

ROCKWOOD®

Item #73835

MIG 160 WELDER

ASSEMBLY AND OPERATING INSTRUCTIONS



The **ROCKWOOD MIG 160 WELDER** draws on Eastwood's fifteen years of experience in the welder market to bring you our most affordable true MIG welding machine yet. This multi-process machine is capable of running flux-cored wire, solid wire with shielding gas, and burning stick welding electrodes out of the box. Lift-start TIG is possible with an optionally available valved TIG welding torch. This welder is a dual voltage machine that can plug into a normal household outlet, or unlock full power with a dedicated welder outlet. Digital controls make for easy setting changes and quick learning. Inverter Technology keeps the unit compact and light so you can take it with on the road or over to a buddy's house to lend a helping hand.

STATEMENT OF LIMITED WARRANTY

The Eastwood Company (hereinafter "Eastwood") warrants to the end user (purchaser) of all new Eastwood-branded tools and chemicals (collectively called the "products") that each will be free of defects in workmanship and material. This warranty is void if the equipment has been subjected to improper installation, improper care or abnormal operations.

WARRANTY PERIOD:

All warranty periods begin on the date of product delivery from Eastwood. Warranty Periods are listed below, along with the products covered during those warranty periods:

3-Year Warranty on Material, Workmanship, and Defects:

- | | | | |
|----------------------------|---------------------------------|--------------------------------|--------------------------------|
| • Eastwood MIG 135 Welder | • Eastwood MIG 140 Welder | • Eastwood MIG 180 Welder | • Eastwood TIG 200 DC |
| • Eastwood MIG 175 Welder | • Eastwood TIG 200 AC/DC | • Eastwood MIG 250 Welder | • Eastwood MP140i Welder |
| • Eastwood TIG 200 Digital | • Eastwood MP200i Welder | • Eastwood Versa-Cut 20 | • Eastwood Elite MP250i Welder |
| • Eastwood Versa-Cut 40 | • Eastwood 90A Flux Core Welder | • Eastwood Versa-Cut 60 | • Eastwood ARC 80 Stick Welder |
| • Eastwood Rotisserie | • Eastwood Contour SCT® | • Concoours Pro HVLP Paint Gun | |

Items not covered under this warranty: Consumables, unless deemed defective, are not covered by the 3-year warranty. Abuse, neglect, and lack of maintenance is not covered under this warranty. All other components are covered by the warranty and will be repaired or replaced at the discretion of Eastwood.

2-Year Warranty on Material, Workmanship and Defects:

- | | | | |
|--|--------------------------------------|--------------------------------------|--------------------------------------|
| • Eastwood Air QST-30/60 Scroll Compressor | • Eastwood 80 Gal. 7.5 HP Compressor | • Eastwood 80 Gal. 5 HP Compressor | • Eastwood 60 Gal. 4.7 HP Compressor |
| • Eastwood 60 Gal. 3.7 HP Compressor | • Eastwood Panoramic Welding Helmet | • Eastwood 30 Gal. 1.9 HP Compressor | • Eastwood XL View Welding Helmet |
| • Eastwood Lg View Welding Helmet | • Eastwood Auto Darkening Helmet | • Concoours 2 HVLP Paint Gun | |

Items not covered under this warranty: Consumables, unless deemed defective, are not covered by the 2-year warranty. Abuse, neglect, and lack of maintenance is not covered under this warranty.

1-Year Warranty on Material, Workmanship and Defects:

- | | | | |
|-------------------------------------|-------------------|------------------------------|---------------------------|
| • Eastwood Tools Not Included Above | • Fairmount Tools | • Rockwood MIG 135 Flux core | • Rockwood MIG 160 Welder |
| • Rockwood Plasma-Cut 40 | | | |

Items not covered under this warranty: Consumables, unless deemed defective, are not covered by the 1-year warranty. Abuse, neglect, and lack of maintenance is not covered under this warranty.

90-Day Warranty on Material, Workmanship and Defects:

- | | |
|-------------------------------|------------------|
| • Eastwood Paints & Chemicals | • Rockwood Tools |
|-------------------------------|------------------|

Items not covered under this warranty: Consumables, unless deemed defective, are not covered by the 90-day warranty. Abuse, neglect, and lack of maintenance is not covered under this warranty.

Lifetime Warranty on Material, Workmanship and Defects:

- Selected Eastwood Hand Tools carry a Limited Lifetime Warranty

Items not covered under this warranty: Abuse, neglect, and lack of maintenance is not covered under this warranty.

CONDITIONS TO OBTAIN WARRANTY COVERAGE:

- Proof of purchase must be provided for all warranty claims
- Purchaser must first contact Eastwood at 1-800-343-9353 for an RMA Number before Eastwood will accept any warranty returns. Final determination of warranty on welding and cutting equipment will be made by Eastwood.

WARRANTY REPAIR: If Eastwood confirms the existence of a defect covered under this warranty plan, Eastwood will determine whether repair or replacement is the most suitable option to rectify the defect. At Eastwood's request, the purchaser must return, to Eastwood, any products claimed defective under Eastwood's warranty.

FREIGHT COSTS: The purchaser is responsible for shipment to and from Eastwood.

WARRANTY LIMITATIONS:

EASTWOOD WILL NOT ACCEPT RESPONSIBILITY OR LIABILITY FOR REPAIRS UNLESS MADE BY EASTWOOD. EASTWOOD'S LIABILITY UNDER THIS WARRANTY SHALL NOT EXCEED THE COST OF CORRECTING THE DEFECT OF THE EASTWOOD PRODUCT. EASTWOOD WILL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (SUCH AS LOSS OF BUSINESS, ETC.) CAUSED BY THE DEFECT OR THE TIME INVOLVED TO CORRECT THE DEFECT. THIS WRITTEN WARRANTY IS THE ONLY EXPRESS WARRANTY PROVIDED BY EASTWOOD WITH RESPECT TO ITS PRODUCTS. WARRANTIES IMPLIED BY LAW SUCH AS THE WARRANTY OF MERCHANTABILITY ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY FOR THE EQUIPMENT INVOLVED. THIS WARRANTY GIVES THE PURCHASER SPECIFIC LEGAL RIGHTS. THE PURCHASER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

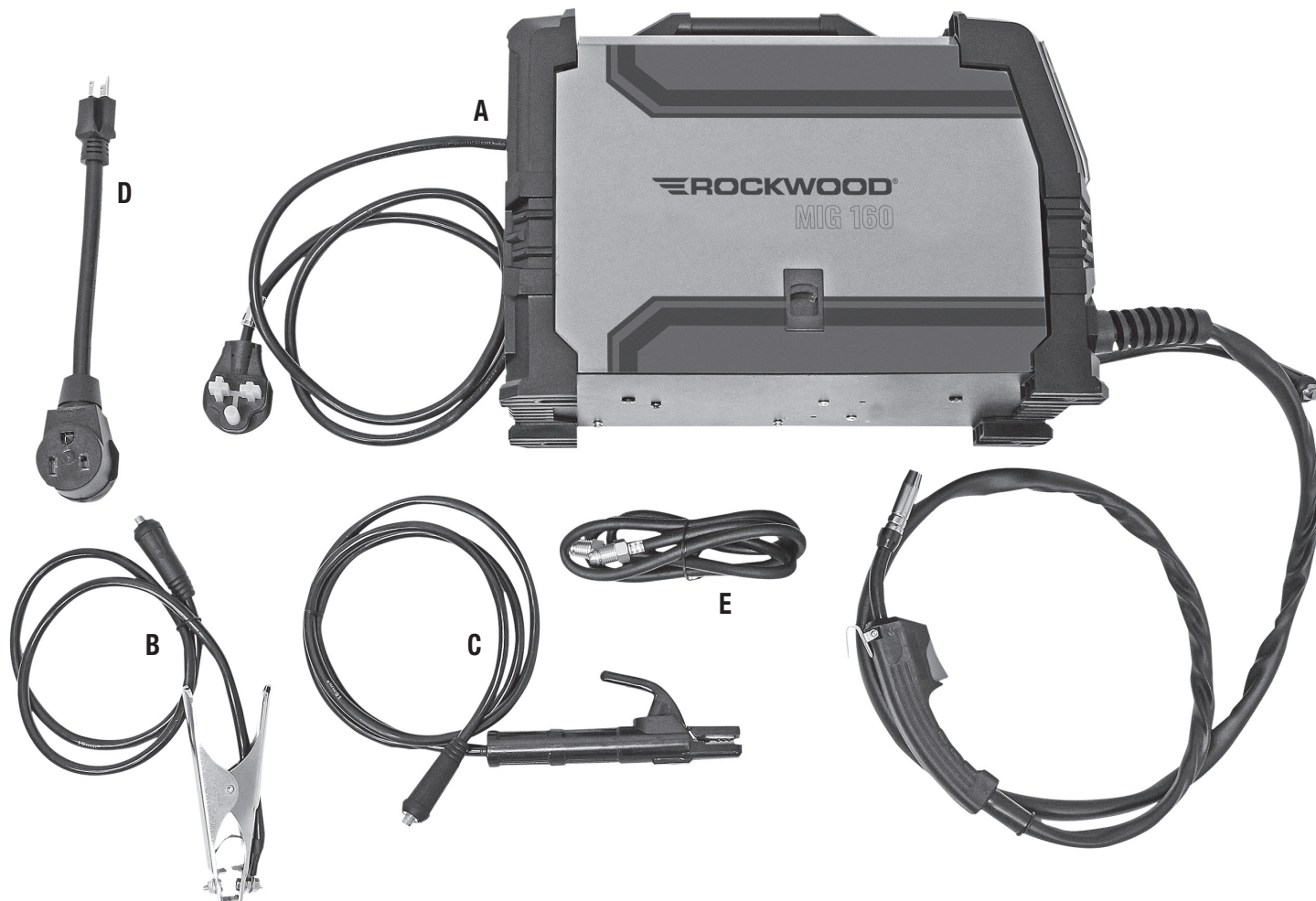
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INCLUDES

- (1) Rockwood MIG 160 Welder w/ MIG Gun w/ 5' [1.5m] Cable Assembly and 0.030" Tip Installed [A]
- (1) Ground Clamp with 4' [1.2m] Cable [B]
- (1) Electrode Holder with 6' [1.8m] Cable [C]
- (1) Adapter Cord, 8" [0.2m] [D]
- (1) Shielding Gas Hose, 4.6' [1.4m] [E]



SPECIFICATIONS

Input Voltage	240 VAC, 50/60Hz, 1 Ph	120 VAC, 50/60Hz, 1 Ph
No Load Voltage: MIG/Stick	64V	
No Load Voltage: TIG	22V	
Rated Input Current: MIG (I1max / I1eff)	29.4A / 18.6A	30.6A / 16.8A
Rated Input Current: TIG (I1max / I1eff)	24.2A / 17.1A	23.7A / 13.0A
Rated Input Current: Stick (I1max / I1eff)	29.4A / 20.8A	37.2A / 20.4A
Output Current Adjustment: MIG	30A (15.5V) - 160A (22V)	30A (15.5V) - 120A (20V)
Output Current Adjustment: TIG	10A (10.4V) - 160A (16.4V)	10A (10.4V) - 120A (14.8V)
Output Current Adjustment: Stick	20A (20.8V) - 140A (25.6V)	20A (20.8V) - 120A (24.8V)
Rated Duty Cycle: MIG	40% @ 160A 60% @ 130A 100% @ 100A	30% @ 120A 60% @ 85A 100% @ 66A
Rated Duty Cycle: TIG	50% @ 160A 60% @ 140A 100% @ 110A	30% @ 120A 60% @ 85A 100% @ 66A
Rated Duty Cycle: Stick	50% @ 140A 60% @ 130A 100% @ 100A	30% @ 120A 60% @ 85A 100% @ 66A
Starting Method: TIG	Lift Start	
Power Factor	0.73	
Efficiency	80%	
Wire Feed Speed: MIG	80 - 472 in/min	
Welding Wire Diameter	0.023 - 0.035 inches	
Overall Dimensions	17.44" x 8.66" x 12.83" [443 x 220 x 326mm]	
Weight	21.61 lbs. [9.8kg]	

SMART WIRE FEED TECHNOLOGY

This machine has Smart Wire Feed (SWF) technology enabled by default. SWF has two functions when MIG welding:

1. **Slow Run-In Wire Feed:** To prevent forcing excessive wire into the start of the weld. Holding the trigger with SWF enabled results in a slow, fixed wire speed until a welding arc is detected. The welding arc automatically switches wire speed to the user-defined rate. This is why briefly pressing the trigger results in a slow wire speed.
2. **Automatic Quick Feed:** To quickly feed wire to the torch. If a welding arc is not detected after 5 seconds, it will feed wire at max speed until trigger is released or it times out after 20 seconds. This feature allows you to quickly feed a new wire spool without altering your wire speed setting. Smart Wire Feed can be disabled (see **CONTROL AND DISPLAY PANEL**) for verifying feed rate by hand.

