

BENCHMARKTM MC

INVERTER MULTI-PROCESS WELDER KIT



120V or 230V 60Hz

5 year limited warranty on tool



Intertek
4009939
MIG-200

**READ ALL INSTRUCTIONS BEFORE FIRST USE.
KEEP THIS MANUAL FOR FUTURE REFERENCE.
KEEP AWAY FROM CHILDREN.**



**WEAR CSA APPROVED
EYE PROTECTION**



**WEAR EAR
PROTECTION**



**WEAR A
FACE MASK**

PRODUCT SPECIFICATIONS

BENCHMARK INVERTER MIG/FLUX/STICK WELDER				
Input Voltage	1ph 120V		1ph 230V	
Function	MIG	MMA	MIG	MMA
Input Power (KVA)	3.3	3.5	8.0	7.6
Input Current (A)	27	29	35	33
Output Current Range (A)	30~100	20-85	30~200	20-170
Max. Output Current	100A/19V	85A/23.4V	200A/24V	170A/26.8V
No-load Voltage(V)	56		56	
Rated Duty Cycle	35 @100A	35 @85A	25 @200A	25 170A
Wire Feeding Speed (m/min)	0.5-13	N/A	0.5-13	N/A
Welding Wire Dia. (mm)	0.6-0.8	N/A	0.6-1.0	N/A
Usable Electrode Size (mm)	N/A	1.6-2.5	N/A	1.6-4.0
Efficiency (%)	85			
Power Factor	0.7			
Protection Class	IP21S			
Insulation Class	F			
Welder Dimensions	17.7" x 8.9" x 11.4" (45 x 22.5 x 37cm)			
Input Power Cord Length	2m/6.5ft			
Tool Weight	37.4 LBS (17KG)			
Welding Cable Length	3m/10ft			
MIG Torch Length	3m /10ft			
Earth Clamp Length	1.5m/5ft			

NEED ASSISTANCE?

Call us on our toll- free customer support line:

1-866-349-8665 (Monday through Friday 9am – 5pm Eastern Standard Time)

- Technical questions
- Replacement parts
- Parts missing from package

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GENERAL SAFETY WARNINGS










IMPORTANT SAFETY INSTRUCTIONS

Read and understand all safety and operational instructions. Failure to follow the safety rules listed below and other basic safety precautions may result in serious personal injury. Keep this manual, sales receipts and applicable warranty forms for future reference.

SAFETY SYMBOLS

The purpose of safety symbols is to alert you of the potential safety RISKS. Recognize and understand them. Follow the instructions provided.

SYMBOL	MEANING
	Failure to obey a DANGER safety alert WILL result in serious personal injury or death to you or to others. Always obey all messages following this symbol to reduce the risk of serious personal injury or death.
	Failure to obey a WARNING safety alert MAY result in serious personal injury or death to you or to others. Always obey all messages following this symbol to reduce the risk of potential serious personal injury or death.
	Failure to obey a CAUTION safety alert MAY result in personal injury or property damage to you or to others. Always obey all messages following this symbol to reduce the risk of personal injury or property damage.
	Failure to obey a NOTICE or a CAUTION (without a safety alert) MAY result in property damage to you or to others. Always obey all messages following this symbol to reduce the risk of property damage.
	ALWAYS WEAR EYE PROTECTION THAT CONFORMS WITH CSA Z94.3 or ANSI SAFETY STANDARD Z87.1 FLYING DEBRIS can cause permanent eye damage. Prescription eyeglasses ARE NOT a replacement for proper eye protection. The usage of a safety standard compliant face shield placed over proper safety glasses or goggles can reduce the risk of facial injury. Non-compliant eyewear can cause serious injury if broken during the operation of a power tool.
	Use hearing protection, particularly during extended periods of operation of the tool, or if the operation is noisy.
	WEAR A DUST MASK THAT IS DESIGNED TO BE USED WHEN OPERATING A POWER TOOL IN A DUSTY ENVIRONMENT.

SYMBOL	MEANING
<p>▲ WARNING</p> 	<p>Always wear non-slip gloves that fit properly to protect your hands and to help you grip the tool.</p> <p>Always wear sturdy clothing with long sleeves and long pants. Never operate the tool while wearing shorts, short sleeve shirt or while shirtless.</p> <p>Always wear non-slip safety boots to prevent foot injuries and slipping that could cause loss of control of the tool.</p>
<p>▲ WARNING</p> 	<p>To avoid electrical hazards, fire hazards or damage to the tool, use proper circuit protection.</p> <p>This machine is wired at the factory for 120V and 230V AC operations (Plug will only fit one way). Plug the power cord into a properly grounded, GFCI protected 120VAC or 230V AC receptacle that matches the plug. The circuit must be equipped with delayed action-type circuit breaker or fuses. To avoid shock or fire, replace power cord immediately if it is worn, cut or damaged in any way</p>
<p>▲ WARNING</p> 	<p>WARNING: Ventilation openings in batteries and chargers must always be open to allow cooling air to circulate freely. Air vents that are blocked, restricted or covered may result in the battery or charger overheating. Overheating may lead to damage to the tool or cause a fire, resulting in possible serious injury.</p>
	<p>ELECTRIC SHOCK CAN KILL</p>
	<p>FUMES AND GASES</p>
	<p>FIRE HAZARDS</p>
	<p>ARC RAYS</p>
	<p>HOT MATERIALS</p>
	<p>MAGNETIC FIELDS</p>

GENERAL SAFETY INSTRUCTIONS

WARNING: OWNER'S MANUAL.

Read and understand this owner's manual BEFORE using machine.

TRAINED OPERATORS ONLY. Untrained operators have a higher risk of being hurt or killed. Only allow trained/supervised people to use this machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use - especially around children. Make your workshop kid proof!

DANGEROUS ENVIRONMENTS. Do not use machinery in areas that are wet, cluttered, or have poor lighting. Operating machinery in these areas greatly increases the risk of accidents and injury.

MENTAL ALERTNESS REQUIRED. Full mental alertness is required for safe operation of machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

ELECTRICAL EQUIPMENT INJURY RISKS. You can be shocked, burned, or killed by touching live electrical components or improperly grounded machinery. To reduce this risk, only allow qualified service personnel to do electrical installation or repair work, and always disconnect power before accessing or exposing electrical equipment.

DISCONNECT POWER FIRST. Always disconnect machine from power supply before making adjustments, changing tooling, or servicing machine. This prevents an injury risk from unintended startup or contact with live electrical components.

EYE PROTECTION. Always wear ANSI-approved safety glasses or a face shield when operating or observing machinery to reduce the risk of eye injury or blindness from flying particles. Everyday eyeglasses are NOT approved safety glasses.

WEARING PROPER APPAREL. Do not wear clothing, apparel or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to reduce risk of slipping and losing control or accidentally contacting cutting tool or moving parts.

HAZARDOUS DUST. Dust created by machinery operations may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material. Always wear a NIOSH-approved respirator to reduce your risk.

HEARING PROTECTION. Always wear hearing protection when operating or observing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

REMOVE ADJUSTING TOOLS. Tools left on machinery can become dangerous projectiles upon startup. Never leave chuck keys, wrenches, or any other tools on machine. Always verify removal before starting!

USE CORRECT TOOL FOR THE JOB. Only use this tool for its intended purpose - do not force it or an attachment to do a job for which it was not designed. Never make unapproved modifications—modifying tool or using it differently than intended may result in malfunction or mechanical failure that can lead to personal injury or death!

AWKWARD POSITIONS. Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make workpiece control difficult or increase the risk of accidental injury.

CHILDREN & BYSTANDERS. Keep children and bystanders at a safe distance from the work area. Stop using machine if they become a distraction.

GUARDS & COVERS. Guards and covers reduce accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly before operating machine.

FORCING MACHINERY. Do not force machine. It will do the job safer and better at the rate for which it was designed.

NEVER STAND ON MACHINE. Serious injury may occur if machine is tipped or if the cutting tool is unintentionally contacted.

STABLE MACHINE. Unexpected movement during operation greatly increases risk of injury or loss of control. Before starting, verify machine is stable and mobile base (if used) is locked.

USE RECOMMENDED ACCESSORIES. Consult this owner's manual or the manufacturer for recommended accessories. Using improper accessories will increase the risk of serious injury.

UNATTENDED OPERATION. To reduce the risk of accidental injury, turn machine OFF and ensure all moving parts completely stop before walking away. Never leave machine running while unattended.

MAINTAIN WITH CARE. Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. A machine that is improperly maintained could malfunction, leading to serious personal injury or death.

DAMAGED PARTS. Regularly inspect machine for damaged, loose, or misaligned parts - or any condition that could affect safe operation. Immediately repair/replace before operating machine. For your own safety, DO NOT operate machine with damaged parts!

MAINTAIN POWER CORDS. When disconnecting cord-connected machines from power, grab and pull the plug—NOT the cord. Pulling the cord may damage the wires inside. Do not handle cord/plug with wet hands. Avoid cord damage by keeping it away from heated surfaces, high traffic areas, harsh chemicals, and wet/damp locations.

SERVICE

- Have your machinery serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the machinery is maintained.

SPECIFIC SAFETY RULES FOR INVERTER MIG/ FLUX/STICK WELDER

⚠️ WARNING: In order to avoid mistakes that could cause serious injury, read the following steps carefully and understand them thoroughly before using this welder.

WELDING FUMES. Breathing welding fumes can cause suffocation or poisoning without warning. Keep your head out of welding fumes. Use adequate ventilation at the arc to safely remove the fumes from your breathing zone and the general area. Use ANSI approved respirators for the type of welding operation. Protect others from these fumes.

WELDING IN A CONFINED SPACE CAN BE HAZARDOUS. Always open all covers, sustain forced ventilation, remove toxic and hazardous materials, and provide a power disconnect to the welder inside the workspace. Always work with someone who can give you help from outside the space. Welding can displace oxygen. Always check for safe breathing atmosphere and provide air-supplied respirators if necessary. Keep in mind that all normal welding hazards are intensified in a confined space.

ELECTRIC SHOCK. DO NOT touch live electrical parts. Connect welder to power source with approved earth ground. Make sure all electrical connections are tight, clean, and dry. Connect workpiece to approved earth ground. The work lead is NOT a ground connection and is to be used only to complete the working welding circuit.

PREVENT FIRES. Welding work zones must be kept clear of flammable liquids, such as gasoline and solvents; combustible solids, such as paper and wood; and flammable gases, such as acetylene and hydrogen. Provide approved fire barriers and fire extinguishing equipment for the welding zone. Stay alert for sparks and spatter thrown into cracks and crevices that can start a smoldering fire. Inspect the work area again one hour after welding for any potential fire hazards.

WORKING AREA. Keep working area clear of any material not involved in the welding operation. Keep all equipment, workpieces, and work surfaces clean, dry, and free of entanglements. Keep lead cables organized and away from your body.

PROTECT BODY FROM ARC BURNS, SPARKS, AND SPATTER. Wear correct and approved eye, ear, and body protection. Wear complete body protection, such as clean and oil-free protective clothing, leather gloves, protective cap, heavy long-sleeve shirt, cuffless pants, and high leather boots. DO NOT wear jewellery or frayed clothing. Use a welding helmet with the correct shade of filter for the operation. Protect other people and property in your working zone from exposure to arc radiation, sparks, and spatter.

HANDLING GAS CYLINDERS. Regardless of content, pressurized gas cylinders can explode. Always secure a protector cap in place over the outlet valve assembly when moving the cylinder. A broken off valve could release the pressurized contents and cause the cylinder to be hurled about at dangerously high speeds, causing serious property damage, personal injury, or death. Always use safe methods when moving gas cylinders. Always secure a gas cylinder to a wall or approved cylinder cart with a chain before using or storing.

PROTECT GAS CYLINDERS FROM HEAT OR DAMAGE. An excess of heat can cause the pressurized gas to expand and explode the cylinder. Never weld on the

gas cylinder. Damaging the outside of the cylinder can cause the cylinder to crack and explode. Exploding pressurized gas cylinders can cause serious property damage, personal injury, or death.

