



OM-235241G

2020-05

Processes



TIG (GTAW) Welding

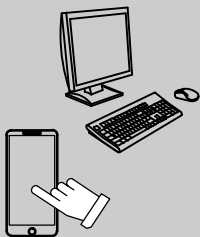
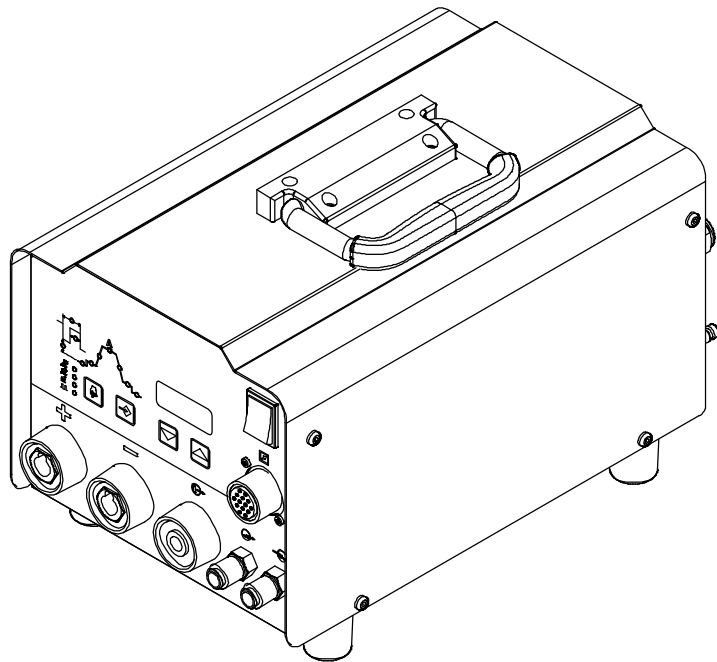


Stick (SMAW) Welding

Description



HF 5000 CE



For product information,
Owner's Manual translations,
and more, visit

www.MillerWelds.com

OWNER'S MANUAL

From Miller to You

Thank you and congratulations on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety Precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller, you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is, and our extensive service network is there to help fix the problem. Warranty and maintenance information for your particular model are also provided.



Miller Electric manufactures a full line of welders and welding-related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets.



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

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DECLARATION OF CONFORMITY

for European Community (CE marked) products.

ITW Welding Products B.V. Edisonstraat 10, 3261 LD Oud-Beijerland, Netherlands, declares that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Council Directive(s) and Standard(s).

Product/Apparatus Identification:

Product	Stock Number
HF 5000	V29012345

Council Directives:

- 2014/35/EU Low Voltage
- 2014/30/EU Electromagnetic Compatibility
- 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment

Standards:

- IEC 60974-1:2012 Arc Welding Equipment – Part 1: Welding Power Sources
- IEC 60974-3:2013 Arc Welding Equipment – Part 3: Arc striking and stabilizing devices
- IEC 60974-10:2014+A1:2015 Arc Welding Equipment – Part 10: Electromagnetic Compatibility Requirements

EU Signatory:

Pieter Keultjes

November 4th, 2019

Date of Declaration

Equipment Technical Manager - EMEAR

956172366

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

som 2020-02

⚠ Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

1-1. Symbol Usage



DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

 Indicates special instructions.



This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid these hazards.

1-2. Arc Welding Hazards



The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Principal Safety Standards listed in Section 1-5. Read and follow all Safety Standards.



Only qualified persons should install, operate, maintain, and repair this equipment. A qualified person is defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project and has received safety training to recognize and avoid the hazards involved.



During operation, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.

- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC weld output in damp, wet, or confined spaces, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).

- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring – replace immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or repaired cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process not in use.
- Use GFCI protection when operating auxiliary equipment in damp or wet locations.

SIGNIFICANT DC VOLTAGE exists in inverter welding power sources AFTER removal of input power.

- Turn off unit, disconnect input power, and discharge input capacitors according to instructions in Manual before touching any parts.



HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- Ventilate the work area and/or use local forced ventilation at the arc to remove welding fumes and gases. The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear body protection made from durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.

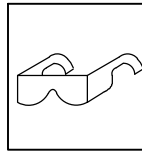


WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.

- Do not cut or weld on tire rims or wheels. Tires can explode if heated. Repaired rims and wheels can fail. See OSHA 29 CFR 1910.177 listed in Safety Standards.
- Do not weld on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 and AWS A6.0 (see Safety Standards).
- Do not weld where the atmosphere can contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear body protection made from durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



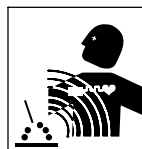
FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



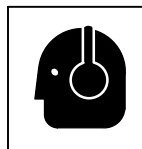
BUILDUP OF GAS can injure or kill.

- Shut off compressed gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



CYLINDERS can explode if damaged.

Compressed gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.

- Never weld on a pressurized cylinder – explosion will result.
- Use only correct compressed gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve. Do not stand in front of or behind the regulator when opening the valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the proper equipment, correct procedures, and sufficient number of persons to lift, move, and transport cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

1-3. Additional Hazards For Installation, Operation, And Maintenance



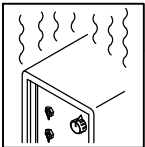
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



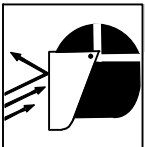
FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use correct procedures and equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94-110) when manually lifting heavy parts or equipment.



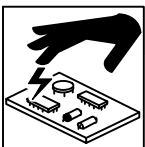
OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



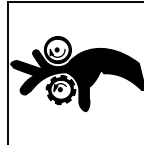
FLYING SPARKS can injure.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



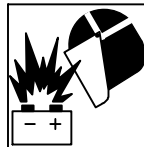
MOVING PARTS can injure.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



WELDING WIRE can injure.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



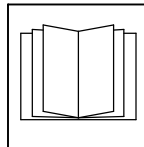
BATTERY EXPLOSION can injure.

- Do not use welder to charge batteries or jump start vehicles unless it has a battery charging feature designed for this purpose.



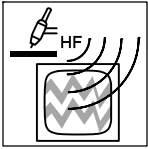
MOVING PARTS can injure.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.



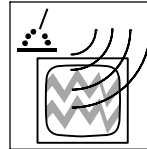
READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform installation, maintenance, and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

⚠ WARNING: This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: www.aws.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1 from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1 from Global Engineering Documents. Website: www.global.ihs.com.

Safe Practices for Welding and Cutting Containers that have Held Combustibles, American Welding Society Standard AWS A6.0 from Global Engineering Documents. Website: www.global.ihs.com.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org and www.sparky.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: www.nfpa.org.

OSHA *Occupational Safety and Health Standards for General Industry*, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

OSHA *Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: www.osha.gov.

Applications Manual for the Revised NIOSH Lifting Equation from the National Institute for Occupational Safety and Health (NIOSH). Website: www.cdc.gov/NIOSH.

1-6. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields can interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passers-by or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.


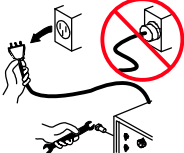

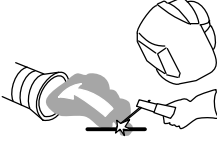
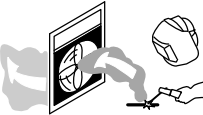
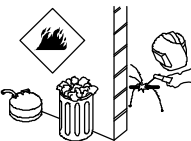


4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.



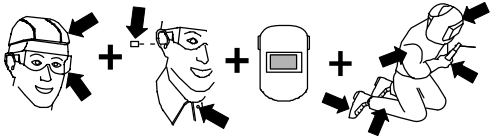
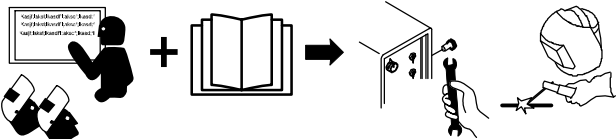
About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.









SECTION 2 – DEFINITIONS









2-1. Additional Safety Symbols And Definitions






	<p>Warning! Watch Out! There are possible hazards as shown by the symbols.</p> <p style="text-align: right;">Safe1 2012-05</p>
	<p>Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.</p> <p style="text-align: right;">Safe2 2017-04</p>
	<p>Protect yourself from electric shock by insulating yourself from work and ground.</p> <p style="text-align: right;">Safe3 2017-04</p>
	<p>Disconnect input plug or power before working on machine.</p> <p style="text-align: right;">Safe5 2017-04</p>
	<p>Keep your head out of the fumes.</p> <p style="text-align: right;">Safe6 2017-04</p>
	<p>Use forced ventilation or local exhaust to remove the fumes.</p> <p style="text-align: right;">Safe8 2012-05</p>
	<p>Use ventilating fan to remove fumes.</p> <p style="text-align: right;">Safe10 2012-05</p>
	<p>Keep flammables away from welding. Do not weld near flammables.</p> <p style="text-align: right;">Safe12 2012-05</p>
	<p>Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.</p> <p style="text-align: right;">Safe14 2012-05</p>
	<p>Do not remove or paint over (cover) the label.</p> <p style="text-align: right;">Safe20 2017-04</p>

	<p>Do not weld on drums or any closed containers.</p> <p style="text-align: right;">Safe16 2017-04</p>
	<p>Do not discard product (where applicable) with general waste. Reuse or recycle Waste Electrical and Electronic Equipment (WEEE) by disposing at a designated collection facility. Contact your local recycling office or your local distributor for further information.</p> <p style="text-align: right;">Safe37 2017-04</p>
	<p>Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.</p> <p style="text-align: right;">Safe38 2012-05</p>
	<p>Become trained and read the instructions before working on the machine or welding.</p> <p style="text-align: right;">Safe40 2012-05</p>

2-2. Miscellaneous Symbols And Definitions

A	Amperes
V	Volts
	Alternating Current
	Protective Earth (Ground)
	Remote
I	On
O	Off
	Single Phase
	Line Connection
	Water (Coolant) Input
	Water (Coolant) Output
	Voltage Input

	Increase
	Decrease
	HF Start (TIG)
	Remote Standard (2T Trigger Mode)
	Remote (4T Trigger Mode)
	Lift-Arc (TIG)
	Gas Tungsten Arc Welding (GTAW)
	Shielded Metal Arc Welding (SMAW)
I₁	Primary Current
U₁	Primary Voltage
1max	Rated Maximum Supply Current
1eff	Maximum Effective Supply Current

I₂	Rated Welding Current
U_p	Voltage Peak
	Suitable For Areas Of Increased Shock Hazard
	Set-Up
X	Duty Cycle
IP	Degree Of Protection
	Circuit Breakers
%	Percent
	Pulse
Hz	Hertz
	Read Instructions

SECTION 3 – SPECIFICATIONS

3-1. Serial Number And Rating Label Location

The serial number and rating information for this product is located on the rear panel. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on cover of this manual.

