



OM-294251B

2023-11

Processes



Multiprocess Welding

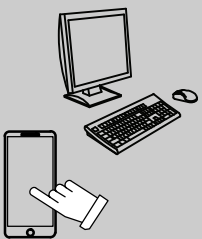
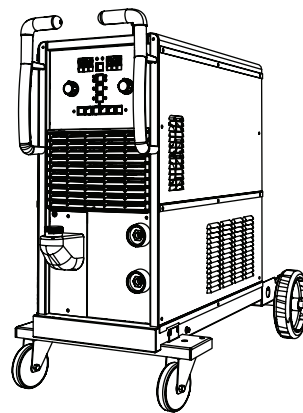
Description



Arc Welding Power Source and Cooler

# Blue Fab S400i

## CE



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

[www.MillerWelds.com](http://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.



ISO 9001  
Quality

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.



# TABLE OF CONTENTS

<b>SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING</b>	<b>1</b>
1-1 Symbol Usage	1
1-2 Arc Welding Hazards	1
1-3 Additional Hazards For Installation, Operation, And Maintenance	3
1-4 California Proposition 65 Warnings	4
1-5 Principal Safety Standards	4
1-6 EMF Information	4
<b>SECTION 2 – DEFINITIONS</b>	<b>5</b>
2-1 Additional Safety Symbol Definitions	5
2-2 Miscellaneous Symbols And Definitions	5
<b>SECTION 3 – SPECIFICATIONS</b>	<b>7</b>
3-1 Serial Number And Rating Label Location	7
3-2 Software Licensing Agreement	7
3-3 Information About Default Weld Parameters And Settings	7
3-4 Specifications	7
3-5 Cooler Specifications*	7
3-6 Coolant Specifications	7
3-7 Dimensions And Weight	8
3-8 Environmental Specifications	8
3-9 Duty Cycle And Overheating	10
3-10 Static Characteristics	10
<b>SECTION 4 – INSTALLATION</b>	<b>11</b>
4-1 Selecting A Location	11
4-2 Installing Running Gear	12
4-3 Selecting Cable Sizes*	13
4-4 Weld Output Terminals	13
4-5 Back Panel Connections	14
4-6 Installing Gas Supply	15
4-7 Cooler Connections	16
4-8 Wire Feeder Connections	18
4-9 Electrical Service Guide	19
4-10 Connecting 3-Phase Input Power	20
4-11 Extension Control Cable Connector	21
<b>SECTION 5 – OPERATION</b>	<b>22</b>
5-1 Front Panel Controls	22
5-2 Initial Setup Menu	23
<b>SECTION 6 – MIG OPERATION</b>	<b>24</b>
6-1 MIG Connections	24
6-2 2T/4T Mode	24
6-3 Inductance	25
6-4 MIG Setup Menu	25
6-5 Synergic MIG Mode	26
6-6 Synergic MIG Job List	26
6-7 Save And Recall (MIG Only)	27
<b>SECTION 7 – MMA (STICK) OPERATION</b>	<b>28</b>
7-1 MMA (Stick) Connections	28
7-2 MMA (Stick) Welding	29
<b>SECTION 8 – TIG OPERATION</b>	<b>30</b>
8-1 TIG Connections	30
8-2 TIG Welding	31
<b>SECTION 9 – MAINTENANCE AND TROUBLESHOOTING</b>	<b>32</b>
9-1 Routine Maintenance	32
9-2 Coolant Maintenance	32
9-3 Blowing Out Inside Of Unit	33
9-4 Error Codes	33
9-5 Troubleshooting	34
9-6 Factory Reset	34
<b>SECTION 10 – ELECTRICAL DIAGRAMS</b>	<b>36</b>

# DECLARATION OF CONFORMITY



for European Community (CE marked) products.