ELECTRIC AND MAGNETIC FIELDS (EMF). Welding operations create EMF around the welding equipment and workpieces. Workers who have pacemakers must consult with their physician before using this equipment or being within 50 feet of welding operations.

EXPERIENCING DIFFICULTIES. If you are experiencing difficulties performing the intended operation, stop using the equipment.

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, provincial and national codes.

Always be aware of your work environment. Be sure to keep other people, especially children, away from you while welding.

Check all components to ensure they are clean and in good operating condition before use.

Do not operate the welder if the output cable, wire, or any part of the system is wet.

Do not immerse them in water.

Do not allow any body part to come in contact with the wire if you are in contact with the material being welded, ground or wire 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 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.

Always use this welder in the rated duty cycle to prevent excessive heat and failure.

Do not attempt to repair or maintain the welder while the power is on.

Do not touch the electrode and the ground or grounded work piece at the same time.

Do not use a welder to thaw frozen pipes.












SAVE THIS USER MANUAL

WARNING:

MISUSE or failure to follow the safety rules stated in this instruction manual may cause serious personal injury.

SAFETY SYMBOLS

The rating plate on your tool may show symbols. These represent important information about the product or instructions on its use.

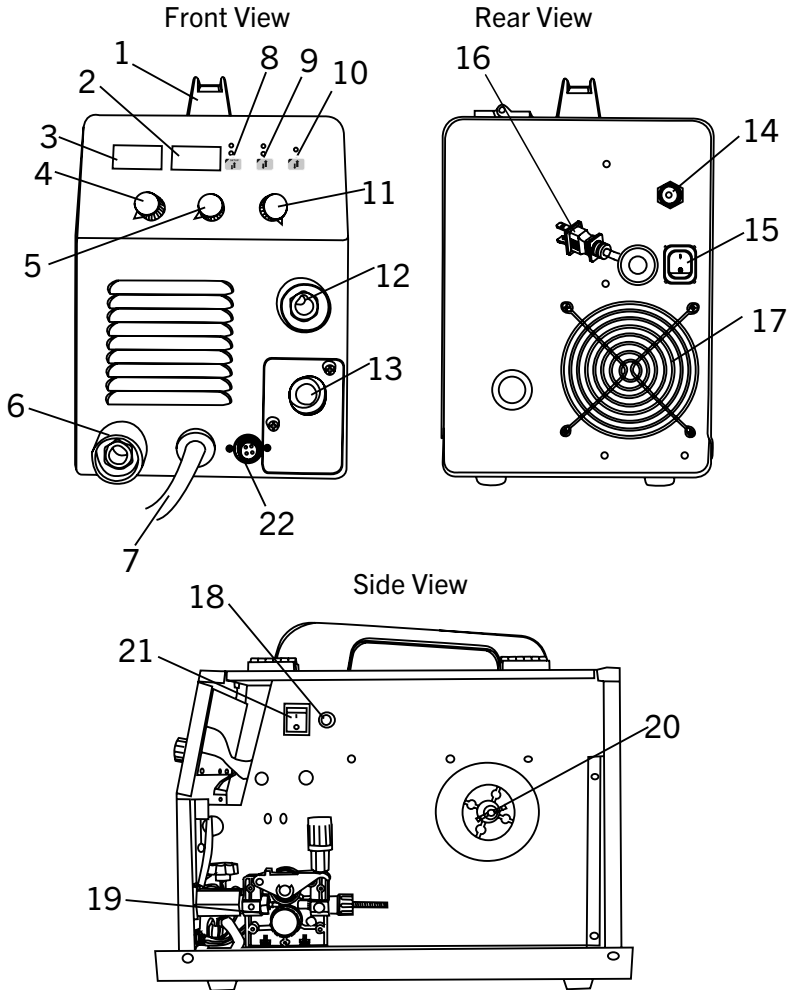
	WARNING: Please read all of the safety and operating instructions carefully before using this tool. Please pay particular attention to all sections of this User Guide that carry warning symbols and notices. Some of the following symbols may be used on this tool.
	Observe caution and safety notes.
	To reduce the risk of injury, user must read and understand User Guide before using this tool.
	Wear ear protection.
	Wear protective helmet and eye protection.
	Switch off and remove plug from power source before cleaning or maintenance.
	Do not use in the rain or leave outdoors while it is raining.
	Keep bystanders away.
	Don't touch the inlet and outlet when the vacuum cover is opened or the tube is removed.
	Double insulation.
	Remove plug from the power source immediately if the power cord is damaged or cut.



Intertek
4009939
MIG-200

This symbol designates that this tool is listed with Canadian and U.S. requirements by CSA
Conforms to ANSI/IEC 60974-1; CSA E60974-1

**KNOW YOUR BENCHMARK INVERTER
MULTI-PROCESS WELDER**







FUNCTIONS

- 1 Handle
- 2 Welding voltage meter
- 3 Welding current meter
- 4 Regulator - wire feeding speed (MIG mode), welding current (MMA mode)
- 5 Regulator - welding voltage (MIG mode)
- 6 Positive output connector
- 7 Polarity switching cable
- 8 MIG/MMA mode selector
- 9 2T/4T mode selector
- 10 Gas test
- 11 Inductor adjustment (MIG mode), arc force (MMA mode)
- 12 Negative output connector
- 13 MIG welding torch connector
- 14 Gas supply inlet
- 15 Power switch
- 16 Power input cable and plug
- 17 Fan
- 18 Quick wire feeding button
- 19 Wire feeder
- 20 Wire spool mount spindle
- 21 Spool gun/MIG gun switch
- 22 Wire feed control socket

GAS & NOGAS Application connection:

Gas application (using solid cored welding wire: polarity switching cable connects "+", earth clamp connects "-", torch connect to "  " and fasten it.

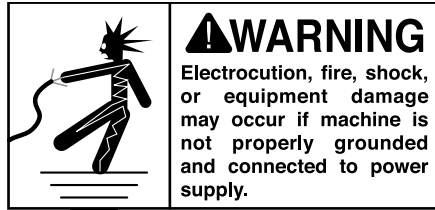
No gas application (using flux cored welding wire: polarity switching cable connects "-", earth clamp connects "+", torch connect to "  " and fasten it.

Note: Inductor adjustment is to set the welding arc force, 0 is standard setting value.

If the code "E01" is shown on the display, it means the machine is over heated and under protection, please wait till the display "E01" is off.

POWER SUPPLY

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed. To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by an electrician or qualified service personnel in accordance with all applicable codes and standards.



FULL-LOAD CURRENT RATING

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

Full-Load Current Rating at 230V 17.5 Amps

Full-Load Current Rating at 120V..... 17.5 Amps

The full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating. If the machine is overloaded for a sufficient length of time, damage, overheating, or fire may result— especially if connected to an undersized circuit. To reduce the risk of these hazards, avoid over- loading the machine during operation and make sure it is connected to a power supply circuit that meets the specified circuit requirements.

CIRCUIT INFORMATION

A power supply circuit includes all electrical equipment between the breaker box or fuse panel in the building and the machine. The power supply circuit used for this machine must be sized to safely handle the full-load current drawn from the machine for an extended period of time. (If this machine is connected to a circuit protected by fuses, use a time delay fuse marked D.)

CAUTION!

For your own safety and protection of property, consult an electrician if you are unsure about wiring practices or electrical codes in your area.

Note: Circuit requirements in this manual apply to a dedicated circuit—where only one machine will be running on the circuit at a time. If machine will be connected to a shared circuit where multiple machines may be running at the same time, consult an electrician or qualified service personnel to ensure circuit is properly sized for safe operation.

CIRCUIT REQUIREMENTS FOR 230V

This machine is prewired to operate on a power supply circuit that has a verified ground and meets the following requirements:

Nominal Voltage 208V, 220V, 230V, 240V
 Cycle 60 Hz
 Phase Single-Phase
 Power Supply Circuit 50 Amps
 Plug/Receptacle NEMA 6-50

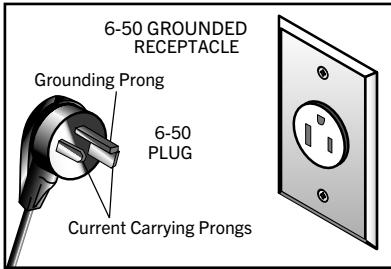


Figure 1. NEMA 6-50 plug and receptacle.

CIRCUIT REQUIREMENTS FOR 115V ADAPTOR

This machine can be converted to operate on a power supply circuit that has a verified ground and meets the requirements listed below. (Refer to Voltage Conversion instructions for details.)

Nominal Voltage 110V, 115V, 120V
 Cycle 60 Hz
 Phase Single-Phase
 Power Supply Circuit 20 Amps
 Plug/Receptacle NEMA 5-15

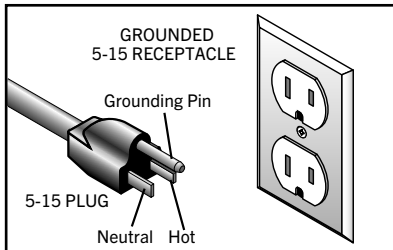


Figure 2. Typical 5-15 plug and receptacle.

GROUNDING REQUIREMENTS

This machine **MUST** be grounded. In the event of certain malfunctions or breakdowns, grounding reduces the risk of electric shock by providing a path of least resistance for electric current. This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug. Only insert plug into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances. **DO NOT** modify the provided plug! Improper connection of the equipment-grounding wire can result in a risk of electric shock.

The wire with green insulation (with or without yellow stripes) is the equipment-grounding wire. If repair or replacement of the power cord or plug is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

Check with a qualified electrician or service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the tool is properly grounded. If you ever notice that a cord or plug is damaged or worn, disconnect it from power, and immediately replace it with a new one.

 WARNING

Serious injury could occur if you connect machine to power before completing setup process. DO NOT connect to power until instructed later in this manual.

EXTENSION CORDS

We do not recommend using an extension cord with this machine. If you must use an extension cord, only use it if absolutely necessary and only on a temporary basis.

Extension cords cause voltage drop, which can damage electrical components and shorten motor life. Voltage drop increases as the extension cord size gets longer and the gauge size gets smaller (higher gauge numbers indicate smaller sizes).

Any extension cord used with this machine must be in good condition and contain a ground wire and matching plug/receptacle. Additionally, it must meet the following size requirements:

Minimum Gauge Size12 AWG

Maximum Length (Shorter is Better)..... 50 ft.

ELECTRODE SELECTION

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 workpiece.

The intense heat of the arc between the rod and the grounded metal melts the electrode and the flux. The most popular electrodes are:

- E6013 60,000 PSI tensile strength used for poor fit-up applications.
- E7014 70,000 PSI tensile strength used for high deposition and fast travel speeds with light penetration.
- E7018 70,000 PSI tensile strength

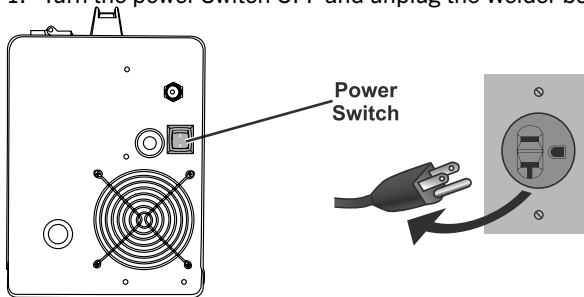
This welder is capable of welding with solid core or flux cored wire 0.024" (0.6mm), 0.030" (0.8mm) or 0.035" (.9mm); accomodates 1 kg or 5kg wire spools both on 120V and 230V.