3-2. Software Licensing Agreement

The End User License Agreement and any third-party notices and terms and conditions pertaining to third-party software can be found at <https://www.millerwelds.com/eula> and are incorporated by reference herein.

3-3. Information About Default Weld Parameters And Settings

NOTICE – Each welding application is unique. Although certain Miller Electric products are designed to determine and default to certain typical welding parameters and settings based upon specific and relatively limited application variables input by the end user, such default settings are for reference purposes only; and final weld results can be affected by other variables and application-specific circumstances. The appropriateness of all parameters and settings should be evaluated and modified by the end user as necessary based upon application-specific requirements. The end user is solely responsible for selection and coordination of appropriate equipment, adoption or adjustment of default weld parameters and settings, and ultimate quality and durability of all resultant welds. Miller Electric expressly disclaims any and all implied warranties including any implied warranty of fitness for a particular purpose.

3-4. Specifications

Type Of Input Power	Welding Power Source Type	Welding Voltage Range	Welding Current Range	Rated Welding Output	Overall Dimensions	Weight
115 Volts AC Single-Phase 500mA 50/60 Hz	XMT 350/304/456 And Standard Constant Current Welding Power Source	10-95 V	5-450 A	400 A @ 34 VDC, 100% Duty Cycle	Length: 420 mm Width: 250 mm Height: 265mm	13 Kg


3-5. Environmental Specifications

A. IP Rating

IP Rating
IP23 This equipment is designed for outdoor use.

IP23 2017-02

B. Information On Electromagnetic Compatibility (EMC)

 This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances.
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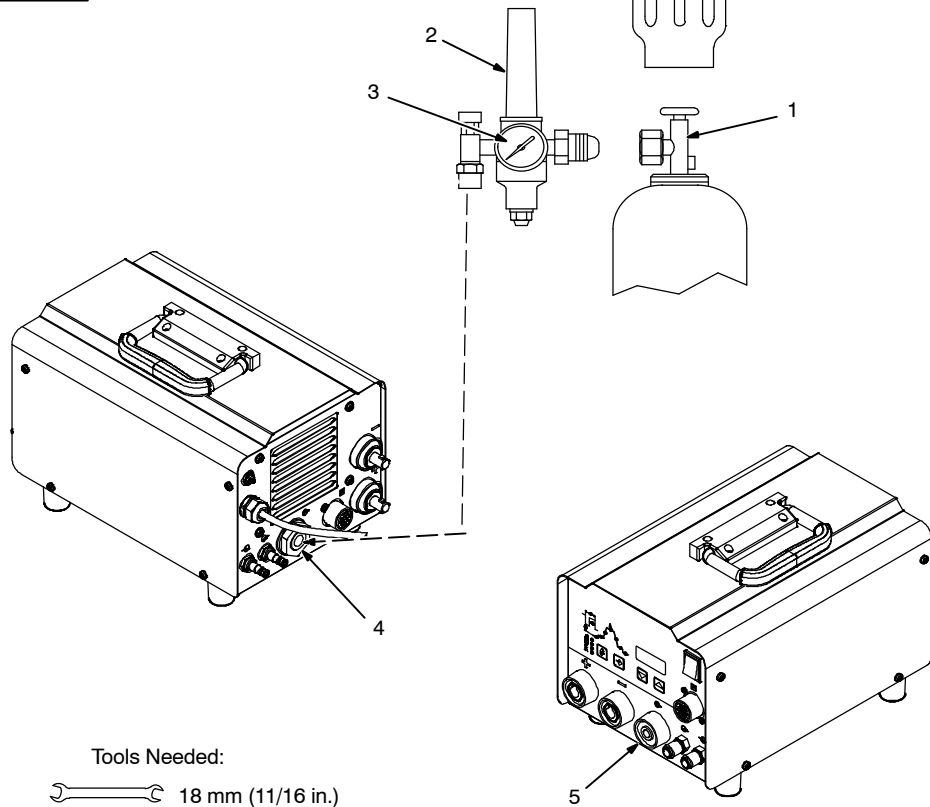
ce-emc 3 2014-07

C. Temperature Specifications

Operating Temperature Range	Storage Temperature Range
-10°C to 40°C (-14°F to 104 °F) *Output is derated at temperatures above 40°C (104°F).	-20°C to 55°C (-4°F to 131 °F)

Temp_2016-07

4-2. Installing Gas Supply



⚠ Turn off HF unit before making gas connections

1 Cylinder valve

Remove cap, stand to side of valve, and open valve slightly. Gas flow blows dust and dirt from valve. Close valve.

2 Regulator/Flowmeter

Install so face is vertical.

3 Flow Adjust

Typical flow rate is 15 CFH (cubic feet per hour) (4.5 L/hr).

Make sure flow adjust is closed when opening cylinder to avoid damage to the flowmeter.

4 Gas Input Fitting

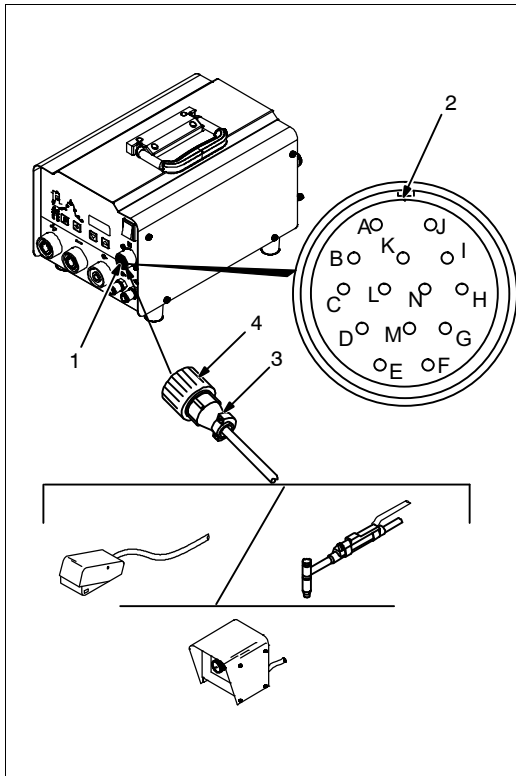
Connect hose from shielding gas supply regulator/flowmeter to gas in fitting. Fitting has 5/8-18 right-hand threads.

5 Gas Output Fitting

Connect shielding gas hose from torch to gas out fitting. Fitting has 3/8-19 BSPP right-hand threads.

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4-3. Connecting Remote Control



⚠ Turn Off HF Unit and welding power source, and disconnect input power before making connections. Stop engine on welding generators.

1. Remote 14 Receptacle

2. Keyway

3. Plug

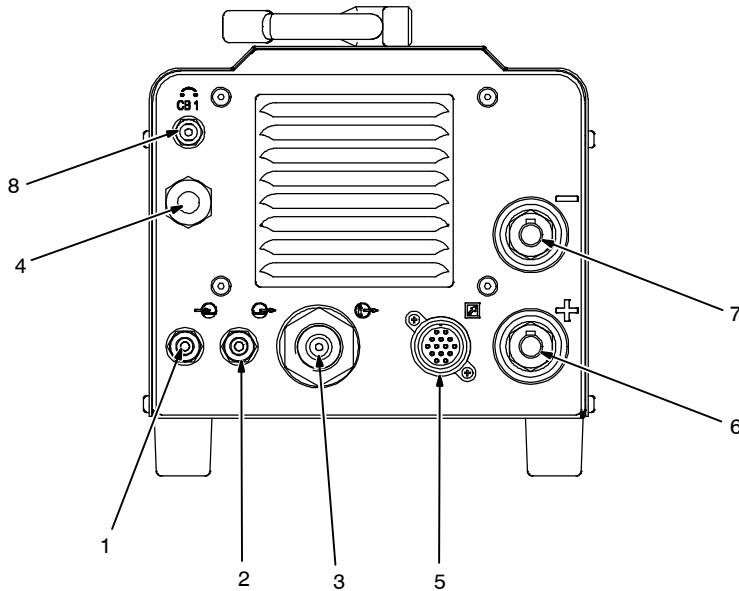
4. Threaded Collar

To connect to receptacle, align keyway, insert plug, and tighten threaded collar.

REMOTE 14	Socket*	Socket Information
OUTPUT (CONTACTOR)	A	Remote control circuit common.
	B	Contact closure to A completes trigger control circuit.
A AMPERAGE	C	0 to +10 volts DC output to remote control.
	D	Remote control circuit common.
	E	0 to +10 volts DC input command signal from remote control.

*The remaining sockets are not used.

4-4. Rear Panel Receptacle Information



⚠ Turn off power before making connections.

⚠ Do not use worn, damaged, undersized, or repaired cables.

1 Coolant Out Connection

Connect coolant return hose to coolant out fitting.

2 Coolant In Connection

Connect coolant supply hose to coolant in fitting.

3 Gas Input Connector

Connect gas supply hose to gas input fitting (see Section 4-2).

4 115 V Input Power Cord

5 14-Pin Receptacle

Make connections between receptacle and matching receptacle on welding power source.

6 Positive (+) Input Receptacle

Connect cable from positive weld output terminal of welding power source.

7 Negative (-) Input Receptacle

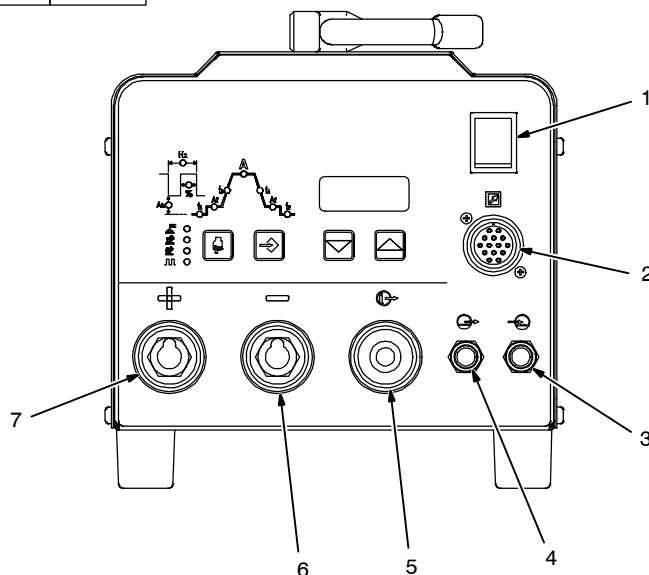
Connect cable from negative weld output terminal of welding power source.

8 Supplementary Protector CB1

CB1 protects unit from overload.

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4-5. Front Panel Receptacle Information



⚠ Turn off power before making connections.

⚠ Do not use worn, damaged, undersized, or repaired cables.