**Orbitalum Tools, Business Unit Miller Europe, Josef Schüttlerstrasse 17, 78224, Singen Germany, declares that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Regulation(s) and Standard(s).**

Product/Apparatus Identification:

Product	Stock Number
BlueFab S400i Air cooled	3400000001
BlueFab C350i Air cooled	3300000001
BlueFab Cooler Separate	7500000003
BlueFab Cooler Compact	7500000004
BlueFab Wirefeeder	3800000002
BlueFab S400i Water cooled	3400000002
BlueFab C350i water cooled	3300000002

Council Directives and Commission Regulations:

- 2014/35/EU Low voltage
- 2014/30/EU Electromagnetic compatibility
- 2009/125/EC and regulation 2019/1784 Ecodesign requirements for energy-related products
- 2011/65/EU and amendment 2015/863 Restriction of the use of certain hazardous substances in electrical and electronic equipment

Standards:

- EN IEC 60974-1:2018/A1:2019 Arc welding equipment – Part 1: Welding power sources
- EN IEC 60974-2:2019 Arc welding equipment- Part 2 Liquid cooling systems
- EN IEC 60974-3:2019 Arc welding equipment- Part 3: Arc striking and stabilizing devices
- EN 60974-10:2014/A1:2015 Arc welding equipment – Part 10: Electromagnetic compatibility requirements
- EN IEC 63000:2018 – Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Signatory:

08.09.2023

**Juergen Jaeckle**  
ENG. / IWE, PRODUCT COMPLIANCE MANAGER

Date of Declaration

295840A

# DECLARATION OF CONFORMITY



for United Kingdom (UKCA marked) products.

**Orbitalum Tools, Business Unit Miller Europe, Josef Schüttlerstrasse 17, 78224, Singen Germany, declares that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Regulation(s) and Standard(s).**

Product/Apparatus Identification:

Product	Stock Number
BlueFab S400i Air cooled	3400000001
BlueFab C350i Air cooled	3300000001
BlueFab Cooler Separate	7500000003
BlueFab Cooler Compact	7500000004
BlueFab Wirefeeder	3800000002
BlueFab S400i Water cooled	3400000002
BlueFab C350i water cooled	3300000002

Council Directives and Commission Regulations:

- S.I. 2016/1101 Electrical Equipment (Safety) Regulations 2016
- S.I. 2016/1091 Electromagnetic Compatibility Regulations 2016
- S.I. 2009/125/EC and regulation 2019/1784 Ecodesign requirements for energy-related products
- S.I. 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Standards:

- EN IEC 60974-1:2018/A1:2019 Arc welding equipment – Part 1: Welding power sources
- EN IEC 60974-2:2019 Arc welding equipment- Part 2 Liquid cooling systems
- EN IEC 60974-3:2019 Arc welding equipment- Part 3: Arc striking and stabilizing devices
- EN 60974-10:2014/A1:2015 Arc welding equipment – Part 10: Electromagnetic compatibility requirements
- EN IEC 63000:2018 – Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Signatory:

08.09.2023

**Juergen Jaeckle**  
ENG. / IWE, PRODUCT COMPLIANCE MANAGER

Date of Declaration

295841A

# EMF DATA SHEET FOR ARC WELDING POWER SOURCE



## Product/Apparatus Identification

Product	Stock Number
BlueFab S400i Air cooled	3400000001
BlueFab S400i Water cooled	3400000002

## Compliance Information Summary

Applicable regulation                      Directive 2014/35/EU

Reference limits                              Directive 2013/35/EU, Recommendation 1999/519/EC

Applicable standards                        IEC 62822-1:2016, IEC 62822-2:2016

Intended use                                   for occupational use                       for use by laymen

Non-thermal effects need to be considered for workplace assessment                       YES                       NO

Thermal effects need to be considered for workplace assessment                       YES                       NO

Data is based on maximum power source capability (valid unless firmware/hardware is changed)

Data is based on worst case setting/program (only valid until setting options/welding programs are changed)

Data is based on multiple settings/programs (only valid until setting options/welding programs are changed)

Occupational exposure is below the Exposure Limit Values (ELVs) for health effects at the standardized configurations                       YES                       NO  
(if NO, specific required minimum distances apply)

Occupational exposure is below the Exposure Limit Values (ELVs) for sensory effects at the standardized configurations                       n.a                       YES                       NO  
(if applicable and NO, specific measures are needed)

Occupational exposure is below the Action Levels (ALs) at the standardized configurations                       n.a                       YES                       NO  
(if applicable and NO, specific signage is needed)

## EMF Data for Non-thermal Effects

Exposure Indices (EIs) and distances to welding circuit (for each operation mode, as applicable)

	Head		Trunk	Limb (hand)	Limb (thigh)
	Sensory Effects	Health Effects			
Standardized distance	10 cm	10 cm	10 cm	3 cm	3 cm
ELV EI @ standardized distance	0.09	0.02	0.04	0.02	0.05
Required minimum distance	1 cm	1 cm	1 cm	1 cm	1 cm

Distance where all occupational ELV Exposure Indices fall below 0.20 (20%)                      3 cm

Distance where all general public ELV Exposure Indices fall below 1.00 (100%)                      24 cm


Tested by:                      Joe Krueger                      Date tested:                      2023-09-07


295725-A

# SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

 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. 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.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- 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.