On 120V, this welder is capable of welding with stick wire 1/16" - 3/32" (1.6-2.5mm) and on 230V is capable of the stick wire 1/16" - 5/32" (1.6-4mm)

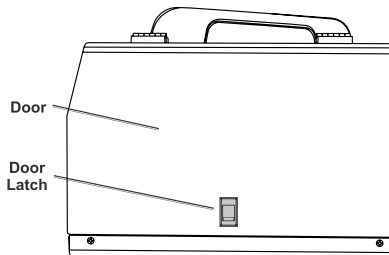
ASSEMBLY

Wire Spool Installation/Wire Setup

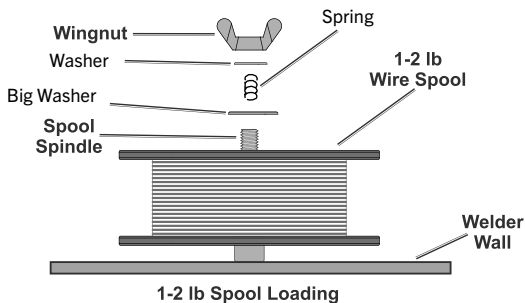
1. Turn the power Switch OFF and unplug the Welder before proceeding.



2. Pull up on the Door Latch, then open the Door.

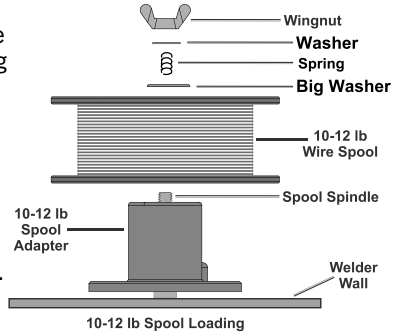


3. 1-2 pound Wire Spool installation: Remove the Wingnut, spring and washers. If replacing a Spool, remove the old Spool and all remaining wire from the liners.
4. Place the new Wire Spool over the Spool Spindle and against the Spool Brake Pad as illustrated. to prevent wire feed problems, set the Spool so that it will unwind clockwise.
5. Replace the Spacer over the Spool Spindle and secure Spool in place with the Wingnut.



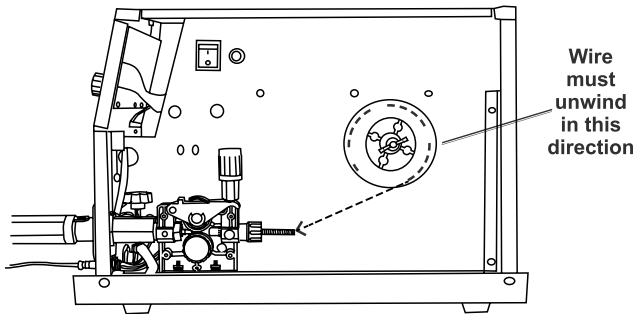
NOTICE: If Wire Spool can spin freely, Wingnut is too loose. This will cause the welding wire to unravel and unspool which can cause tangling and feeding problems.

6. 10-12 pound Wire Spool installation: Remove the Wingnut, spring and washers. If replacing a Spool, remove the old Spool and all remaining wire from the liners.
7. Place the Spool Adapter over the Spool Spindle and against the Spool Brake Pad as illustrated.
8. Place the new Wire Spool over the Adapter and line up pin on Adapter with hole in Spool. to prevent wire feed problems, set the Spool so that it will unwind clockwise.
9. Replace the Spacer over the Spool Spindle and secure Spool in place with the Wingnut.



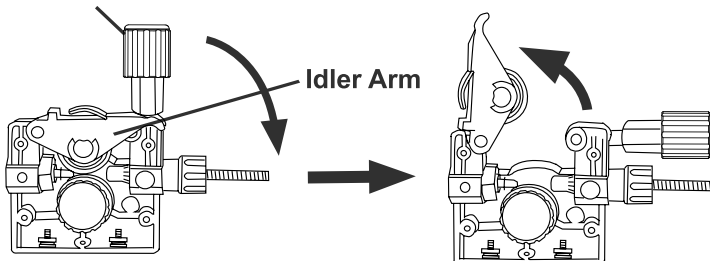
NOTICE: This will cause the welding wire to unravel and unspool which can cause tangling and feeding problems.

10. Screw the Spool Knob into the Spool Adapter.



11. Turn the Feed Tensioner knob counterclockwise to loosen it enough to pull it down to remove tension. The spring-loaded Idler Arm will move up as shown.

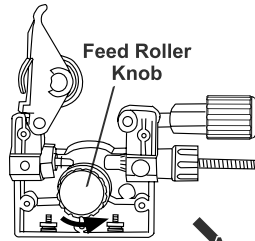
Feed Tensioner



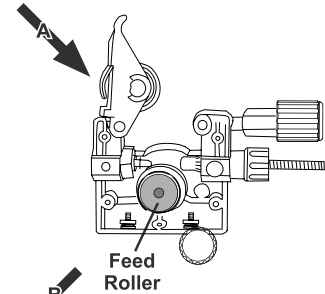
12. Feed Roller instructions:

Check that the Feed Roller is correct for the type of wire being used (solid core or flux-cored) and that it is turned to properly match the wire size marked on the Wire Spool:

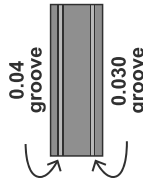
- a. Unscrew the Feed Roller Knob counterclockwise.



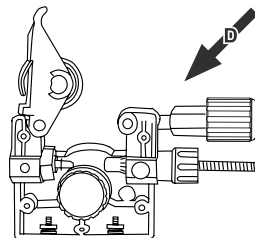
- b. Remove the Feed Roller Knob to expose the Feed Roller.



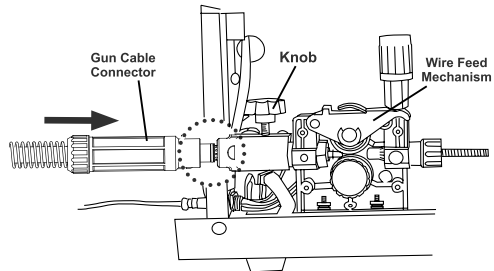
- c. Flip or replace the Feed Roller as needed and confirm that it is the correct Roller for the type of wire being used and that **the number showing is the same as the wire diameter on the Spool.**



- d. Screw the Feed Roller Knob back into place to secure the Feed Roller.

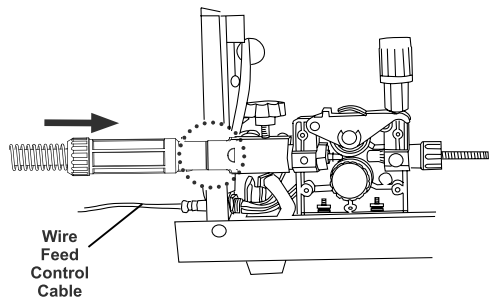


13. Loosen the Knob on the Wire Feed mechanism, then insert the Gun Cable Connector through the hole on the Welder front and into the socket on the Wire Feed.



Incorrect—Connector not fully inserted

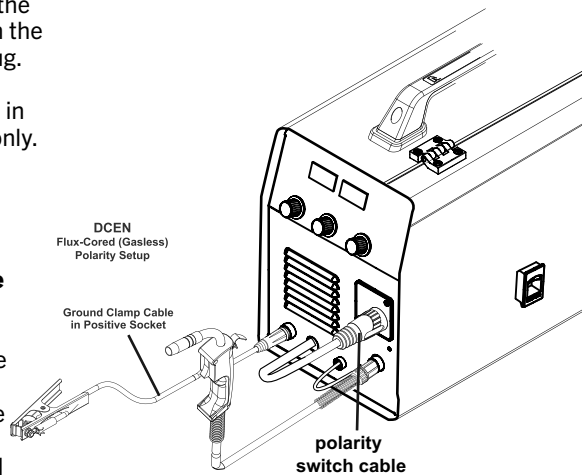
14. Ensure that the Gun Cable Connector is fully inserted into the socket on the Wire Feed mechanism as shown, then tighten the Knob securely. If Connector is not fully inserted, the gas connection will leak, preventing shielding gas from reaching the welding arc.
NOTICE: To prevent damage, do not overtighten the Knob.



Correct—Connector fully inserted

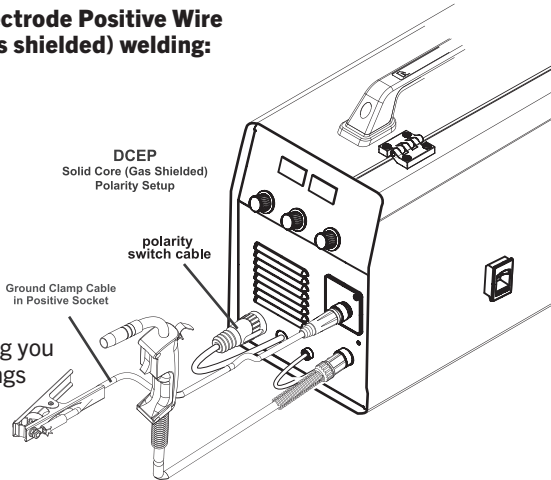
15. Insert the Wire Feed Control Cable into the socket on the welder front, then tighten the lock ring on the Cable plug. Note that the plug on the Cable fits into the Socket in one specific orientation only.

16. **DCEN direct current Electrode negative Wire Setup for Flux-cored (gasless) welding:** Plug Ground Clamp Cable into Positive (+) Socket. Plug polarity switch cable into Negative (-) Socket. Twist cables clockwise all the way to lock in place.



17. DCEP Direct Current Electrode Positive Wire Setup for Solid Core (gas shielded) welding:

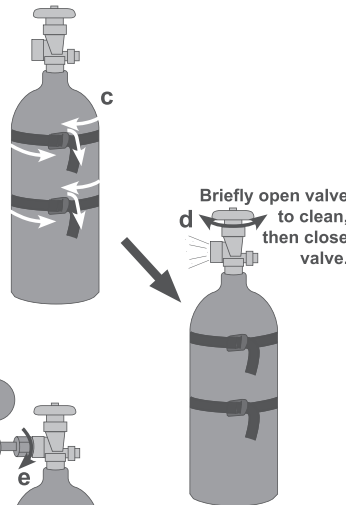
- a. Plug Ground Clamp Cable into Negative (–) Socket. Plug polarity switch cable into Positive (+) Socket. Twist cables clockwise all the way to lock in place.



- b. Determine which type of shielding gas would be appropriate for the welding you will do. Refer to the Settings Chart on the inside of the Welder door.

- c. With assistance, set the cylinder (not included) onto a cabinet or cart near the Welder and secure the cylinder in place with two straps (not included) to prevent tipping.

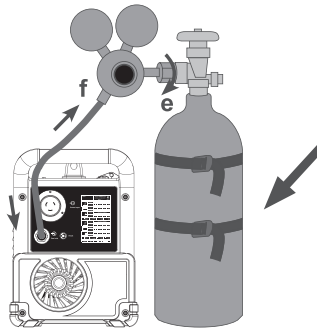
- d. Remove the cylinder's cap. Stand to the side of the valve opening, then open the valve briefly to blow dust and dirt from the valve opening. Close the cylinder valve.



- e. Locate the Regulator (included) and close its valve until it is loose, then thread Regulator onto cylinder and wrench-tighten connection.

NOTE: When using C100 shielding gas, connect the enclosed CGA 580/320 adapter to the inlet connection of the Regulator and wrench-tighten. Thread the adapter onto the gas cylinder and wrench-tighten.

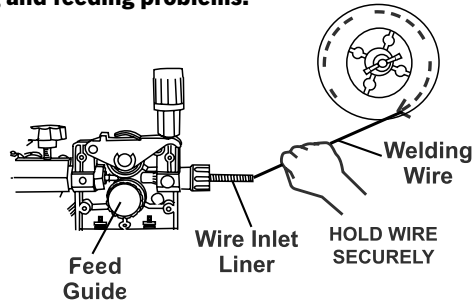
- f. Attach the Gas Hose (not included) to the Regulator's outlet and the Welder's gas inlet. Wrench-tighten both connections.



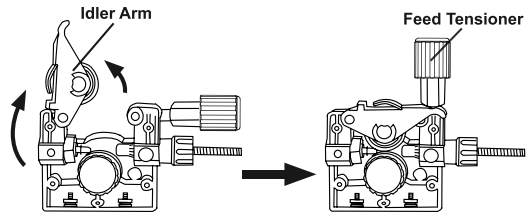
⚠ IMPORTANT

Securely hold onto the end of the welding wire and keep tension on it during the following steps. If this is not done, the welding wire will unravel and unspool which can cause tangling and feeding problems.

