



CORNWELL[®]
QUALITY TOOLS

MMWTIG242DVI

Inverter Powered Dual Voltage AC/DC TIG/Stick Welder

OWNER'S MANUAL



12/2020



WARNING:

Read carefully and understand all **ASSEMBLY AND OPERATION INSTRUCTIONS** before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury.

WARRANTY

Cornwell Quality Tools

EFFECTIVE JANUARY 1, 2013

LIMITED WARRANTY

This warranty applies to the original purchaser and is subject to the terms and conditions listed below. This Limited Warranty is for new equipment sold after the above date, providing coverage for defects in material and workmanship at the time it is shipped from the factory.

Limited to the warranty periods below, CORNWELL will repair or replace the item under warranty that fails due to defects in material and workmanship. CORNWELL must be notified within 30 days of the failure, to provide instructions on how to proceed with the repair of your welder and warranty claim processing. Warranty period begins at the time the welder is purchased from an Authorized Reseller of CORNWELL products. **Keep your receipt as proof of purchase.**

Warranty Periods

Limited Warranty is divided into three categories. No Warranty, 90 days and 3 year.

No Warranty

Normal wear items, TIG torch parts (Collet body, Nozzle, Collets, TIG Tungsten), ground clamps.

90 days

All parts exterior of the main welder unit except normal wear items as described above. This warranty covers the absence of, or defective parts. These parts include the regulator, gas hose, ground cable and clamp, and the TIG Torch.

3 year

This 3 year warranty covers parts and Labor on items such as: transformer, reactor, rectifier, solenoid valve, PC Board, switches, controls, gas valve, and any other component that requires the removal of the sheet metal to access. Any shipping related to warranty repair is the responsibility of the customer.

Voiding Warranty

Warranty does not apply to: Shipping Damage, Misuse and abuse of the unit, alteration of the unit in any way.

Warranty Claim

This is a parts and labor warranty. **Do not return your unit to the retailer you purchased it from.** Retain your receipt in the case a warranty claim is needed. No warranty will be provided without the original receipt from an authorized reseller of Cornwell Quality tools Products. To make a warranty claim, call our welder help line at 888-762-4045, M-F 8:00 am to 5:00 PM Central time.

GENERAL SAFETY RULES



WARNING: Read and understand all instructions. Failure to follow all instructions listed below may result in serious injury.



CAUTION: Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of how the unit works.



WARNING: The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions or situations that could occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product but must be supplied by the operator.

SAVE THESE INSTRUCTIONS

IMPORTANT SAFETY CONSIDERATIONS

1.1 Your Welding Environment

- Keep the environment you will be welding in free from flammable materials.
- Always keep a fire extinguisher accessible to your welding environment.
- Always have a qualified person install and operate this equipment.
- Make sure the area is clean, dry, and ventilated. Do not operate the welder in humid, wet, or poorly ventilated areas.
- Always have your welder maintained by a qualified technician in accordance with local, state, and national codes.
- Always be aware of your work environment. Be sure to keep other people, especially children, away from you while welding.
- Keep harmful arc rays shielded from the view of others.
- Mount the welder on a secure bench or cart that will keep the welder secure and prevent it from tipping over or falling.

1.2 Your Welder's Condition

- Check ground cable, power cord and welding cable to be sure the insulation is not damaged. Always replace or repair damaged components before using the welder.
- Check all components to ensure they are clean and in good operating condition before use.

1.3 Use of Your Welder

CAUTION

Do not operate the welder if the output cable, electrode, torch, wire, or wire feed system is wet. Do not immerse them in water. These components and the welder must be completely dry before attempting to use them.

- Follow the instructions in this manual.
- Keep welder in the off position when not in use.
- Connect ground lead as close to the area being welded as possible to ensure a good ground.
- Do not allow any body part to come in contact with the welding wire if you are in contact with the

material being welded, ground or electrode from another welder.

- Do not weld if you are in an awkward position. Always have a secure stance while welding to prevent accidents. Wear a safety harness if working above ground.
- Do not drape cables over or around your body.
- Wear a full coverage helmet with appropriate shade (see ANSI Z87.1 safety standard) and safety glasses while welding.
- Wear proper gloves and protective clothing to prevent your skin from being exposed to hot metals, UV, and IR rays.
- Do not overuse or overheat your welder. Allow proper cooling time between duty cycles.
- Keep hands and fingers away from moving parts and stay away from the drive rolls.
- Do not point MIG gun at any body part of yourself or anyone else.
- Always use this welder in the rated duty cycle to prevent excessive heat and failure.

1.4 Specific Areas of Danger, Caution or Warning



Electrical Shock

▲ WARNING

Electric arc welders can produce a shock that can cause injury or death. Touching electrically live parts can cause fatal shocks and severe burns. While welding, all metal components connected to the wire are electrically hot. Poor ground connections are a hazard, so secure the ground lead before welding.

- Wear dry protective apparel: coat, shirt, gloves, and insulated footwear.
- Insulate yourself from the work piece. Avoid contacting the work piece or ground.
- Do not attempt to repair or maintain the welder while the power is on.
- Inspect all cables and cords for any exposed wire and replace immediately if found.
- Use only recommended replacement cables and cords.
- Always attach ground clamp to the work piece or worktable as close to the weld area as possible.
- Do not touch the welding wire and the ground or grounded work piece at the same time.
- Do not use a welder to thaw frozen pipes.



Fumes and Gases

▲ WARNING

- Fumes emitted from the welding process displace clean air and can result in injury or death.
- Do not breathe in fumes emitted by the welding process. Make sure your breathing air is clean and safe.
- Work only in a well-ventilated area or use a ventilation device to remove welding fumes from the environment where you will be working.
- Do not weld on coated materials (galvanized, cadmium plated or containing zinc, mercury, or barium). They will emit harmful fumes that are dangerous to breathe. If necessary, use a ventilator, respirator with air supply or remove the coating from the material in the weld area.
- The fumes emitted from some metals when heated are extremely toxic. Refer to the material safety data sheet for the manufacturer's instructions.
- Do not weld near materials that will emit toxic fumes when heated. Vapors from cleaners, sprays and degreasers can be highly toxic when heated.



UV and IR Arc Rays

▲ DANGER

The welding arc produces ultraviolet (UV) and infrared (IR) rays that can cause injury to your eyes and skin. Do not look at the welding arc without proper eye protection.

- Always use a helmet that covers your full face from the neck to top of head and to the back of each ear.
- Use a lens that meets ANSI standards and safety glasses. For welders under 160 Amps output, use a shade 10 lens; for above 160 Amps, use a shade 12. Refer to the ANSI standard Z87.1 for more information.
- Cover all bare skin areas exposed to the arc with protective clothing and shoes. Flame-retardant cloth or leather shirts, coats, pants, or coveralls are available for protection.
- Use screens or other barriers to protect other people from the arc rays emitted from your welding.
- Warn people in your welding area when you are going to strike an arc so they can protect themselves.



Fire Hazards

▲ WARNING

Do not weld on containers or pipes that contain or have had flammable, gaseous or liquid combustibles in them. Welding creates sparks and heat that can ignite flammable and explosive materials.

- Do not operate any electric arc welder in areas where flammable or explosive materials are present.
- Remove all flammable materials within 35 feet of the welding arc. If removal is not possible, tightly cover them with fireproof covers.
- Take precautions to ensure that flying sparks do not cause fires or explosions in hidden areas, cracks, or areas you cannot see.
- Keep a fire extinguisher close in the case of fire.
- Wear garments that are oil-free with no pockets or cuffs that will collect sparks.
- Do not have on your person any items that are combustible, such as lighters or matches.
- Keep work lead connected as close to the weld area as possible to prevent any unknown, unintended paths of electrical current from causing electrical shock and fire hazards.
- To prevent any unintended arcs, cut wire back to ¼" stick out after welding.

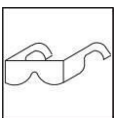


Hot Materials

▲ CAUTION

Welded materials are hot and can cause severe burns if handled improperly.

- Do not touch welded materials with bare hands.
- Do not touch MIG gun nozzle after welding until it has had time to cool down.



Sparks/Flying Debris

▲ CAUTION

Welding creates hot sparks that can cause injury. Chipping slag off welds creates flying debris.

- Wear protective apparel at all times: ANSI-approved safety glasses or shield, welder's hat and ear plugs to keep sparks out of ears and hair.



Electromagnetic Field

⚠ CAUTION

-Electromagnetic fields can interfere with various electrical and electronic devices such as pacemakers.

- Consult your doctor before using any electric arc welder or cutting device
- Keep people with pacemakers away from your welding area when welding.
- Do not wrap cable around your body while welding.
- Wrap MIG gun and ground cable together whenever possible.
- Keep MIG gun and ground cables on the same side of your body.



Shielding Gas Cylinders Can Explode

⚠ WARNING

High pressure cylinders can explode if damaged, so treat them carefully.