1 On/Off Switch

Use switch to turn unit on and off.

2 Remote 14-Pin Receptacle

Make connections according to Section 4-3.

3 Coolant In Connection

Connect torch return hose to coolant in fitting.

4 Coolant Out Connection

Connect torch supply hose to coolant out fitting.

5 Gas Out Connection (See Section 4-2)

Connect torch supply hose to gas out fitting.

6 Negative (-) Output Receptacle

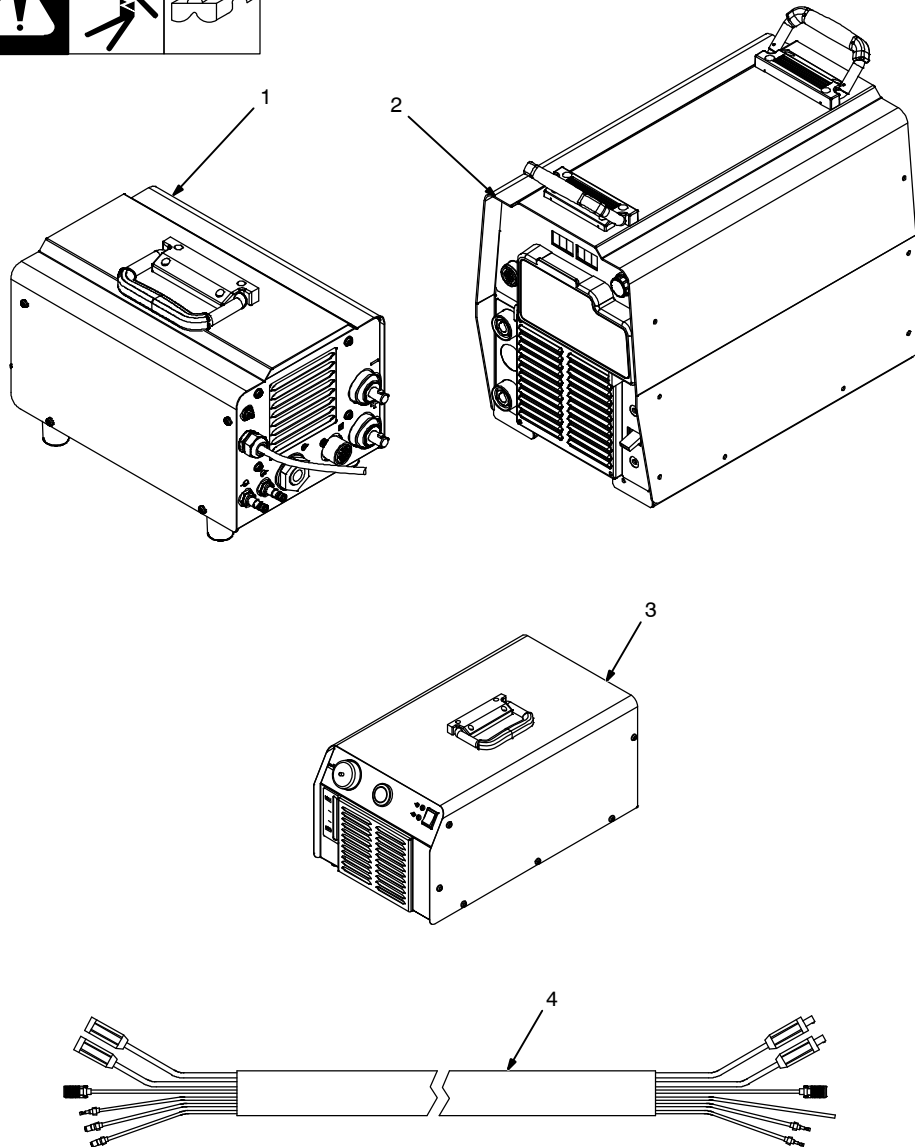
Connect TIG torch when TIG welding, or work cable when Stick welding.

7 Positive (+) Output Receptacle

Connect work cable when TIG welding, or electrode holder when Stick welding.

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4-6. Typical Connection To Power Source



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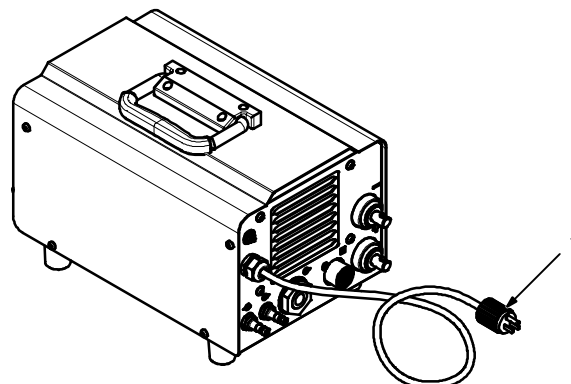
- 1 HF 5000
- 2 Welding Power Source
- 3 Cooling System
- 4 Typical Interconnecting Cable

⚠ Size power cables within the interconnecting cable for the required welding current and duty cycle (see Section 4-1). See welding power source Owner's Manual, and following all applicable codes when selecting cable sizes.

Make interconnecting cable connections as follows:

- Connect negative weld cable to negative weld receptacle on power supply
- Connect negative weld cable to negative weld terminal on unit
- Connect positive weld cable to positive weld receptacle on power supply
- Connect positive weld cable to positive weld terminal on unit
- Connect 14-pin plug to 14-pin receptacle on power supply.
- Connect 14-pin plug to 14-pin receptacle on rear panel of unit.
- Connect gas supply hose to gas supply. See section 4-2.
- Connect gas supply hose to gas in connection. See section 4-4.
- Connect coolant supply hose to coolant out fitting on coolant recirculating system.
- Connect coolant supply hose to coolant in fitting on unit.
- Connect coolant return hose to coolant in fitting on coolant recirculating system.
- Connect coolant return hose to coolant out fitting on unit.

4-7. Input Power Connection



⚠ Read and follow entire Section 8 about HF equipment before installing unit.

⚠ Turn Off HF Unit and welding power source, and disconnect input power before making connections.

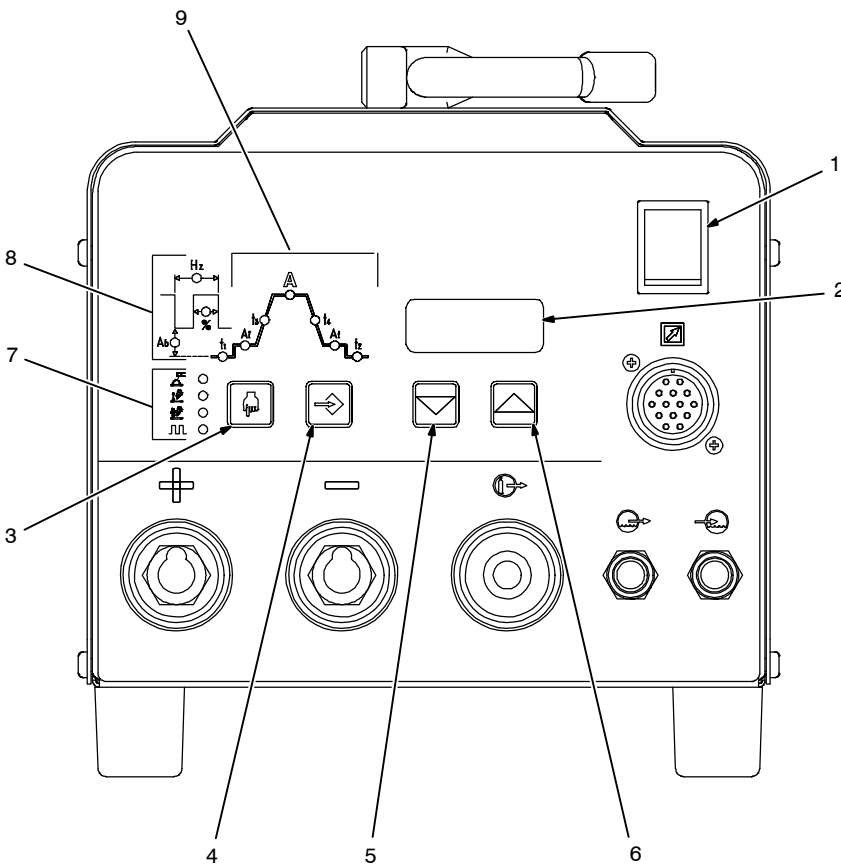
- 1 Input Power Cord

Connect unit to a 115 VAC receptacle.

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SECTION 5 – OPERATION

5-1. Front Panel Controls



1 Power (On/Off) Switch

Use switch to turn unit on/off. Upon power up, unit will recall and display the last welding procedure, or factory default procedure.

The display on the unit will show STCK if Stick was selected last.

The display on the unit will show 2T or 4T if TIG welding.

2T or 4T trigger mode will display based on last selection.

STCK, 2T, and/or 4T will display for 5 seconds, and then display preset amperage.

2 Ammeter And Parameter Display

Displays actual amperage while welding. Meter also displays preset parameters for any of the following variables: time, frequency function, setup.

3 Process Control Adjust

Use control to select welding process and light corresponding LED. Control is also used for initial setup, memory setting, and recalling factory parameters.

4 Setup Control

Use control to change selected parameter, as indicated by lit LED, for either the Standard TIG or TIG Pulse process.

5 Decrease Control

Use control to reduce value shown on display.

6 Increase Control

Use control to increase value shown on display.

7 Process Indicator LEDs

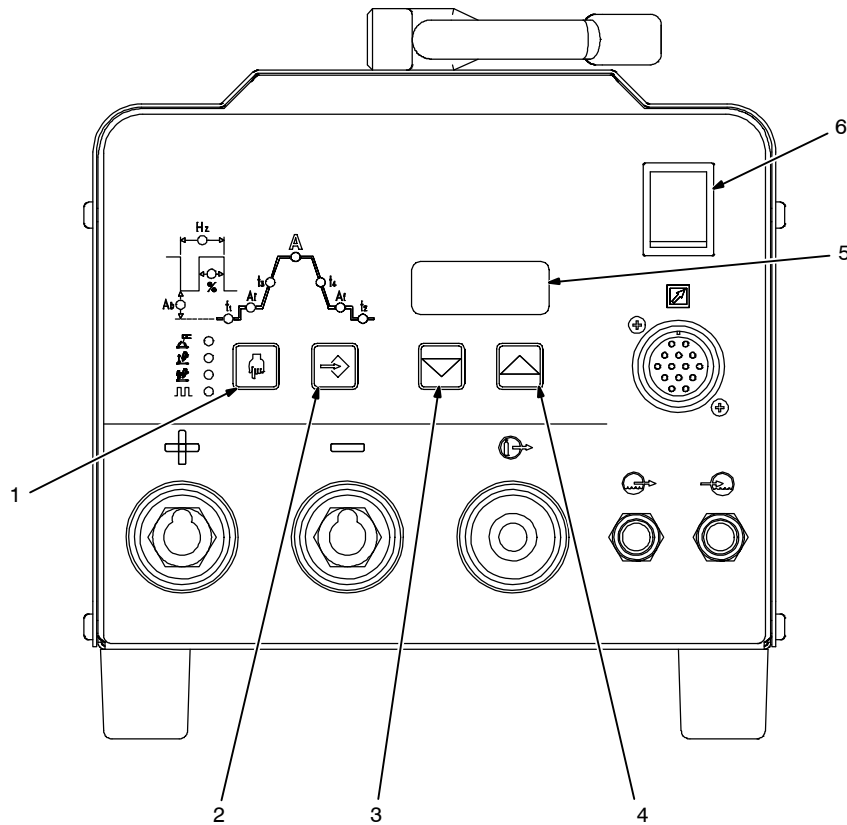
LEDs show the selected welding process.