DUTY CYCLE

The rated duty cycle refers to the amount of welding that can be done within an amount of time. It is easiest to look at your welding time in blocks of 10 minutes and the duty cycle being a percentage of that 10 Minutes. If welding at 130 amps with a 60% duty cycle, within a 10 minute block of time you can weld for 6 minutes with 4 minutes of cooling for the Welder.

If the duty cycle is exceeded, and the built-in breaker is tripped, allow the unit to cool for a minimum of 15 minutes. When a safe temperature has been reached, the Welder will automatically enable welding again. To increase the duty cycle, turn down the welder output. Going above 130 amps will yield a lower duty cycle.

OVERLOAD PROTECTION

The Rockwood MIG 160 Welder is equipped with overload protection. This will protect the Welder if the duty cycle is exceeded. If the duty cycle is exceeded, the Welder will cut off the power supply to the Welder's outputs and the digital display will flash **ERR -02-** for overheat protection. The fan will still run to cool the unit. Allow the Welder to cool for a minimum of 15 minutes or until the error display goes out.

SAFETY INFORMATION

IMPORTANT NOTE:

These instructions are intended only to provide the user with some familiarity of the Rockwood MIG 160. Electric Welding is a highly complex procedure with many variables. If you have no prior experience with Electric Welding, it is extremely important to seek the advice of someone experienced in Electric Welding for instruction, enroll in a local technical school welding course or study a comprehensive how-to video and obtain a good quality reference book on Electric Welding as there is a moderate learning curve necessary before achieving proficiency in Welding different metals such as steel, stainless steel and aluminum. It is also strongly recommended that the user adhere to the American Welding Society guidelines, codes, and applications prior to producing welds where safety is affected.

Welding can be dangerous to you and other persons in the work area. Read and understand this instruction manual before using this Eastwood welding machine. Injury or death can occur if safe welding practices are not followed. Safety information is set forth below and throughout this manual. Save these instructions for future reference.

To learn more about welding safety, read OSHA Title 29 CFR 1910, available at www.osha.gov; ANSI Z49.1, "Safety in Welding, Cutting and Allied Processes," available at www.aws.org; and the consumable manufacturer's Safety Data Sheets.

The following explanations are displayed in this manual, on the labeling, and all other information provided with this product:

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.



⚠ READ INSTRUCTIONS

- Thoroughly read and understand this manual before using.
- Save for future reference.



⚠ WARNING ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- Improper use of an electric Welder can cause electric shock, injury, and death! Read all precautions described in the Welder Manual to reduce the possibility of electric shock.
- Disconnect Welder from power supply before performing any assembly, disassembly, or maintenance of the Welder.
- Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.
- If other persons or pets are in the area of welding, use welding screens to protect bystanders from sparks.
- Always operate the Welder in a clean, dry, well-ventilated area. Do not operate the Welder in humid, wet, rainy, or poorly ventilated areas.
- The electrode and work (or ground) circuits are electrically “hot” when the Welder is on. Do not allow these “hot” parts to come in contact with bare skin or wet clothing.
- Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.
- Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.
- Always attach the Ground Clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.



⚠ DANGER WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!

- Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.
DO NOT operate electric arc Welder in areas where flammable or explosive vapors are present.
DO NOT use near combustible surfaces. Remove all flammable items from the work area where welding sparks can reach (minimum of 35 feet).
- Always keep a fire extinguisher nearby while welding.
- Use welding blankets to protect painted and or flammable surfaces, rubber weather-stripping, dash boards, engines, etc.



⚠ WARNING ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!

- The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.
- Exposure to the electromagnetic fields generated while welding may have other health effects which are not known.



⚠ WARNING ARC RAYS CAN INJURE EYES AND BURN!

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing (long pants, long sleeves, closed toe shoes, gloves) made from durable flame-resistant material for skin protection.
- If other persons or pets are in the area of welding, use welding screens to protect bystanders from sparks and arc rays.



⚠ WARNING FUMES AND WELDING GASES CAN BE A HEALTH HAZARD!

- Fumes and gases released during welding are hazardous. Do not breathe fumes that are produced by the welding operation.
- Prolonged inhalation of welding fumes above safety exposure limits can injure the lungs and other organs.
- Use enough ventilation and/or exhaust at the arc to keep fumes and gases from your breathing area.
- Use an OSHA approved respirator when welding in confined spaces or where there is inadequate ventilation.
- Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints, powder coat.



⚠ WARNING BUILDUP OF GAS CAN INJURE OR KILL!

- Shut off gas supply when not in use.
- Ensure adequate ventilation of the welding area.
- Do not weld in confined areas.
- Always turn your face away from valve outlet when opening cylinder valve.



⚠ WARNING CYLINDERS CAN EXPLODE IF DAMAGED!

- Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. As gas cylinders are a normal component of the welding process, use extra care to handle them carefully.
- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs. Keep away from any welding or other electrical circuits.
- Install cylinders in an upright position by securing to a specifically designed rack, cart, or stationary support to prevent falling or tipping over.
- Never weld on a pressurized cylinder or explosion will occur.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and all related components in good condition.
- Keep protective cap in place over valve except when cylinder is in use.
- Use proper equipment, procedures and have adequate help when moving or lifting cylinders.



⚠ CAUTION HOT METAL AND TOOLS WILL BURN!

- Electric welding heats metal and tools to temperatures that will cause severe burns!
- Use protective, heat resistant gloves and clothing when using Eastwood or any other welding equipment. Never touch welded work surface, the welding torch tip, nozzle or tungsten until they have completely cooled.



⚠ CAUTION FLYING METAL CHIPS CAN CAUSE INJURY!

- Grinding and sanding will eject metal chips, dust, debris, and sparks at high velocity. To prevent eye injury wear approved safety glasses.
- Wear an OSHA-approved respirator when grinding or sanding.
- Read all manuals included with specific grinders, sanders or other power tools used before and after the welding process.
- Be aware of all power tool safety warnings.



⚠ NOTICE FIRST AID

- If exposed to excessive fumes move to an area with fresh air. Follow safety information on the welding wire, tungsten electrode, filler rod and stick electrode manufacturers' Safety Data Sheets.
- For other injuries follow basic first aid techniques and call physician or emergency medical personnel.

CONNECTING THE WELDER TO A POWER SOURCE

The Rockwood MIG 160 Welder requires a dedicated 240 VAC, 50 AMP, circuit breaker protected outlet. The plug installed on the Welder is a NEMA 6-50P and should be used with a NEMA 6-50R receptacle. If unsure about your electrical setup contact a licensed electrician.

As an alternative, by using the included Adapter Cord, the MIG 160 can be used with a 120 VAC, 20 AMP grounded NEMA 5-15R outlet protected by a circuit breaker.

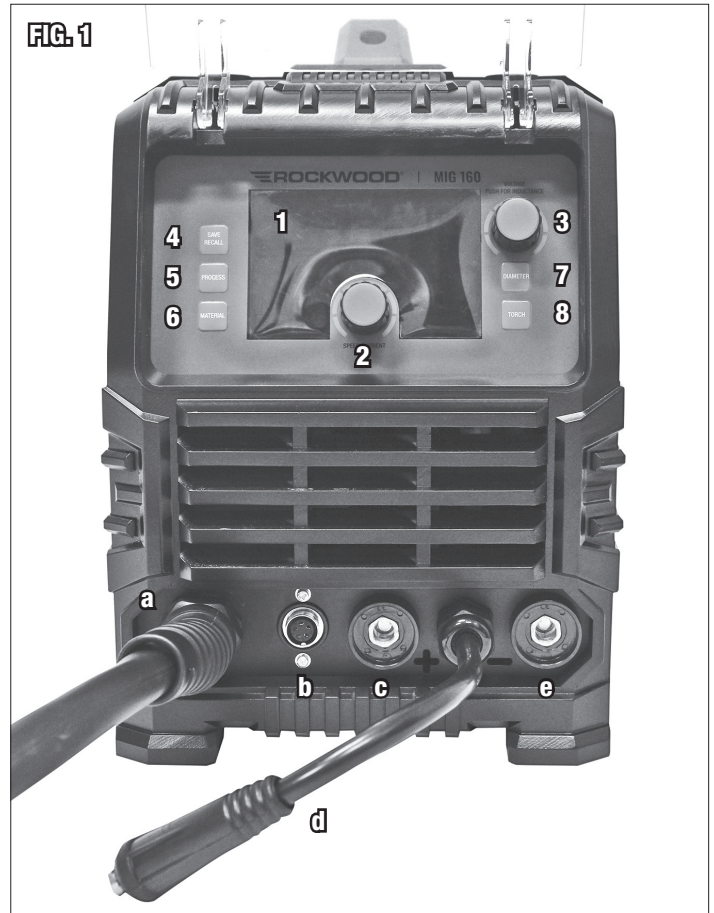
If using an extension cord is required, we recommend using our Welder Extension Cords for optimal performance: Eastwood items #31739 25ft Heavy Duty 110V Extension Cord, #20029 25ft Heavy Duty 220V Extension Cord, and #20285 40ft Heavy Duty 220V Extension Cord.

CONTROL AND DISPLAY PANEL

FRONT UPPER PANEL (FIG 1)

1. **Digital Display.** The digital display is your visual interface with the machine. It shows all parameters and settings.
2. **Primary Adjustment Knob.** Rotate Knob clockwise and counterclockwise to adjust parameters up and down, respectively.
3. **Secondary Adjustment Knob.** Rotate Knob clockwise and counterclockwise to adjust parameters up and down, respectively.
4. **SAVE RECALL Button.** Use to save and load stored welding setting profiles. Press to enter **re** (recall) mode or press and hold to enter **SA** (save) mode. Use Primary Knob to scroll through the fifteen available profiles slots. To confirm the save or recall, press **SAVE RECALL** again. After several seconds of no activity, it will exit the menu.
NOTE: To load a profile the welder must be set to the same process (MIG, ARC, or TIG) that the profile was saved in. The welder will display **Err** if attempting to load a profile from a different mode.
5. **PROCESS Button.** Cycles between welding process modes.
 - **MAN MIG:** Manual control of voltage output and wire feed speed (inches per minute, IPM). Press the Secondary Knob to adjust Inductance. Higher inductance settings can make a “wet and soft” puddle that gives smooth fillet welds. Lower inductance settings can be useful for narrowing the bead and offering greater penetration; however, it will produce more spatter.
 - **SYN MIG:** Synergic MIG automatically calibrates the welding output range based on the **MATERIAL** and **DIAMETER** settings then sets a baseline output after you input material thickness **○** in inches. The baseline can then be adjusted as amperage output **A** or wire feed speed **IPM** (press Primary Knob to cycle between) manually.
 The Secondary Knob defaults to voltage offset adjustment **V** which can be fine-tuned by $\pm 2.7V$. Clicking the Secondary Knob will cycle through Inductance adjustment (see **MAN MIG** for Inductance description), then back to material thickness input **○**.
ARC: Stick welding mode.
 - **LIFT TIG:** TIG mode for use with a valved torch (Eastwood #33423) and optional foot pedal (Eastwood #73881).
6. **MATERIAL Button.** Used for parameter adjustment in **SYN MIG**. Define the gas/wire type being utilized. Greater detail is provided in **WELDING WIRE AND GAS SELECTION**.
 - **Fe CO2:** For welding steels with solid MIG wire and 100% CO2 shielding gas.
 - **Fe MIX:** For welding steels with solid MIG wire and 75% Argon / 25% CO2 shielding gas.
 - **Flux:** Disables gas solenoid for welding with self-shielding flux-cored wire.
 - **SS:** Stainless steel specific mode for welding with stainless steel wire and shielding gas.
 - **Almg:** Aluminum specific welding mode for using aluminum wire and 100% Argon shielding gas.
7. **DIAMETER Button.** Set the diameter of the MIG welding wire you are using.