- Never expose cylinders to high heat, sparks, open flames, mechanical shocks or arcs.
- Do not touch cylinder with MIG gun.
- Do not weld on the cylinder
- Always secure cylinder upright to a cart or stationary object.
- Keep cylinders away from welding or electrical circuits.
- Use the proper regulators, gas hose and fittings for the specific application.
- Do not look into the valve when opening it.
- Use protective cylinder cap whenever possible

1.5 Proper Care, Maintenance and Repair

⚠ DANGER

- Always have power disconnected when working on internal components.
- Do not touch or handle PC board without being properly grounded with a wrist strap. Put PC board in static proof bag to move or ship.
- Do not put hands or fingers near moving parts such as drive rolls or fan

USE AND CARE

- **Do not modify this unit in any way.** Unauthorized modification may impair the function and/or safety and could affect the life of the equipment. There are specific applications for which this **unit** was designed.
- **Always check for damaged or worn out parts before using this unit.** Broken parts will affect the **unit's** operation. Replace or repair damaged or worn parts immediately.
- **Store idle.** When **this unit** is not in use, store it in a secure place out of the reach of children. Inspect it for good working condition prior to storage and before re-use.

TECHNICAL SPECIFICATIONS

Item	Specification
Power Supply	120V, 20A, 50/60 Hz, Single Phase
	230V, 22A, 50/60 Hz, Single Phase
No-Load Voltage	60V DC
Output Range - STICK	10 to 80A DC with 120V Input Power
	10 to 160A DC with 230V Input Power
Output Range – TIG DC	10 to 120A with 120V Input Power
	10 to 200A with 230V Input Power
Output Range – TIG AC	15 to 120A with 120V Input Power
	15 to 200A with 230V Input Power
Duty Cycle - STICK	35% @ 80A with 120V Input Power
	20% @ 160A with 230V Input Power
Duty Cycle- TIG AC/DC	35% @ 120A with 120V Input Power
	20% @ 200A with 230V Input Power
Pulse Frequency	0.2Hz to 500Hz
AC Arc Frequency	50 Hz to 150Hz
AC Arc Balance Control	50% to 85% EN
Weight	31.97 lb.
Dimensions	19.69 in X 9.45 in X 16.14 in

DESCRIPTION

The Cornwell Inverter Powered MMWTIG242DVI is a dual voltage, inverter powered AC and DC TIG, Pulse TIG and DC Stick welder. This unit is intended to be used on a 50-amp 230V AC circuit or 120V, 20A AC Circuit, without the use of an extension cord. This machine comes complete with a TIG Torch, a Foot Pedal, regulator/flowmeter with inert gas hose, a ground cable and clamp, and an Electrode Holder with cable.

The MMWTIG242DVI is the ideal Stick and TIG welder for every shop. The DC stick mode allows you to stick weld when your application requires it. In the DC TIG mode, you can TIG weld metals such as steel and stainless steel. In the AC TIG mode, you can TIG weld non-ferrous metals such as Aluminum. This unit is equipped with advanced TIG capabilities including Pulse, AC Arc Frequency Control, AC Arc Balance Control, and Auto Balance/Frequency Control. The advanced inverter technology that powers the Cornwell MMWTIG242DVI provides for better arc control, lower power consumption, in a lighter more portable unit.

DIGITAL METERS

Digital meters display welding amperage and voltage while welding.

FUNCTIONAL CONTROL

Use the Functional Control dial to increase and decrease the value of the function you are setting. An indicator light will then illuminate showing which function you are setting.

WELD PARAMETER SETTING INDICATORS

When the push button below this set of indicators lights is pushed, the operator can sequence through the different welding parameters. Use the Functional control to adjust the parameter setting indicated on the digital meters.

REMOTE FOOT PEDAL CONTROL

The foot pedal is used to start the arc and manually adjust the amperage while TIG welding. The cord will attach to the 5-Pin connector on the front of the unit.



STYLE 26 TIG TORCH

The TIG torch transfers welding power from the welding power source to the tungsten for the purpose of TIG welding. It also delivers the shielding gas from the welding power source to the welding zone. This style 26 torch uses the same common parts as other Style 26 TIG torches

GROUND CABLE AND CLAMP

The ground cable and clamp are attached to the work piece to complete the circuit allowing the flow of current needed to weld.

REGULATOR/FLOWGAUGE AND GAS HOSE

The regulator installs directly on the shielding gas cylinder. Required for TIG welding. The regulator controls the compressed gas and allows you to adjust the flow rate of the gas. The gas hose connects to the regulator/flow gauge and delivers the shielding gas from the shielding gas bottle to the welder.

ELECTRODE HOLDER AND CABLE

The electrode holder and weld cable transfers welding power from the welding power source to the electrode for the purpose of stick welding.

WELD PROCESS INDICATORS

When the push button below this set of indicator lights is pushed, the operator can sequence through the different welding processes.

INDICATOR LIGHTS

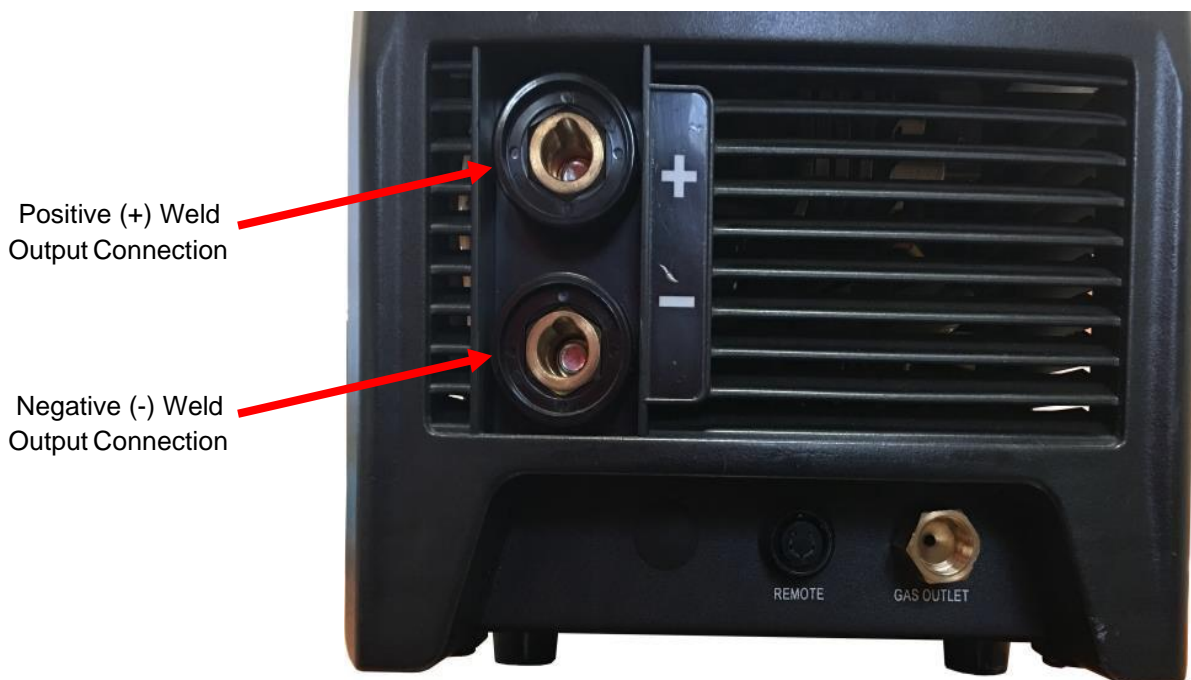
The indicator lights can be used to help with troubleshooting the welder. When the power indicator light is on, input power is supplied to the main transformer and control circuit. When the work indicator is on, it is indicating welding current is activated. When the temperature indicator is on, the machine has gone into protection mode and requires the internal temperature to cool. When the power protection light is on, the machine has gone into protection mode and requires that the input voltage stabilize to within 15% of the rated input voltage.

ASSEMBLY

Electrical Shock Can Kill!