8 Pulse Parameter Indicator LEDs

9 Sequence Indicator LEDs

LEDs show the TIG parameter selected.

5-2. Initial Setup



- 1 Process Control Adjust
- 2 Setup Control
- 3 Decrease Control
- 4 Increase Control
- 5 Ammeter And Parameter Display
- 6 Power Switch

To enter Initial Setup, turn power off. Press and hold Increase and Decrease controls and turn power on. Continue to hold Increase and Decrease controls until software version clears display, and display begins to flash, release Increase and Decrease controls.

Upon power up TIG HF and Pulse LEDs turn on, and the factory default of 400 flashes on the display.

Press the Setup control to scroll through the following: power source current range, current reading display, and TIG starting current.

Setting Power Source Current Range:

Setting Maximum Amperage – While display is flashing, press the Increase and decrease controls until amperage shown on display matches the maximum value of the welding power source (see welding power source Owner's Manual). Maximum amperage range is 200 to 600 amps, with 400 amps being the default.

Press Setup control to confirm setting and continue Initial Setup.

Setting Minimum Amperage – While display is flashing, press the Increase and decrease controls until amperage shown on display matches the minimum value of the welding power source (see welding power source Owner's Manual). Minimum amperage range is 5 to 200 amps, with 20 amps being the default.

Press Setup control to confirm setting and continue Initial Setup.

Setting Current Display Reading:

While display is flashing, press the Increase and Decrease controls to select CURR or NOCU (CURR is the default). CURR is actual current output of the power source. NOCU is the percentage of the current output of the power source.

Press Setup control to confirm setting and continue Initial Setup.

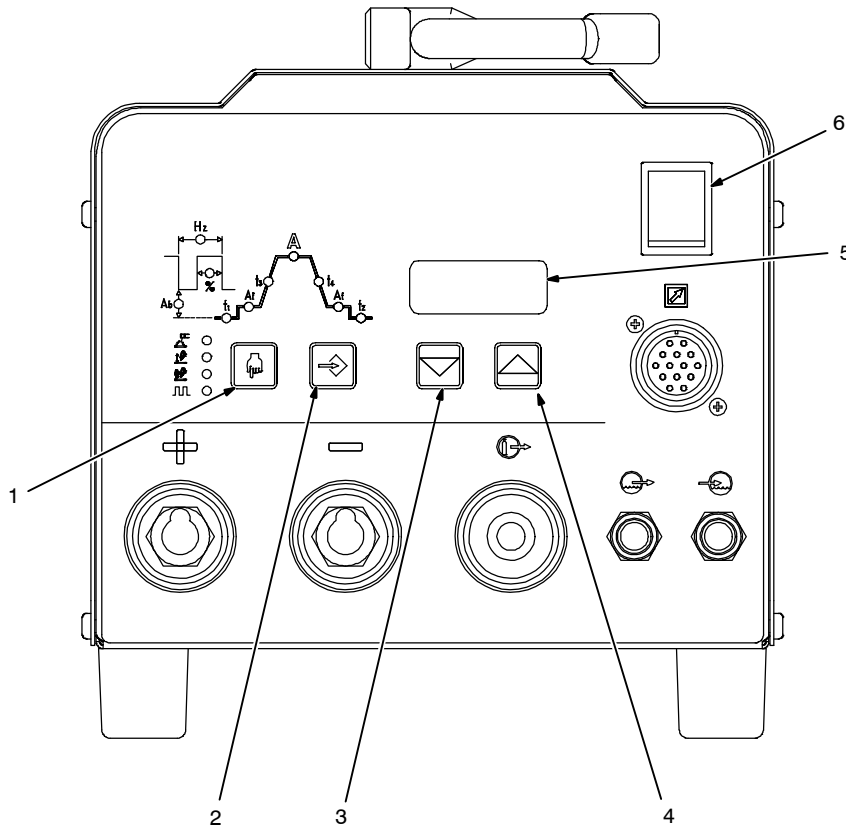
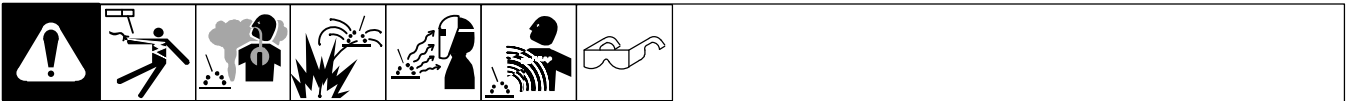
Setting TIG Starting Current:

While display is flashing, press the Increase and Decrease controls to set the TIG start current. The start current range is 10 to 200 amps, 20 amps is the default.

Press Setup control to confirm setting

Turn power off to exit Initial Setup.

5-3. Memory Control



☞ The first three alphanumeric digits of the display indicate the desired action being requested for the selected memory position.

☞ The fourth alphanumeric digit of the display shows the selected memory position. If the fourth digit is -, then the requested action is not valid for the selected memory position.

LOA – Loads the welding parameters previously stored by the operator from the specified memory position.

STO – Stores welding parameters set by the operator to an operator specified memory position.

DEL – Permanently deletes stored welding parameters from a specified memory position.

☞ All memory positions are empty when machine leaves factory

☞ Document all welding parameters for each memory position.

☞ Welding parameter data is stored until intentionally deleted, or a recall of factory parameters is performed (see Section 5-4).

ory parameters is performed (see Section 5-4).

- 1 Process Control
Use control to enter memory control and confirm selected action.
- 2 Setup Control
Use control to exit memory control.
- 3 Decrease Control
Use control to scroll through the desired actions required for the selected memory positions, LOA, STO, and DEL.
- 4 Increase Control
Use control to scroll through memory positions 0–9.
- 5 Ammeter And Parameter Display
- 6 Power Switch

To create or change a welding parameter memory position, proceed as follows:

Select desired process, Stick, TIG Lift, TIG Lift Pulse, TIG HF, TIG HF Pulse.

Set or modify all desired parameters.

With power on, press and hold Process control until LOA is displayed .

Press and hold Decrease control until STO is displayed.

Press Increase control to select desired memory position 0–9.

Press Process control until OK is displayed.

To Recall a welding parameter memory position, proceed as follows:

Press and hold Process control until LOA is displayed .

Press Increase control to select desired memory position 0–9.

Press Process control until OK is displayed.

To delete welding parameters from a memory position, proceed as follows:

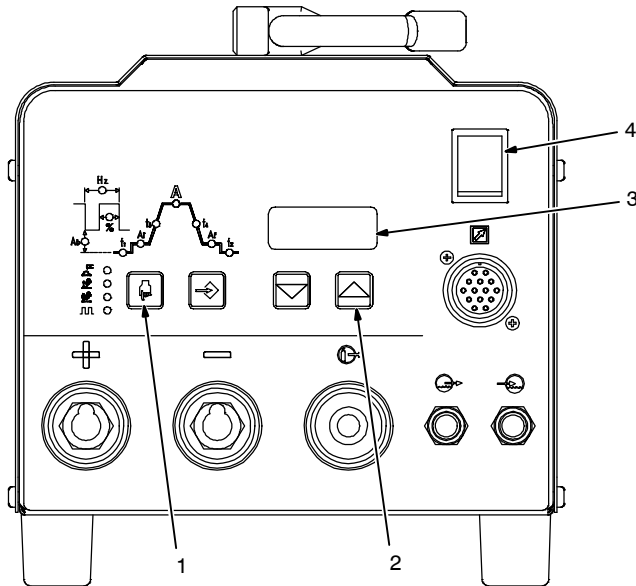
Press and hold Process control until LOA is displayed .

Press and hold Decrease control until DEL is displayed.

Press Increase control to select desired memory position 0–9.

Press and release Setup control to exit memory control.

5-4. Resetting Unit To Factory Default Settings



☞ Document all welding parameters for each memory position.

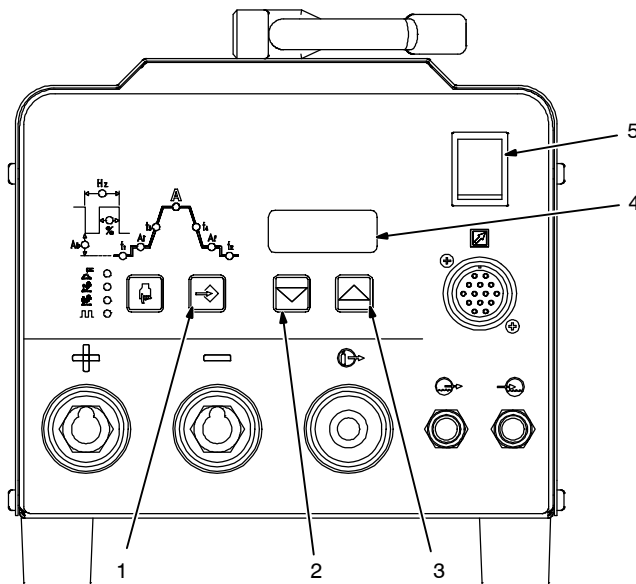
☞ This procedure will delete all operator specified parameters, and recall all factory parameters..

- 1 Process Control
- 2 Increase Control
- 3 Ammeter And Parameter Display
- 4 Power Switch

Turn unit off. Press and holding the Process and Increase controls, turn unit on, wait for CLR to display before releasing controls.

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5-5. Selecting Remote Control



☞ Document all welding parameters for each memory position.

- 1 Setup Control
- 2 Decrease Control
- 3 Increase Control
- 4 Ammeter And Parameter Display
- 5 Power Switch

Turn unit on. Press and hold Setup control until INT or EXT is displayed. Press Increase or Decrease controls to change between INT and EXT.

Press Setup control, and OK will display.

INT - indicates weld sequence is initiated when electrode makes contact with workpiece. INT should be used for Stick, TIG Lift, and TIG Lift with pulse only

EXT - indicates weld sequence is initiated with some external type of remote control.