FIG. 1



FRONT LOWER PANEL (FIG 1)

- [a] MIG Gun Connection (fixed)
- [b] Foot Pedal Connection
- [c] Positive Connection
- [d] Polarity Jumper Lead
- [e] Negative Connection

8. TORCH Button. Cycles trigger modes in MIG processes and allows you to adjust arc welding settings in ARC mode.

To enable/disable Smart Wire Feed (SWF) select **MAN MIG, 4T**, adjust wire speed to 100 IPM and then press the **TORCH** button until the **4T** indicator blinks. In **ARC** mode you have the option to turn the Voltage Reducing Device (VRD) on/off. The VRD drops voltage when not stick welding to help prevent potential ARC start or shock when replacing an electrode. Normal output is 64V, while VRD drops the no-load voltage to roughly 24V. Press and hold **TORCH** to open the VRD menu.

- **2T:** Normal operation for short welds: Depress trigger and hold. Arc begins and continues until trigger is released, which terminates arc.
- **4T:** "Cruise control" for welding, less fatigue on long passes: Depress trigger and hold until arc is initiated, then release trigger. Arc continues until trigger is pressed again, which terminates arc.
- **SPOT:** This Mode automatically produces a brief 0.1 - 20 second timed, ON/OFF "Tack Weld" operation every time the Trigger is depressed. Adjust timer by clicking the Secondary Knob button to cycle through parameters until S is illuminated then rotate the Knob to adjust.
- **Hot-start:** Adjust OFF or from 1 - 50 (relative adjustment units). Hot start increases amperage over the set point when the arc is initiated, this makes it easier to start and maintain an arc especially in adverse conditions.
- **Arc-force:** Adjust OFF or from 1 - 50A. Arc force, also known as force or dig, allows for a tighter arc to the workpiece without extinguishing. This is accomplished by dynamically adjusting the amperage upward as the voltage of the arc drops when the stick is moved closer to the workpiece in order to maintain the same overall power output.

REAR PANEL (FIG 2)

- [f] Power Cord
- [g] ON/OFF Switch
- [h] Shielding Gas Connection

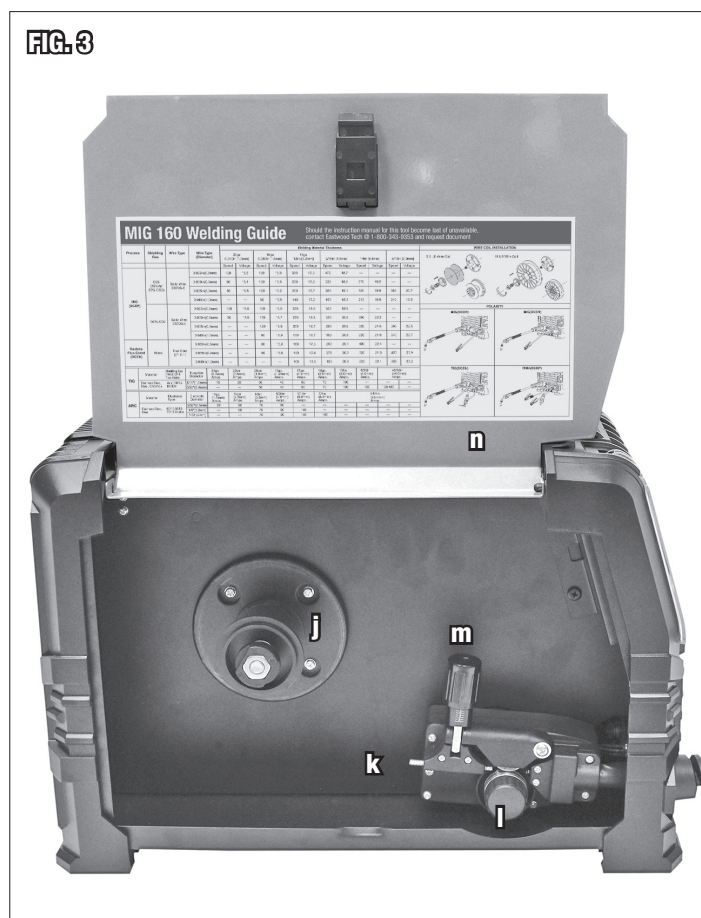
SIDE INTERIOR PANEL (FIG 3)

- [j] Wire Spool Spindle
- [k] Guide Tube
- [l] Wire Drive Roller
- [m] Wire Tensioner
- [n] Guide Chart

FIG.2



FIG.3



MIG WELDING SET-UP

⚠ DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

Turn the ON/OFF Switch [g] on the Rear Panel to the OFF position and unplug the Welder from the power supply before beginning welder set-up.

WELDING WIRE AND GAS SELECTION

Before MIG welding, you must select the welding wire you will be using and configure the welder accordingly. There are a variety of types and sizes available, and the wire must be suited for the material being welded.

- Two of the most popular types of MIG wire are ER70S-6 solid wire (does not self-shield, therefore a shielding gas source is required) and E71T-11 flux core wire (hollow wire containing shielding flux, therefore no shielding gas required). Both wires are suitable for welding common steel types. Solid wire with a shielding gas provides a clean, aesthetically pleasing weld that does not require much post processing. Flux core wire generally provides a “hotter” weld, lending itself to thicker materials, projects with contaminated base materials, and outdoor projects where wind would disrupt shielding gas flow. Flux core welds have a less pleasing, “dirtier” appearance and require more clean-up before coating.
 - For solid wire welding, the most common shielding gases are 75% Argon/25% CO2 mix or 100% CO2. The former provides a more stable arc with less spatter, best for projects that must look aesthetically pleasing such as sheet metal bodywork. The latter is cheaper, lasts longer, and will provide a “hotter” weld that is best suited for thicker materials.
 - When corrosion resistance is needed while welding stainless steels, it is best to use stainless steel solid wire (with Tri-Mix or 98% Argon shielding gas) or stainless steel flux core wire.
- Thicker materials will require a larger wire diameter to achieve optimal results. 0.030” or 0.035” diameter wire should be suitable for most welding with the MIG 160. If welding thin gauge steel at low amps, such as during automotive bodywork where a particularly small weld bead is desired, stepping down to 0.023” is a good idea. If you’re maxing the output of this machine on thick plate you might find 0.040” wire works better.
- Wire that is poorly sized for the application will be difficult to get good results. Undersized wire can result in poor penetration. Burn-through may be difficult to manage with wire that is too large.

CONFIGURING POLARITY AND INSTALLING THE GROUND CLAMP WITH CABLE

Polarity required depends on the wire being used. Solid wire is typically welded as electrode positive (DCEP) and flux cored wire as electrode negative (DCEN).

CONFIGURATION FOR DCEP SOLID WIRE WELDING

- Locate the Polarity Jumper Lead [d] and connect the plug on the brass end to the (+) Positive Connection [c]. Align the key of the brass ferrule with the notch of the receptacle at the 12:00 position, insert the plug and twist clockwise 1/2 turn until it is tight (**FIG 4**).
- Locate the Ground Clamp with 4’ [1.2m] Cable [B] and connect the plug on the brass end to the (-) Negative Connection [e]. Align the key of the brass ferrule with the notch of the receptacle at the 12:00 position, insert the plug and twist clockwise 1/2 turn until it is tight (**FIG 4**).

FIG. 4



CONFIGURATION FOR DCEN FLUX CORED WIRE WELDING

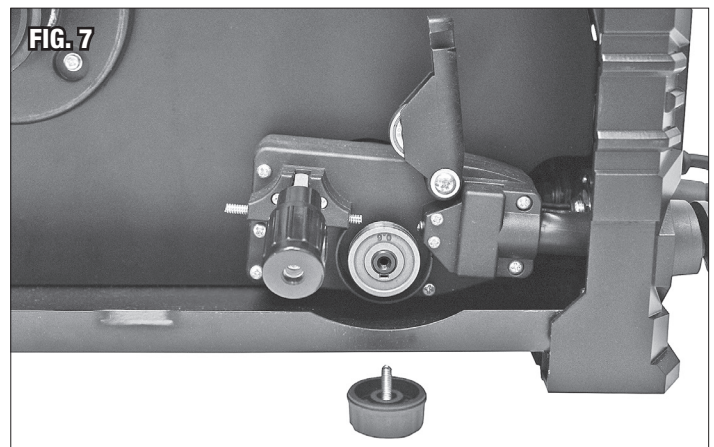
- Locate the Polarity Jumper Lead **[d]** and connect the plug on the brass end to the (-) Negative Connection **[e]**. Align the key of the brass ferrule with the notch of the receptacle at the 12:00 position, insert the plug and twist clockwise 1/2 turn until it is tight (**FIG 5**).
- Locate the Ground Clamp with 4' [1.2m] Cable **[B]** and connect the plug on the brass end to the (+) Positive Connection **[c]**. Align the key of the brass ferrule with the notch of the receptacle at the 12:00 position, insert the plug and twist clockwise 1/2 turn until it is tight (**FIG 5**).

DRIVE ROLLER

The Rockwood MIG 160 Wire Drive Roller has twin grooves to accommodate both 0.023" [0.6mm] and 0.030" [0.8mm] wire. The Drive Roller is factory set and ready to use 0.030" [0.8mm] wire.

IMPORTANT NOTE: When installed, the stamped marking on the side of the Drive Roller facing inward (not observable unless removed) denotes the groove size being used (**FIG 6**). Reverse the Drive Roller position according to the following procedure:

- Open the side panel door of the Welder to access the drive motor compartment.
- Swing the Wire Tensioner down off the Tension Arm so you can pivot the Arm up and away from the Drive Roller (**FIG 7**).
- Unthread the Drive Roller Thumbscrew counterclockwise to remove (**FIG 7**).
- Remove the Drive Roller and view the wire sizes stamped on each side of the Roller. Reinstall the Drive Roller on the keyed drive shaft with the desired wire size stamping facing inward (**FIG 6**).
- Reinstall the Drive Roller Thumbscrew. Replace the Tension Arm and Wire Tensioner.



INSTALLING WIRE SPOOL

The Rockwood MIG 160 can be used with either a 4" or an 8" wire spool.

TO INSTALL A 4" WIRE SPOOL

- Verify the ON/OFF Switch [g] on the Rear Panel is in the **OFF** position and unplug the Welder from the power supply.
- Open the side panel door of the Welder and remove the Spool Retaining Nut, Spring and Washer from the Wire Spool Spindle by unthreading the Nut counterclockwise (**FIG 8**).
- With the wire feed oriented forward and from the underside of the spool, slide the 4" Wire Spool onto the Spindle and reinstall the Washer, Spring and Spool Retaining Nut (**FIG 9**). **DO NOT** unravel wire at this point.

TO INSTALL AN 8" WIRE SPOOL

- Verify the ON/OFF Switch [g] on the Rear Panel is in the **OFF** position and unplug the Welder from the power supply.
- Open the side panel door of the Welder and remove the Spool Retaining Nut, Spring and Washer from the Wire Spool Spindle by unthreading the Nut counterclockwise (**FIG 8**).
- With the wire feed oriented forward and from the underside of the spool, slide the 8" Wire Spool onto the Spindle and the inside over the raised support lip (**FIG 10**). Hold it in place and install the Washer with the raised boss supporting the outside of the spool.
- Reinstall the Spring and Spool Retaining Nut (**FIG 11**) to hold everything in place. **DO NOT** unravel wire at this point.