▲ WARNING

- **High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This welder must be grounded while in use to protect the operator from electrical shock.**
 - **Do not remove grounding prong or alter the plug in any way. Use only the supplied adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF then connect your welder's power cord to a properly grounded 230 VAC (220V - 240V), 60 HZ, single phase, 50-amp power source. If operating on 120V, attach the 120V Adapter cord to the unit power cord and then connect the assembly to a properly grounded 120 VAC (110V-130V), 60 Hz, single phase, 20-amp power source.**
- 1. POWER REQUIREMENT 230V** - AC single phase 230V (220-240V) 50/60 HZ fused with a 50-amp time delayed fuse or circuit breaker is required. **DO NOT OPERATE THIS UNIT** if the ACTUAL power source voltage is less than 215 volts AC or greater than 240 volts AC.
 - 2. POWER REQUIREMENT 120V** - AC single phase 120V (110-130V) 50/60 HZ fused with a 20-amp time delayed fuse or circuit breaker is required. **DO NOT OPERATE THIS UNIT** if the ACTUAL power source voltage is less than 110 volts AC or greater than 130 volts AC.
 - 2.1 When connecting this unit to 120V power, connect the 120V adapter cord to the power cord pigtail that is attached to the machine.
 - 3. EXTENSION CORD** - We do not recommend an extension cord because of the voltage drop they produce. This drop in voltage can affect the performance of the welder. If you need to use an extension cord, we recommend you check with a qualified electrician and your local electrical codes for your specific area. Do not use an extension cord over 25 ft. in length.
 - 4. STICK WELDING CONNECTION** – DC Stick welding is generally performed DC Electrode Positive. That means that the electrode holder and cable would be attached to the Positive (+) weld output connection and the ground cable and clamp would be attached to the Negative (-) weld output connection.



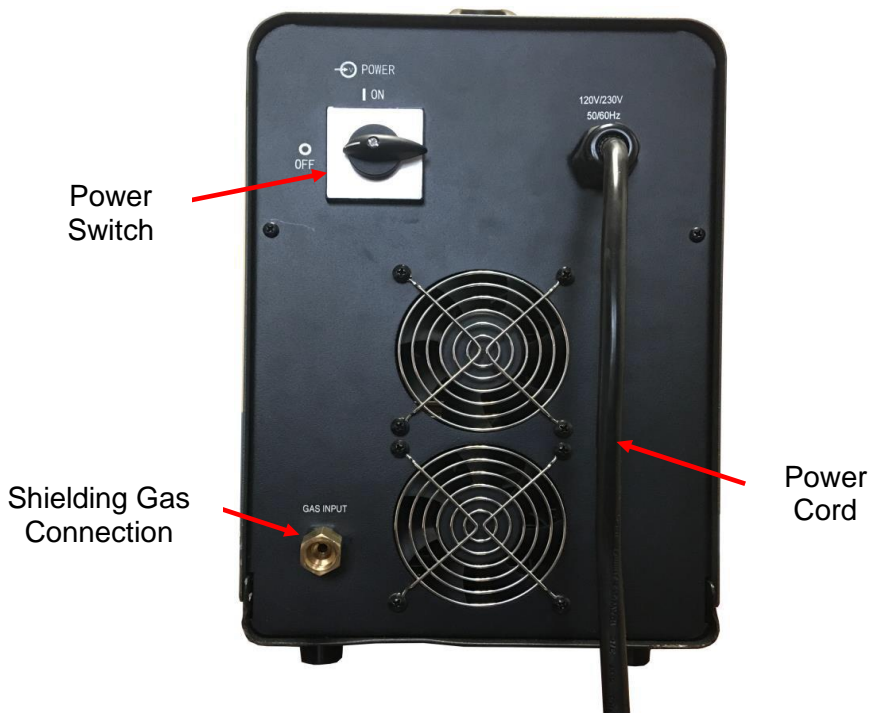
5. TIG WELDING CONNECTION – DC TIG welding is generally performed DC Electrode negative. That means that the TIG torch and cable would be attached to the Negative (-) weld output connection and the ground cable and clamp would be attached to the Positive (+) weld output connection. Use this same connection when AC TIG welding. Connect the Remote Foot Pedal to the Remote connection on the lower front panel. Connect the TIG torch gas supply line to the Gas Outlet on the lower front panel.



Remote Foot Pedal Connection

TIG Torch Gas Connection

6. BACK PANEL CONNECTIONS

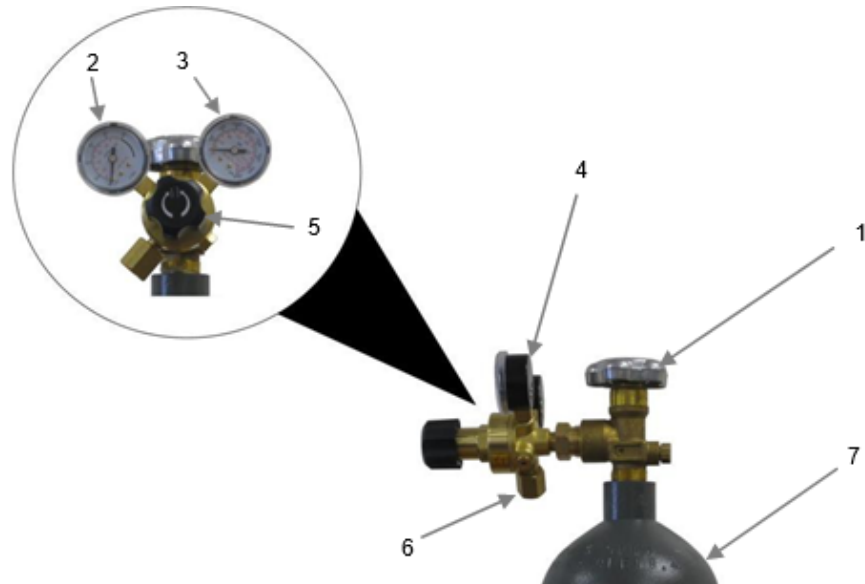


7. GAS INSTALLATION

▲WARNING

Shielding gas cylinders and high-pressure cylinders can explode if damaged, so treat them carefully.

- Never expose cylinders to high heat, sparks, open flames, mechanical shocks or arcs.
 - Do not weld on the cylinder.
 - Always secure cylinder upright to a cart or stationary object.
 - Keep cylinders away from welding or electrical circuits.
 - Use the proper regulators, gas hose and fittings for the specific application.
- a. Connect one end of the gas hose to the gas hose connection on the back of the welder. Use a wrench to snug up the connection.
 - b. Connect the other end of the gas hose to the gas hose connection on the supplied rear mount regulator/flow gauge. Use a wrench to snug up the connection.
 - c. Before installing the regulator, it is good practice to make certain no debris is in the gas bottle connection. Rotate the bottle so the gas connection is not pointing toward you or any other person. Turn the valve on the gas bottle clockwise and quickly close. This quick thrust of gas will clear any debris in the connection. Connect the regulator to the gas bottle connection. Use a wrench to snug up the connection.



(1) Gas Bottle Valve

(2) Gas Flow Gauge (Set at 20 CFH)

(3) Gas Pressure Gauge

(4) Regulator

(5) Gas Flow Adjuster

(6) Gas Hose Connection

(7) Gas Cylinder

- d. Open the Gas Bottle Valve on the cylinder of gas.
- e. Turn the Gas Flow Adjuster on the regulator so that the gas flow rate is set at approximately 20 CFH. Make certain you are reading the correct scale on the gauge.

NOTE: Slowly open the cylinder valve by turning it counterclockwise until the cylinder pressure gauge registers on the first gauge of the regulator. Turn the adjustment knob clockwise (right) slowly to increase gas flow to 20 CFH. To reduce the gas flow, turn the adjustment counterclockwise (left). The gas valve is located on the back panel of the welder and activated by the remote control. Gas flow should be heard when the remote is activated. No gas flow will result in a harsh arc.

Gas selection:

Except for very specialized TIG welding applications, TIG welding can be done with 100% Argon. Consult your gas supplier for more information.

8. REMOTE CONTROL INSTALLATION

NOTE: When stick welding, remove all remote controls. Failure to do this will result in minimal welding output only.

Remote Contactor and Amperage Control – This unit comes standard with a remote foot pedal control. The remote foot pedal is used to initiate the arc and then vary the amperage during your weld. Connect the remote foot pedal control to the Foot Pedal Connection on the front of the unit.



Remote Foot
Pedal Connection

EQUIPMENT SET-UP

Electrical Shock Can Kill!

▲ WARNING

- High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This welder must be grounded while in use to protect the operator from electrical shock.
- Do not remove grounding prong or alter the plug in any way. Use only the supplied adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF then connect your welder's power cord to a properly grounded 230 VAC (220V - 240V), 60 HZ, single phase, 50-amp power source. If operating on 120V, attach the 120V Adapter cord to the unit power cord and then connect the assembly to a properly grounded 120 VAC (110V-130V), 60 Hz, single phase, 20-amp power source.

1. PROCESS SELECTION

▲ CAUTION

AVOID ACCIDENTAL ARCING

- When in the STICK welding mode, the weld output connections of this unit are electrically hot. To avoid accidental arcing, be mindful of the welding accessories that are connected to the

weld output connections.

- Make certain the welding accessories connected to this unit are not touching each other and are not electrically connected to each other.