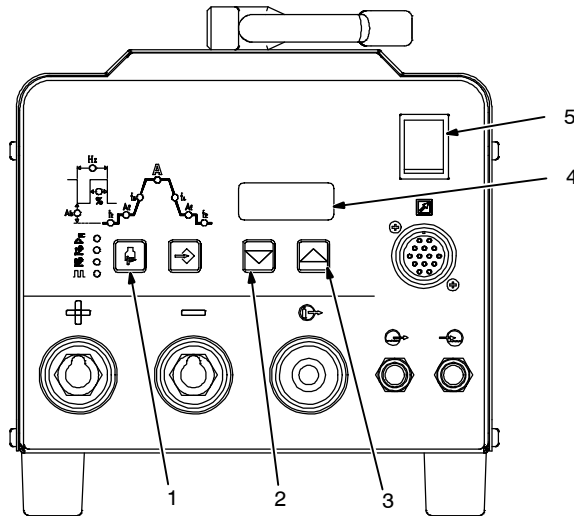
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5-6. 2T Or 4T Trigger Mode Selection



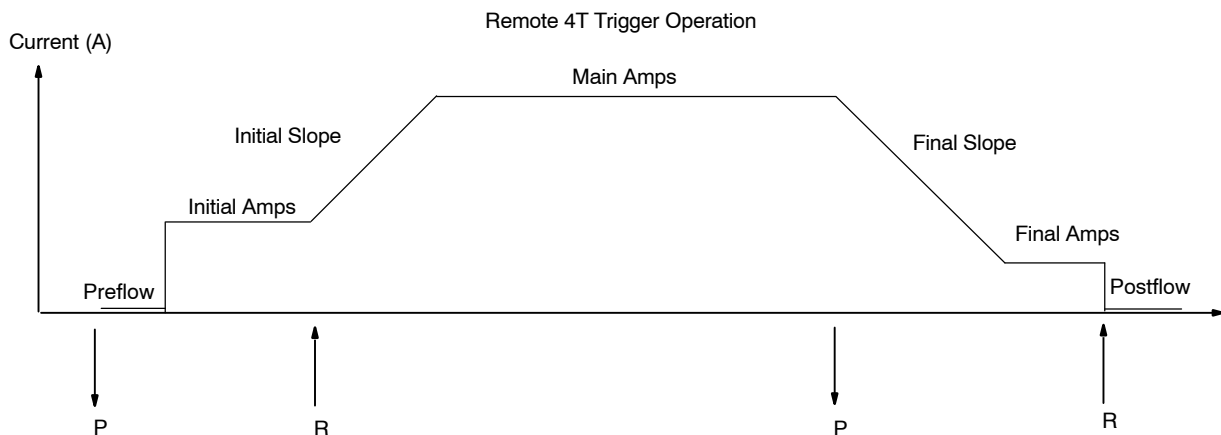
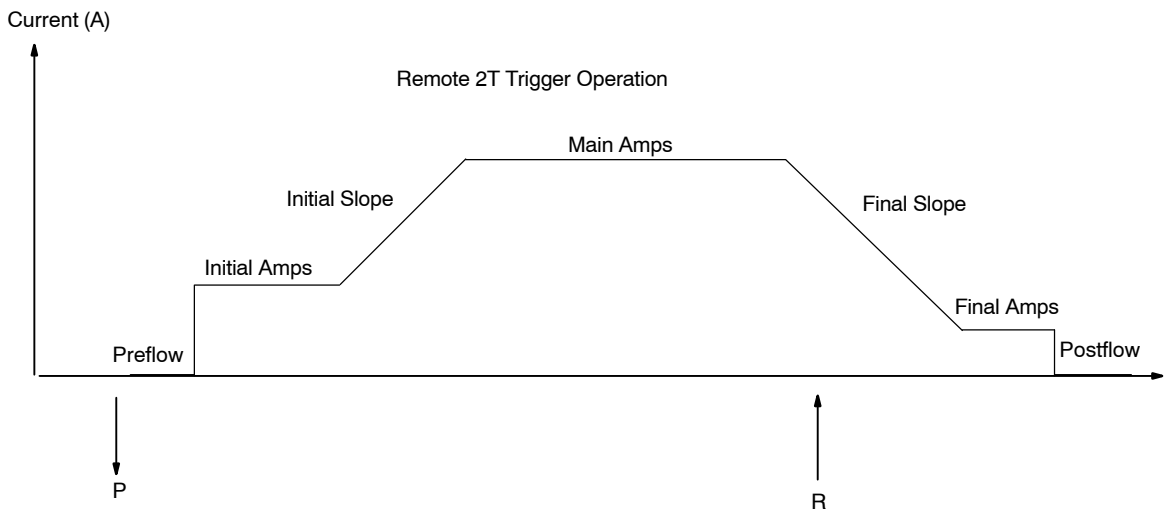
☞ Document all welding parameters for each memory position.

- 1 Process Control
- 2 Decrease Control
- 3 Increase Control
- 4 Ammeter And Parameter Display
- 5 Power Switch



Turn unit on. When welding with any TIG process, the unit will first display 2T or 4T.

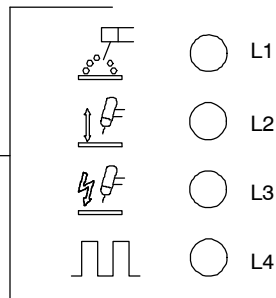
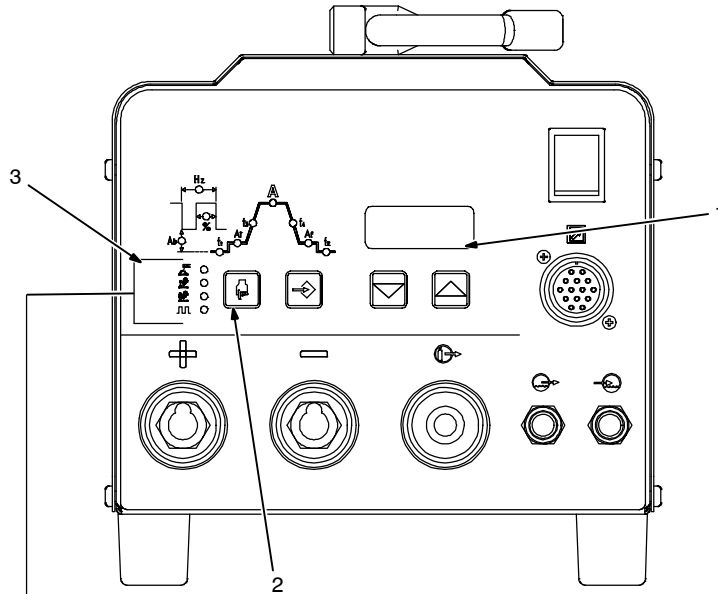
To change between 2T and 4T, press the Process control and 2T or 4T will display. Press the Increase or Decrease control to change, after 5 seconds, weld amperage is displayed. Resume welding.



P&R = Push and release trigger.

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5-7. Process Control



- 1 Ammeter And Parameter Display
- 2 Process Control
- 3 Process LEDs

Press Process control until desired process LED or combination of LEDs are illuminated:

L1 – Stick welding (SMAW)

L2 – TIG Lift Start – when selected, is an arc starting method in which the electrode must come in contact with the workpiece to initiate an arc (see Section 5-10).

L3 – TIG HF Start – When selected, a pulsed HF (non-contact) arc starting method is activated.

L4 – TIG Pulse Welding can be used in combination with L2 or L3. Pulsing is available only while a TIG process is active.

Press Process control to scroll through the possible process selections indicated by the LED or LED combinations being illuminated:

L1 – Stick Welding

L2 – TIG Lift Start

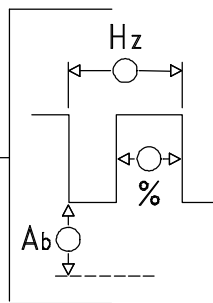
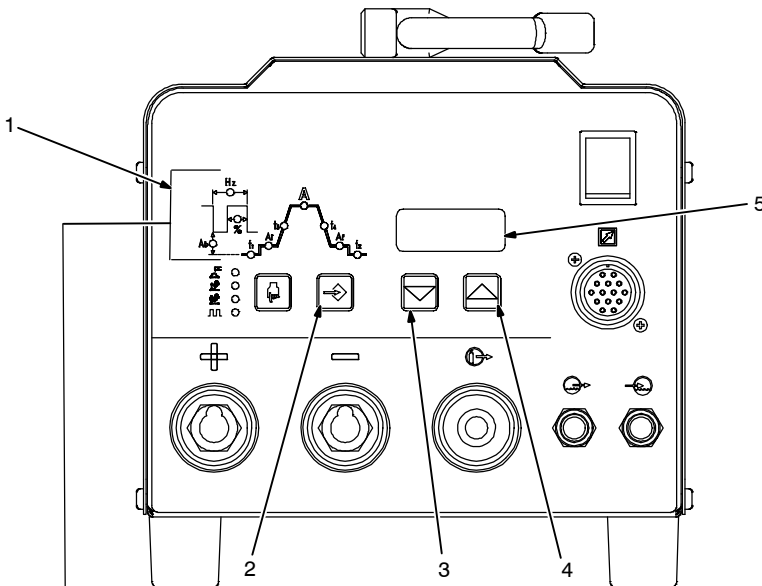
L2 And L4 – TIG Lift Start with Pulse


L3 – TIG HF Start

L3 And L4 – TIG HF Start with pulse.

Return to top.

5-8. Pulse Control



 Pulse welding is only available while using the TIG process.

- 1 Pulse Control LEDs
- 2 Setup Control
- 3 Decrease Control
- 4 Increase Control
- 5 Ammeter And Parameter Display

While pulse welding, the current is alternating between a peak current (A) and a background current (Ab), with a defined percent (%) of peak current, and a defined frequency (Hz). Full control of these parameters gives the operator better control of penetration, bead width, heat input, crowning, and undercutting.

Press Setup control to select desired parameter, indicated by illuminated LED.

Use the Increase/Decrease controls to change value of selected pulse parameter.