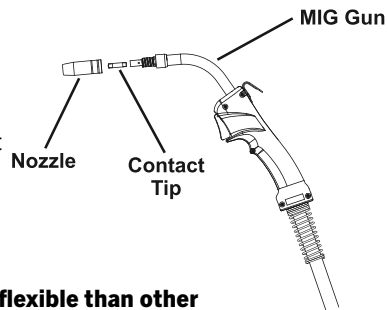
18. Cut off all bent and crimped wire. The cut end must have no burrs or sharp edges; cut again if needed.
19. Keep tension on the wire and guide at least 12 inches of wire into the Wire Inlet Liner and Feed Guide.
20. Make sure the welding wire is resting in the groove of the Feed Roller, then push the wire Idler Arm down, and swing the Feed Tensioner up to latch it across the tip of the arm. After the wire is held by the Tensioner, you may release it.



NOTE: The tension should be 3–5 for solid wire and 2–3 for flux-cored wire. Too much force on flux-cored wire will crush it and may cause feeding issues.



21. Pull the Nozzle to remove it.
22. Unscrew the Contact Tip counterclockwise and remove.
23. Lay the MIG Gun Cable out in a straight line so that the welding wire moves through it easily. Leave the cover open, so that the feed mechanism can be observed.



IMPORTANT Stainless steel wire is less flexible than other welding wire. therefore, it is more difficult to feed through the liner and gun. it is especially important to keep the gun cable straight while feeding stainless steel wire.



⚠ DANGER

PARTS MAY BE AT WELDING VOLTAGE
TO PREVENT ELECTRIC SHOCK AND DEATH:

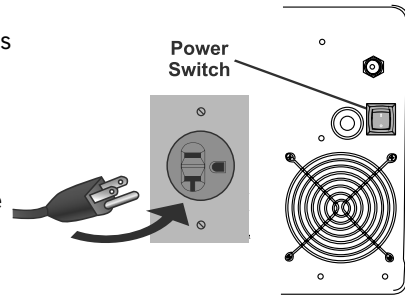
1. Keep hands away from Wire Feed mechanism.
2. Close door before plugging in, unless using Cold Wire Feed to feed wire through to gun.
3. Do not touch Trigger while feeding wire through to gun.

24. Do not touch the Gun's Trigger. Plug the Power Cord into a properly grounded, GFCI protected 120VAC (20 amp rated) or 240VAC receptacle that matches the plug and turn the Power Switch ON. The circuit must be equipped with delayed action-type circuit breaker or fuses.

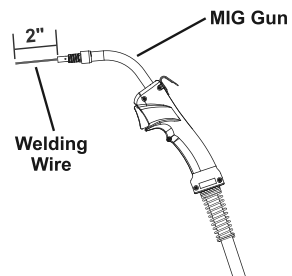
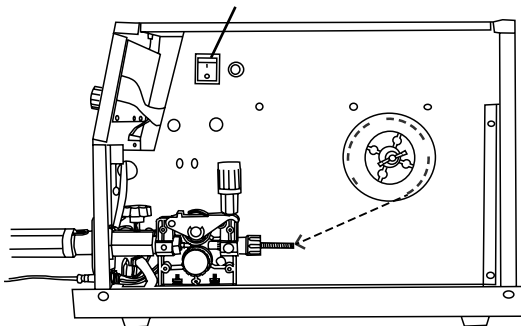
25. Point the Gun away from all objects. Press and hold the quickly wire feeding button until the wire feeds through two inches.

The wire liner may come out with the welding wire. This is normal, just push the wire liner back into the gun.

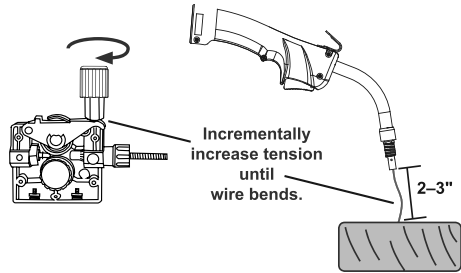
If the wire does not feed properly and the Spool is stationary, turn OFF and unplug the Welder and slightly tighten the Feed Tensioner clockwise before retrying.



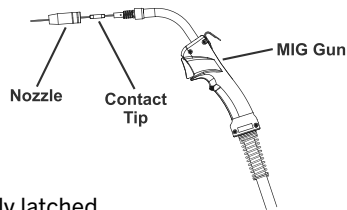
quickly wire feeding button



26. To check the wire's drive tension, press and hold Trigger to feed the wire against a piece of wood from 2 to 3 inches away. If the wire stops instead of bending, unplug the Welder, slightly tighten the Feed Tensioner clockwise, and try again. If the wire bends from the feed pressure, then the tension is set properly. Before proceeding, turn OFF the Power Switch and unplug the Power Cord from its electrical outlet.



27. Turn OFF the Power Switch and unplug the Power Cord from its electrical outlet.

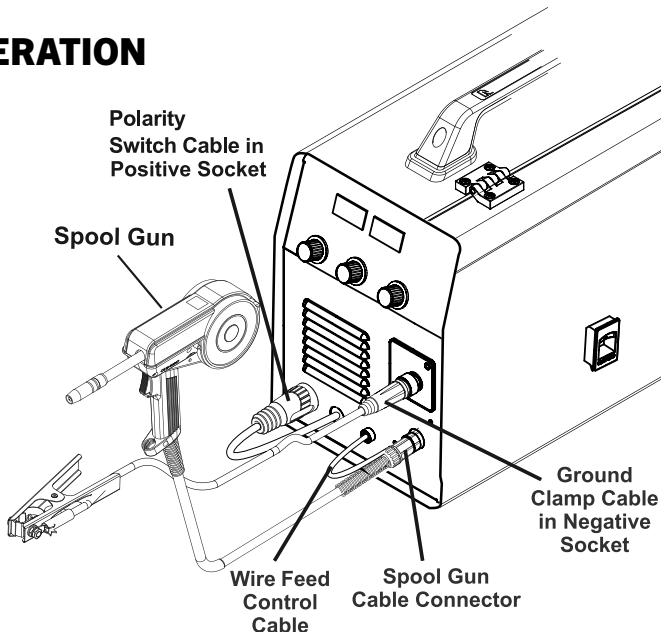


28. Close the Door. Make sure Door is securely latched.

29. Select a Contact Tip that is compatible with the welding wire used. Slide the Contact Tip over the wire and thread it clockwise into the MIG Gun. Tighten the Contact Tip.

30. Replace the Nozzle and cut the wire off at 1/2" from tip (1/2" stickout).

OPERATION



1. To set up optional Spool Gun (sold separately), plug Ground Clamp Cable into Negative (–) Socket. Plug polarity switch cable into Positive (+) Socket. Twist cables clockwise all the way to lock in place.
2. Loosen the Knob on the Wire Feed mechanism, then insert the Spool Gun Cable Connector through the hole on the Welder front and into the socket on the Wire Feed.
3. Ensure Cable Connector is fully inserted and tighten the Knob securely. If Connector is not fully inserted, the gas connection will leak, preventing shielding gas from reaching the welding arc.

NOTICE: To prevent damage, do not overtighten the Knob.

4. Insert the Wire Feed Control Cable into hole on Welder front , then tighten lock ring on the Cable plug. Note that the plug on the Cable fits into the Socket in one specific orientation only.
5. Connect Gas Hose on Spool Gun Cable Connector to Spool Gun Gas Outlet on front of Welder.
6. Refer to Spool Gun manual for operational information.

BASIC WIRE WELDING

 **Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before welding.**

 **WARNING**

TO PREVENT SERIOUS INJURY:

Protective gear must be worn when using the Welder; minimum shade number 10 full face shield (or welding mask), ear protection, welding gloves, sleeves and apron, NIOSH-approved respirator, and fire-resistant work clothes without pockets should be worn when welding. Light from the arc can cause permanent damage to the eyes and skin. Do not breathe arc fumes.

Flux-cored wire welding is used to weld mild steel and stainless steel without shielding gas. MIG welding uses solid wire and shielding gas, and is used to weld mild steel and stainless steel. MIG welding can also be used to weld thinner workpieces than flux-cored welding can.

Aluminum welding can be performed with an optional Spool Gun (sold separately) using aluminum wire and shielding gas. Good welding takes a degree of skill and experience. Practice a few sample welds on scrap before welding your first project.

Additional practice periods are recommended whenever you weld:

- a different thickness of material
- a different type of material
- a different type of connection
- using a different process



Make practice welds on pieces of scrap to practice technique before welding anything of value.

⚠ Warning

To prevent serious injury, fire and burns:

Keep welding tip clear of grounded objects whenever unit is plugged in and turned on.

Practice your welding technique on scrap pieces before welding anything of value

Duty cycle (duration of use)

Avoid damage to the welder by not welding for more than the prescribed duty cycle time. The duty cycle defines the number of minutes, within a 10-minute period, during which a given welder can produce a particular welding current without overheating.

For example, a welder with a 40% duty cycle at 100A welding current must be allowed to rest for at least 6 minutes after every 4 minutes of continuous welding.

Failure to carefully observe duty cycle limitations can easily over-stress a welder's power generation system contributing to premature welder failure.

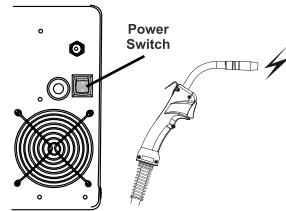
This welder has an internal thermal protection system to help prevent this sort of over-stress.

When the welder overheats, it automatically shuts down and the code "e 01" appears in the current display window. The welder automatically returns to service after cooling off. Should this occur, rest the MIG gun on an electrically non-conductive, heat-proof surface, such as a concrete slab, well clear of the ground clamp.


Allow the welder to cool with the power switch on, so that the internal fan will help

Cool the welder.

When normal operation resumes, use shorter welding periods and longer rest periods to prevent needless wear.




Rated Duty Cycle
120VAC
 35% Use at 100A
 For 10 Continuous Minutes

3-1/2 Minutes Welding  6-1/2 Minutes Resting

100% Continuous Use at 60A

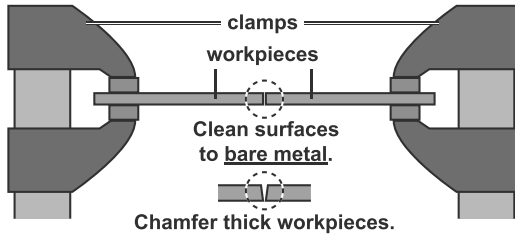
Rated Duty Cycle
230 VAC
 25% Use at 200A
 For 10 Continuous Minutes

2-1/2 Minutes Welding  7-1/2 Minutes Resting

100% Continuous Use at 100A

SETTING UP THE WELD

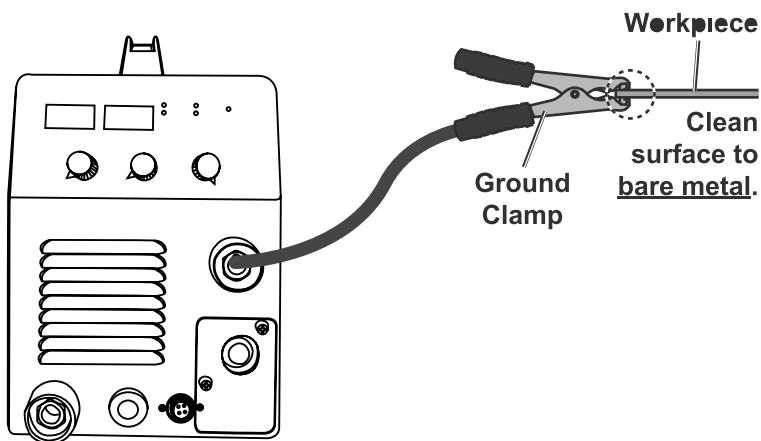
1. Make practice welds on pieces of scrap the same thickness as your intended workpiece to practice technique before welding anything of value. Clean the weld surfaces thoroughly with a wire brush or angle grinder; there must be no rust, paint, oil, or other materials on the weld surfaces, only bare metal.