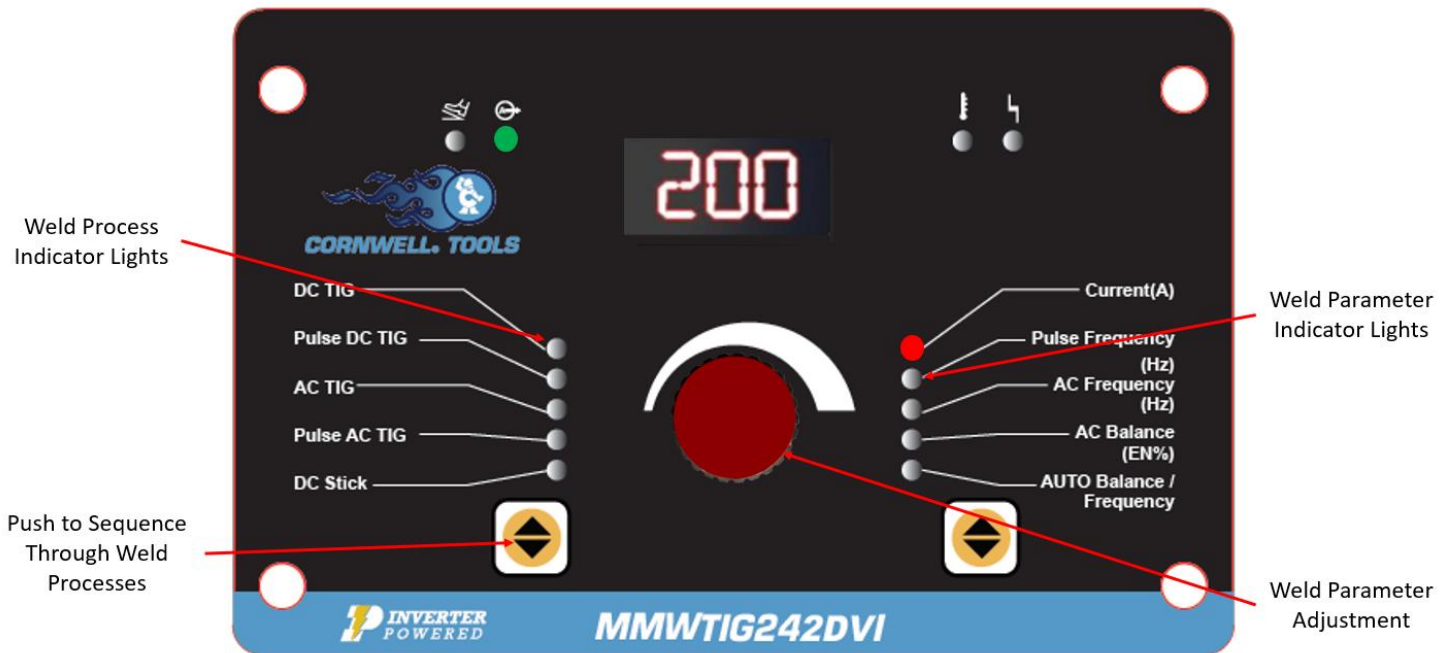
- a. With the input power switch turned ON, observe which of the Weld Process Indicator Lights is on.
- b. Press the button under the weld process indicators until the Weld Process Indicator Light next to your desired weld process is on.

2. DC STICK SET-UP

▲ CAUTION

AVOID ACCIDENTAL ARCING

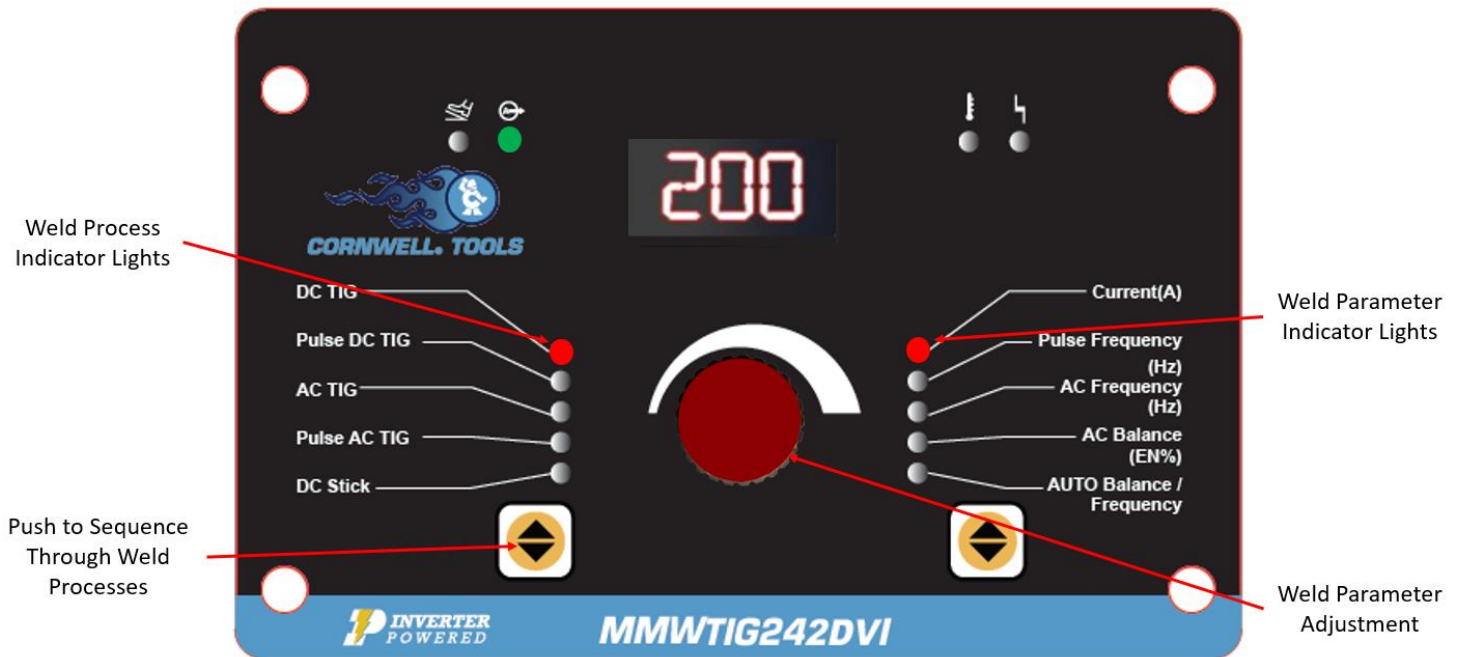
- When in the STICK welding mode, the weld output connections of this unit are electrically hot. To avoid accidental arcing, be mindful of the welding accessories that are connected to the weld output connections.
- Make certain the welding accessories connected to this unit are not touching each other and are not electrically connected to each other.



- a. See the ASSEMBLY section for the correct welding accessories connections for DC Stick Welding.
- b. Turn the input power switch ON.
- c. Press the button below the weld process indicators until the weld process indicator light next to DC Stick is on.
- d. Press the button below the weld parameter indicator lights until the Indicator Light is ON for the Current (A) Weld Parameter.
- e. The Digital Meter is displaying the Current (A) setting.
- f. Turn the Parameter Adjustment Control until the Digital Meter displays the desired Current (A) setting.

3. DC TIG SET-UP

- a. See the ASSEMBLY section for the correct welding accessories connections for DC TIG Welding.
- b. Turn the input power switch ON.
- c. Press the Weld Process Selector button until the Weld Process Indicator Light next to DC TIG is on.
 - i. If the operator wants to use Pulse DC TIG, press the Weld Process Selector until the Weld Process Indicator Light next to Pulse DC TIG is on.
- d. Press the Weld Parameter Selector button until the Indicator Light is ON for the Current (A) Weld Parameter.
- e. The Digital Meter is displaying the Current (A) setting.



f. Turn the Parameter Adjustment Control until the Digital Meter displays the desired Current (A) setting. This is the current setting that the operator wants when the foot pedal is completely pressed to the maximum. The operator will then have control of the Current (A) output from minimum amperage to this maximum setting by varying the amount the operator is pressing down on the foot pedal.

- i. If the operator is using Pulse DC TIG, this setting will be the maximum peak amperage, or the amperage that the welder will pulse up to when the foot pedal is completely pressed to the maximum.
- ii. As the operator varies the amount, they are pressing down on the foot pedal, the peak amperage and background amperage will automatically be adjusted proportionally.

g. If the operator is using Pulse DC TIG, they will need to adjust the number of times per second that the welder will pulse between the peak amperage (high end amperage) and the background amperage (low end amperage).

- i. Press the weld parameter selector button until the indicator light in front of the Pulse Frequency (HZ) is on.
- ii. The Digital Meter is now displaying the Pulse Frequency (HZ) setting.
- iii. Turn the Parameter Adjustment Control until the Pulse Frequency (Hz) display shows the desired setting.