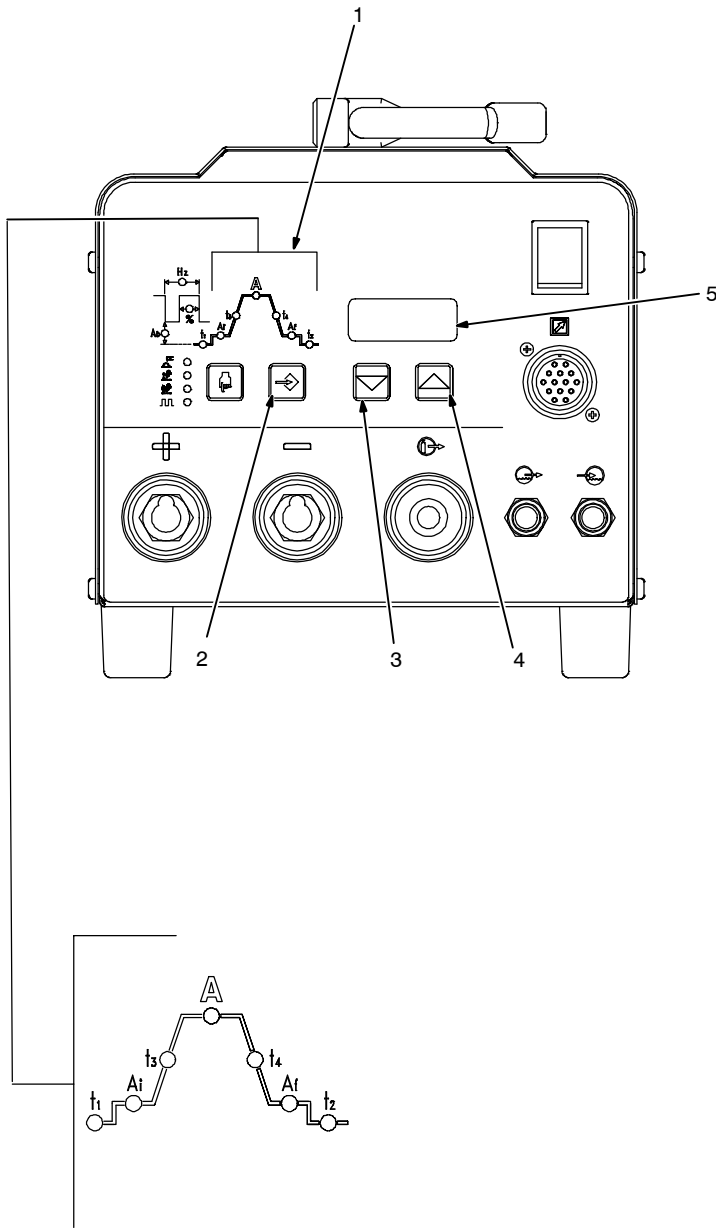
Peak Current (A) controls weld penetration, and the min/max values were established during Initial Setup (see Section 5-2).

Pulse Frequency (Hz) controls weld bead appearance. Minimum value is 0.1 Hz, Maximum value is 10 or 500 Hz, the default is 10 Hz. Maximum pulse frequency is determined by type of power source. Thyristor, engine driven, and old inverter power sources are capable of only a 10 Hz maximum, while newer inverters may be capable of up to 500 Hz.

Background Current (Ab) controls heat input, and the min/max values were established during Initial Setup (see Section 5-2).

Duty Cycle (%) controls weld puddle cooling. The minimum value is 5%, the maximum value is 95%, and the default is 50%.

5-9. Sequence Control



☞ Sequencing is only available while using a TIG process.

1 Sequence LEDs

Sequencing is available only while using the TIG process, but is disabled if a remote foot or finger current control is connected to the remote receptacle. Sequencer parameters cannot be selected if the stick process is active.

2 Setup Control

Press setup control to select desired parameter, and illuminate corresponding LED.

3 Decrease Control

4 Increase Control

Press increase or decrease control to set appropriate value for active sequence parameter. Value selected is shown on the ammeter.

5 Ammeter And Parameter Display

Pre Gas Time (t1) – Use control to set the length of time gas flows before arc initiation. Default = 0.2s (MIN = 0.0s, MAX = 25.0s).

Initial Current (Ai) – Use control to set the current level that the arc will be established with. Default = 10A (MIN = 5A or minimum value set during initial setup, MAX = 500A or maximum value set during initial set up).

Slope Up Time (t3) – Use control to set the rate that current will rise from Initial to Weld current. Default = 0.0s (MIN = 0.0s, MAX = 25.0s).

Weld Current (A) – Use control to set the maximum Welding Current. Default = 100A (MIN = 5A, MAX = 500A or maximum value set during initial set up).

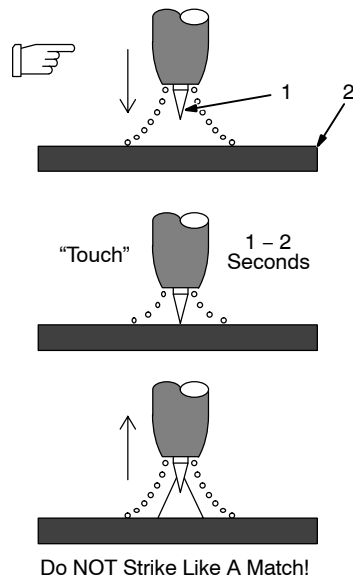
Slope Down Time (t4) – Use control to set the rate that current will decrease from Weld current to Final Current. Default = 0.0s (MIN = 0.0s, MAX = 25.0s).

Final Current (Af) – Use control to set the current level that the arc will finish with. Default = 10A (MIN = 5A or minimum value set during initial setup, MAX = 500A or maximum value set during initial set up).

Post Gas Time (t2) – Use control to set the length of time gas flows after welding to protect the weld pool. Default = 10.0s (MIN = 0.0s, MAX = 50.0s).

5-10. Lift-Arc™ And HF TIG Start Procedures

Lift-Arc Start Method



Lift-Arc Start

When Lift-Arc™ button light is On, start arc as follows:

- 1 TIG Electrode
- 2 Workpiece

Touch tungsten electrode to workpiece at weld start point, enable output and shielding gas with torch trigger, foot control, or hand control. **Hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode. Arc is formed when electrode is lifted.

Normal open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. The solid-state output contactor does not energize until after electrode is touching workpiece. This allows electrode to touch workpiece without overheating, sticking, or getting contaminated.

Application:

Lift-Arc is used for the DCEN or AC GTAW process when HF Start method is not permitted, or to replace the scratch method.



HF Start

When HF Start button light is On, start arc as follows:

High frequency turns on to help start arc when output is enabled. High frequency turns off when arc is started, and turns on whenever arc is broken to help restart arc.

Application:

HF start is used for the DCEN GTAW process when a non-contact arc starting method is required.

SECTION 6 – MAINTENANCE AND TROUBLESHOOTING

6-1. Routine Maintenance

			Disconnect power before maintaining.
--	--	--	---

	✓ = Check * To be done by Factory Authorized Service Agent	◇ = Change	● = Clean	△ = Repair	☆ = Replace
Every 3 Months	☆ Labels	☆ Gas Hoses	● Weld Terminals		
Every 3 Months	☆ Cables And Cords				
Every 6 Months	●: During heavy service, clean monthly. <p>Do not remove case when blowing out inside of unit. During heavy service, clean monthly.</p>				

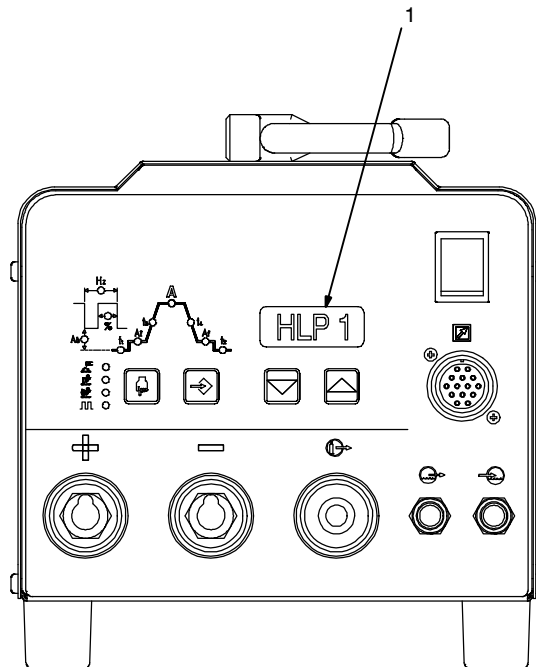
6-2. Troubleshooting Table

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Trouble	Remedy
Display On, fan does not start.	Check input power connection.
	Turn power source on.
	Check interconnecting cable and connectors, and tighten ring nuts on both sides.
	Check power source 14-pin outputs.
Fan does not start, display on.	Check for and remove anything blocking fan movement.
	Have Factory Authorized Service Agent check fan motor.
Parameters setting is not possible.	Check process selection, and change selection if necessary.
	Switch unit off and on to reset factory parameters.
	Re-program incorrect initial setup.
Current reading on unit exceeds maximum by more than five percent.	Set correct current on welding power source.
	Have Factory Authorized Service Agent check current signal from welding power source.

Trouble	Remedy
Lack of HF, difficult arc starting. Unstable arc starts.	Prevent torch cables from contacting work circuit.
	Repair or replace damaged or broken torch or cables.
	Use correct size and/or type of tungsten electrode.
	Have Factory Authorized Service Agent check control board PC1.
Arc unstable or difficult to control.	Use correct size and/or type of tungsten electrode.
	Check for loose connections or worn parts (see Section 6-1).
Tungsten electrode oxidizing and not clean after completion of weld.	Prevent contact with filler wire or workpiece while welding.
	Check all gas fittings for loose or poor connections.
	Increase gas flow rate.

6-3. Temperature/Ammeter Help Displays



1 Display Screen

- HLP 1 Display

Indicates 500 amps has been exceeded for 5 seconds.

- HLP 2 Display

Indicates an open/shorted thermistor.

- HLP 3 Display


Indicates an over temperature condition.

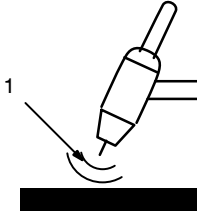
- HLP 0 Display

Indicates a ground fault.

