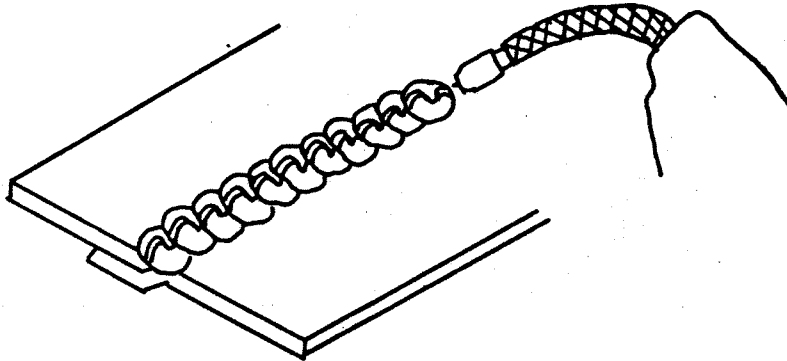
Turn the power selector to position 5, 6, or Max. (5 for thin sheet metal, Max. for heavier sheet metal). Tune in the wire feed rate until the proper frying noise is heard. Reduce the wire feed just until the machine begins to sound out of tune. (A slightly slower wire feed rate will produce flatter spot welds). Change the machine from continuous to spot welding mode. Place the welding gun over the punched hole so that the welding wire is centered in the punched hole (See Fig. 5). Depress the trigger on the welding gun. The machine will stop automatically. Look at the spot weld. If the hole is not completely full, either the welding wire was not centered over the hole or there was not enough spot weld time. The spot weld time should be set to the minimum amount of time that will completely fill the hole. If the spot weld is not flat and has an excessive metal build up, either there is an excessive amount of spot weld time, or the power is not high enough. The correct power setting and spot weld time will produce spot welds which will lie flat and require little if any finishing.



(Fig. 5)

## STITCH WELDING

The term stitch welding refers to a method in which the trigger on the welding gun is manually activated and released. (See Fig. 6) This produces a welded seam which is actually a series of overlapping spot welds that give the appearance of "Fish Scales". Stitch welding is recommended for use with very thin materials, since the burn time is not long enough to burn through the material.



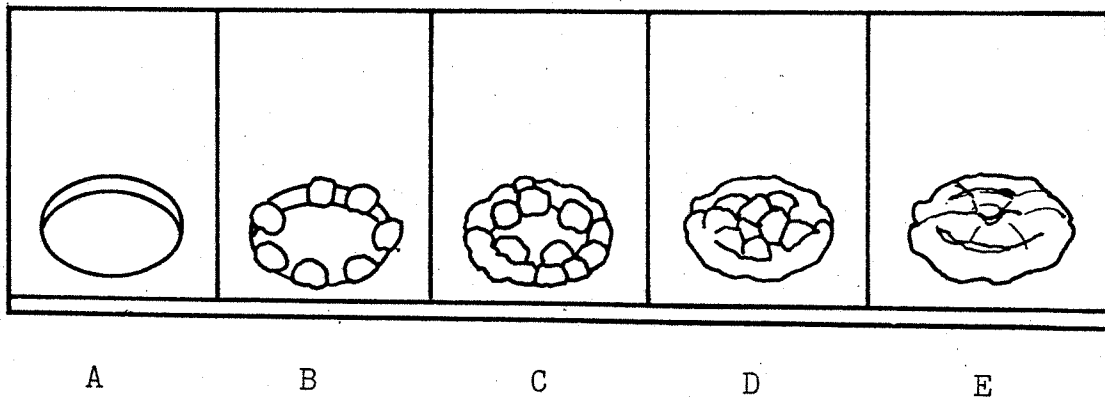
(Fig. 6)

Stitch welding is done with the conical nozzle (part # 15005). The trigger on the welding gun is depressed until a 1/8" diameter puddle of metal is deposited on the workpiece. Release the trigger and move the welding gun so that the center of the next puddle will lie on the edge of the first puddle. Wait for the orange glow to disappear and deposit the second puddle of metal. Repeat this process until the seam is completed.