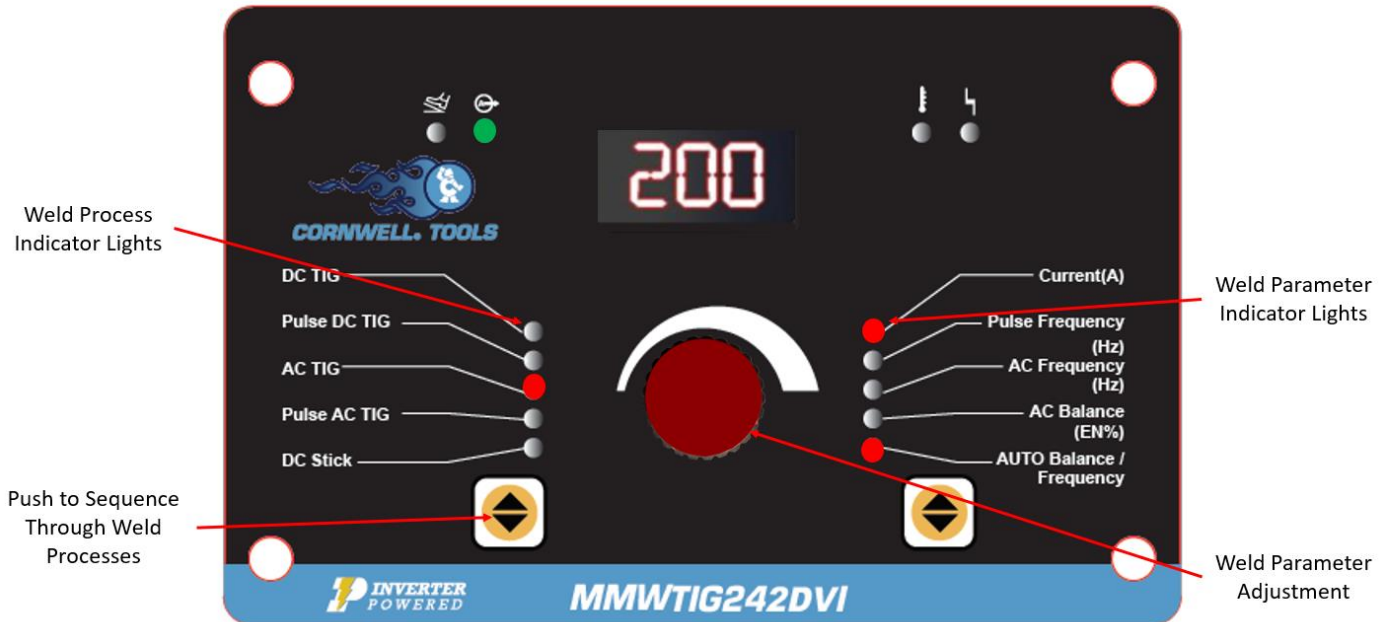
NOTE: When adjusting the Pulse Frequency (HZ) parameter, this unit will automatically default back to the Current (A) parameter after 5 seconds on no parameter changes.

a. See the ASSEMBLY section for the correct welding accessory connections for AC TIG Welding.

b. Turn the input power switch ON.

c. Press the Weld Process Selector button until the Weld Process Indicator Light next to AC TIG is on.

i. If the operator wants to use Pulse AC TIG, press the Weld Process Selector until the Weld Process Indicator Light next to Pulse AC TIG is on.



d. AUTO BALANCE/FREQUENCY

Note: For most AC TIG welding applications, we recommend the use of the Auto Balance/Frequency Weld Parameter. This allows the welder to automatically control the AC Arc Frequency and the AC Balance automatically based on the amperage the operator is welding at.

- i. Press the Weld Parameter Selector button until the Indicator Light is On for the AUTO Balance/Frequency Weld Parameter. You will notice that both the AUTO Balance/Frequency Indicator and the Current (A) Indicators are on.
- ii. The Digital Meter is displaying the Current (A) setting.
- iii. Turn the Parameter Adjustment Control until the Digital Meter displays the desired Current (A) setting. This is the current setting that the operator wants when the foot pedal is completely pressed to the maximum. The operator will then have control of the Current (A) output from minimum amperage to this maximum setting by varying the amount the operator is pressing down on the foot pedal.
 1. If the operator is using Pulse AC TIG, this setting will be the maximum peak amperage, or the amperage that the welder will pulse up to when the foot pedal is completely pressed to the maximum.
 2. As the operator varies the amount, they are pressing down on

the foot pedal, the peak amperage and background amperage will automatically be adjusted proportionally.

e. CURRENT (A)

- i. Press the Weld Parameter Selector button until the Indicator Light is On for the Current (A) Weld Parameter.
- ii. The Digital Meter is displaying the Current (A) setting.
- iii. Turn the Parameter Adjustment Control until the Digital Meter displays the desired Current (A) setting. This is the current setting that the operator wants when the foot pedal is completely pressed to the maximum. The operator will then have control of the Current (A) output from minimum amperage to this maximum setting by varying the amount the operator is pressing down on the foot pedal.
 1. If the operator is using Pulse AC TIG, this setting will be the maximum peak amperage, or the amperage that the welder will pulse up to when the foot pedal is completely pressed to the maximum.
 2. As the operator varies the amount, they are pressing down on the foot pedal, the peak amperage and background amperage will automatically be adjusted proportionally.

DC STICK OPERATION

▲ WARNING

- *High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This cutter must be Grounded while in use to protect the operator from electrical shock.*
- *Do not remove grounding prong or alter the plug in any way. Use only the supplied adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF when connecting your plasma cutter's power cord directly to a properly grounded 120 VAC, 60 Hz, single phase, 20-amp input power supply.*

1. SETTING UP THE WORK PIECE

1.1 Welding positions

There are two basic positions, for welding: Flat and Horizontal. Flat welding is generally easier, faster, and allows for better penetration. If possible, the work piece should be positioned so that the bead will run on a flat surface.

1.2 Preparing the Joint:

Before welding, the surface of work piece needs to be free of dirt, rust, scale, oil or paint or it will create brittle and porous welds. If the base metal pieces to be joined are thick or heavy, it may be necessary to bevel the edges with a metal grinder, the correct bevel should be around 60 degrees. See following picture:

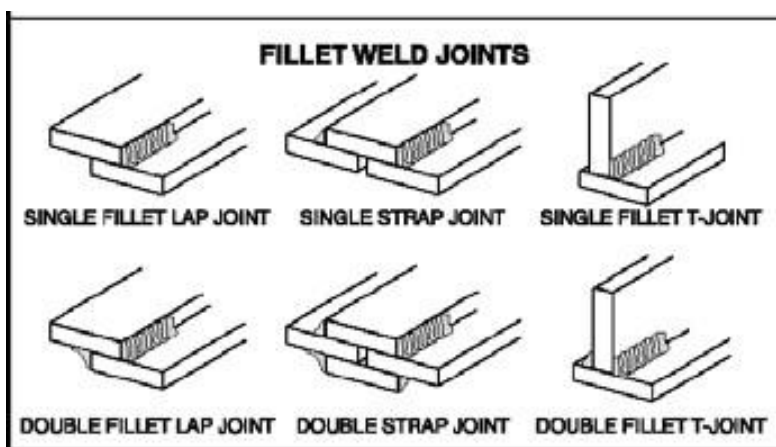
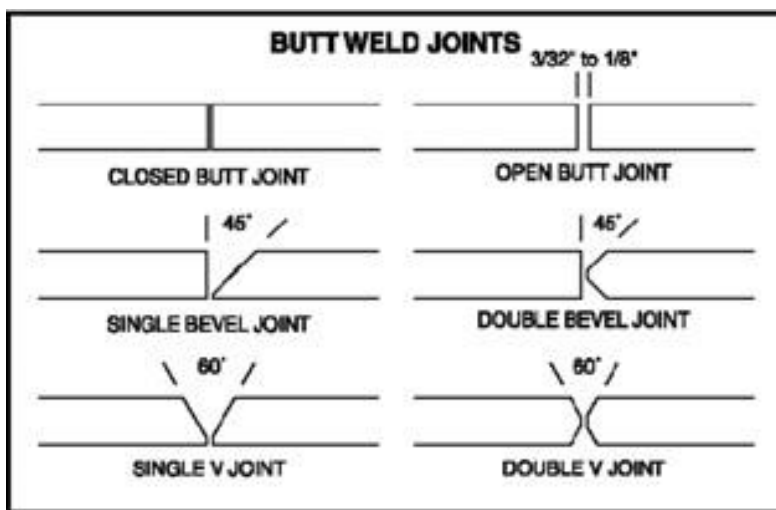
INCORRECT



CORRECT



Based on different welding positions, there are different welding joints. See following images for more information.



2. GROUND CLAMP CONNECTION

Clear any dirt, rust, scale, oil or paint on the ground clamp. Make certain you have a good solid ground connection. A poor connection at the ground clamp will waste power and heat. Make sure the ground clamp touches the metal.