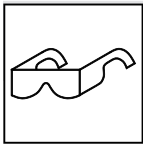




### HOT PARTS can burn.

- 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.



### 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.



### 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.



### 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.



### 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.

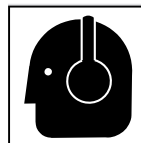
- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear body protection made from leather or flame-resistant clothing (FRC). 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 (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 leather or flame-resistant clothing (FRC). 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.



### NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



### 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.





### **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**



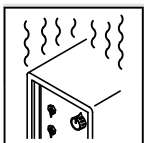
### **FIRE OR EXPLOSION hazard.**

- 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.



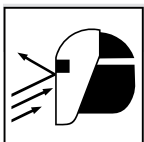
### **FALLING EQUIPMENT can injure.**

- 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.



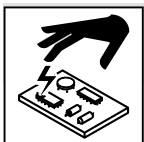
### **OVERUSE can cause OVERHEATING.**

- 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.



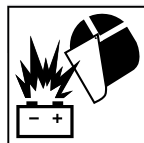
### **MOVING PARTS can injure.**

- 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.



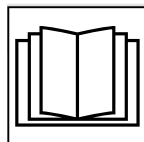
### **BATTERY EXPLOSION can injure.**

- 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 microprocessors, 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](http://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: <http://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](http://www.ansi.org).

*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting*, American Welding Society Standard AWS F4.1. Website: <http://www.aws.org>.

*National Electrical Code*, NFPA Standard 70 from National Fire Protection Association. Website: [www.nfpa.org](http://www.nfpa.org).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1 from Compressed Gas Association. Website: [www.cganet.com](http://www.cganet.com).

*Safety in Welding, Cutting, and Allied Processes*, CSA Standard W117.2 from Canadian Standards Association. Website: [www.csagroup.org](http://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](http://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](http://www.osha.gov).

*OSHA Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: [www.osha.gov](http://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](http://www.cdc.gov/NIOSH).

SOM 2022-01

## 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 Symbol Definitions






Some symbols are found only on CE products.



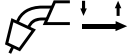
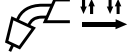
	Warning! Watch Out! There are possible hazards as shown by the symbols.
	Do not discard product (where applicable) with general waste. Reuse or recycle Waste Electrical and Electronic Equipment (WEEE) by disposing at a designated collection facility. Contact your local recycling office or your local distributor for further information.
	Do not remove or paint over (cover) the label.
	Disconnect input plug or power before working on machine.
	Drive rolls can injure fingers.
	Use coolant suggested by the manufacturer.

## 2-2. Miscellaneous Symbols And Definitions

<b>A</b>	Amperage		Line Connection	<b>I<sub>1eff</sub></b>	Maximum Effective Supply Current
<b>V</b>	Voltage	<b>3</b>	Three Phase	<b>U<sub>2</sub></b>	Conventional Load Voltage
	Direct Current (DC)		Three Phase Static Frequency Converter Transformer-Rectifier	<b>I<sub>2</sub></b>	Rated Welding Current
	Remote		Gas Metal Arc Welding (GMAW)	<b>X</b>	Duty Cycle
<b>I</b>	On	<b>U<sub>1</sub></b>	Primary Voltage	<b>%</b>	Percent
<b>O</b>	Off	<b>I<sub>1max</sub></b>	Rated Maximum Supply Current	<b>IP</b>	Degree of Protection

	Negative
	Positive
	Input Voltage
	Suitable for Welding in an Environment with Increased Risk of Electric Shock
$U_0$	Rated No-Load Voltage (OCV)
$Hz$	Hertz

	Wire Feed
	Material Thickness
	Arc Force (DIG)
	Arc Length
	MMA Welding

	Gas Tungsten Arc Welding (GTAW) / Tungsten Inert Gas (TIG) Welding
	Inductance
	Two-Step Trigger Operation
	Four-Step Trigger Operation

# SECTION 3 – SPECIFICATIONS

## 3-1. Serial Number And Rating Label Location

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

☞ Do not use information in unit specifications table to determine electrical service requirements. See Sections 4-9 and 4-10 for information on connecting input power.