SECTION 8 – HIGH FREQUENCY

8-1. Welding Processes Requiring High Frequency






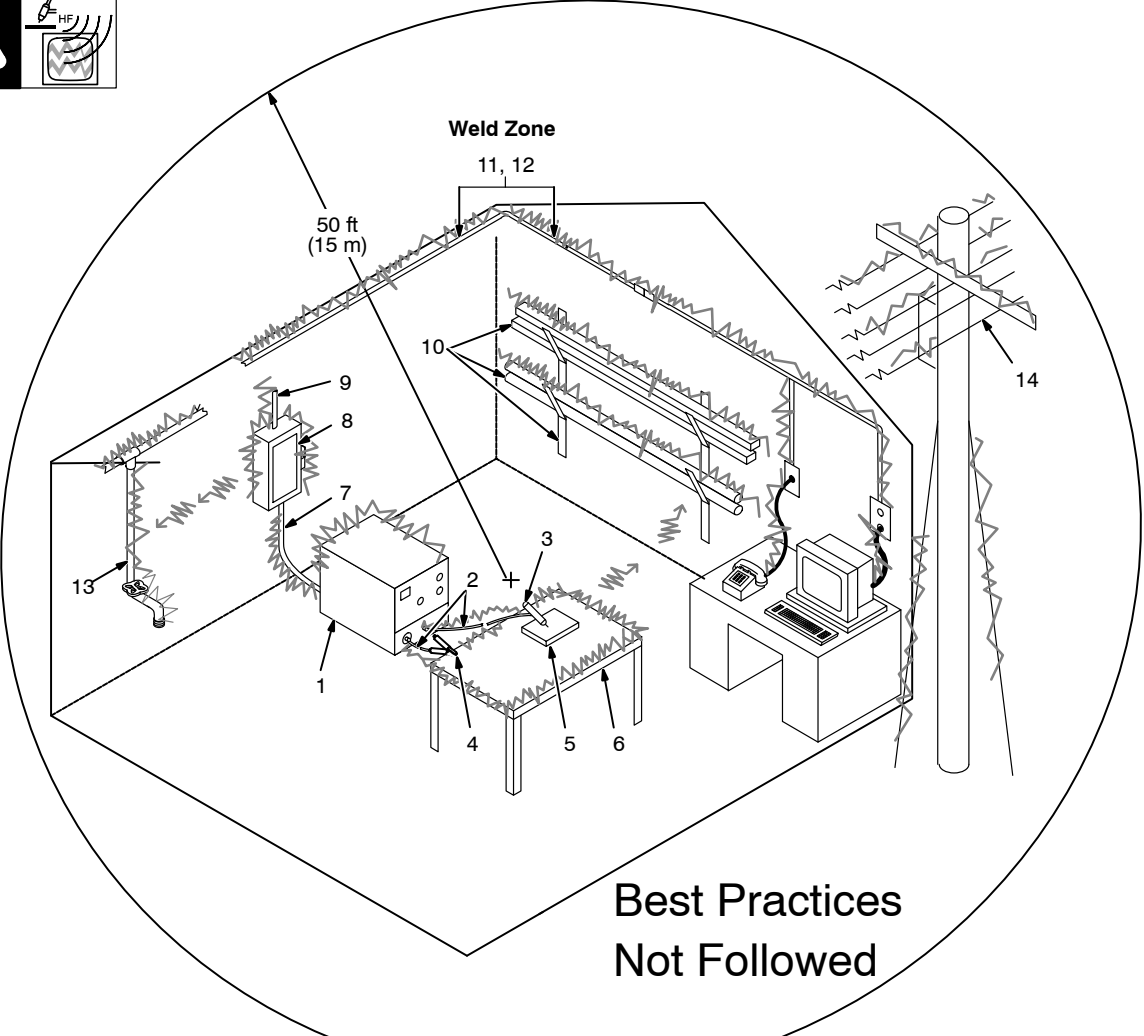
TIG

1 High-Frequency Voltage
TIG – helps arc jump air gap between torch and workpiece and/or stabilize the arc.

high_freq 2018-01

8-2. Installation Showing Possible Sources Of HF Interference



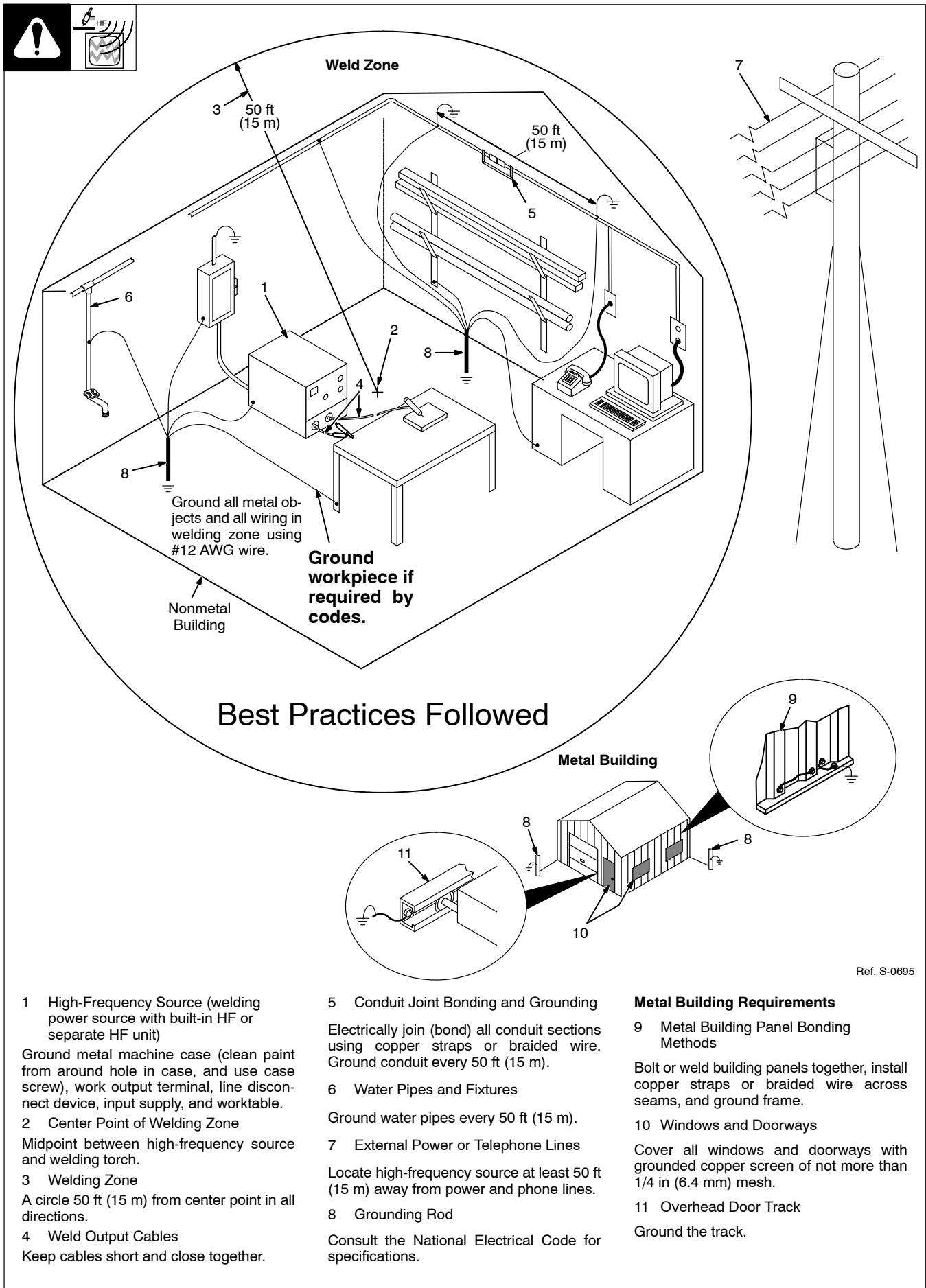


Best Practices
Not Followed

Sources of Direct High-Frequency Radiation	Sources of Conduction of High Frequency	Sources of Reradiation of High Frequency
1 High-Frequency Source (welding power source with built-in HF or separate HF unit)	7 Input Power Cable	10 Ungrounded Metal Objects
2 Weld Cables	8 Line Disconnect Device	11 Lighting
3 Torch	9 Input Supply Wiring	12 Wiring
4 Work Clamp		13 Water Pipes and Fixtures
5 Workpiece		14 External Phone and Power Lines
6 Work Table		

S-0694

8-3. Recommended Installation To Reduce HF Interference



Ref. S-0695




- 1 High-Frequency Source (welding power source with built-in HF or separate HF unit)
Ground metal machine case (clean paint from around hole in case, and use case screw), work output terminal, line disconnect device, input supply, and worktable.
- 2 Center Point of Welding Zone
Midpoint between high-frequency source and welding torch.
- 3 Welding Zone
A circle 50 ft (15 m) from center point in all directions.
- 4 Weld Output Cables
Keep cables short and close together.

- 5 Conduit Joint Bonding and Grounding
Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).
- 6 Water Pipes and Fixtures
Ground water pipes every 50 ft (15 m).
- 7 External Power or Telephone Lines
Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.
- 8 Grounding Rod
Consult the National Electrical Code for specifications.

- Metal Building Requirements**
- 9 Metal Building Panel Bonding Methods
Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.
 - 10 Windows and Doorways
Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.
 - 11 Overhead Door Track
Ground the track.

SECTION 9 – SELECTING AND PREPARING A TUNGSTEN FOR DC OR AC WELDING WITH INVERTER MACHINES


gtaw_Inverter_2018-01

Whenever possible and practical, use DC weld output instead of AC weld output.

9-1. Selecting Tungsten Electrode (Wear Clean Gloves To Prevent Contamination Of Tungsten)

A. Select Tungsten Electrode.

 Not all tungsten electrode manufacturers use the same colors to identify tungsten type. Contact the tungsten electrode manufacturer or reference the product packaging to identify the tungsten you are using.

Electrode Diameter	Amperage Range - Gas Type♦ - Polarity	
	(DCEN) – Argon Direct Current Electrode Negative (For Use With Mild Or Stainless Steel)	AC – Argon Unbalanced Wave (For Use With Aluminum)
2% Ceriated, 1.5% Lanthanum, Or 2% Thorium Alloy Tungstens		
.010 in. (.25 mm)	Up to 15	Up to 15
.020 in. (.50 mm)	5-20	5-20
.040 in. (1 mm)	15-80	15-80
1/16 in. (1.6 mm)	70-150	70-150
3/32 in. (2.4 mm)	150-250	140-235
1/8 in. (3.2 mm)	250-400	225-325
5/32 in. (4.0 mm)	400-500	300-400
3/16 in (4.8 mm)	500-750	400-500
1/4 in. (6.4 mm)	750-1000	500-630

♦ Typical argon shielding gas flow rates are 10 to 25 CFH (cubic feet per hour).


Figures listed are a guide and are a composite of recommendations from American Welding Society (AWS).

B. Electrode Composition.

Tungsten Type	Application Notes
2% Cerium (Grey*)	Good all-around tungsten for both AC and DC welding.
1.5–2% Lanthanum (Yellow/Blue)	Excellent low amp starts for AC and DC welding.
2% Thorium (Red)	Commonly used for DC welding, not ideal for AC.
Pure Tungsten (Green)	Not Recommended for inverters! For best results in most applications use a sharpened cerium or lanthanum electrode for AC and DC welding.

* Color may vary depending on manufacturer, please refer to manufacturer's guide for color designation.

SECTION 10 – PARTS LIST

 Hardware is common and not available unless listed.