## HOLE FILLING

Before you begin to fill holes, you must look at the reason why there are holes. If the holes are due to burnthrough, you should remember that this was caused by too much heat input. Therefore, if you are welding a seam and burnthrough occurs, continue welding and finish the seam. This will give the burnthrough area time to cool and make it easier to fill the hole. It is not recommended to try to fill holes over  $\frac{1}{2}$ " diameter; weld in a new piece of metal.

First, the perimeter of the hole must be built up. This is accomplished by randomly placing puddles of metal (similar to stitch welding) around the perimeter of the hole (See 7B). Once this has been completed, again place puddles around the area which has just been welded (See 7C). Continue to lay in the puddles until the hole is filled (See 7D & 7E). The power setting for hole filling is one to two settings below seam welding.



(Fig.7)

## METAL SHRINKING

Metal Shrinking is done with the shrinking attachment (part # 15003). Remove the contact tip. Lift the spring steel handle on the pressure roller and swing pressure roller out of the way. Reel enough welding wire back onto the spool so that the shrinking attachment can be screwed into the swan neck. Turn off the shield gas. You are now ready to shrink.

Shrinking with your shrinking attachment is similar to shrinking with an oxy-acetylene torch; the area is alternately heated and cooled until properly shrunk. The advantage to the shrinking attachment is that the heat is applied directly, the heat is much more concentrated, and there is less chance of fire because there are no open flames.

Warning: Shrinking should only be done with the power switch in Position 1.

## METAL FILL

Your HTP Mini-MIG has the ability to fill large gaps and holes with metal in the semi-molten state.

Turn the power selector to position 1. Turn the wire feed rate to maximum. Hold the welding gun  $\frac{1}{2}$ " to 1" away from the gap to be filled. Pull the trigger and allow the welding wire to come in contact with the grounded metal. The wire will flow out of the welding gun in a red hot, semi-molten state. Once the gap has been filled, the metal must be welded into place, as very little bonding occurs with the metal in the semi-molten state.

## WELDING ALUMINUM:

Due to the differences between aluminum and steel, a few simple changes must be made prior to welding aluminum.

Shield Gas - The shield gas required for welding aluminum is 100% Argon. Due to the rate at which aluminum oxidizes, the flow rate of the Argon gas must be increased to 25 to 30 liters/minute (13 to 16 ft<sup>3</sup>/hr). The cylindrical gas nozzle (part #15004) is recommended for use when welding aluminum. The larger opening area of the nozzle will result in a wider dispersion of the shield gas, insuring adequate gas coverage of the weldment.

Welding Wire - To weld aluminum, aluminum welding wire must be used. HTP has aluminum wire available in two diameters; part # 12130 - .030" diameter and part # 12135 - .035" diameter. The .030" wire is recommended for thin gauge to 1/8" material, while the .035" wire is recommended for .060" material and thicker. For installation of the aluminum wire, see "Feeding the Wire".

Whenever the welding wire has been changed, it is important that the correct size contact tip and drive roll groove have been selected. (See "Changing the Contact Tip" and "Changing the Drive Roll").

Cleanliness- Aluminum is very sensitive to impurities. Therefore, it is extremely important that the surfaces to be welded are clean from paint, grease and dust. The only method that will properly clean aluminum is the use of a stainless steel brush.

Technique - Aluminum also requires a slightly different technique when welding. The gas nozzle should be held perpendicular to the welding surface and inclined 5 to 15 degrees away from the direction of travel. The motion of the welding gun should be consistent and at a greater speed than when welding steel. To minimize the chances of producing a black, sooty weld, the welder should always "Push the Weld".

The end of the welding wire should always be clipped off with side cutters to aid in striking the arc.

The thermal conductivity of aluminum is much higher than that of steel. Therefore, when welding thin gauge aluminum a heat sink ( a wet, non-flammable rag) should be used. Aluminum hoods and trunk lids may require the stitch welding technique if burnthrough is a problem.

Because of its better electrical conductivity, aluminum wire will require a higher wire feed rate for the same power setting.

The tendency for aluminum spatter to adhere to the swan neck, contact tip and gas nozzle is much greater than that for steel. Therefore, use of the nozzle spray is extremely important.

CAUTION - Aluminum does not change color when hot.