FIG. 8



FIG. 9



FIG. 10



FIG. 11



FEEDING WIRE

- Twist off the Nozzle and remove the Contact Tip from the end of the MIG Gun.
- Verify the Drive Roller setting is correct for the wire size being used, as previously described in **DRIVE ROLLER**.
- Swing the Wire Tensioner down off the Tension Arm so you can pivot the Arm up and away from the Drive Roller (**FIG 7**).
- Pull out welding wire from the wire spool carefully. DO NOT let go or the wire spool will unravel. Cut off the welding wire to have a straight end.
- Insert the welding wire feeding from the underside of the spool and through the Guide Tube then guide over the Drive Roller and into the Wire Feed Hole (**FIG 12**).
- Replace the Tension Arm and Wire Tensioner.
- Connect the Welder to a power supply and turn the ON/OFF Switch [g] on the Rear Panel to the **ON** position. Set to either MIG mode via the PROCESS Button [5].
- With the gun pointed away from you and others, depress the trigger to begin feeding wire. After approximately 5 seconds the drive motor will go into quick feed mode. Quick feed mode times out after 20 seconds. This function is part of Smart Wire Feed technology and can be disabled (see **FRONT UPPER PANEL**).
- Feed until wire comes out of the MIG Gun. Verify the Contact Tip size marking matches the wire being used, then reinstall the Contact Tip and Nozzle.

NOTE: The Wire Tensioner may need to be adjusted. To do so:

- If any slipping is occurring between the Drive Roller and the wire: Turn Wire Tensioner 1/4 turn clockwise and test again.
 - Repeat until wire is feeding smoothly and capable of applying light pressure when fed against an ungrounded surface (**FIG 13**).
- Cut the wire about 1/4" from the end of the Contact Tip.

FIG. 12

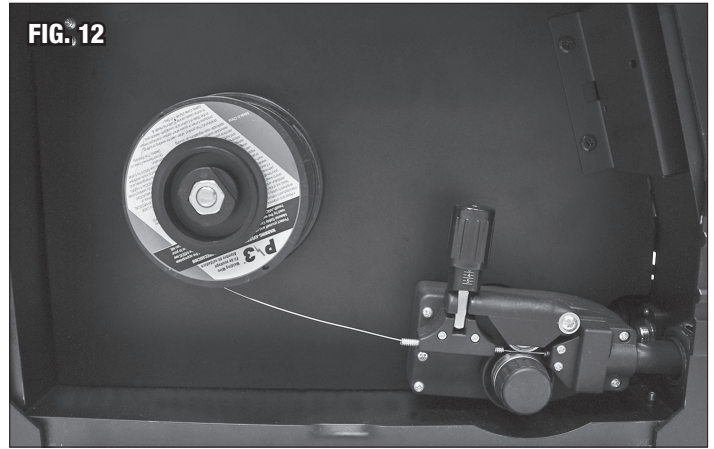
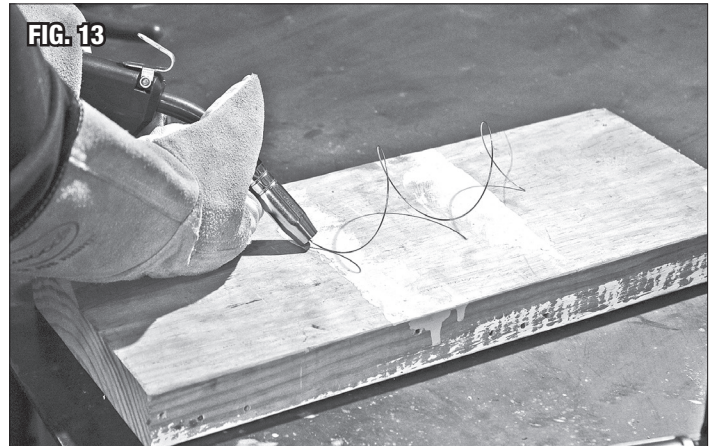


FIG. 13



INSTALLING AND ADJUSTING THE MIG SHIELDING GAS SUPPLY

⚠ WARNING BUILDUP OF GAS CAN INJURE OR KILL!

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.
- Always turn your face away from valve outlet when opening cylinder valve.

⚠ WARNING CYLINDERS CAN EXPLODE IF DAMAGED!

- Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. As gas cylinders are a normal component of the welding process, use extra care to handle them carefully.
- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs. Keep away from any welding or other electrical circuits.
- Install cylinders in an upright position by securing to a specifically designed rack, cart, or stationary support to prevent falling or tipping over.
- Never weld on a pressurized cylinder or explosion will occur.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and all related components in good condition.
- Keep protective cap in place over valve except when cylinder is in use.
- Use proper equipment, procedures and have adequate help when moving or lifting cylinders.

A shielding gas cylinder and regulator (Eastwood #12238) are **NOT INCLUDED** with the Rockwood MIG 160. They can be bought at most local Welding Supply Stores. See **WELDING WIRE AND GAS SELECTION** for the recommended gas mix with your wire.

- Place the Rockwood MIG 160 in a secure dedicated area or on a welding cart (not included).
- Secure the shielding gas cylinder to a stationary object or mount to a specifically designed welding cart, equipped to hold one so that the cylinder cannot fall over.
- Remove the cap from the shielding gas cylinder.
- Insert the large brass male fitting on the shielding gas regulator (not included, Eastwood #12238) into the female fitting on the shielding gas cylinder (not included).

⚠ NOTICE

BUILDUP OF GAS CAN INJURE OR KILL!

Do not use white thread sealing tape on these connections as it is an inert spherical gas fitting and does not require it. If you have a leak check for burrs or dirt in the threads or on the spherical joints.

- Tighten the fitting with a wrench until snug, do not over tighten (**FIG 14**).
- Connect the fitting end of the included Shielding Gas Hose **[E]** to the fitting on the regulator and wrench tighten until snug.
- Connect the other end of the Gas Hose to the Shielding Gas Connection **[h]** on the rear panel (**FIG 2**) of the welder and tighten with a wrench until snug.
- Check the gas line for leaks by slowly opening the valve on the gas cylinder. When welding, the valve on the cylinder should always be fully open. Close it when done welding to avoid loss of gas.
- After connecting the shielding gas regulator, the gas flow rate needs to be adjusted so that the proper amount of Shielding Gas is flowing over the weld. If there is too little gas flow, there will be porosity in the resulting welds as well as excessive spatter. If there is too much gas flow, this will waste gas and may affect the weld quality. Most regulators have two gauges: Flow Rate and Tank Pressure.
- Open the MIG Shielding Gas tank valve all the way. Adjust the knob on the regulator to ~30 CFH (Cubic Feet per Hour).
- Turn on the Welder and set to MIG mode. Trigger the MIG Gun and watch the flow rate needle will drop to a steady reading. Adjust that reading to ~20 CFH. This is a good baseline, but it may need to be adjusted in some cases depending on if there is a slight breeze or some other instance where additional shielding gas is required to prevent porosity in the weld.
- When finished welding or adjusting, the valve on the gas cylinder must be closed.

FIG. 14



MIG WELDING OPERATION

Configure the welder settings according to your setup and preference. The settings are described in **CONTROL AND DISPLAY PANEL**. Most beginner welders will start with:

- **SYN MIG** process. Use the **Primary Adjustment Knob** to match the number on the display to the thickness, in inches, of the workpiece.
- Set **MATERIAL** and **DIAMETER** to match the shielding gas and wire being used.
- **TORCH** set to 2T.

MIG WELDING

⚠ DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- Disconnect Welder from power supply before performing any assembly, disassembly, or maintenance of the Welder.
- Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.
- Always operate the Welder in a clean, dry, well-ventilated area. Do not operate the Welder in humid, wet, rainy, or poorly ventilated areas.
- The electrode and work (or ground) circuits are electrically “hot” when the Welder is on. Do not allow these “hot” parts to come in contact with bare skin or wet clothing.
- Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.
- Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.
- Always attach the Ground Clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.

⚠ DANGER WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!

- Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.
DO NOT operate electric arc Welder in areas where flammable or explosive vapors are present.
DO NOT use near combustible surfaces. Remove all flammable items from the work area where welding sparks can reach (minimum of 35 feet).
- Always keep a fire extinguisher nearby while welding.
- Use welding blankets to protect painted and or flammable surfaces, rubber weather-stripping, dash boards, engines, etc.

⚠ WARNING ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!

- The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.
- Exposure to the electromagnetic fields generated while welding may have other health effects which are not known.

⚠ WARNING ARC RAYS CAN INJURE EYES AND BURN!

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing (long pants, long sleeves, closed toe shoes, gloves) made from durable flame-resistant material for skin protection.

⚠ WARNING FUMES AND WELDING GASES CAN BE HEALTH HAZARD!

- Fumes and gases released during welding are hazardous. Do not breathe fumes that are produced by the welding operation.
- Prolonged inhalation of welding fumes above safety exposure limits can injure the lungs and other organs.
- Use enough ventilation and/or exhaust at the arc to keep fumes and gases from your breathing area.
- Use an OSHA approved respirator when welding in confined spaces or where there is inadequate ventilation.
- Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints, powder coat.

⚠ CAUTION HOT METAL AND TOOLS WILL BURN!

- Electric welding heats metal and tools to temperatures that will cause severe burns!
- Use protective, heat resistant gloves and clothing when using Eastwood or any other welding equipment. Never touch welded work surface, the welding torch tip, nozzle or tungsten until they have completely cooled.

Before welding it is of importance to understand a push, perpendicular, or drag technique can be used to weld the pieces together. Technique may be limited by physical boundaries, and certain wires generally work better with certain techniques, as briefly described below.

Pushing with solid wire (up to 20°) or perpendicular is commonly practiced and leans toward a slightly cleaner, flatter weld bead profile. However, dragging the weld puddle is also practiced and may provide enhanced penetration.

Pushing with flux-cored wire may result in less spatter, but at risk of reduced weld quality due to trapped slag. Generally, a perpendicular or drag (up to 20°) technique is used for flux-cored welding, but staying at the leading edge of the weld puddle to avoid trapping slag is most important.

Aluminum and stainless steel are welded almost exclusively with a push technique. Dragging will result in a dirtier, lower quality weld bead.

- Always practice with a scrap piece before welding an actual project piece!
- Connect your ground clamp to the workpiece that is to be welded. Make sure the ground clamp contacts are placed on a clean piece of metal free of paint, grease, rust, oils, etc. It is recommended to place your ground clamp as close to the welding area as possible.
- Assess the general work area and make sure the welding area is also cleaned of any paint grease, rust, oils, etc.
- Wearing protective welding helmet, gloves, long sleeve shirt and pants, closed-toe shoes, put the end of the wire sticking out of the gun into the joint to be welded.
- Position the MIG Gun so that it is perpendicular to the joint (**FIG 15**).
- Depress the trigger to start the arc.

⚠ NOTICE

This machine has smart wire feeding technology to prevent forcing excessive wire into the start of the weld. When the machine is not welding and feeding wire, it will feed wire at a slow fixed speed for approximately five seconds, and then speed up to max speed. This is to quickly feed wire through the torch. Once the machine senses that it is welding it will automatically run at the preset wire speed that the user has set on the machine. Do not be alarmed when the wire feeds slowly while not welding.



- Once you depress the trigger and the arc has started, you will notice a molten puddle forming; this puddle is the weld bead and will follow the motion of the MIG Gun. The goal is allowing it to grow hot and large enough to achieve optimal penetration, but not waiting so long that it melts through the material.
- If you burn through the material, you are moving too slow. If you're not penetrating the base metal, you're moving too fast.
- Release the trigger on the MIG Gun to stop the weld. After welding is complete for the day, turn off the Welder and disconnect from the power source.