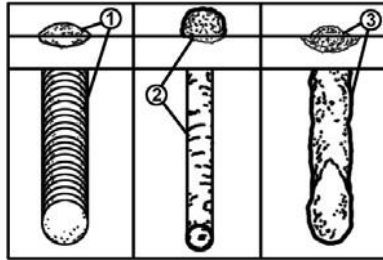
3. ELECTRODE

The welding electrode is a rod coated with a layer of flux. When welding, electrical current flows between the electrode (rod) and the grounded metal work piece. The intense heat of the arc between the rod and the grounded metal melts the electrode and the flux.

4. SELECTING THE PROPER ELECTRODE

There is no golden rule that determines the exact rod or heat setting required for every situation. The type and thickness of metal and the position of the work piece determine the electrode type and the

amount of heat needed in the welding process. Heavier and thicker metals required more amperage. It is best to practice your welds on scrap metal which matches the metal you intend to work with to determine correct heat setting and electrode choice. See the following helpful trouble shooting tips to determine if you are using a correct electrode.



4.1 When proper rod is used:

- 4.1a. The bead will lay smoothly over the work without ragged edges
- 4.1b. The base metal puddle will be as deep as the bead that rises above it
- 4.1c. The welding operation will make a crackling sound like the sound of eggs frying

4.2 When too small of a rod is used:

- 4.2a. The bead will be high and irregular
- 4.2b. The arc will be difficult to maintain

4.3 When the rod is too large:

- 4.3a. The arc will burn through light metals
- 4.3b. The bead will undercut the work
- 4.3c. The bead will be flat and porous
- 4.3d. Rod may freeze or stick to work piece

Note: Rate of travel over the work also affects the weld. To ensure proper penetration and enough deposit of rod, the arc must be moved slowly and evenly along the weld seam.

5. SETTING THE AMPERAGE CONTROL

The welder has current control that is infinitely adjustable within its range. It is capable of welding with electrodes up to 3/32" diameter. There is no golden rule that determines the exact amperage required for every situation. It is best to practice your welds on scrap metal which matches the metals you intend to work with to determine correct setting for your job. The electrode type and the thickness of the work piece metal determine the amount of heat needed in the welding process.

Heavier and thicker metals require more voltage (amperage), whereas lighter and thinner metals require less voltage (amperage). Consult the welding electrode packaging for recommended welding amperage range.

6. WELDING TECHNIQUES

The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on valuable equipment until you are satisfied that the appearance of your practice welds is of good appearance and free of slag or gas inclusions.

6.1 Holding the electrode:

The best way to grip the electrode holder is the way that feels most comfortable to you. Position the Electrode to the work piece when striking the initial arc, it may be necessary to hold the electrode perpendicular to the work piece. Once the arc is started, the angle of the electrode in relation to the work piece should be between 10 and 30 degrees. This will allow for good penetration, with minimal spatter.

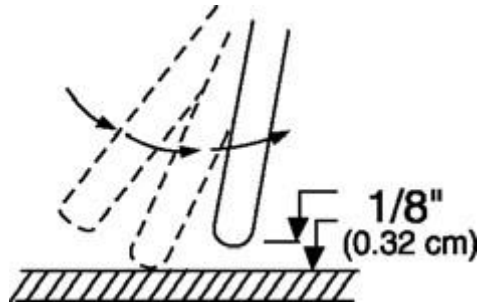
6.2 Striking the arc

▲ WARNING

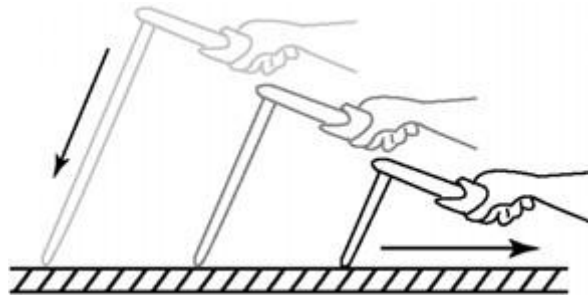
EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN!

Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long-sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

Scratch the work piece with the end of electrode to start arc and then raise it quickly about 1/8-inch gap between the rod and the work piece. See following picture



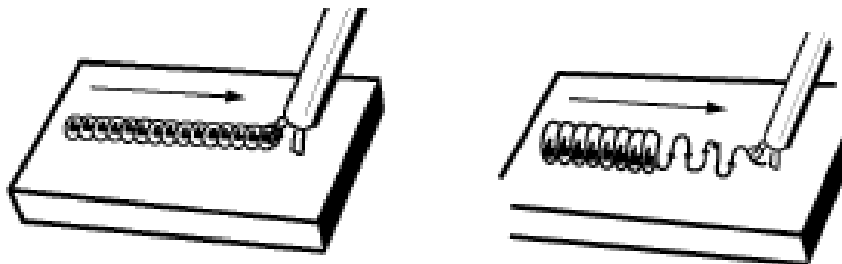
It is important that the gap be maintained during the welding process and it should be neither too wide nor too narrow. If too narrow, the rod will stick to the work piece. If too wide, the arc will be extinguished. It takes much practice to maintain the gap. The beginners may get stuck or arc will be extinguished. When the rod is stuck to the work piece, gently rock it back and forth to make them separate. If not, a short circuit will occur, and it will break the welder. A good arc is accompanied by a crisp, cracking sound. The sound is like that made by eggs frying. To lay a weld bead, only 2 movements are required; downward (as the electrode is consumed) and in the direction the weld is to be laid, as in following figure:



6.3 Types of weld bead:

The following paragraphs discuss the most used arc welding beads.

The stringer bead: Formed by traveling with the electrode in a straight line while keeping the electrode centered over the weld joint.



The weave bead: Used when you want to deposit metal over a wider space than would be possible with a stringer bead. It is made by weaving from side to side while moving with the electrode. It is best to hesitate momentarily at each side before weaving back the other way.

6.4 Welding position

Flat position: It is easiest of the welding positions and is most used. It is best if you can weld in the flat position if possible, as good results are easier to achieve.



Flat Position

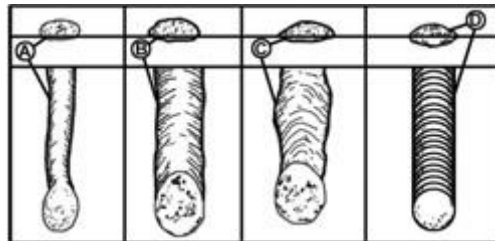


Horizontal Position

The horizontal position: Is performed very much the same as the flat weld except that the angle is different such that the electrode, and therefore the arc force, is directed more toward the metal above the weld joint. This more direct angle helps prevent the weld puddle from running downward while still allowing slow enough travel speed to achieve good penetration. A good starting point for your electrode angle is about 30 degrees DOWN from being perpendicular to the work piece.

6.5 Judge the good weld bead:

When the trick of establishing and holding an arc has been learned, the next step is learning how to run a good bead. The first attempts in practice will probably fall short of acceptable weld beads. Too long of an arc will be held or the travel speed will vary from slow to fast (see following).



- A. Weld speed is too fast
- B. Weld speed is too slow
- C. Arc is too long
- D. Ideal weld

A solid weld bead requires that the electrode be moved slowly and steadily along the weld seam. Moving the electrode rapidly or erratically will prevent proper fusion or create a lumpy, uneven bead.

▲WARNING

ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH! To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded work piece.

6.6 Finish the bead

As the coating on the outside of the electrode burns off, it forms an envelope of protective

gases around the weld. This prevents air from reaching the molten metal and creating an undesirable chemical reaction. The burning coating, however, forms slag. The slag formation appears as an accumulation of dirty metal scale on the finished weld. Slag should be removed by using a chipping hammer.

▲ WARNING

PEENING THE SLAG FROM A WELD JOINT CAUSES SMALL CHIPS OF METAL TO FLY THROUGH THE AIR! Metallic chips flying through the air can cause eye injury or injury to other parts of the head, hands, or exposed portions of the body. Wear goggles or safety glasses with side shields and protect the hands and other exposed parts of the body with protective garments, or if possible, work with a shield between the body and the work piece.

The intense heat produced at the arc sets up strains in the metal joined by welding. Peening the weld not only removes the scale left behind in the welding but relieves the internal strains developed by the heating and cooling process.

BASIC TIG WELDING OPERATION

▲ WARNING

High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle at the power source. This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure if your outlet is properly grounded, have it checked by a qualified electrician. Do not cut off the grounding prong or alter the plug in any way and do not use any adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF then connect your welder's power cord to a properly grounded 230 VAC, 60 HZ, single phase, 50-amp power source.