2. Use clamps (not included) to hold the workpieces in position so that you can concentrate on proper welding technique. The distance (if any) between the two workpieces must be controlled properly to allow the weld to hold both sides securely while allowing the weld to penetrate fully into the joint. The edges of thicker workpieces may need to be chamfered (or beveled) to allow proper weld penetration.

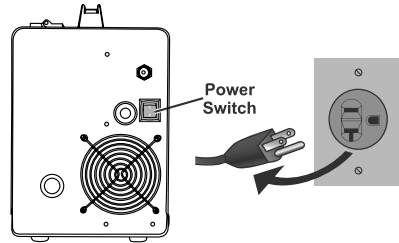
NOTICE: When welding equipment on a vehicle, disconnect the vehicle battery power from both the positive connection and the ground before welding. This prevents damage to some vehicle electrical systems and electronics due to the high voltage and high frequency bursts common in welding.

3. Clamp Ground Cable to bare metal on the workpiece near the weld area, or to metal work bench where the workpiece is clamped.



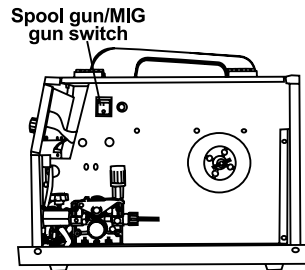
Ground connection depends on desired welding polarity

4. Turn the Power Switch to the OFF position, then plug the Power Cord into a properly grounded, GFCI protected 120VAC (20 amp rated) or 230VAC receptacle that matches the plug. The circuit must be equipped with delayed action-type circuit breaker or fuses.
5. Set MIG Gun down on nonconductive, nonflammable surface away from any grounded objects.
6. Turn the Power Switch ON.
7. Press the Spool gun/MIG gun switch to MIG gun position.



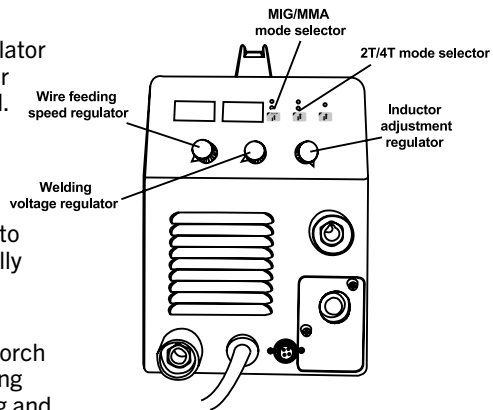
SETTING

1. Press the setting up button to select MIG.
2. Turn the welding voltage regulator to adjust voltage.
3. Turn the wire feeding speed regulator to adjust the wire feed speed.
4. Turn the Inductor adjustment regulator to adjust length of arc. Increase for more fluid puddle and flatter bead. Decrease for colder puddle.
5. Press the 2T/4T mode selector to select work mode.



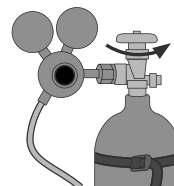
2T Mode: Press the gun/torch trigger to weld and release to stop. It's usually used under spot welding/section welding application.

4T Mode: Press and release the gun/torch trigger to start, weld without holding the trigger on and stop by pressing and releasing the trigger again.



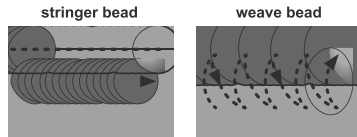
This is particularly useful when doing continuously welding jobs.

GAS SHIELDED, SOLID-CORE WIRE ONLY



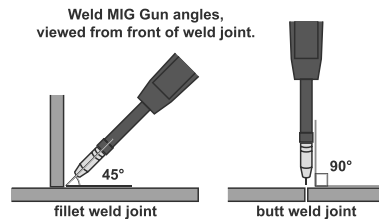
Basic Wire Welding Technique

1. Press (and hold) Trigger and contact the area to be welded with electrode wire to ignite arc.
2. For a narrow weld, you can usually draw the wire in a steady straight line. This is called a **stringer bead**.

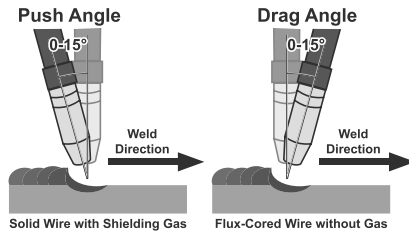


For a wider weld, draw the wire back and forth across the joint. This is called a **weave bead** and takes practice to perform properly.

3. Direct the welding wire straight into the joint. This gives an angle of 90° (straight up and down) for butt (end to end) welds, and an angle of 45° for fillet (T-shaped) welds.

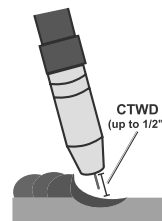


4. For MIG welding using solid wire and shielding gas, the end of the MIG Gun should be tilted so that wire is angled anywhere in-between straight on and 15° away from the direction you are welding. The amount of tilt is called the **push angle**.



5. When using flux-cored wire without shielding gas, the end of the MIG Gun should be tilted so that wire is angled anywhere in-between straight on and 15° in the direction you are welding. The amount of tilt is called the **drag angle**.

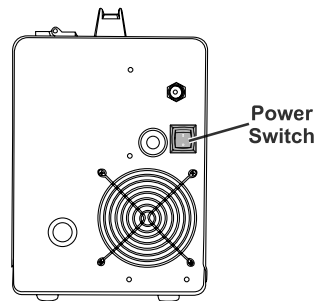
6. The Contact Tip should remain within $1/2''$ of the work surface. This distance is called **CTWD** - Contact Tip to Work Distance.



NOTE: If welder is used too long, a warning, the code “E01” appears in the current LCD and the unit automatically shuts down. The welder automatically returns to service after cooling off. Should this occur, rest the MIG gun on an electrically non-conductive surface.

Allow the Welder to cool with the Power Switch on, so that the internal Fan will help cool the Welder.

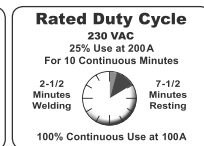
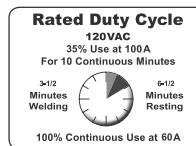
When normal operation resumes, use shorter welding periods and longer rest periods to help prevent needless wear.



7. **After welding the test weld on a piece of scrap for a few seconds**, stop, and check your progress. Clean, then compare your weld’s appearance with the diagrams and descriptions in the **Welding Tips** section starting on the next page. After making any necessary adjustments, continue to weld

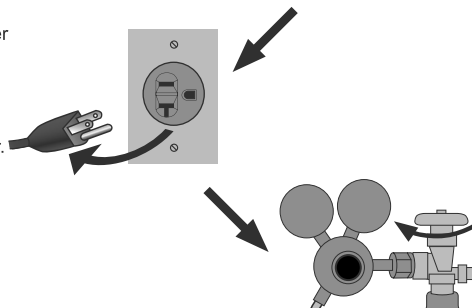
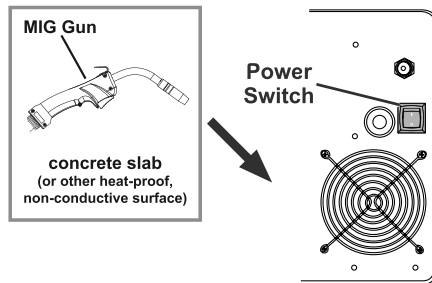
After practice welding for a few seconds, STOP and examine your weld using the guidelines starting on the next page.

FOLLOW DUTY CYCLE!



CAUTION! Weld will be hot, do not touch.

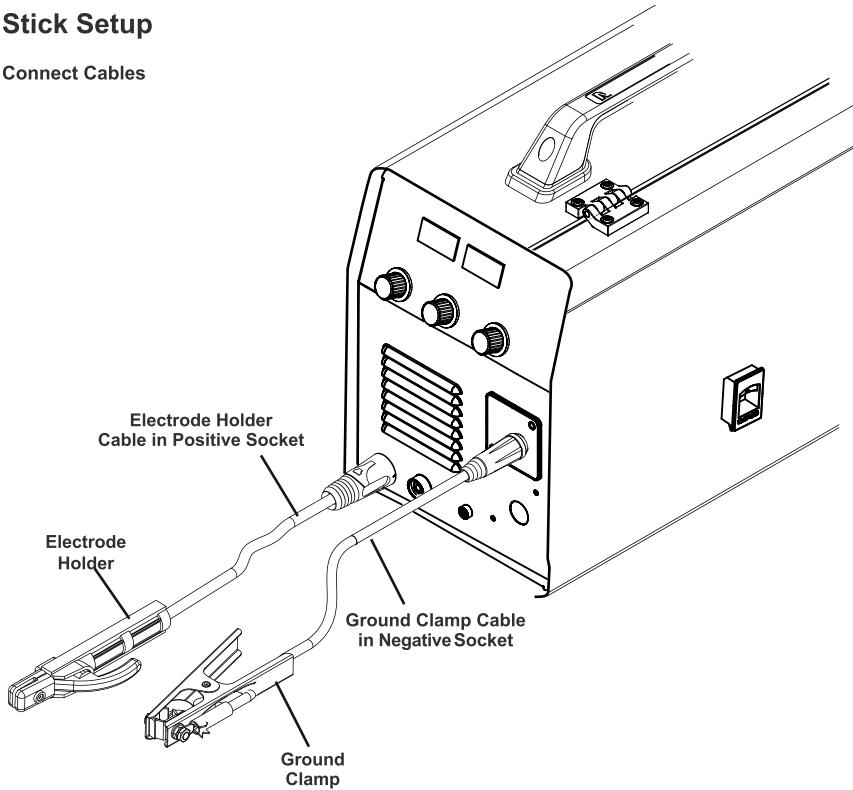
8. **When welding is complete, set the MIG Gun down on a heat-proof, electrically non-conductive surface.**
Turn the Power Switch OFF.
9. Allow Welder to cool down, then unplug the Power Cord.
10. Remove Ground Clamp from workpiece or table and disconnect MIG Gun.
11. Respool wire by clipping wire, removing gas nozzle/contact tip on MIG gun, releasing Idler Arm on Wire Feed mechanism, and rotating the Wire Spool counterclockwise. Be sure to securely hold wire as it is being respooled because the end of wire has a tendency to quickly unravel once it clears the wire feeder.



12. **MIG ONLY:**
Close shielding gas cylinder valve securely. Remove Regulator and replace cap. Disconnect Gas Hose from Welder. Store and secure gas cylinder.

Stick Setup

Connect Cables



1. Plug Ground Clamp Cable into Negative Socket. Twist clockwise all the way to lock in place.
2. Plug Electrode Holder Cable into Positive Socket. Twist clockwise all the way to lock in place.

Connect Power Cord

Plug either 120VAC or 230VAC Power Cord into Power Input Socket.

Note: Plug will only fit one way.

WARNING! TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION: Do not plug cord into wall outlet at this time.



DUTY CYCLE (DURATION OF USE)

This Welder has an internal thermal protection system to help prevent this sort of over-stress.

When the Welder overheats, it automatically shuts down and a warning screen appears in the LCD Display window. The Welder automatically returns to service after cooling off.

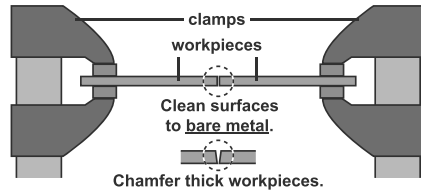
Should this occur, rest the Tig Torch or Electrode Holder on an electrically non-conductive, heat-proof surface, such as a concrete slab, well clear of the ground clamp. Allow the Welder to cool with the power Switch on, so that the internal Fan will help cool the Welder.

When normal operation resumes, use shorter welding periods and longer rest periods to prevent needless wear.