MIG WELDING TECHNIQUES

SHEET METAL WELDING TECHNIQUES

When welding sheet metal a different approach is usually taken to account for how thin the metal is and how susceptible to warping it is. The dominant technique is called Stitch Welding and this process is described below:

NOTE: Welding with solid wire and shielding gas is preferable for a cleaner, flatter, lower heat weld that requires less clean up. Flux-cored wire is generally “hotter” and dirtier, making it more challenging.

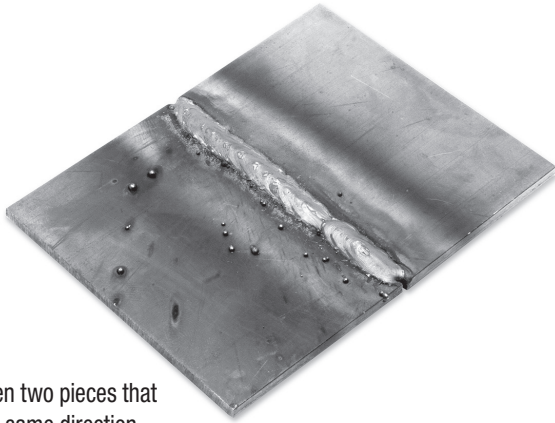
- Clean the metal to be welded of any paint, rust, oil, grease, dirt, or any other contaminants that may be on the surface of the piece.
- Secure the pieces to be welded in place using clamps. In some instances, a small gap between the two pieces of sheet metal for the weld to flow into will result in a lower bead height which will require minimal finishing.
- Adjust **SYN MIG** to the metal thickness at hand. Depending on the setup, some manual fine-tuning may be required for optimal results. Alternatively, experienced welders may prefer **MAN MIG** to dial in the settings themselves.
- Get some pieces of scrap metal of the same thickness and verify that the settings will work for the specific weld you will be making.
- Once the settings have been fine-tuned tack weld your final pieces in place and remove the clamps if they are in the way of the weld.
- The Stitch Welding technique can now be utilized which is basically a series of connected “Tacks” To perform the technique, depress the trigger for a short period of approximately half a second to lay a tack. When welding thin metal <18 gauge, welding time may need to be minimized further. The **SPOT** trigger mode can also be used to easily accomplish perfect repeatability.
TECH TIP: Specifically with flux-cored wire, running an excessive wire stick-out of 1” or more can reduce heat input to the panel.
- Once you have the winning formula, continue making a series of connected tack welds. Make a small series of tacks and then move to a different section of the joint and perform the process there. It is essential to keep moving around to spread out the heat, and take breaks, to reduce warp of the workpiece.
- Once the entire weld has been completed allow the metal to cool. If necessary, follow up with a flap disc to grind the weld bead flush.

HEAVIER GAUGE METAL WELDING TECHNIQUES

When welding heavier gauge metal, a continuous bead is recommended with slow travel and high heat. This process is described below:

- Clean the metal to be welded of any paint, rust, oil, grease, dirt or any other contaminants that may be on the surface of the piece.
- Secure the pieces to be welded in place using clamps. Be sure to leave a small gap between the two pieces of metal for the weld to flow into, this will result in a lower bead height which will require minimal finishing.
- Set the thickness being welded in **SYN MIG** mode or consult a welder settings chart and set the Voltage and Wire Speed appropriately.
- Get some pieces of scrap metal of the same thickness and verify that the settings will work for the specific weld you will be making.
- Once the settings have been fine-tuned, tack weld the final pieces in place and remove the clamps if they are in the way of the weld.
- When welding heavy gauge metal there are two basic approaches to creating the weld. The first is a continuous bead with steady gun movement along the length of the joint. The second type of weld is a stringer or weave bead. This is accomplished by moving the MIG Gun in a circular or zig zag pattern. Either of these techniques will create strong welds but in some cases the stringer or weave type will create a more aesthetically pleasing weld bead.
- Once the entire weld has been completed, allow the metal to cool. If necessary, follow up with a flap disc to grind the weld bead flush.

TYPES OF WELD JOINTS



BUTT WELD

is a joint between two pieces that are laying in the same direction.



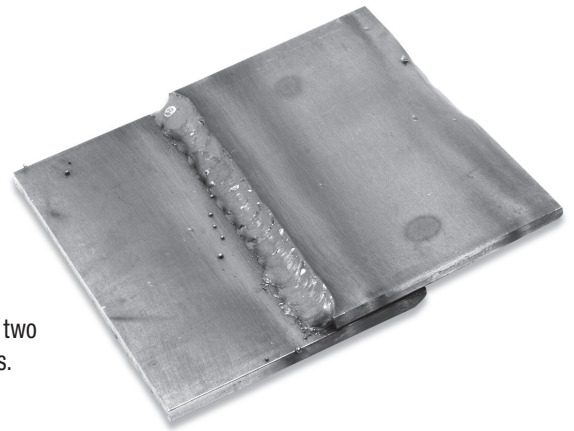
CORNER WELD

is a joint between two pieces that meet at or near perpendicular at their edges.



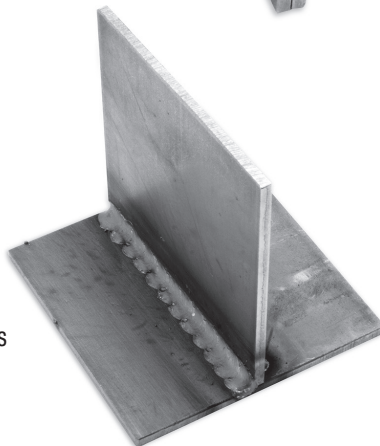
EDGE WELD

is a joint between two pieces where the edges are being joined.



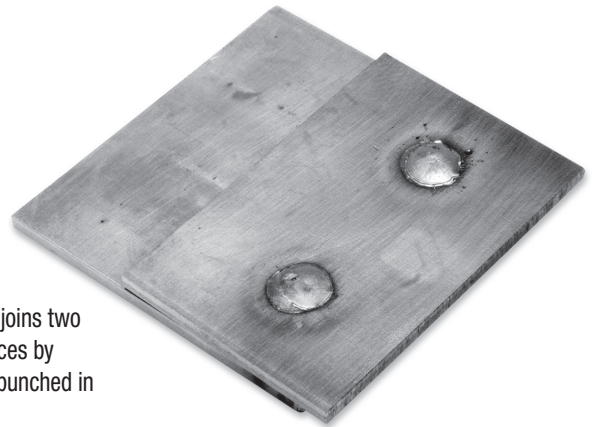
LAP WELD

is a joint between two overlapping pieces.



TEE WELD

is a joint between two pieces where one is perpendicular to the other.



PLUG WELD

is a joint which joins two overlapping pieces by filling in a hole punched in the top piece.

STICK WELDING SET-UP

⚠ DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

Turn the ON/OFF Switch [g] on the Rear Panel to the OFF position and unplug the Welder from the power supply before beginning welder set-up.

POLARITY SELECTION

The Rockwood MIG 160 can weld in both Direct Current Electrode Positive (DCEP) and Direct Current Electrode Negative (DCEN). The electrode, or rod, when welding in DCEP is positive and the grounded surface is negative. Generally, DCEP is the most commonly used polarity when stick (aka ARC) welding. The electrode when welding in DCEN is negative and the grounded surface is positive. DCEN is typically used for building up heavy deposits of material with less penetration.

ARC (DCEN)

- Connect the Ground Clamp with 4' [1.2m] Cable [B] to the (+) Positive Connection [c] on the Front Panel of the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist clockwise until it is tight (**FIG 16**).
- Connect the Electrode Holder with 6' [1.8] Cable [C] to the (-) Negative Connection [e] on the Front Panel of the Welder. Connect plug as described above (**FIG 16**).

ARC (DCEP)

- Connect the Ground Clamp with 4' [1.2m] Cable [B] to the (-) Negative Connection [e] on the Front Panel of the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist clockwise until it is tight.
- Connect the Electrode Holder with 6' [1.8] Cable [C] to the (+) Positive Connection [c] on the Front Panel of the Welder. Connect plug as described above.



ELECTRODE SELECTION

Before beginning welding with your Eastwood Elite AC/DC MP200i, you will need to purchase electrodes as these are a consumable item in the ARC welding process. There are a variety of different types of rods available and they should be selected depending on the project at hand. The chart below is an overview of some of the most popular electrodes.

Electrode	Polarity	Usage
E6010	DCEP	This electrode works well for welding rusty, dirty, painted, or greasy steels.
E6011	DCEP	This electrode is a general purpose rod used for carbon and galvanized steel. It is recommended for use when deep penetration is necessary.
E6013	DCEP, DCEN	This electrode is a general purpose rod used for welding carbon steel with poor-fitting joints. It is capable of light penetration.
E7014	DCEP, DCEN	This electrode can be used where a high deposition is necessary along with fast travel speed. It is capable of light penetration.
E7018	DCEP	This electrode is best for use with clean, bare steel and is suitable for moderate penetration.

Electrode/Amperage Chart								
Electrode	Diameter		Amperage Range					
	IN	MM	MIN.	50 A	100 A	150 A	200 A	MAX.
6010 & 6011	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
	3/16	4.8						
6013	1/16	1.5						
	5/64	2.0						
	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
	3/16	4.8						
7014	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
7018	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
7024	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
Ni-CI	3/32	2.4						
	1/8	3.2						
	5/32	4.0						
	3/16	4.8						
308L	3/32	2.4						
	1/8	3.2						
	5/32	4.0						

STICK WELDING OPERATION

Configure the welder settings according to your setup and preference. The settings are described in **CONTROL AND DISPLAY PANEL**. Most beginner welders will start with:

- Set to **ARC** process, then use the **Primary Adjustment Knob** to set the amperage based on material thickness and the electrode at hand.
- Selecting **Hot-start** and Arc-force via the **TORCH Button** and setting to around 25 may be helpful for beginners.

STICK WELDING

DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- Disconnect Welder from power supply before performing any assembly, disassembly, or maintenance of the Welder.
- Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.
- Always operate the Welder in a clean, dry, well-ventilated area. Do not operate the Welder in humid, wet, rainy, or poorly ventilated areas.
- The electrode and work (or ground) circuits are electrically “hot” when the Welder is on. Do not allow these “hot” parts to come in contact with bare skin or wet clothing.
- Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.
- Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.
- Always attach the Ground Clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.

DANGER WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!

- Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.
DO NOT operate electric arc Welder in areas where flammable or explosive vapors are present.
DO NOT use near combustible surfaces. Remove all flammable items from the work area where welding sparks can reach (minimum of 35 feet).
- Always keep a fire extinguisher nearby while welding.
- Use welding blankets to protect painted and or flammable surfaces, rubber weather-stripping, dash boards, engines, etc.

WARNING ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!

- The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.
- Exposure to the electromagnetic fields generated while welding may have other health effects which are not known.

WARNING ARC RAYS CAN INJURE EYES AND BURN!

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing (long pants, long sleeves, closed toe shoes, gloves) made from durable flame-resistant material for skin protection.

⚠ WARNING FUMES AND WELDING GASES CAN BE HEALTH HAZARD!

- Fumes and gases released during welding are hazardous. Do not breathe fumes that are produced by the welding operation.
- Prolonged inhalation of welding fumes above safety exposure limits can injure the lungs and other organs.
- Use enough ventilation and/or exhaust at the arc to keep fumes and gases from your breathing area.
- Use an OSHA approved respirator when welding in confined spaces or where there is inadequate ventilation.
- Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints, powder coat.

⚠ CAUTION HOT METAL AND TOOLS WILL BURN!

- Electric welding heats metal and tools to temperatures that will cause severe burns!
- Use protective, heat resistant gloves and clothing when using Eastwood or any other welding equipment. Never touch welded work surface, the welding torch tip, nozzle or tungsten until they have completely cooled.