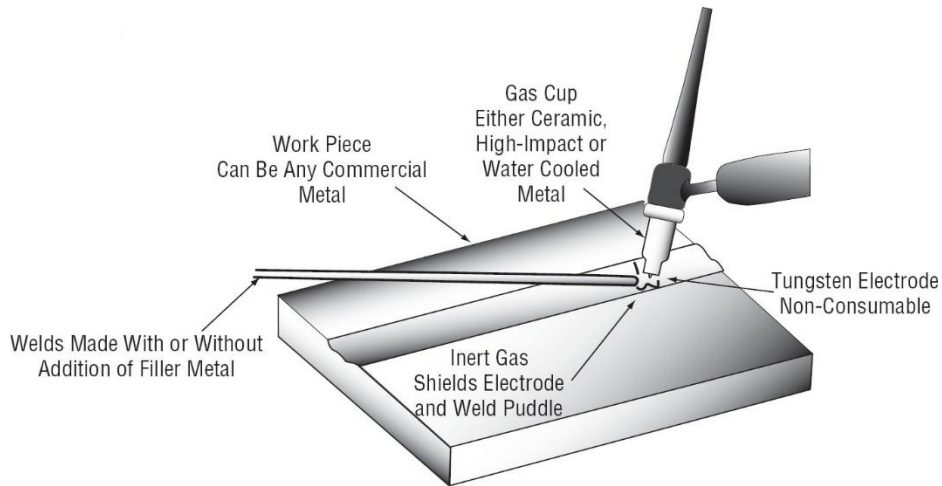
▲ WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN! Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long-sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

▲ CAUTION

Be aware that the TIG torch will be electrically LIVE when the Input Power Switch on the welder is turned on.

Gas Tungsten Arc Welding (GTAW) or TIG (Tungsten Inert Gas) as it is commonly referred to, is a welding process in which fusion is produced by an electric arc that is established between a single tungsten (non-consumable) electrode and the work piece. Shielding is obtained from a welding grade shielding gas or welding grade shielding gas mixture which is generally Argon based. A filler metal may also be added manually in some circumstances depending on the welding application.



Tungsten Electrode Current Ranges

Electrode Diameter	DC Current (Amps)
0.040" (1.0 mm)	30-60
1/16" (1.6 mm)	60-115
3/32" (2.4 mm)	100-165
1/8" (3.2mm)	135-200
5/32" (4.0 mm)	190-280
3/16" (4.8 mm)	250-340

Guide for Selecting Filler Wire Diameter

Filler Wire Diameter	DC Current Range (Amps)
1/16" (1.6 mm)	20-90
3/32" (2.4 mm)	65-115
1/8" (3.2 mm)	100-165
3/16" (4.8 mm)	200-350

Tungsten Electrode Types

Electrode Type (Ground Finish)	Welding Application	Features	Color Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper	Excellent arc starting, Long life, High current carrying capacity	Red
Zirconated 1%	High quality AC welding of aluminium, magnesium and their alloys.	Self cleaning, Long life, Maintains balled end, High current carrying capacity.	White
Ceriated 2%	AC & DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc.	Grey

Aluminum Welding Material

Base Metal Thickness	AC Current for Aluminium	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate	JOINT TYPE
1/16" 1.6 mm	60-80 70-90	1/16" 1.6 mm	1/16" 1.6 mm	15 CFM 7 LPM	Butt/Corner Lap/Fillet
1/8" 3.2 mm	125-145 140-160	3/32" 2.4 mm	1/16"-3/32" 1.6 mm - 2.4 mm	17 CFM 8 LPM	Butt/Corner Lap/Fillet

Welding Rate

Base Metal Thickness	DC Current for Mild Steel	DC Current for Stainless Steel	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate	Joint Type
0.040" 1.0 mm	35-45 40-50	20-30 25-35	0.040" 1.0 mm	1/16" 1.6 mm	10 CFH(5 LPM)	Butt/Corner Lap/Fillet
0.045" 1.2 mm	45-55 50-60	30-45 35-50	0.040" 1.0 mm	1/16" 1.6 mm	13 CFH(6 LPM)	Butt/Corner Lap/Fillet
1/16" 1.6 mm	60-70 70-90	40-60 50-70	1/16" 1.6 mm	1/16" 1.6 mm	15 CFH(7 LPM)	Butt/Corner Lap/Fillet
1/8" 3.2 mm	80-100 90-115	65-85 90-110	1/16" 1.6 mm	3/32" 2.4 mm	15 CFH(7 LPM)	Butt/Corner Lap/Fillet
3/16" 4.8 mm	115-135 140-165	100-125 125-150	3/32" 2.4 mm	1/8" 3.2 mm	21 CFH(10 LPM)	Butt/Corner Lap/Fillet
1/4" 6.4 mm	160-175 170-200	135-160 160-180	1/8" 3.2 mm	5/32" 4.0 mm	21 CFH(10 LPM)	Butt/Corner Lap/Fillet

TIG Welding is generally regarded as a specialized process that requires operator competency. While many of the principles outlined in the previous Arc Welding section are applicable a comprehensive outline of the TIG Welding process is outside the scope of this Operating Manual.