### Stud Welding

Your HTP Mini-MIG has been designed to weld studs onto dented panels allowing the dents to be pulled without drilling holes. Install the stud weld nozzle (part # 15007) on the welding gun. Set the power to #5, 6 or MAX., depending on the thickness of the material. Tune in the wire feed rate to the proper setting. Invert the welding gun and install a stud (part # 12038) in the tube protruding from the gas nozzle. The head of the stud will prevent the stud from falling out of the gas nozzle.

Grind away paint and rust from dented area to be pulled. Place welding gun against dented area so that the stud will be welded in the desired position. Place your finger over the end of the stud protruding from the nozzle so that the stud comes in contact with the dented panel. Depress the trigger on the welding gun while maintaining pressure on the stud. The stud will begin to melt. Continue welding until your finger has reached the gas nozzle and no more stud can be pushed into the panel. Allow the weld to cool. Remove gas nozzle from the stud.

Install slide hammer on stud and pull the dent. The stud may be removed by grinding, or clipping off with side cutters.

The HTP Dent Puller Kit (part# 12015) includes the stud weld nozzle, box of 500 studs, and the slide hammer for those hard to pull dents.

## MAINTENANCE AND SERVICE

### Welding Gun

90% of the problems with MIG welders are wire feed/welding gun related. Of these problems, 98% are due to owner/operator abuse, misuse, or ignorance. Read the following service tips and adhere to them.

The welding gun is exposed to the heat and spatter of welding. The nozzle spray (part # 12021) should be sprayed on the inside of the gas nozzle, contact tip, and swan neck with every use. The function of the nozzle spray is to prevent the spatter from adhering to gas nozzle, contact tip, and swan neck, making it easy to keep these parts clean. However, using the spatter spray does not eliminate the need to remove the gas nozzle and clean these parts. This should be done more frequently when welding overhead. The HTP Nozzle Reamer (part #12025) is a tool especially designed to clean the inside of the nozzle.

Failure to clean the gas nozzle will result in spatter build-up. This will restrict the flow of shield gas through the nozzle, causing poor quality welds. In extreme cases, the spatter build-up will bridge the gap between the contact tip and gas nozzle, causing a short circuit. This can ruin the gas nozzle, contact tip, and swan neck. **KEEP THE NOZZLE CLEAN.**

### Changing the Gas Nozzle

The gas nozzle is removed by simultaneously twisting the gas nozzle and pulling it off. The gas nozzle can only be twisted in one direction. Twisting the nozzle in the opposite direction will damage the nozzle spring. To install the gas nozzle, simply twist the nozzle while pushing it on the swan neck. The following gas nozzles are available for the MB-14 AK welding guns:

Part #	Description	Application
15004	Cylindrical Nozzle	Aluminum Welding
15005	Conical Nozzle	Steel Welding
15006	Spot Weld Nozzle	Spot Welding
15007	Stud Weld Nozzle	Stud Welding for Dent Pulling

## Changing the Contact Tip

The contact tip should be regarded as a wearing part and therefore requires periodic replacement. The contact tip should be replaced whenever the hole in the tip becomes oblong or excessively oversized.

To remove the contact tip, clip off the burnt wire at the end of the welding gun. Unscrew the contact tip. Install the new tip by feeding the wire through the hole in the center of the tip and screwing the tip into the swan neck.

The following contact tips are available for the MB-14AK welding gun:

Part #	Fits Wire Size	
	inches	millimeters
15023	.023	0.6
15030	.030	0.8
15035	.035	0.9

## Changing the Liner

Should feeding problems occur, the first item to be checked should be the liner. The following check should be made to determine if the liner is defective.

- 1) Remove the gas nozzle and contact tip.
- 2) Feed 12" of fresh wire out of the gun.
- 3) Disconnect the welding gun from the machine with the wire still threaded in the gun. Pull the gun 6" away from machine and clip wire so that 6" of wire is extending out of the welding gun.
- 4) Stretch welding gun out straight. Remove the liner positioner nut. Grasping the wire and the liner together, pull the liner out of the welding gun.
- 5) The wire should move freely in the liner with little or no resistance. If there is a high resistance, the liner should be replaced.