- Always practice with a scrap piece before welding an actual project piece!
- Connect your ground clamp to the workpiece that is to be welded. Make sure the ground clamp contacts are placed on a clean piece of metal free of paint, grease, rust, oils, etc. It is recommended to place your ground clamp as close to the welding area as possible.
- Assess the general work area and make sure the welding area is also cleaned of any paint grease, rust, oils, etc.
- Wearing protective welding helmet, gloves, long sleeve shirt and pants, closed-toe shoes, insert the electrode into the electrode holder being careful to not allow the electrode to contact the grounded area.
- To start welding an arc must be struck, to do this is a similar motion to striking a match will have to be performed with the electrode. Slowly bring the electrode closer to the weld joint and then contact and drag the electrode across the piece to strike the arc. Once the arc has been struck you can continue feeding the electrode into the weld joint.
- While moving along the weld joint the electrode will burn down, while it is burning you will need to continue moving the electrode closer to the joint trying to keep a 1/8" gap between the end of the electrode and the weld joint. The electrode holder must be held so that the electrode is in a downward angle moving in the direction of the weld joint.
- To stop welding simply lift the electrode away from the workpiece. When finished welding remove the electrode from the holder and turn off the Welder.

TIG WELDING SET-UP

SHIELDING GAS AND TIG TORCH CONNECTION

⚠ WARNING BUILDUP OF GAS CAN INJURE OR KILL!

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.
- Always turn your face away from valve outlet when opening cylinder valve.

⚠ WARNING CYLINDERS CAN EXPLODE IF DAMAGED!

- Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. As gas cylinders are a normal component of the welding process, use extra care to handle them carefully.
- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs. Keep away from any welding or other electrical circuits.
- Install cylinders in an upright position by securing to a specifically designed rack, cart, or stationary support to prevent falling or tipping over.
- Never weld on a pressurized cylinder or explosion will occur.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and all related components in good condition.
- Keep protective cap in place over valve, except when cylinder is in use.
- Use proper equipment, procedures and have adequate help when moving or lifting cylinders.

A shielding gas cylinder and regulator (Eastwood #12238) are **NOT INCLUDED** with the Rockwood MIG 160 but are necessary to TIG weld. They can be bought at most local Welding Supply Stores. 100% Argon is recommended for all TIG welding applications. Also required, but not included, is a valved TIG welding torch (Eastwood #33243).

- Place the Rockwood MIG 160 in a secure dedicated area or on a welding cart (not included).
- Secure the shielding gas cylinder to a stationary object or mount to a specifically designed welding cart, equipped to hold one so that the cylinder cannot fall over.
- Remove the cap from the shielding gas cylinder.
- Insert the large male fitting on the gas flowmeter (not included, Eastwood #12238) into the female fitting on the shielding gas cylinder (not included).

⚠ NOTICE

Do not use white thread sealing tape on these connections as it is an inert spherical gas fitting and does not require it. If you have a leak check for burrs or dirt in the threads or on the spherical joints.

- Tighten the fitting with a wrench until snug, do not over tighten (**FIG 14**).
- Connect the shielding gas hose fitting of the valved TIG torch (Eastwood #33243) to the fitting on the regulator and wrench tighten until snug (**FIG 14**).
- Verify the TIG torch valve is closed (rotated fully clockwise) then check the gas lines for leaks by slowly opening the valve on the gas cylinder.
- When welding, the valve on the cylinder should always be fully open. Close it when done welding to avoid loss of gas.
- Connect the Ground Clamp with 4' [1.2m] Cable **[B]** to the (+) Positive Connection **[c]** on the Front Panel of the Welder. To connect the plug line up the key on the plug with the keyway on the socket of the Welder, insert the plug and twist clockwise until it is tight (**FIG 16**).
- Connect the valved TIG welding torch power lead to the (-) Negative Connection **[e]** on the Front Panel of the Welder. Connect plug as described above (**FIG 16**).

TUNGSTEN SELECTION

Before welding, you will need to purchase a tungsten electrode. There are a variety of different types and sizes available, and they should be selected depending on the material at hand.

- The most popular tungsten types for DC welding are color coded Pink, Multi-Mix (Lanthanum, Cerium, Yttrium), Blue (Lanthanum) and Red (Thoriated).
- Higher welding currents require a larger tungsten. Generally, a 3/32" tungsten is suitable for most hobbyist jobs. If welding thin gauge steel at double digit amperage often, you may find a 1/16" gives you a better start.

TUNGSTEN SHARPENING

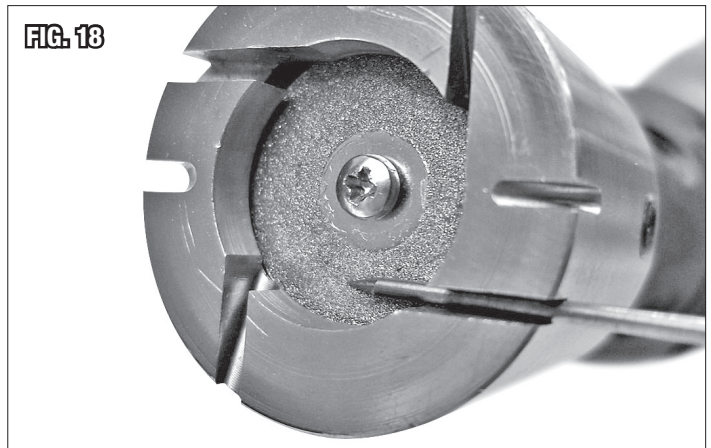
The geometry and quality of the tungsten's sharpened point is as important as the size and type. To avoid contamination of the tungsten and ultimately the weld, it is imperative to have a dedicated grinding wheel used for tungsten grinding only. A fine grit standard 6" synthetic stone grinding wheel on a bench top grinder is sufficient, or a dedicated Tungsten Grinder (#33307 Corded or #58878 Cordless) are optionally available.

- Shut off the Welder.
 - Make sure the tungsten and Torch are sufficiently cooled for handling, then loosen and remove the Back Cap. Remove the tungsten from the front of the Torch (Removing from the rear could damage the collet if the tip is distorted). Remove the Collet.
 - If the tungsten is used and the end is contaminated, use pliers or a suitable tool to grip the tungsten above the contaminated section and snap off the end of the tungsten.
- NOTE:** Tungsten is brittle and often splinters if snapped. To avoid splintering, grind a notch in the tungsten before snapping it off or grind fully through.
- Holding the tungsten tangent to the surface of the grinding wheel, rotate the tungsten while exerting light pressure until a point is formed (**FIGS 17 & 18**).

- Point geometry affects arc wander and the "cone" of the welding arc (**FIG 19**).
 - Longer, pointed tips (shallow angle 5° - 35°) will give the least arc wander, easiest start and generally shallower penetration with a slightly wider weld puddle. Extremely shallow angles may melt off under high amps. 22.5° is one of the most common sharpening angles.
 - Shorter tips (wider angle 40° - 60°) have significantly better longevity with increased penetration, but a narrower weld puddle. It is also more likely to encounter arc wander and might not start as smoothly.
 - Blunt tips (90° - 180°) further exaggerate the effects of a shorter tip. Typically found when welding thick material at high amperage.

TECH TIP: Grinding the point off of a tip (aka blunting or flat spotting it) will typically increase penetration and durability of any given sharpening angle at cost of increased likelihood of arc wander. It may also narrow the weld puddle.

- Replace the tungsten in the TIG Torch.



TIG TORCH DISASSEMBLY (FIG 20)

- Make sure the Welder is turned **OFF** and unplugged.
- Remove the Back Cap from the Torch.
- If there is a tungsten installed in the Torch, pull it out from the front of the Torch.
- Slide the Collet out of the Torch rear.
- Unscrew and remove the Gas Cup.
- Unscrew and remove the Collet Body.

TIG TORCH ASSEMBLY (FIG 21)

- Select the Collet Body that matches your tungsten diameter and thread it into the front of the Torch.
- Select a Collet that matches your tungsten diameter. Insert the tungsten into the Collet and put the Collet and tungsten back into the Torch.
- Reinstall the Gas Cup to the Collet Body. The Gas Cup size should be selected according to shielding gas requirements for the material being welded. Generally, carbon steel does not require as much shielding effect as stainless steel does. Selection also depends on the joint being welded (large Cups will not fit in tight corners). Smaller Cups are more economical on shielding gas because they need less flow.
- Reinstall the Back Cap to lock the tungsten in place. The general rule of thumb for tungsten "stick out" distance is to not extend further than the inner diameter of the Gas Cup (**FIG 22**). However, this is only a general rule and can vary depending on your particular setup and joint.

TIG SHIELDING GAS FLOW ADJUSTMENT

Before welding, the gas flow rate needs to be adjusted so that the proper amount of shielding gas is flowing over the weld. If there is too little gas flow, there will be porosity in the resulting welds as well as contamination of the tungsten. If there is too much gas flow, this will be a waste of gas and may also result in turbulent flow that negatively affects the weld quality. Most regulators have two gauges: Flow Rate and Tank Pressure.

- Open the gas cylinder valve all the way.
- Turn the valve on the TIG torch counterclockwise to open it. The flow rate needle will drop to a steady reading. This is the value to be used for setting gas flow.
- The general rule of thumb is to set gas flow in cubic feet per hour (CFH) at 1.5 - 2 times the cup number size (eg. #8 gas cup start with 12 - 16 CFH) while flowing. If the shielding effect is not great enough, adjust up in increments of two until satisfactory.
- Once set, close the valve on the TIG torch to avoid wasting gas.
- When finished welding, the valve on the gas cylinder must be closed.

FIG. 20

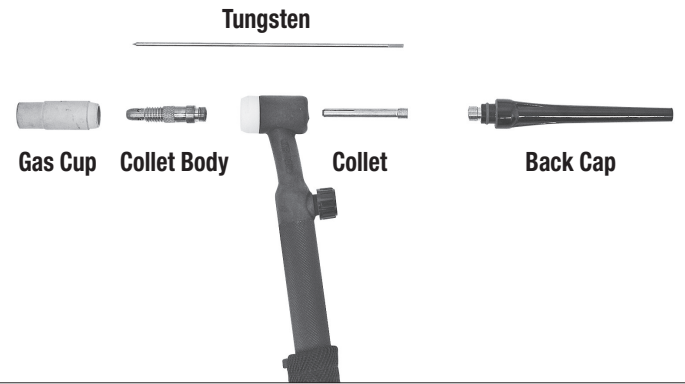
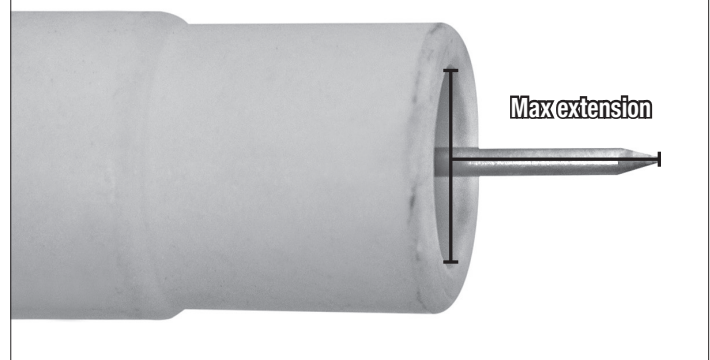


FIG. 21



FIG. 22



FILLER ROD SELECTION

The addition of a filler metal rod to the welding puddle is required for most joints. As with **TUNGSTEN SELECTION**, there are a variety of types and sizes available, and the rod must be suited for the material being welded.

- The most popular common rod for welding mild steel is ER70S-2 and stainless steel is ER308L. Specialty materials might require a different filler rod and TIG brazing will require a brazing specific silicon bronze rod.
- Generally, higher welding currents will require a larger filler rod. 1/16" diameter rod should be suitable for most welding with the MIG 160. If welding thin gauge steel at low amps, stainless steel exhaust pipe, or a particularly small weld bead is desired, stepping down to 0.045" or thinner is a good idea (in a pinch solid MIG wire can be straightened out and used). If you're maxing the output of this machine on thick plate, you might find stepping up to a 3/32" rod to work better.
- Rod that is too thick for your application will have a greater tendency to "stick" in the welding puddle and can reduce penetration due to the cooling effect it has on the weld puddle. If the rod is too thin you will have to feed it very fast, and the end might melt before reaching the weld puddle.