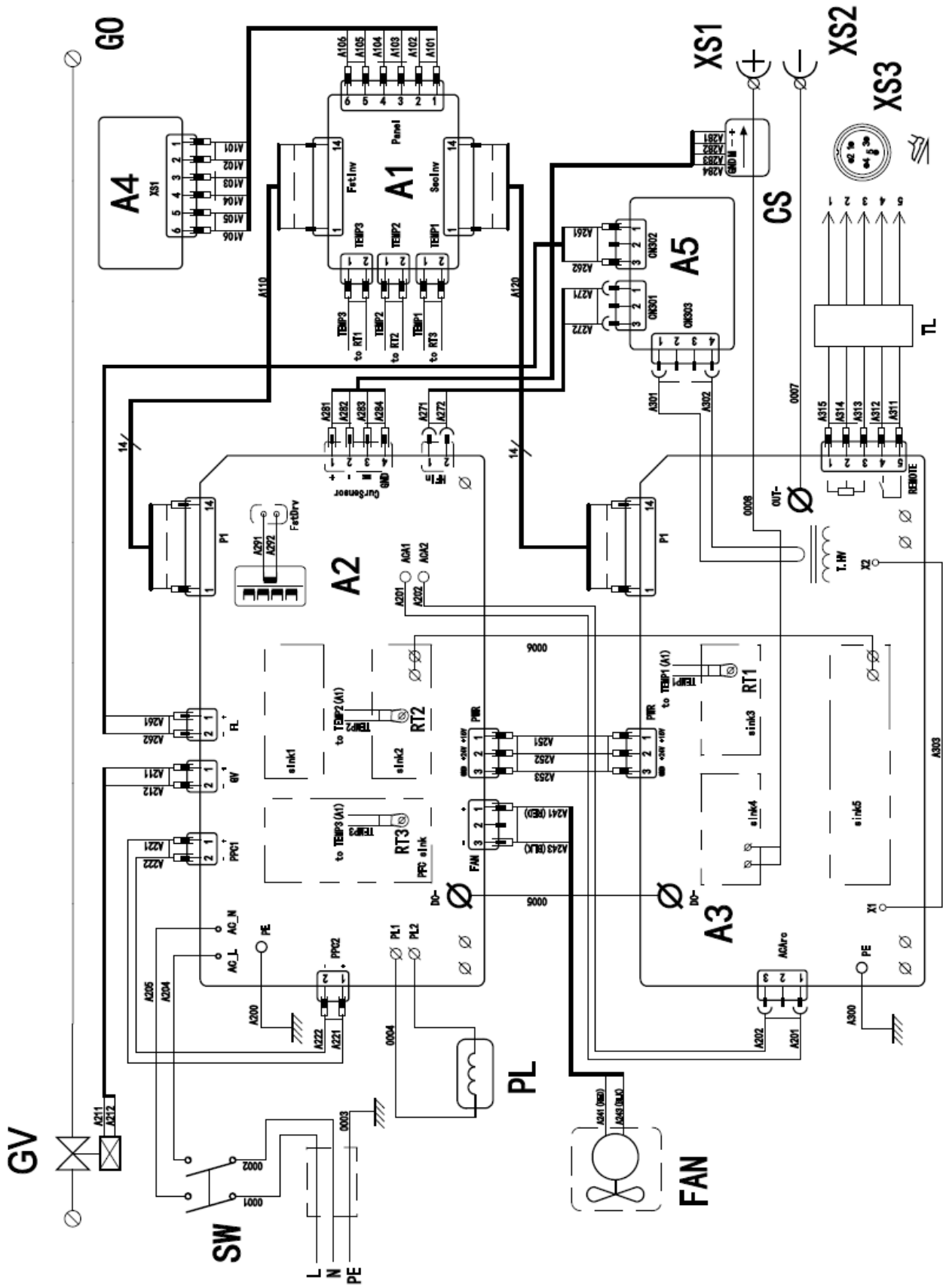
MAINTENANCE

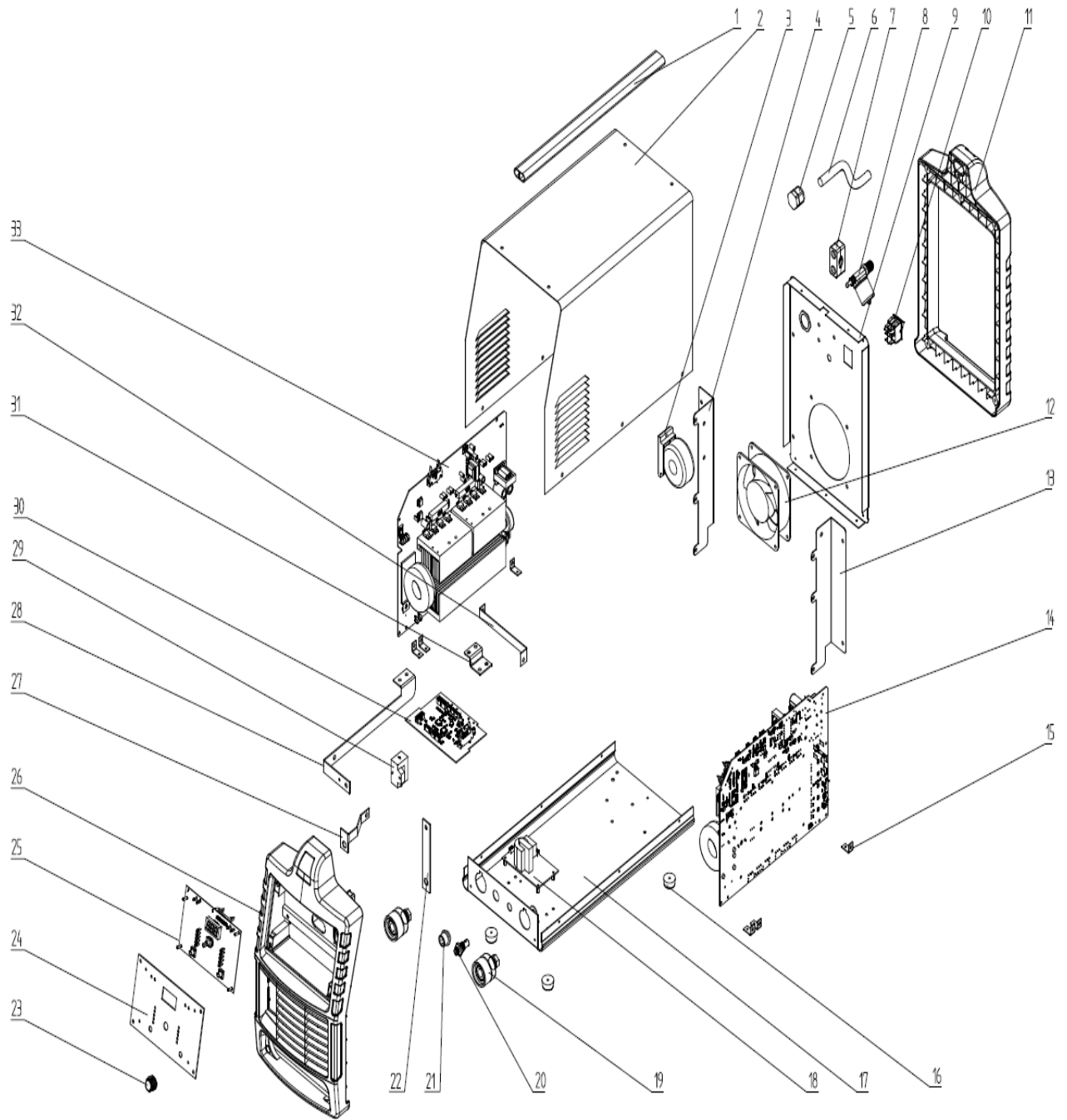
▲ WARNING

- **High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This cutter must be Grounded while in use to protect the operator from electrical shock.**
- **Do not remove grounding prong or alter the plug in any way. Use only the supplied adapter between the plasma cutter's power cord and the power source receptacle. Make sure the POWER switch is OFF when connecting your plasma cutter's power cord directly to a properly grounded 120 VAC, 60 Hz, single phase, 20-amp input power supply.**
- **Maintain your welder.** It is recommended that the general condition of any welder be examined before it is used. Keep your welder in good repair by adopting a program of conscientious repair and maintenance. Have necessary repairs made by qualified service personnel.
- Periodically clean dust, dirt, grease, etc. from your welder.
- Every six months, or as necessary, remove the cover panel from the welder and air-blow any dust and dirt that may have accumulated inside the welder.
- Replace power cord, ground cable, ground clamp, or electrode assembly when damaged or worn.

TROUBLESHOOTING

Failure	Possible Cause	Corrective Action
Unit does not power up.	Unit is not plugged in.	Plug in unit.
	Input power circuit breaker is not on.	Reset input power circuit breaker.
	The main power switch is not working.	Replace main power switch.
Temperature indicator is on.	The internal temperature is too high.	Leave power on and let the fan cool the unit. Output will continue when the unit has cooled.
	Cooling fan is damaged.	Replace cooling fan.
Alarm indicator is on.	Input power voltage is too high or too low.	Meter input power voltage. This unit must be used with input voltage that ranges from 230V AC plus or minus 15%. 120V plus or minus 15% when operating on 120V.
TIG arc does not start.	Remote foot pedal control is broken.	Replace remote control.
	Work piece is painted or rusty.	Remove all paint and rust.
	Ground clamp is connected where there is paint or rust.	Remove all paint and rust so ground clamp is connected to bare metal.
	Ground clamp is not electrically connected to the work piece.	Make certain the ground clamp is connected to the work piece.
	Wrong shielding gas.	Check to make certain you are using 100% Argon shielding gas.
	Main PC Board has failed.	Replace the Main PC Board.
	HF PC Board has failed.	Replace the HF PC Board.
Stick amperage seems low.	Remote control is installed.	Remove remote control.
	Amperage is set too low.	Increase the amperage. See the Setting-Up Equipment section.
There is no shielding gas.	Shielding gas bottle is empty.	Fill the shielding gas bottle.
	Shielding gas bottle supply valve is off.	Open valve on shielding gas bottle.
	Gas flow rate on regulator is off or very low.	Adjust gas flow rate to 20 CFH.
	Gas valve has failed.	Replace gas valve.
	Main PC Board has failed.	Replace Main PC Board.
Cooling fan is not working.	Cooling fan has failed.	Replace cooling fan.
	Cooling fan connections have come loose.	Inspect cooling fan connections and repair.
There is no display on the digital meters.	The adjustment potentiometer has failed.	Replace the adjustment potentiometer.
	The adjustment potentiometer connections have come loose.	Inspect the adjustment potentiometer connections and repair.
	Main PC Board has failed.	Replace Main PC Board.
For assistance, contact the Welder Help Line at 888-762-4045		





Ref #	Part #	Description	Qty.
1	155500012	CARRYING HANDLE	1
2	155500013	ENCLOSURE	1
3	105300219	PFC INDUCTANCE	1
4	105500142	MAIN PCB SUPPORT (LEFT)	1
5	105200112	Power Cord STRAIN RELEIF	1
6	105500158	POWER CORD	1
7	105200307	STRAIN RELEIF	2
8	105500143	GAS VALVE	1
9	155500014	BACK PLATE	1
10	155500015	POWER SWITCH	1
11	155500016	REAR BEZEL	1
12	105500147	FAN	1
13	105500144	MAIN PCB SUPPORT (RIGHT)	1
14	105500146	SECONDARY PCB	1
15	105500148	MAIN PCB SUPPORT (BOTTOM)	3
16	105800007	FEET	4
17	155500017	BOTTOM PLATE	1
18	105500154	HIGH VOLTAGE ARC PCB	1
19	105200136	QUICK CONNECTOR	2
20	105500130	FRONT GAS CONNECTION	1
21	105200131	5 PIN TRIGGER RECEPTACLE	1
22	155500018	OUTPUT BUSBAR STRAIGHT	1
23	105500042	MULTI FUNCTION CONTROL KNOB	1
24	155500019	FRONT PCB SUPPORT	1
25	195300007	FRONT PCB	1
26	105500092	FRONT BEZEL	1
27	155500020	OUTPUT BUSBAR CURVED	1
28	155500021	OUTPUT BUSBAR BLOCK	1
29	105500150	HALL HANRNESS	1
30	155500022	MAIN PCB	1
31	105500149	CONDUCTANCE STRIP	1
32	105500156	CONDUCTANCE STRIP SMALL	1
33	105500054	PRIMARY INVERTER PCB	1
*	105500041	GROUND CABLE WITH CLAMP	1
*	105500055	ELECTRODE HOLDER WITH CABLE	1
*	105200081	GAS HOSE	1
*	105500040	TIG TORCH STYLE 26	1

For technical questions contact our welder help line at 888-762-4045



CORNWELL QUALITY TOOLS COMPANY
667 SEVILLE RD
WADSWORTH OH 44281-1077
Made in China