Stick Rated Duty Cycles	
230VAC 25% Use at 170 A For 10 Continuous Minutes	120VAC 35% Use at 85 A For 10 Continuous Minutes
2-1/2 Minutes Welding  7-1/2 Minutes Resting	3-1/2 Minutes Welding  6-1/2 Minutes Resting
100% Continuous Use at 90 A	100% Continuous Use at 55 A

SETTING UP THE WELD

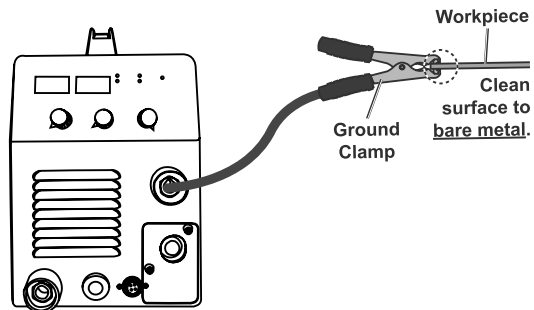
1. Make practice welds on pieces of scrap the same thickness as your intended workpiece to practice technique before welding anything of value. Clean the weld surfaces thoroughly with a wire brush or angle grinder; there must be no rust, paint, oil, or other materials on the weld surfaces, only bare metal.



2. Use clamps (not included) to hold the workpieces in position so that you can concentrate on proper welding technique. The distance (if any) between the two workpieces must be controlled properly to allow the weld to hold both sides securely while allowing the weld to penetrate fully into the joint. The edges of thicker workpieces may need to be chamfered (or beveled) to allow proper weld penetration.

NOTICE: When welding equipment on a vehicle, disconnect the vehicle battery power from both the positive connection and the ground before welding. This prevents damage to some vehicle electrical systems and electronics due to the high voltage and high frequency bursts common in welding.

3. Clamp Ground Cable to bare metal on the workpiece near the weld area, or to metal work bench where the workpiece is clamped.



Ground connection depends on desired welding polarity

STICK WELDING

1. Turn the Power Switch to the OFF position, then plug the Welder into a properly grounded, GFCI protected, 120VAC (20 amp rated) outlet or 230V outlet. The circuit must be equipped with delayed action-type circuit breaker or fuses.
2. Set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.
3. Turn the Power Switch ON.
4. Press the MIG/MMA mode selector to select MMA mode.
5. Turn the welding current adjustment knob to select desired welding current.
6. Turn the arc force adjustment knob to adjust weld penetration and smoothness.
7. Place the bare metal end of the Stick Electrode (sold separately) inside the jaws of the Electrode Holder.
8. Stroke the workpiece lightly to ignite the arc. Tips for igniting the arc:
 - a. Tap the surface with the Electrode.
 - b. Stroke the surface with the Electrode.
 - c. Strike the surface like a match with the Electrode.
9. After the arc ignites:
 - a. Lift the Electrode off workpiece the same distance as the diameter of the bare metal end.
 - b. Tilt Electrode back 10 to 20 degrees.
 - c. Drag Electrode to the back end of the weld puddle to deposit material as needed.
10. When finished welding; lift the Electrode from the workpiece, then set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.
11. Turn the Power Switch OFF.
12. To prevent accidents, after use:
 - Allow Welder to cool down.
 - Unplug Welder's power cord from outlet.
 - Remove Ground Clamp.
 - Disconnect Electrode Holder and Ground Cables.
13. Clean, then store Welder and its accessories indoors out of children's reach.

Welding Tips

A good way to test welding technique is to examine a weld's appearance after it has cooled and the slag has been removed. Then, better welding can be learned by adjusting your weld technique to remedy any problems found.

NOTICE: TIG welding is a complicated process, requiring experience and skill to achieve successful results. Training beyond the scope of this manual is required to TIG weld properly.

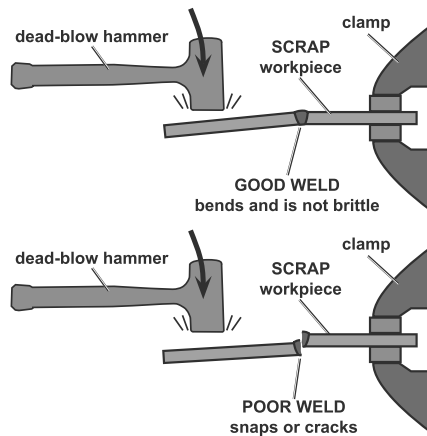
After practice welding a couple of welding beads, STOP and examine your weld using the following guidelines.

Strike Test

A test weld on a **PIECE OF SCRAP** can be tested by using the following procedure.
WEAR ANSI-APPROVED SAFETY GOGGLES DURING THIS PROCEDURE.

WARNING! This test **WILL** damage the weld it is performed on. This test is **ONLY** an indicator of weld technique and is not intended to test working welds.

1. After two scraps have been welded together and the weld has cooled, clamp one scrap in a sturdy vise.
2. Stay clear from underneath while you strike the opposite scrap with a heavy hammer, preferably a dead-blow hammer.
3. A **GOOD WELD** will deform but not break, as shown on top.
 A **POOR WELD** will be brittle and snap at the weld, as shown on bottom.



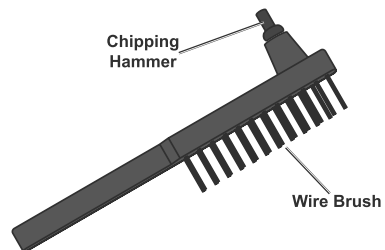
Cleaning the Weld

⚠️ WARNING

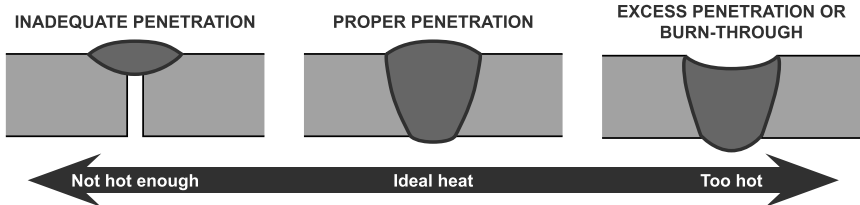


TO PREVENT SERIOUS INJURY: Continue to wear ANSI-approved safety goggles and protective wear when cleaning a weld. Sparks or chips may fly when cleaning.

1. A weld from flux-cored wire welding or stick welding will be covered by slag. Use a chipping hammer to knock this off. **Be careful not to damage the weld or base material.**
2. Use a wire brush to further clean the weld or use an angle grinder (sold separately) to shape the weld.



Wire Weld Diagnosis—Workpiece Heat Control / Weld Penetration



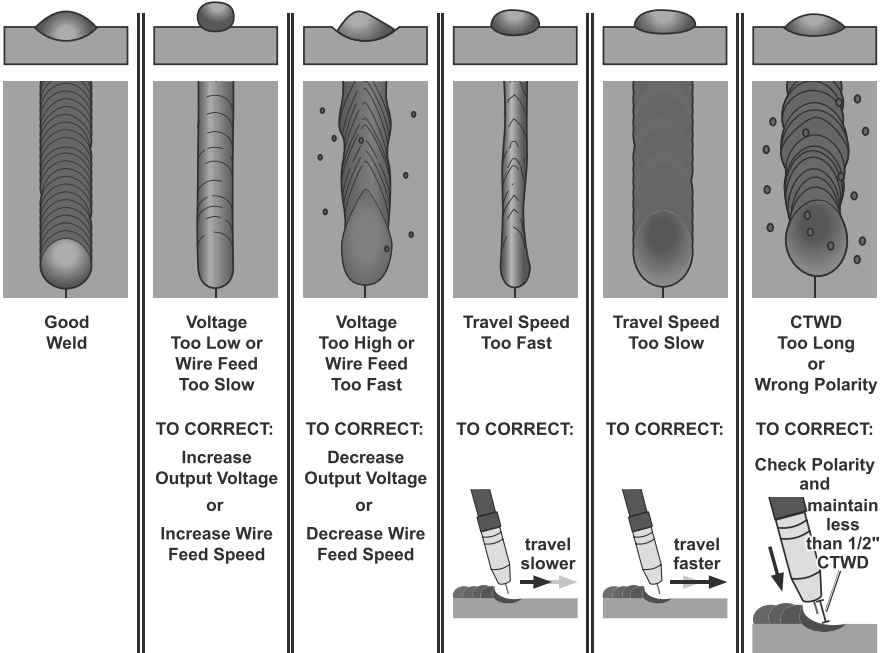
How to increase workpiece heat and increase penetration:
(to weld THICKER workpieces properly)

- a. Increase weld current
- b. Decrease travel speed
- c. Use faster wire feed
- d. Use shorter CTWD

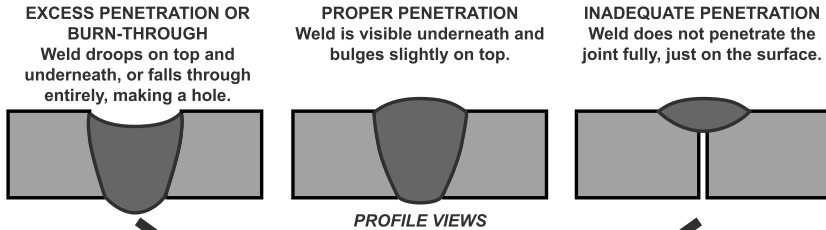
How to reduce workpiece heat and limit penetration:
(to weld THINNER workpieces properly)

- e. Decrease weld current
- f. Increase travel speed
- g. Use slower wire feed
- h. Use longer CTWD

Example Wire Weld Diagrams



Wire Weld Penetration (Workpiece Heat Control)



EXCESS PENETRATION OR BURN-THROUGH
Weld droops on top and underneath, or falls through entirely, making a hole.

PROPER PENETRATION
Weld is visible underneath and bulges slightly on top.

INADEQUATE PENETRATION
Weld does not penetrate the joint fully, just on the surface.

PROFILE VIEWS

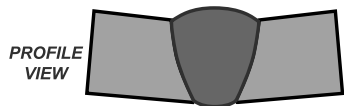
POSSIBLE CAUSES AND SOLUTIONS

- Workpiece overheating:**
Reduce wire feed speed.
Decrease weld current.
- Travel speed too slow:**
Increase travel speed and ensure that travel speed is kept steady.
- Excessive material at weld:**
Reduce wire feed speed.

POSSIBLE CAUSES AND SOLUTIONS

- Incorrect welding technique:**
Maintain 1/2" or less CTWD.
Keep arc on leading edge of weld puddle.
Hold MIG Gun at proper angles.
- Insufficient weld heat:**
Reduce travel speed.
Increase weld current.
- Workpieces too thick/close:**
Bevel thick workpieces, allow slight gap, and weld in several passes.
- Insufficient weld material:**
Increase wire feed speed.

Bend at Joint

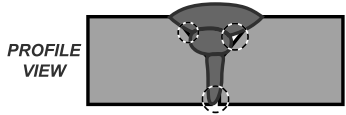


POSSIBLE CAUSES AND SOLUTIONS

- Improper clamping:**
Clamp workpieces securely.
Make tack welds to hold workpieces.
- Excessive heat:**
Weld a small portion and allow to cool before proceeding.
Increase travel speed.
Reduce wire feed speed.

Weld Not Adhering Properly

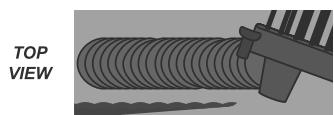
Gaps present between weld and previous bead or between weld and workpiece. See areas below.



POSSIBLE CAUSES AND SOLUTIONS

- Incorrect welding technique:**
Place stringer bead at correct place in joint.
Adjust workpiece position or weld angle to permit proper welding to bottom of piece.
Pause briefly at sides during weave bead.
Keep arc on leading edge of weld puddle.
Hold MIG Gun at proper angles.
- Insufficient weld heat:**
Increase current.
Increase wire feed speed.
- Dirty workpiece:**
Clean workpiece down to bare metal.
- Insufficient weld material:**
Increase wire feed speed.
- Workpiece gap too narrow:**
Widen groove or increase bevel.