OPTIONAL FOOT PEDAL

A variable foot pedal is available as an accessory for use TIG welding (Eastwood #73881). The foot pedal enables you to adjust the amperage output in real time. This pedal works just like a car's throttle pedal: rocking your foot down will gradually increase the amperage output, all the way up to the user set limit, and letting off will gradually decrease to minimum output.

- To connect the foot pedal, plug the 5-pin plug into the Foot Pedal Connector [b].
- In **LIFT TIG** mode the foot pedal will automatically be recognized, as indicated by the foot pedal icon in the center of the screen.
- Set the welding amperage as you would normally. This will be the max. limit when the foot pedal is fully depressed.

TIG WELDING OPERATION

Set to **LIFT TIG** process, then use the **Primary Adjustment Knob** to set the amperage based on material thickness. The general rule of thumb for amperage is 1A for every 0.01" of material thickness (e.g. 0.050" start with 50A). If welding dissimilar thicknesses, you might need to split the difference and adjust technique to bias more heat in the thicker piece.

These instructions are intended only to provide the user with some familiarity of the MIG 160. TIG welding is a highly complex procedure with many variables. If you have no experience with TIG welding; it is extremely important to seek the advice of someone experienced in TIG welding for instruction, enroll in a local technical school welding course or study a comprehensive how-to video and obtain a good quality reference book on TIG welding as there is a moderate learning curve necessary before achieving proficiency in TIG Welding. Before attempting to use this unit on an actual project or object of value, practice on a similar material as there are many variables present and settings required when TIG welding different metals such as steel and stainless steel. It is also strongly recommended that the user adhere to the American Welding Society guidelines, codes and applications prior to producing welds where safety is affected.

TIG WELDING

DANGER ELECTRIC SHOCK CAN CAUSE INJURY OR DEATH!

- **Disconnect Welder from power supply before performing any assembly, disassembly, or maintenance of the Welder.**
- **Always wear dry, protective clothing and leather welding gloves and insulated footwear. Use suitable clothing made from durable flame-resistant material to protect your skin.**
- **Always operate the Welder in a clean, dry, well-ventilated area. Do not operate the Welder in humid, wet, rainy, or poorly ventilated areas.**
- **The electrode and work (or ground) circuits are electrically "hot" when the Welder is on. Do not allow these "hot" parts to come in contact with bare skin or wet clothing.**
- **Separate yourself from the welding circuit by using insulating mats to prevent contact from the work surface.**
- **Be sure that the work piece is properly supported and grounded prior to beginning an electric welding operation.**
- **Always attach the Ground Clamp to the piece to be welded and as close to the weld area as possible. This will give the least resistance and best weld.**

⚠ DANGER WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION!

- Electric welding produces sparks which can be discharged considerable distances at high velocity igniting flammable or exploding vapors and materials.
DO NOT operate electric arc Welder in areas where flammable or explosive vapors are present.
DO NOT use near combustible surfaces. Remove all flammable items from the work area where welding sparks can reach (minimum of 35 feet).
- Always keep a fire extinguisher nearby while welding.
- Use welding blankets to protect painted and or flammable surfaces, rubber weather-stripping, dash boards, engines, etc.

⚠ WARNING ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!

- The electromagnetic field that is generated during arc welding may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any electric welding operations.
- Exposure to the electromagnetic fields generated while welding may have other health effects which are not known.

⚠ WARNING ARC RAYS CAN INJURE EYES AND BURN!

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use a shield with the proper filter (a minimum of #11) to protect your eyes from sparks and the rays of the arc when welding or when observing open arc welding (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing (long pants, long sleeves, closed toe shoes, gloves) made from durable flame-resistant material for skin protection.

⚠ WARNING FUMES AND WELDING GASES CAN BE HEALTH HAZARD!

- Fumes and gases released during welding are hazardous. Do not breathe fumes that are produced by the welding operation.
- Prolonged inhalation of welding fumes above safety exposure limits can injure the lungs and other organs.
- Use enough ventilation and/or exhaust at the arc to keep fumes and gases from your breathing area.
- Use an OSHA approved respirator when welding in confined spaces or where there is inadequate ventilation.
- Never weld coated materials including but not limited to: cadmium plated, galvanized, lead based paints, powder coat.

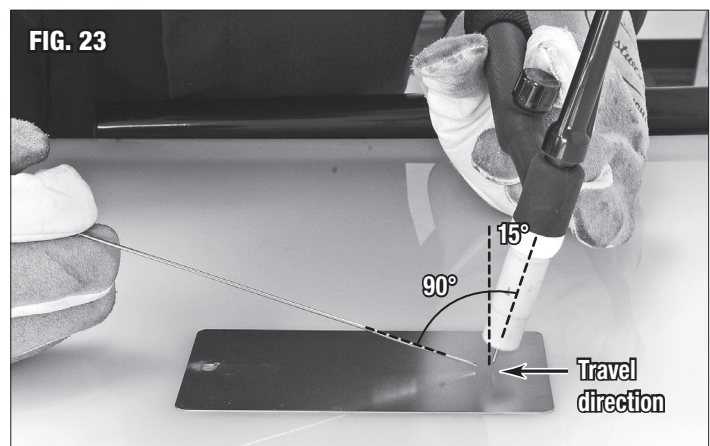
⚠ CAUTION HOT METAL AND TOOLS WILL BURN!

- Electric welding heats metal and tools to temperatures that will cause severe burns!
- Use protective, heat resistant gloves and clothing when using Eastwood or any other welding equipment. Never touch welded work surface, the welding torch tip, nozzle or tungsten until they have completely cooled.

- Turn the Power Switch at the Rear Panel to the **ON** position.
- Slowly open the gas cylinder valve.

NOTE: Always open valve fully to avoid shielding gas leakage.

- Grounding is very important, place the Ground Cable Clamp on a clean, bare area of your work piece as close to the welding area as possible to minimize the chance of shock. Scrape, wire brush, file or grind a bare area to achieve a good ground to assure safety.
- Use a dedicated stainless steel brush or flap-disc to clean the areas to be welded. To avoid contamination, do not use the brush or flap-disc for any other purpose.
- Although there is much room for personal style and job specific constraints, a good starting point is to hold the torch perpendicular and centered over the weld joint with a 15° tilt back so the tungsten tip is visible and pointing in the direction of travel (**FIG 23**). When welding, try to keep the distance between the tungsten tip and material equal to the tungsten's diameter. Avoid "dipping" the tungsten tip into the welding puddle because it will be contaminated, necessitating a clean break and sharpen.



- Make sure all your safety gear is in place (welding mask, welding gloves, non-flammable long sleeve apparel) and the area is completely free of flammable material.
- Open the gas valve on the TIG Torch by turning it counterclockwise. Lift start TIG means you will have to touch the tungsten to the workpiece then lift it off to start the welding arc, similar to stick welding. Lightly scratching the workpiece may help you start the arc.
- To stop welding, pull the torch up and away from the workpiece. Keep in mind that after welding you should pause to let the shielding gas flow over the tungsten and weld bead for approx. 5 - 10 seconds. Failure to do so will allow the tungsten and welded area to oxidize as they cool, compromising integrity. After cooling the TIG torch valve can be closed by turning it clockwise.
- We recommend starting without a filler metal rod and practicing “forming a puddle” in the workpiece a handful of times.
- Once comfortable, move on to “stacking dimes” by “forming a puddle” and moving the torch then pausing in a rhythm to create a series of overlapping puddles. You can do this on a single piece or fusion weld (a weld without using filler material) two pieces together.
- Constantly be aware that TIG welding quickly generates intense heat in the work piece and Torch. Severe burns can quickly occur by contacting hot metal pieces.
- The final challenge is integrating feeding of the filler metal rod. Again, this is a matter of personal preference and dictated by physical constraints, but practice with the rod at a 60° - 90° angle from the tungsten while welding (**FIG 23**). Dab a small amount of rod into the leading edge or center of the puddle when you pause for a dime. Too wide of an angle and you might melt or “blob” the rod end before it makes it to the welding puddle. Too shallow and it can be challenging to get the filler rod to the welding puddle before the arc cone melts it into the puddle which may compromise weld quality. Avoid hitting the tungsten tip with the filler rod because it will be contaminated, necessitating a clean break and sharpen.
- Most welders feed filler by pinching the rod between their thumb and hand, feeding between the index and middle finger. Alternatively, a rod feeding pen (Eastwood #33996) will substitute for some technique.
- When finished, switch the welder **OFF**, close the valve in the Torch Handle then close the shielding gas cylinder valve completely.

TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Welder Will Not Power Up	Welder Not Plugged Into Proper Power Supply	Check power supply. The Rockwood MIG 160 requires a properly grounded, 240 Volt AC, 50 Amp power supply or a properly grounded 120 Volt AC, 20 Amp power supply.
	Facility Power Source Breaker Tripped	Reset breaker.
	Power Switch Not Fully On	Check that Power Switch is fully ON .
	Duty Cycle Exceeded	Allow the Welder to cool for a minimum of 15 minutes before attempting to use again.
Digital Displays Show: ERR -02-	Unit Overheated and Went Into Thermal Protection Mode	Allow the Welder to cool for a minimum of 15 minutes or until the error display goes out. If error is still flashing after 15 minutes, restart the welder.
Digital Displays Show: ERR -03-	Wire Feeding Malfunction	Contact Eastwood Technical Assistance at 800-343-9353 or help@eastwood.com .
Digital display shows: ERR -01-	Output Current Limit Exceeded	Restart machine and check if issue persists. Contact Eastwood Technical Assistance at 800-343-9353 or help@eastwood.com .
Digital display shows: ERR -04-	Internal Circuit Board Communication Failure	Restart machine and check if issue persists. Contact Eastwood Technical Assistance at 800-343-9353 or help@eastwood.com .

MIG WELDING TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Wire Will Not Feed	Mode Not Set to MIG	Press the Mode Selection button until it cycles to a MIG mode.
	Drive Motor Wire Tension is Insufficient, Allowing Wire Slippage	Tighten drive roller tensioner.
	Duty Cycle Exceeded	Allow the Welder to cool for a minimum of 15 minutes before attempting to use again.
Wire Burning Back to Contact Tip	Drive Motor Wire Tension is Insufficient, Allowing Wire Slippage	Tighten drive roller tensioner.
	Voltage Offset Too Great	Turn Secondary Adjustment Knob counterclockwise to decrease voltage offset.
	Wire Stick Out from End of Contact Tip Too Short	Cut wire stick out to at least 1/4".
Welder Will Not Produce an Arc	Ground Cable not Attached to Metal Being Welded	Attach ground clamp to metal being welded.
	Ground Clamp Attached to a Contaminated or Rusty Workpiece	Prepare a thoroughly cleaned spot for the ground clamp.
	Ground Cable Connector not Fully Secured to Welder Terminal	Check Ground Clamp connection at Welder for tight connection.
	Wrong Ground Clamp from Another Device is Attached to Workpiece	Check that the correct welding ground from Welder being used is attached to the work piece.
	MIG Gun Contact Tip is Excessively Worn	Replace MIG Gun contact tip.