To replace the liner, disconnect the welding gun from the welding machine. Remove the liner positioner nut. Pull the old liner completely out of the welding gun. To install the new liner (part #14040) lay the welding gun out straight. Using a sharp razor knife, slightly bevel ( $5^{\circ}$  to  $15^{\circ}$ ) the end of the liner which will be inserted into the welding gun until it is completely seated at the end of the gun. Using the razor knife, cut the liner off flush with the end of the adapter block. Pull liner partially out of the gun, and trim an additional  $1/16"$  to  $1/8"$  off the liner. Thread on a new collet (part #14042) finger tight. Push liner into gun. Install liner positioner nut.

## CHANGING THE DRIVE ROLL

The drive roll has two grooves on it. The narrower of the two grooves is marked 0.6 and is used for .023" wire. The wider groove, marked 0.8 is used for .030" and .035" wire.

To change the drive roll, simply remove the drive roll retaining screw (7) and remove the drive roll (8). Select the correct groove, and install the drive roll so that the proper groove lines up with the inlet wire guide (10) and the guide tube (6). Install drive roll retaining screw.

## CHANGING THE SWAN NECK

In the event that excessive spatter has been allowed to build up and damage the swan neck, it will be necessary to change the swan neck (part# 14999).

- 1) Twist handle lock ring (#4) and remove from the end of the handle. (See MB-14AK diagram).
- 2) Split the handle (#'s 3,5) in half.
- 3) Put the hex fitting at the end of the power cable (#36) in a vise. Loosen the locknut on the swan neck (#1) with a 12mm wrench.
- 4) Unscrew the swan neck from the power cable. Remove the swan neck from the handle half (#3).
- 5) Place the new swan neck through the handle half. Screw the swan neck as far into the cable assembly as possible.
- 6) Line up the bend in the swan neck with one of the points of the hex fitting. Tighten the locknut securely.
- 7) Put the handle halves back together and install handle lock ring.