Coat of Slag Over Weld



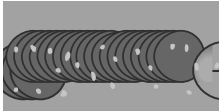
PARTIALLY CHIPPED AWAY TO SHOW WELD

Slag is a necessary part of a flux-cored wire weld. It shields the weld from impurities. Clean off the slag with a Chipping Hammer and Wire Brush after welding.
Gas-shielded MIG welds are protected by the shielding gas and do not need slag to protect them.

Wire Weld—Porosity

Small cavities or holes in the bead.

TOP
VIEW



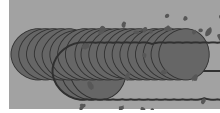
POSSIBLE CAUSES AND SOLUTIONS

1. **Incorrect polarity:**
Check that polarity is set correctly for type of welding.
2. **Insufficient shielding gas (MIG only):**
Increase flow of gas.
Clean nozzle.
Maintain proper CTWD.
3. **Incorrect shielding gas (MIG only):**
Use shielding gas recommended by wire supplier.
4. **Dirty workpiece or welding wire:**
Clean workpiece down to bare metal.
Make certain that wire is clean and free from oil, coatings, and other residues.
5. **Inconsistent travel speed:**
Maintain steady travel speed.
6. **CTWD too long:**
Reduce CTWD.

Wire Weld—Excessive Spatter

Fine spatter is normal.
Spatter that is grainy and large is a problem.

TOP
VIEW

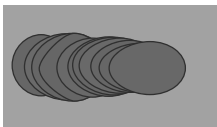


POSSIBLE CAUSES AND SOLUTIONS

1. **Dirty workpiece or welding wire:**
Clean workpiece down to bare metal.
Make certain that wire is clean and free from oil, coatings, and other residues.
2. **Incorrect polarity:**
Check that polarity is set correctly for type of welding.
3. **Insufficient shielding gas (MIG only):**
Increase flow of gas.
Clean nozzle.
Maintain proper CTWD.
4. **Wire feeding too fast:**
Reduce wire feed speed.
5. **CTWD too long:**
Reduce CTWD.

Wire Weld—Crooked/Wavy Bead

TOP
VIEW



POSSIBLE CAUSES AND SOLUTIONS

1. **Inaccurate welding:**
Use two hands or rest hand on steady surface.
2. **Inconsistent travel speed:**
Maintain steady travel speed.
3. **CTWD too long:**
Reduce CTWD.

Wire Weld—Burn-Through

Base material melts away,
leaving a hole in the weld.

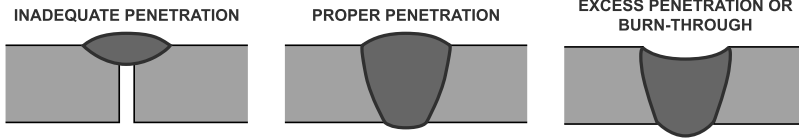
TOP
VIEW



POSSIBLE CAUSES AND SOLUTIONS

1. **Workpiece overheating:**
Reduce current and/or wire feed speed.
2. **Travel speed too slow:**
Increase travel speed and ensure that travel speed is kept steady.
3. **Excessive material at weld:**
Reduce wire feed speed.

Stick Weld Diagnosis – Workpiece Heat Control / Weld Penetration



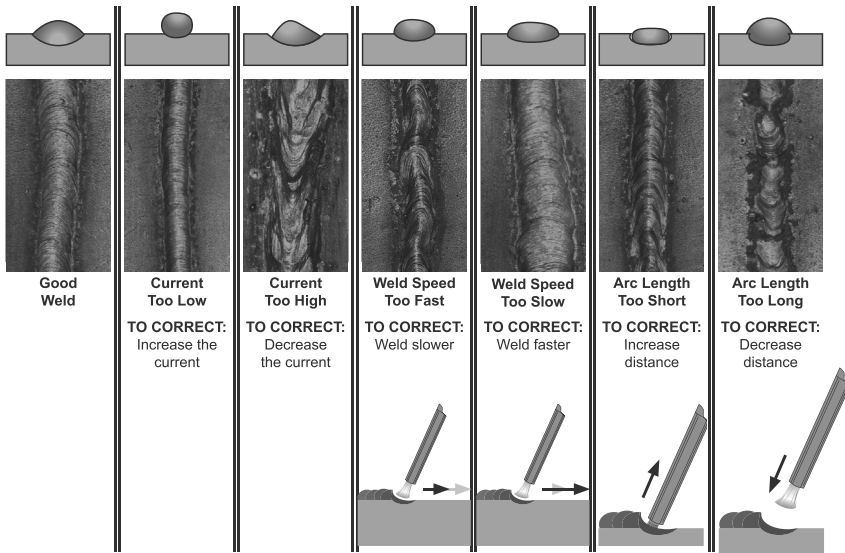
How to increase workpiece heat and increase penetration:
 (to weld **THICKER** workpieces properly)
 a. Increase current. b. Weld more slowly.

How to reduce workpiece heat and limit penetration:
 (to weld **THINNER** workpieces properly)
 c. Decrease current. d. Weld more quickly.

Example Stick Weld Diagrams

CLEAN WELDS FIRST!

Stick welds will have a coat of slag over them until cleaned.

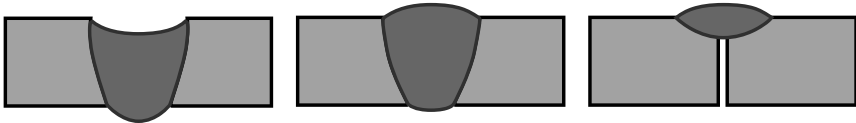


Stick Weld Penetration (Workpiece Heat Control)

EXCESS PENETRATION OR BURN-THROUGH
Weld droops on top and underneath or falls through entirely, making a hole.

PROPER PENETRATION
Weld is visible underneath and bulges slightly on top.

INADEQUATE PENETRATION
Weld does not contact the joint fully, just on the surface.



PROFILE VIEWS

POSSIBLE CAUSES AND SOLUTIONS FOR EXCESS PENETRATION OR BURN-THROUGH

1. **Workpiece overheating:**
Reduce current.
2. **Welding speed too slow:**
Increase welding speed and ensure that welding speed is kept steady.

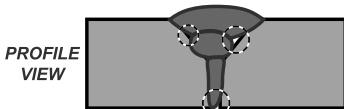
POSSIBLE CAUSES AND SOLUTIONS FOR INADEQUATE PENETRATION

1. **Incorrect welding technique:**
Keep arc on leading edge of weld puddle. Hold torch at proper angles.
2. **Insufficient weld heat:**
Slow down so fill material has time to melt into the weld location. Increase current.
3. **Workpieces too thick/close:**
Bevel thick workpieces, allow slight gap, and weld in several passes.
4. **Insufficient weld material:**
Increase amount of fill material.

Stick Weld–Weld Not Adhering Properly

Gaps present between weld and previous bead or between weld and workpiece. See areas below.

POSSIBLE CAUSES AND SOLUTIONS

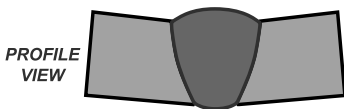


1. **Incorrect welding technique:**
Place stringer bead at correct place in joint. Adjust workpiece position or weld angle to permit proper welding to bottom of piece. Keep arc on leading edge of weld puddle. Hold Electrode and fill material at proper angles.

2. **Insufficient weld heat:**
Increase current.
3. **Dirty workpiece:**
Clean workpiece down to bare metal.
4. **Insufficient weld material:**
Increase amount of fill material.
5. **Distance between workpieces too large:**
Decrease distance and increase bevel.

Stick Weld–Bend at Joint

POSSIBLE CAUSES AND SOLUTIONS



1. **Improper clamping:**
Clamp workpieces securely. Make tack welds to hold workpieces.
2. **Excessive heat:**
Weld a small portion and allow to cool before proceeding. Increase weld speed.

Stick Weld—Coat of Slag Over Weld

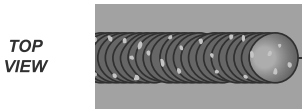


PARTIALLY CHIPPED AWAY TO SHOW WELD

Slag is a necessary part of a stick weld. It shields the weld from impurities. Clean off the slag with the Chipping Hammer and Wire Brush after welding.

Stick Weld—Porosity — Small cavities or holes in the bead.

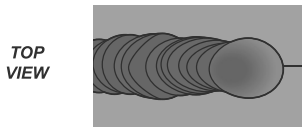
POSSIBLE CAUSES AND SOLUTIONS



1. **Dirty workpiece or fill material:**
Clean workpiece down to bare metal. Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.
2. **Inconsistent welding speed:**
Maintain steady weld speed.

Stick Weld—Crooked/Wavy Bead

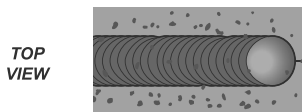
POSSIBLE CAUSES AND SOLUTIONS



1. **Inaccurate welding:**
Use two hands or rest hand on steady surface.
2. **Inconsistent welding speed:**
Maintain steady weld speed.

Stick Weld—Excessive Spatter

POSSIBLE CAUSES AND SOLUTIONS



Fine spatter is normal. Spatter that is grainy and large is a problem.

- Dirty workpiece or fill material:**
Clean workpiece down to bare metal. Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.

Stick Weld—Burn-Through — Base material melts away, leaving a hole in the weld.

POSSIBLE CAUSES AND SOLUTIONS



1. **Workpiece overheating:**
Reduce current.
2. **Welding speed too slow:**
Increase welding speed and ensure that welding speed is kept steady.
3. **Excessive material at weld:**
Reduce amount of fill material.

MAINTENANCE

⚠ WARNING



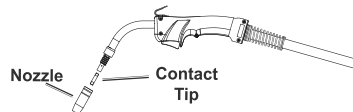
TO PREVENT SERIOUS INJURY, FIRE AND BURNS:

Unplug the Welder, rest the tool on a heat-proof, electrically non-conductive surface, and allow all parts of the Welder to cool thoroughly before service.

- BEFORE EACH USE**, inspect the general condition of the Welder. Check for:
 - loose hardware
 - misalignment or binding of moving parts
 - damaged cord/electrical wiring
 - frayed or damaged cables
 - cracked or broken parts
 - any other condition that may affect its safe operation.
- PERIODICALLY**, have a qualified technician remove the Rear Panel and use compressed air to blow out all dust from the interior.
- AFTER EVERY USE**, store in a clean and dry location.
- For optimal MIG/Flux-Cored wire weld quality, clean and inspect the MIG Gun Contact Tip and Nozzle before each use, as explained below.**

MIG Gun Nozzle and Contact Tip Inspection and Cleaning

- Make sure that the entire MIG Gun is completely cool and that the Power Cord is unplugged from the electrical outlet before proceeding.**
- Pull the Nozzle to remove it.
- Scrub the interior of the Nozzle clean with a wire brush.
- Examine the end of the Nozzle. The end should be flat and even. If the end is uneven, chipped, melted, cracked, or otherwise damaged, the Nozzle will adversely effect the weld and should be replaced.
- Unscrew the Contact Tip counterclockwise and slide it off the welding wire to remove.
- Scrub the outside of the Tip clean with a wire brush. Clean out the inside of the tip with a tip cleaner (sold separately). Check that the Tip is the proper type for the wire size used.
- Examine the shape of the hole at the end of the Contact Tip. It should be an even circle; it should not be oblong or have any bulges in it.
- If any problems are noted, replace the Contact Tip. Select a new Tip of the correct size for the welding wire used.
- Reinstall the Tip and securely reinstall the Nozzle as well.



TROUBLESHOOTING


IMPORTANT!

Be **CERTAIN** to shut off the Welder, disconnect it from power, and discharge the MIG Gun to ground before adjusting, cleaning, or repairing the unit.