PROBLEM	CAUSE	CORRECTION
Intermittent Welding Arc	Incorrect Input Voltage	Check power supply. The Rockwood MIG 160 requires a properly grounded, 240 Volt AC, 50 Amp power supply or a properly grounded 120 Volt AC, 20 Amp power supply.
	Wrong Size Drive Roller Groove	Check Drive Roller size and install Drive Roller as required to match wire size being run. See DRIVE ROLLER under MIG WELDING SET-UP for more details.
	Poor Ground	Prepare a thoroughly cleaned spot for the ground clamp.
		Check condition of ground clamp and clean clamping surfaces if necessary.
		Check ground clamp attachment at Welder for tight connection.
	Wire Slipping on Drive Roller	Tight drive roller tensioner.
	Wrong Size or Worn Contact Tip	Replace the contact tip for one of the correct size or new condition.
Welder Digital Display Shows ERR-02 and Will Not Function	Duty Cycle Exceeded	Allow the Welder to cool for a minimum of 15 minutes before attempting to use again.
Wire Binding Up Ahead of Drive Roller	Wire Tension Set Too High	Loosen Drive Roller Wire Tensioner.
Burn Through	Welder Set Too "Hot" or Voltage Offset Too Great	Turn welder output to a lower setting or turn Secondary Adjustment Knob counterclockwise to decrease voltage offset.
	Slow MIG Gun travel	Increase your travel speed with the MIG Gun.
Lack of Penetration	Low Voltage and Wire Speed	Adjust output, or just voltage offset, to a higher setting.
	Fast MIG Gun travel	Slow your travel speed of the MIG Gun making sure to pull or drag the molten metal puddle.
	Excessive Wire Protruding	Move the contact tip on the MIG Gun closer to the work piece to shorten the length of exposed wire.
	Material Too Thick	The MIG 160 is rated for a maximum thickness of 1/4". Exceeding this may result in poor penetration.
	Poor Material Preparation	If welding heavy gauge metals, it may be necessary to increase the welding gap between the two pieces and also bevel the edges on the weld side of the pieces.
Excessive Penetration	High Voltage and Wire Speed	Adjust output, or just voltage offset, to a lower setting.
	Slow MIG Gun travel	Increase your travel speed with the MIG Gun.
Warping	Lack of Tack Welds	Tack weld the pieces in multiple areas to keep the pieces from pulling apart.
	No Clamping	Use welding clamps to secure the pieces in the proper shape.
	Poor Technique	To prevent warping, allow the workpiece to cool after welding small sections at a time. Move to another section to spread out the heat in the piece.

STICK WELDING TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Electrode Sticking	Arc Too Short	While welding, keep the ignited end of the electrode further from the weld joint.
	Current Too Low	Adjust the current on the front of the welder to a higher current setting.
Holes in Weld Bead (Porosity)	Arc Too Long	While welding, keep the ignited end of the electrode closer to the weld joint.
	Moisture in Electrode	Replace electrode with a new one.
Excessive Spatter	Arc Too Long	While welding, keep the ignited end of the electrode closer to the weld joint.
	Current Too High	Adjust the current on the front of the welder to a lower current setting.
Poor Penetration	Poor Joint Preparation	Clean the weld joint of any dirt, grease, paint or other possible contaminants. If the pieces being welded are of a heavy gauge it may be necessary to bevel the edges of the pieces.
	Current Too Low	Adjust the current on the front of the welder to a higher current setting.
	Travel Speed Too Fast	Slow down the travel speed of the electrode while welding.
Welder Digital Display Shows ERR-02 and Will Not Function	Duty Cycle Exceeded	Allow the Welder to cool for a minimum of 15 minutes before attempting to use again.

TIG WELDING TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Arc Will Not Strike	Incomplete Circuit	Check Ground connection. Make sure that the ground is on a freshly cleaned surface and close to the welding area.
	Incorrect Tungsten	Consult TUNGSTEN SELECTION or welding handbook.
	Wrong Polarity	Make sure polarity is set correctly. TIG welding is done with the electrode negative. See TIG WELDING SET-UP .
Arc Wanders and it is Hard to Concentrate Heat in a Specific Area	Poorly Prepped Tungsten	See TUNGSTEN SHARPENING .
	Poor Gas Flow	Adjust the flow rate of the shielding gas (see TIG SHIELDING GAS FLOW ADJUSTMENT). Check for loose fittings where gas could be leaking.
	Contaminated Tungsten	Remove tungsten from torch, cleanly break off contaminated section, and resharpen.
	Incorrect Arc Length	Try to keep the distance between the tungsten tip and material equal to the tungsten's diameter.
	Incomplete Circuit	Check Ground connection. Make sure that the ground is on a freshly cleaned surface and close to the welding area.
	Contaminated Base Metal	Clean base metal to bare, shiny metal making sure to wipe away any oil, debris, coatings, or moisture.

PROBLEM	CAUSE	CORRECTION
Porosity in Weld Bead	Poor Gas Flow	Check for loose fittings where gas could be leaking. Adjust the flow rate of the shielding gas. The general rule of thumb is to set gas flow in CFH at 1.5 - 2 times the cup number size (eg. #8 gas cup start with 12 - 16 CFH) while flowing.
	Contaminated Filler Metal	Clean filler metal making sure to wipe away any oil, debris, or moisture.
	Contaminated Base Metal	Clean base metal to bare, shiny metal making sure to wipe away any oil, debris, coatings, or moisture.
	Poor Shielding Gas Coverage	Make sure to be in an area with no wind and with any fans turned off. Wind or fans will blow the shielding gas away from the weld causing porosity.
	Incorrect Tungsten "Stick Out"	The general rule of thumb for tungsten "stick out" distance is to not extend further than the inner diameter of the Gas Cup (FIG 22).
Contamination in Weld Bead	Contaminated Tungsten	Remove tungsten from torch, cleanly break off contaminated section, and sharpen.
	Contaminated Filler Metal	Clean filler metal making sure to wipe away any oil, debris, or moisture.
	Contaminated Base Metal	Clean base metal to bare, shiny metal making sure to remove any oil, debris, coatings, or moisture. If base metal is cold rolled steel, make sure to remove any mill scale.
Melting Tungsten	Poor Gas Flow	Check for loose fittings where gas could be leaking. Adjust the flow rate of the shielding gas. The general rule of thumb is to set gas flow in CFH at 1.5 - 2 times the cup number size (eg. #8 gas cup start with 12 - 16 CFH) while flowing.
	Wrong Polarity	Make sure polarity is set correctly. TIG welding is done with the electrode negative. See TIG WELDING SET-UP .
	Wrong Tungsten Too Small	Increase tungsten diameter.
	Incorrect Shielding Gas	Only use 100% Argon when TIG Welding.
Poor Penetration	Low Amperage	Amperage setting is too low for material/thickness. The general rule of thumb for amperage is 1A for every 0.01" of material thickness (e.g. 0.050" start with 50A). If welding dissimilar thicknesses, you might need to split the difference and adjust technique to bias more heat in the thicker piece.
Tungsten Contaminated	Contact of Tungsten with Base Metal or Filler Metal	If tungsten comes in contact with the base material or filler rod, cleanly break off the end and sharpen immediately.
Poor Weld Appearance	Incorrect Positioning	The angle between the filler metal and the torch should be less than 90° otherwise the filler metal may prematurely melt and glob off, causing poor weld quality.
Crater in the End of the Weld Bead	Insufficient Shielding Effect	Keep the torch on the base metal while the post flow shielding gas flows to protect and cool the metal and tungsten.
	Not Enough Filler Material or Heat Saturation	Reduce add more filler at end of weld and "back step" the torch 1/4" - 1/2" to reduce the chances of making a crater.
Weld Bead is Cracking	Too Much Heat in Material	Reduce heat and allow more time between passes.
	Base Metal is Absorbing Too Much Heat	Some metals may require preheat of the base metal (consult welding codes for requirements).
	Incorrect Filler Rod	Use appropriate filler rod type and diameter for the joint being welded.
Material is Warping	Insufficient Clamping	Clamp work piece tightly and weld while clamps are in place.
	Insufficient Tack Welds	Add more tack welds until rigidity and stiffness is developed.
	Too Much Heat in Material	To reduce heat, it is best to spread the welding out around the area. This can be done by using stitch welding techniques, alternating sides, and/or taking your time and allowing the pieces to cool between passes.

[illegible]

CONSUMABLES

FLUX CORE WIRE

#23022 / 23025	0.023" Solid MIG Wire (4" / 8") Spool
#23023 / 23036	0.030" Solid MIG Wire (4" / 8") Spool
#23024 / 23027	0.035" Solid MIG Wire (4" / 8") Spool
#23028	0.030" Flux Core Wire 4" Spool
#66646	0.035" Flux Core Wire 4" Spool

MIG GUN CONSUMABLE ITEMS

#12211	0.023" Contact Tips (5 Pack)
#12224	0.030" Contact Tips (5 Pack)
#20412	0.035" Contact Tips (5 Pack)
#21204	Nozzle (2 Pack)
#21203	MIG Consumables Kit

STICK WELDING ELECTRODES

#19001	E6013 Electrode 1/16" x 14" x 3 lb
#59121	E6013 Electrode 1/16" x 14" x 5 lb
#59120	E6013 Electrode 1/8" x 14" x 10 lb
#59119	E6013 Electrode 1/8" x 14" x 5 lb
#59117	E6013 Electrode 3/32" x 14" x 5 lb
#59114	E6013 Electrode 5/64" x 14" x 5 lb
#59112	E7018 Electrode 1/8" x 14" x 5 lb
#59111	E7018 Electrode 3/16" x 14" x 5 lb
#59110	E7018 Electrode 3/32" x 14" x 10 lb
#59109	E7018 Electrode 3/32" x 14" x 5 lb
#59107	E7018 Electrode 5/32" x 14" x 5 lb

TIG TUNGSTEN & FILLER ROD

#33331 / 33333	1/16" Multi-Mix Tungsten (3 Pack / 10 Pack)
#33332 / 33334	3/32" Multi-Mix Tungsten (3 Pack / 10 Pack)
#33337 / 33340	0.045" ER70S-2 Filler Rod (1lb / 10lb)
#33338 / 33341	1/16" ER70S-2 Filler Rod (1lb / 10lb)
#33339 / 33342	3/32" ER70S-2 Filler Rod (1lb / 10lb)
#33347 / 33349	1/16" ER308L Filler Rod (1lb / 10lb)
#33348 / 33350	3/32" ER308L Filler Rod (1lb / 10lb)
#33335	1/16" Silicon Bronze Filler Rod 1lb
#33336	3/32" Silicon Bronze Filler Rod 1lb

TIG TORCH CONSUMABLE ITEMS

#13953	Standard TIG Consumables Kit
#20284	#6/8 Gas Lens Components Kit
#20652	#10/12 Gas Lens Components Kit
#20653	TIG Torch #6 "Gas Lens-Style" Gas Cup 10 Pack
#20654	TIG Torch #8 "Gas Lens-Style" Gas Cup 10 Pack
#20655	TIG Torch #10 "Gas Lens-Style" Gas Cup 10 Pack
#12824	3/32" Collet
#12825	Long Back Cap

Visit eastwood.com for complete info and pricing.

ADDITIONAL ITEMS

R&D MUST-HAVE ACCESSORIES



#33243
Eastwood Valved TIG Torch



#12238
Gas Regulator



#98110
Eastwood HotCoat® PCS-250 and
Benchtop Oven Kit

OPTIONAL ITEMS

- | | |
|-----------------------|--|
| #60278 | MIG Welders Pliers |
| #55070 / 55071 | Leather MIG Welding Gloves (M / L) |
| #55068 / 55068 | Leather TIG Welding Gloves (M / L) |
| #12762 | L, XL, XXL Cotton Welding Jacket |
| #55065 | L, XL, XXL Leather Welding Jacket |
| #21484 | XL View Auto Darkening Welding Helmet |
| #21483 | Large View Auto Darkening Welding Helmet |
| #12418 | Stainless Steel Wire Brush |
| #33307 | TG1800 Tungsten Grinder |
| #58878 | TG2000 Cordless Tungsten Grinder |
| #20640 | 10' Long Ground Cable Extension |
| #31739 | 25' Long 110V Heavy Duty Welder Extension Cord |
| #20029 | 25' Long 220V Heavy Duty Welder Extension Cord |
| #20285 | 40' Long 220V Heavy Duty Welder Extension Cord |

Visit eastwood.com for complete info and pricing.

If you have any questions about the use of this product, please contact

The Eastwood Technical Assistance Service Department: 800.343.9353 >> email: tech@eastwood.com

PDF version of this manual is available at eastwood.com

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