☞ This equipment will deliver rated output at an ambient air temperature up to 104°F (40°C).

Process	Rated Output		Max. Open Circuit Voltage	Amperage Range DC	KVA (100% Duty Cycle / 60 % Duty Cycle)	KW (100% Duty Cycle / 60 % Duty Cycle)
	100%	60%				
MIG	310 A	400 A	45 V	30–400	10.08–14.98	10.05–14.95
TIG	310 A	350 A	12 V	10–350	7.9–9.32	7.86–9.29
MMA	310 A	350 A	60 V	20–350	10.83–12.96	10.8–12.93

☞ See Section 3-9 for duty cycle rating.

## 3-5. Cooler Specifications\*

Input Power	Maximum Cooling Capacity	Cooler on Standby	Cooler Enabled	Coolant Tank Capacity	Rated Maximum Supply Current I <sub>1max</sub> (A)	pMax (MPa)
400V, Single Phase, 50/60 Hz	1.1 kW	Volts in: 400 VAC I in: 54 mA Input Power (W): 6 Input Power (VA): 22	Volts in: 400 VAC I in: 683 mA Input Power (W): 237 Input Power (VA): 273	5 L	0.75	0.35

\*IEC Cooling Capacity States That The Water Inlet Temperature Can Not Exceed 40° C Above Ambient Temperature At A 1l/ Min Flow Rate.

Recirculating Coolant System For Water-Cooled GTAW Torches And GMAW Guns.

Use With Guns/Torches Rated Up To 600 Amperes

## 3-6. Coolant Specifications

⚠ Do not use conductive coolant.

Application	Coolant
GTAW Or Where High Frequency Current Is Used	Low Conductivity Coolant 043810* Distilled Or Deionized Water Okay Above 32°F (0°C)
GMAW Or Where High Frequency Current Is Not Used	Low Conductivity Coolant 043810* Aluminum Protecting Coolant 043809* Distilled Or Deionized Water Okay Above 32°F (0°C)
Where Coolant Contacts Aluminum Parts	Aluminum Protecting Coolant 043809*

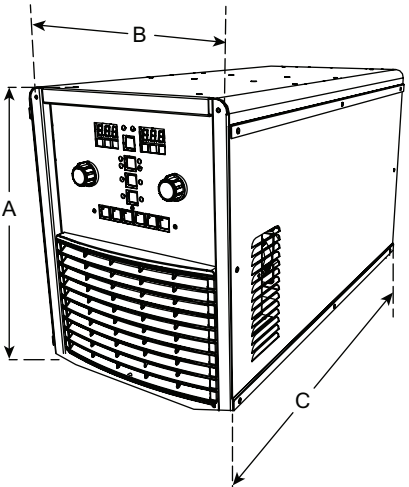
\*Coolants 043810 and 043809 protect to -37°F (-38°C) and resist algae growth.

**NOTICE** – Use of any coolant other than those listed in the table voids the warranty on any parts that come in contact with the coolant (pump, radiator, etc.).

### 3-7. Dimensions And Weight

#### A. Welding Power Source

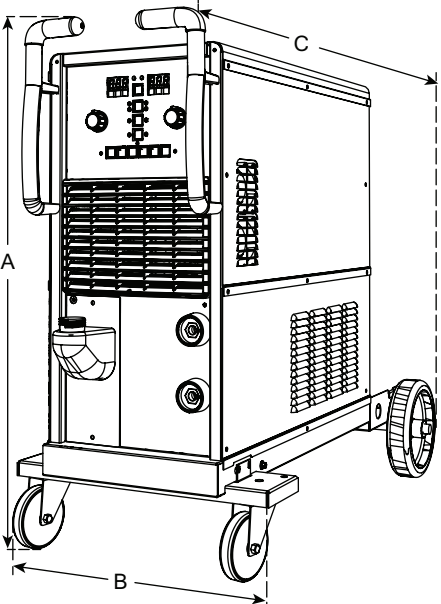
Dimensions	
A	20.9 in. (530 mm)
B	12 in. (305 mm)
C	28.7 in. (730 mm)
Weight	
Net: 116.8 lb (53 kg) Ship: 123.5 lb (56 kg)	



#### B. Welding Power Source With Cart And Cooler

*Overall dimensions (A, B, and C) include lifting eye, handles, hardware, etc.*

Dimensions	
A	58.5 in. (1485 mm)
B	20.9 in. (530 mm)
C	43.9 in. (1115 mm)
Weight	
Net: 280 lb (127 kg)	



### 3-8. Environmental Specifications

#### A. IP Rating

IP Rating
IP23S
This equipment is designed for outdoor use. It may be stored, but is not intended to be used for welding outside during precipitation unless sheltered.