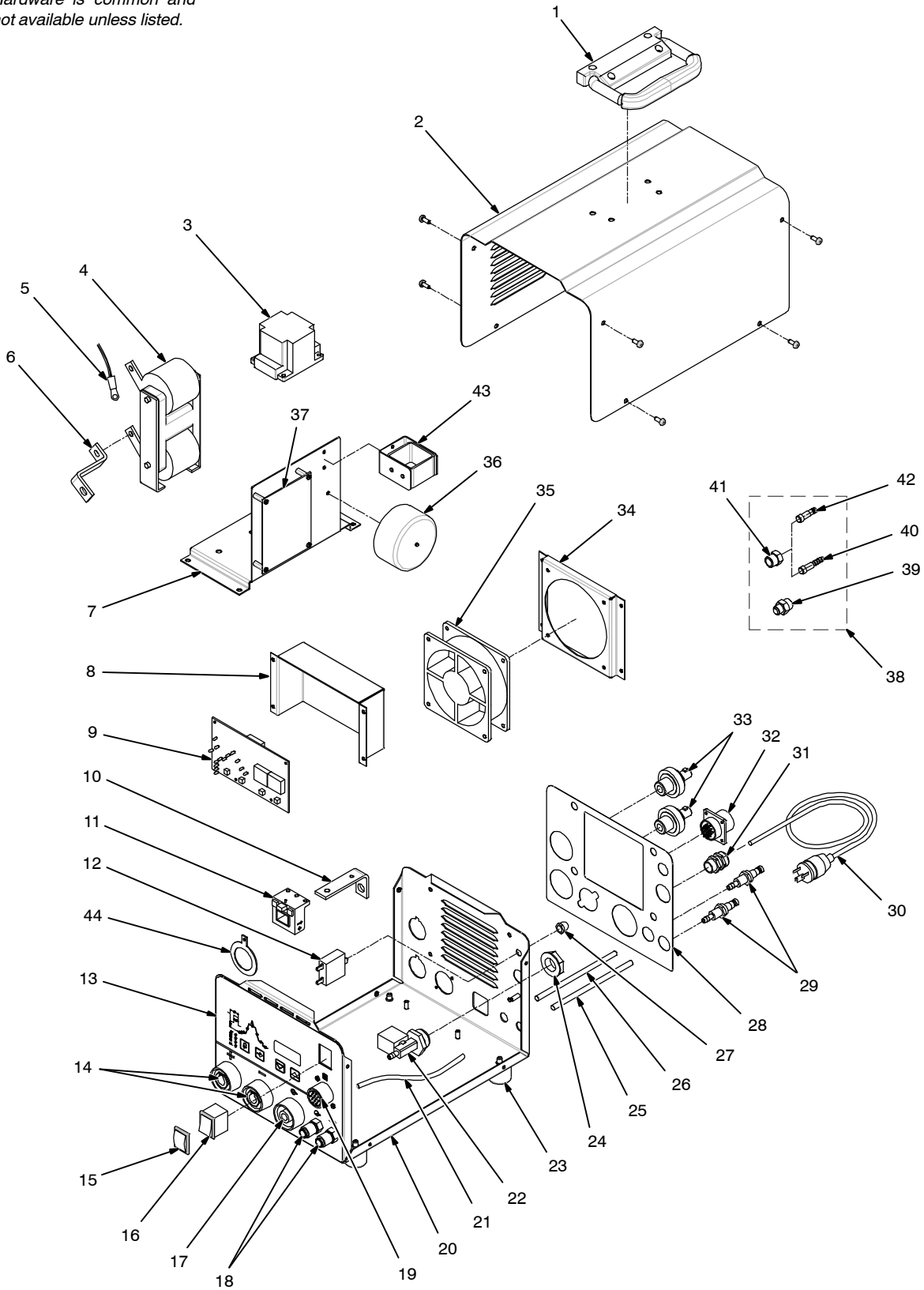


Figure 10-1. Main Assembly

956.142.655-C

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure 10-1. Main Assembly

1		208015	Handle Assy	1
2		V56121323	Wrapper	1
3		V56075245	HF Generator	1
4		V58021244	XFMR HF	1
5	RT1	056057201	Thermistor, NTC 30K Ohm11	1
6		V56003325	Bus Bar, Output	1
7		V56006321	Plate	1
8		V56039324	Box, PCB	1
9	PC1	057084135	PCB, Control	1
10		356031004	Bus Bar, LEM	1
11	HD1	182918	Transducer, Current 400A Moduyle Supply V+/-15	1
12	CB1	056067262	Circuit Breaker, Man Reset 1P 10A 250VAC	1
13		V56029326	Nameplate, Front	1
14		208967	Dinse 50, Female	2
15		756007013	Cover, Power Switch	1
16	S1	056067251	Switch, Power On/Off	1
17		188192	Receptacle, Gas	1
18		556049423	Fitting, Quick Connect Water, Female	2
19		056076170	Receptacle, 14-Pin	1
20		V56006320	Base	1
21		656026120	Hose, 5x8, 5x270 Black Gas	1
22	GSV1	228036	Valve, 24VAC 1 Way	1
23		134306	Foot, Rubber Mount	4
24		220805	Nut	1
25		656026121	Hose, 6x11x320 Red Water	1
26		656026122	Hose, 6x11x320 Blue Water	1
27		156033034	3/8"-27 Rubber Boot	1
28		V56029347	Nameplate, Rear	1
29		556049424	Fitting, Quick Connect Water, Male	2
30		056112010	Plug, Primary, Duplex 3-Pin 115 V	1
31		656089056	Strain Relief, Primary Cord	1
32		56076192	Receptacle, 14-Pin	1
33		056076216	Receptacle, Dinse	2
34		V56005322	Fan Support	1
35	FM	V56126035	Fan Assy, 115 V	1
36		V58021336	XFMR, Toroid	1
37	PC2	V57084349	PCB, Trigger - Filter	1
38		058066057	GAS, connection kit	1
39		057052043	Adapter 5/8 UNC-3/8 BSP	1
40		057052044	Fitting, Hose Brs Barbed M 1/4Tbg x 5/8-18 SAE	1
41		156018115	Nut 5/8	1
42		057052045	Fitting, Quick Connector	1
43		193440	Ground Fault Sensor	1
44		178548	Terminal, Connector Friction	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

TRUE BLUE[®]

WARRANTY

Effective January 1, 2020

(Equipment with a serial number preface of NA or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

Warranty Questions?
Call your ITW Welding
Regional Office.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. LLC, Appleton, Wisconsin and ITW Welding (hereafter referred to as Miller) warrant to authorized distributors that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.**

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed. Notifications submitted as online warranty claims must provide detailed descriptions of the fault and troubleshooting steps taken to diagnose failed parts. Warranty claims that lack the required information as defined in the Miller Service Operation Guide (SOG) may be denied by Miller.

Miller shall honor warranty claims on warranted equipment listed below in the event of a defect within the warranty coverage time periods listed below. Warranty time periods start on the delivery date of the equipment to the end-user purchaser, or 18 months after the equipment is shipped to an International distributor, whichever occurs first.

- 5 Years Parts — 3 Years Labor
 - * Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules
- 3 Years — Parts and Labor Unless Specified
 - * Auto-Darkening Helmet Lenses (No Labor) (See Classic Series Exception Below)
 - * Engine Driven Welder/Generators **(NOTE: Engines are Warranted Separately by the Engine Manufacturer.)**
 - * Insight Welding Intelligence Products (Except External Sensors)
 - * Inverter Power Sources
 - * Plasma Arc Cutting Power Sources
 - * Process Controllers
 - * Semi-Automatic and Automatic Wire Feeders
 - * Transformer/Rectifier Power Sources
- 2 Years — Parts and Labor
 - * Auto-Darkening Helmet Lenses – Classic Series Only (No Labor)
 - * Auto-Darkening Weld Masks (No Labor)
 - * Fume Extractors – Capture 5, Filtair 400 and Industrial Collector Series
- 1 Year — Parts and Labor Unless Specified
 - * ArcReach Heater
 - * AugmentedArc and LiveArc Welding Systems
 - * Automatic Motion Devices
 - * Bernard BTB Air-Cooled MIG Guns (No Labor)
 - * CoolBelt (No Labor)
 - * Desiccant Air Dryer System
 - * Field Options **(NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)**
 - * RFCS Foot Controls (Except RFCS-RJ45)
 - * Fume Extractors – Filtair 130, MWX and SWX Series, ZoneFlow Extraction Arms and Motor Control Box HF Units
 - * ICE/XT Plasma Cutting Torches (No Labor)
 - * Induction Heating Power Sources, Coolers **(NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)**
 - * Load Banks
 - * Motor-Driven Guns (except Spoolmate Spoolguns)
 - * PAPR Blower Unit (No Labor)

- * Positioners and Controllers
 - * Racks (For Housing Multiple Power Sources)
 - * Running Gear/Trailers
 - * Subarc Wire Drive Assemblies
 - * Supplied Air Respirator (SAR) Boxes and Panels
 - * TIG Torches (No Labor)
 - * Tregaskiss Guns (No Labor)
 - * Water Cooling Systems
 - * Wireless Remote Foot/Hand Controls and Receivers
 - * Work Stations/Weld Tables (No Labor)
- 6 Months — Parts
 - * Batteries
 - 90 Days — Parts
 - * Accessories (Kits)
 - * ArcReach Heater Quick Wrap and Air Cooled Cables
 - * Canvas Covers
 - * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
 - * MDX Series MIG Guns
 - * M-Guns
 - * MIG Guns, Subarc (SAW) Torches, and External Cladding Heads
 - * Remote Controls and RFCS-RJ45
 - * Replacement Parts (No labor)
 - * Spoolmate Spoolguns

Miller's True Blue[®] Limited Warranty shall not apply to:

- Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
- Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
- Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.
- Defects caused by accident, unauthorized repair, or improper testing.

MILLER PRODUCTS ARE INTENDED FOR COMMERCIAL AND INDUSTRIAL USERS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

The exclusive remedies for warranty claims are, at Miller's option, either: (1) repair; or (2) replacement; or, if approved in writing by Miller, (3) the pre-approved cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon use). Products may not be returned without Miller's written approval. Return shipment shall be at customer's risk and expense.

The above remedies are F.O.B. Appleton, WI, or Miller's authorized service facility. Transportation and freight are the customer's responsibility. TO THE EXTENT PERMITTED BY LAW, THE REMEDIES HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES REGARDLESS OF THE LEGAL THEORY. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT) REGARDLESS OF THE LEGAL THEORY. ANY WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY, OR REPRESENTATION, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, ARE EXCLUDED AND DISCLAIMED BY MILLER.

This Limited Warranty provides specific legal rights, and other rights may be available, but may vary by country.



Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

Country

Zip/Postal Code

For Service

Contact a *DISTRIBUTOR* or *SERVICE AGENCY* near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Service and Repair

Replacement Parts

Owner's Manuals

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

ITW Welding Products B.V.

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