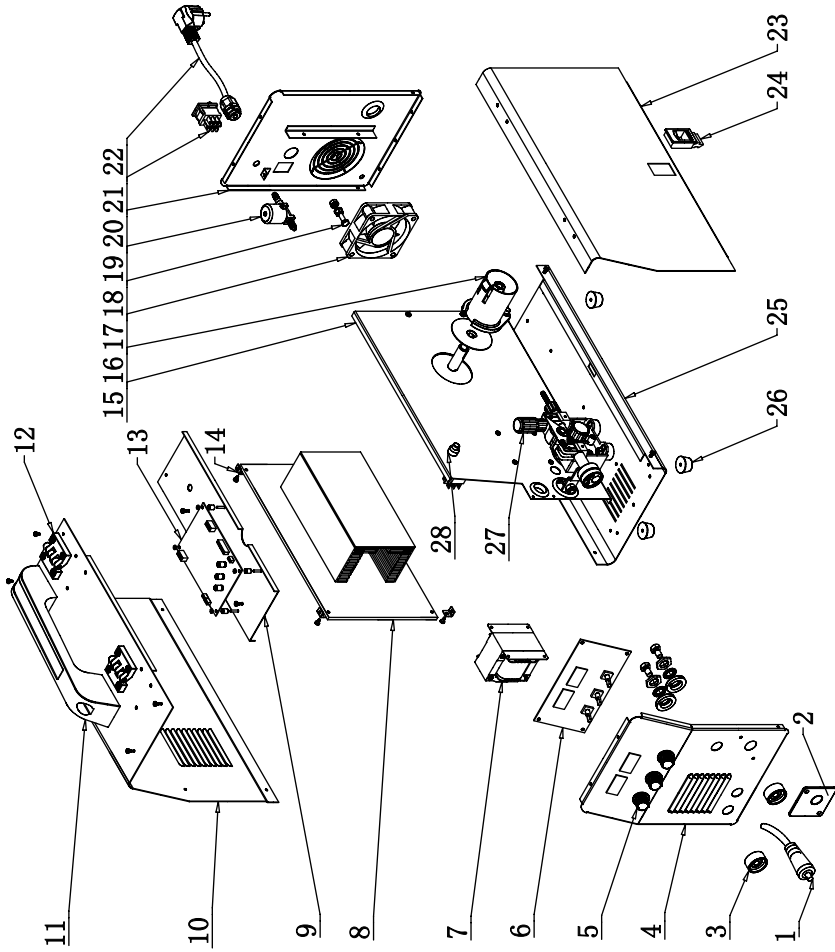
Problem	Possible Causes	Likely Solutions
Wire Feed Motor Runs but Wire Does Not Feed Properly	<ol style="list-style-type: none"> 1. Insufficient wire feed pressure. 2. Incorrect wire feed roller size. 3. Damaged MIG Gun, cable, or liner assembly. 4. Feed Tensioner is too tight. 	<ol style="list-style-type: none"> 1. Increase wire feed pressure properly. Follow step 27 on page 17. 2. Flip roll to correct size. Follow the Feed Roller instructions on page 12. 3. Have a qualified technician inspect these parts and replace as necessary. 4. Loosen Feed Tensioner so it applies only enough pressure to prevent continued spinning after the Gun Trigger is released.
Wire Creates a Bird's Nest During Operation	<ol style="list-style-type: none"> 1. Excess wire feed pressure. 2. Incorrect Contact Tip size. 3. MIG Gun Cable Connector not fully inserted into Wire Feed mechanism. 4. Damaged liner. 	<ol style="list-style-type: none"> 1. Adjust wire feed pressure properly. Follow step 27 on page 17. 2. Replace with the proper tip for wire used. 3. Insert Gun Cable Connector properly. Follow steps 13 and 14 on page 13. 4. Have a qualified technician inspect and repair/replace as necessary.
Wire Stops During Welding	<ol style="list-style-type: none"> 1. Gun cable is severely bent and Wire Feed mechanism cannot feed wire. 2. Gun liner is clogged or worn. 3. Gun liner is too small for welding wire being used. 4. Wire is tangled on the spool. 5. Wire is not making contact with Feed Rollers. 6. Feed Roller is not making enough contact with wire or is crushing flux-cored wire. 	<ol style="list-style-type: none"> 1. Straighten Gun cable. 2. Check gun liner for obstruction. Replace if necessary. 3. Check that gun liner is correct size for wire. 4. Check wire for cross winding or tangled spool. 5. Check Feed Rollers and ensure correct groove for wire diameter is being used. 6. Check Feed Tensioner and ensure it is set properly.
Welding Arc Not Stable	<ol style="list-style-type: none"> 1. Wire not feeding properly. 2. Incorrect Contact Tip or liner size or excessive wear. 3. Incorrect wire feed speed. 4. Loose MIG Gun cable or ground cable. 5. Damaged MIG Gun or loose connection within Gun. 6. Incorrect polarity for process being run. 7. Gas coverage may be insufficient or too high. 8. Poor connection with workpiece. 	<ol style="list-style-type: none"> 1. See first Troubleshooting section above. 2. Replace with the proper tip or liner size for wire used. 3. Adjust wire feed speed to achieve a more stable arc. 4. Check to ensure that all connections are tight. 5. Have a qualified technician inspect and repair/replace as necessary. 6. Ensure polarity is correct for operation: DCEP for MIG welding and DCEN for Flux-Cored self-shielded welding. 7. Ensure gas flow rate is set according to Settings Chart. Make sure MIG Gun Cable Connector is fully inserted into Wire Feed mechanism with no O-Rings exposed. 8. Check the ground clamp connection to the workpiece and machine. Ensure the MIG Gun is properly secured.
Weak Arc Strength	<ol style="list-style-type: none"> 1. Incorrect line voltage. 2. Improper gauge or length of cord. 3. Not enough current. 	<ol style="list-style-type: none"> 1. Check the line voltage and, if insufficient, have a licensed electrician remedy the situation. 2. Do not use an extension cord on this Welder. Use only one of the supplied power cords for this Welder or an identical replacement cord. 3. Switch current to proper setting for metal thickness.



Follow all safety precautions whenever diagnosing or servicing the equipment.

Problem	Possible Causes	Likely Solutions
Welder Does Not Function When Switched On	<ol style="list-style-type: none"> 1. Tripped thermal protection device. 2. Circuit supplies insufficient input voltage or amperage. 3. Faulty or improperly connected Trigger. 4. Machine is in low- or over-voltage protection. 5. Machine is in the incorrect mode. 	<ol style="list-style-type: none"> 1. If a warning screen appears in the LCD Display window, Welder may have overheated and shut down. Stop and wait with the Power Switch ON for the Welder to cool. The Welder automatically returns to service after cooling off. Reduce duration or frequency of welding periods to help reduce wear on the Welder. Refer to <i>Duty Cycle (Duration of Use)</i> on page 19. 2. Verify that the circuit is designed to supply the required input voltage and amperage as detailed on the Specifications table. If a warning screen appears in the LCD Display window, check the input voltage to ensure it is within specified range. 3. Ensure the gun connection is properly seated on machine. Qualified technician must check and secure/replace Trigger. 4. Check input voltage and ensure it falls within the specified range. If input voltage is correct, press Reset Button on back of machine. 5. Ensure the correct process has been selected.
LCD Display Does Not Light When Welder is Switched On	<ol style="list-style-type: none"> 1. Unit is not connected to outlet properly. 2. Outlet is unpowered. 3. Plug does not have correct rating. 4. Circuit breaker has tripped due to high input amperage. 5. Input Power Cord is not seated properly. 	<ol style="list-style-type: none"> 1. Verify the voltage at the outlet and the connection to the outlet. 2. Check circuit breaker/GFCI devices; if any are tripped, determine and remedy cause before resetting. 3. Make sure installed plug is correct rating. See <i>Specifications</i> on page 7. 4. Press Reset Button on back of machine to reset circuit breaker. 5. Ensure the twist lock input Power Cord is fully secured.
Wire Feeds, but Arc Does Not Ignite	<ol style="list-style-type: none"> 1. Improper ground connection. 2. Improperly sized Contact Tip. 3. Excessively worn Contact Tip. 4. Dirty Contact Tip. 	<ol style="list-style-type: none"> 1. Make certain that the workpiece is contacted properly by the Ground Clamp and that the workpiece is properly cleaned near the ground clamp and the welding location. 2. Verify that Contact Tip is the proper size for welding wire. If needed, replace Contact Tip with proper size and type. 3. Check that the hole in the tip is not deformed or enlarged. If needed, replace Contact Tip with proper size and type. 4. Properly clean Contact Tip.
Porosity in the Weld Metal	<ol style="list-style-type: none"> 1. Shielding gas bottle is empty. 2. Not enough or too much shielding gas. 3. Dirty workpiece. 4. Gun is being used too far away from workpiece. 5. Polarity is incorrect for the application. 6. Dirty welding wire is introducing contamination into the weld. 	<ol style="list-style-type: none"> 1. Check gas bottle and replenish as necessary. 2. Check gas regulator to ensure proper flow. 3. Clean workpiece down to bare metal. 4. Check CTWD (contact tip to work distance) for the proper procedure. 5. Check the polarity and ensure it is DCEP for MIG and DCEN for Flux-Cored. 6. Make certain that welding wire is clean and free of rust and residues.
 Follow all safety precautions whenever diagnosing or servicing the equipment.		

EXPLODED VIEW



PARTS LIST

⚠ WARNING: When servicing, use only original equipment replacement parts. The use of any other parts may create a safety hazard or cause damage to the brushless power washer.

Any attempt to repair or replace electrical parts on this power washer may create a safety hazard unless repairs are performed by a qualified technician. For more information, call the Toll-free Helpline, at 1-866-349-8665; Monday - Friday: 9am to 5pm Eastern Standard Time.

Always order by key number.

Key#	Part #	Part Name	Qty
1	1150-003-001	Polarity Switching Cable	1
2	1150-003-002	MIG Torch Flange	1
3	1150-003-003	Quick Connector	2
4	1150-003-004	Front Panel	1
5	1150-003-005	Control Knob	3
6	1150-003-006	Panel Control PCB	1
7	1150-003-007	Reactor	1
8	1150-003-008	Main Board	1
9	1150-003-009	Top Installation Plate	1
10	1150-003-010	Right Side Case	1
11	1150-003-011	Handle	1
12	1150-003-012	Hinge	2
13	1150-003-013	Control PCB	1
14	1150-003-014	Connector	4
15	1150-003-015	Dividing plate	1
16	1150-003-016	Wire Spool	1
17	1150-003-017	Fan	1
18	1150-003-018	Grounding Screw	1
19	1150-003-019	Solenoid Valve	1
20	1150-003-020	Rear Panel	1
21	1150-003-021	Power Switch	1
22	1150-003-022	Power Cord	1
23	1150-003-023	Left Side Case	1
24	1150-003-024	Buckle	1
25	1150-003-025	Bottom Case	1
26	1150-003-026	Rubber Stand	4
27	1150-003-027	Wire Feeder	1
28	1150-003-028	Inching Button	1

WARRANTY**BENCHMARK INVERTER MIG/FLUX/STICK WELDER**

If this Benchmark tool fails due to a defect in material or workmanship within five years from the date of purchase, return it to any Home Hardware store with the original bill of sale for exchange. 3-year warranty for the battery and charger. This warranty does not include expendable parts including but not limited to blades, brushes, belts, light bulbs.

This warranty covers defects in material or workmanship only. It does not cover normal wear and tear, failure due to abuse/misuse, or defects caused by careless or accidental mishandling. If this Benchmark product is used for commercial or rental purposes, this warranty does not apply.

INVERTER MULTI-PROCESS WELDER KIT



5 year limited warranty on tool

BENCHMARK™
MC

BENCHMARK TOOLS CANADA
ST. JACOBS, ONTARIO N0B 2N0
© 2022 Home Hardware Stores Limited

CUSTOMER SERVICE/TECH SUPPORT
1-866-349-8665

1150-003

Made in China



* This Benchmark™ product carries a five (5) year LIMITED warranty against defects in workmanship and materials. See Owner's Manual for full details.



Intertek
4009939
MIG-200

**READ ALL INSTRUCTIONS BEFORE FIRST USE.
KEEP THIS MANUAL FOR FUTURE REFERENCE.
KEEP AWAY FROM CHILDREN.**



**WEAR CSA APPROVED
EYE PROTECTION**



**WEAR EAR
PROTECTION**



**WEAR A
FACE MASK**