#### B. Temperature Specifications

Operating Temperature Range*	Storage/Transportation Temperature Range
-10 to 40°C	-20 to 55°C

\*Output is derated at temperatures above 104°F (40°C).


### C. 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.**

This equipment does not comply with IEC 61000-3-12. If it is connected to a public low voltage system, it is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment can be connected. IEC/TS 61000-3-4 can be used to guide parties concerned by the installation of arc welding equipment with an input current greater than 16 A in a low voltage network.

### D. EU Ecodesign Information

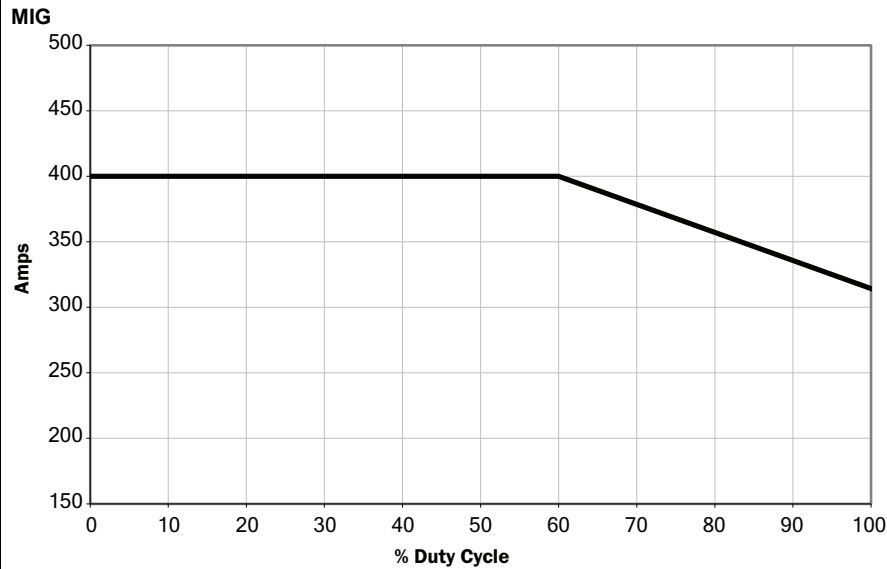
Model	Input	Minimum Power Source Efficiency	Maximum Idle State Power Consumption
S400i	400V Three Phase	91%	10W

	<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>
---	---

Critical raw materials possibly present in indicative amounts higher than 1 gram at component level	
Component	Critical Raw Material
Printed circuit boards	Baryte, Bismuth, Cobalt, Gallium, Germanium, Hafnium, Indium, Heavy Rare Earth, Light Rare Earth, Niobium, Platinum Group Metals, Scandium, Silicon Metal, Tantalum, Vanadium
Plastic components	Antimony, Baryte
Electrical and electronic components	Antimony, Beryllium, Magnesium
Metal components	Beryllium, Cobalt, Magnesium, Tungsten, Vanadium
Cables and cable assemblies	Borate, Antimony, Baryte, Beryllium, Magnesium
Display panels	Gallium, Indium, Heavy Rare Earth, Light Rare Earth, Niobium, Platinum Group Metals, Scandium
Batteries	Fluorspar, Heavy Rare Earth, Light Rare Earth, Magnesium