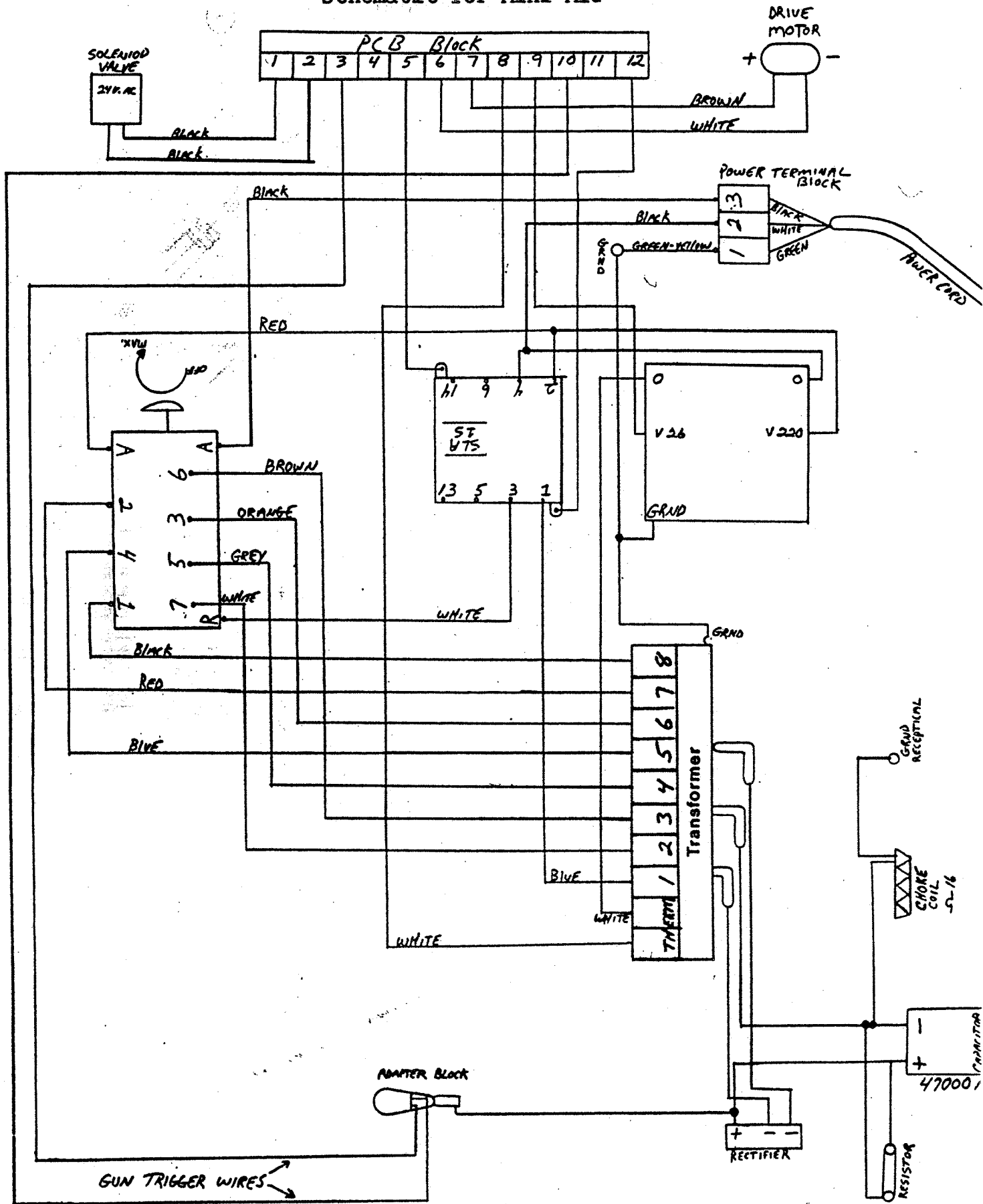
## REPLACING THE PRINTED CIRCUIT BOARD

The PCB is a very reliable part of your HTP Mini-MIG. Should failure occur, it usually happens within the first five minutes of operation and is caught during the initial test period at the factory. However, should failure occur, replacement is very simple.

- 1) UNPLUG MACHINE
- 2) Using a razor blade, pry the front cover off the knobs.
- 3) Using a 9mm nut driver, remove the knobs.
- 4) Remove right side panel.
- 5) Gripping the circuit board by the phenolic board itself, gently pull backwards so the shafts clear the front of the machine and cardboard unsulation.
- 6) Lift the PCB board gently upwards until it unplugs from the terminal block.
- 7) Turn PCB board to allow access to the indicator light wires. Remove wires.
- 8) Connect wires to new PCB.
- 9) Installation is the reverse of the above
- 10) Adjust knobs as follows:
  - a) Spot Weld Timer shaft completely counter clockwise, set pointer to continuous.
  - b) Wire Feed Rate shaft completely clockwise, set points to maximum.



# Schematic for Mini-MIG



This diagram is included for authorized service technician's use only.

# REPLACEMENT GUN

## Binzel Type MB-13AK Welding Gun

Item #	Description	HTP #
1	Swan Neck	13002
	Flexible Swan Neck	15500
2-4	Handle Assembly - Standard Swan Neck	14008
	Handle Assembly - Flexible Swan Neck	14508
8	Head Insulator - Standard Swan Neck	14058
	Head Insulator - Flexible Swan Neck	15058
5	Trigger Switch	14009
6	Nozzle Spring (pkg/4)	15062B
10	Contact Tip - .023" (pkg/5)	15023B
	Contact Tip - .030" (pkg/5)	15030B
	Contact Tip - .035" (pkg/5)	15035B
16	Conical Nozzle (pkg/3)	15105B
	Small Conical Nozzle (pkg/3)	15108B
17	Stud Weld Nozzle	15007
	Cylindrical Nozzle (pkg/3)	15104B
18	Spot Welding Nozzle (pkg/3)	15106B
49	Replacement Liner	15040
65	Replacement Liner for D-1410 Only	1410-L
	Teflon Liner-Aluminum Only	15044
66	Collet for 15044 Liner	14042

### COMPLETE WELDING GUNS

- 10' MB-13AK Welding Gun 13100
- 12' MB-13AK Welding Gun 13120
- 15' MB-13AK Welding Gun 13150

### FLEX NECK WELDING GUNS

- 10' Welding Gun for Dan Mig 145/5000 D1410
- 10' Welding Gun f/Lincoln SP-150 & SP-200 LE100
- 10' MB-13AK Flex Neck Welding Gun 13510
- 12' MB-13AK Flex Neck Welding Gun 13512
- 15' MB-13AK Flex Neck Welding Gun 13515