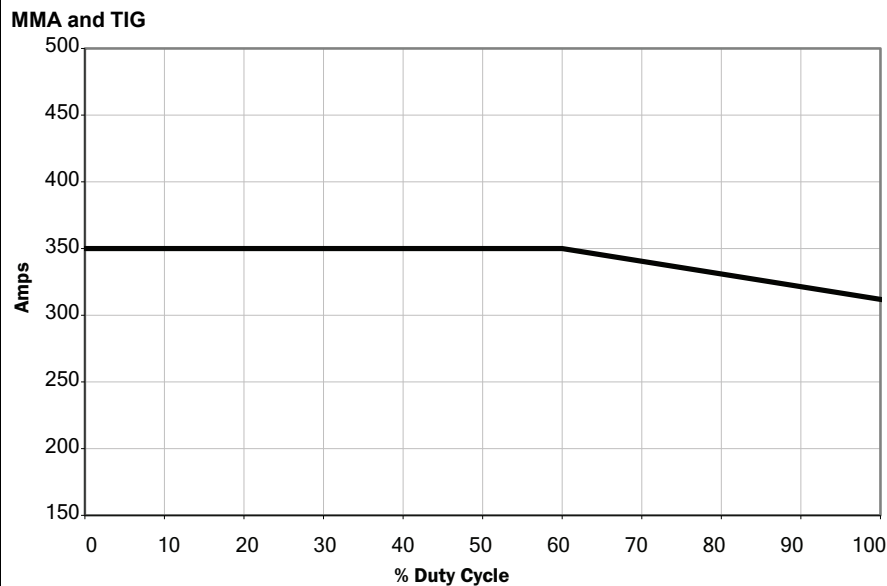
### 3-9. Duty Cycle And Overheating



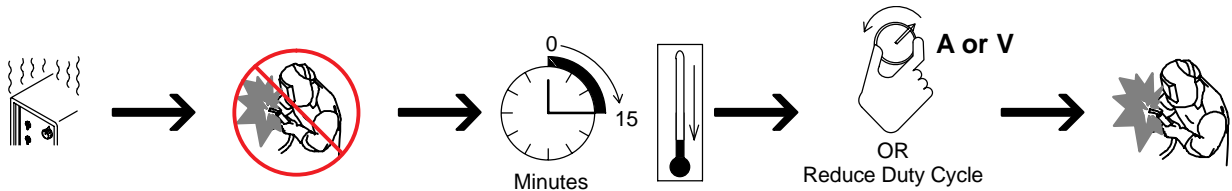
Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

**NOTICE** – Exceeding duty cycle can damage unit and void warranty.



#### Overheating

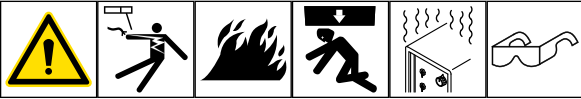


### 3-10. Static Characteristics

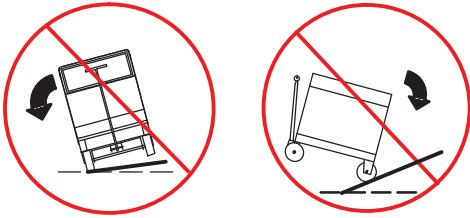
The static (output) characteristics of the welding power source can be described as *flat* during the GMAW process and *drooping* during the SMAW and GTAW processes. Static characteristics are also affected by control settings (including software), electrode, shielding gas, weldment material, and other factors. Contact the factory for specific information on the static characteristics of the welding power source.

# SECTION 4 – INSTALLATION

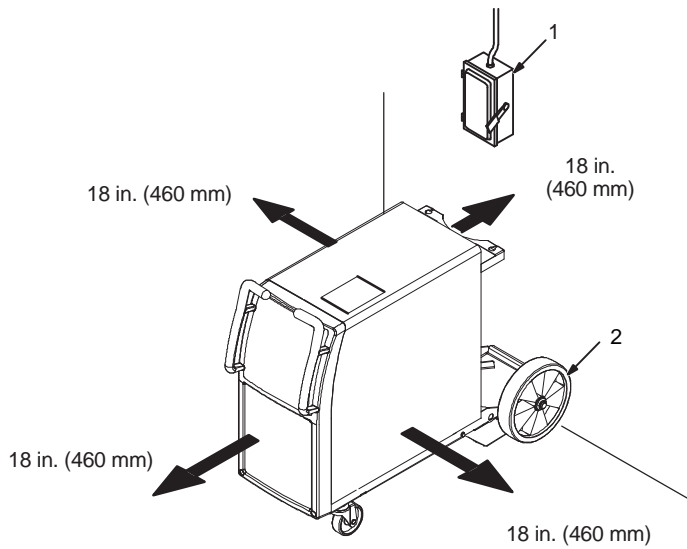
## 4-1. Selecting A Location



### Movement



### Location And Airflow



⚠ Do not move or operate unit where it could tip.

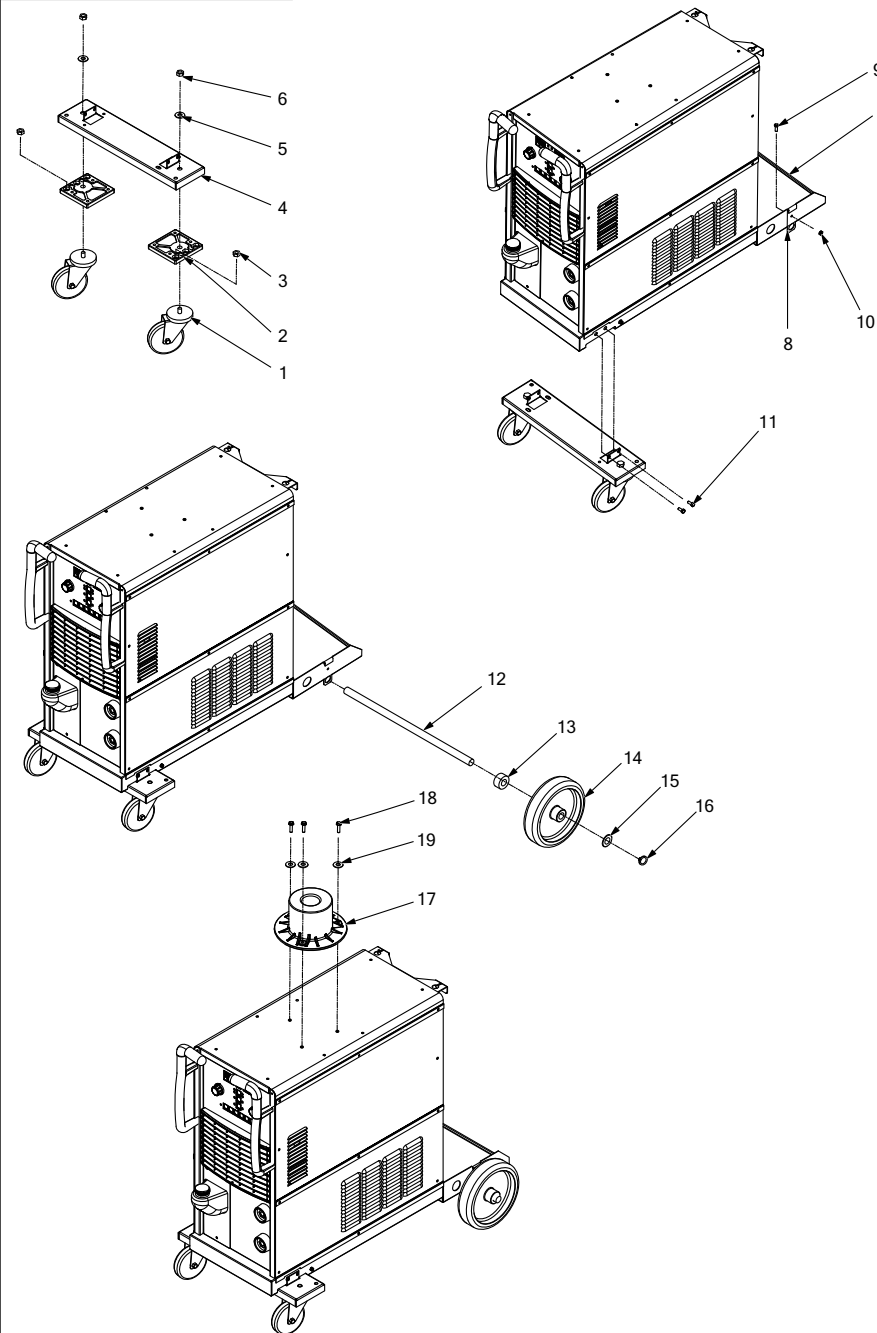
⚠ Special installation may be required where gasoline or volatile liquids are present - see NEC Article 511 or CEC Section 20.

1 Line Disconnect Device

2 Running Gear

Locate unit near correct input power supply.

## 4-2. Installing Running Gear



- 1 Caster Wheels (2)
- 2 Plates (2)
- 3 M10 Nuts (2)
- 4 Wheel Bracket
- 5 12 x 24 Washers (2)
- 6 M12 Nuts (2)

Assemble front caster wheels as shown. Use handles on front of power source to lift machine onto casters.

- 7 Rear Bracket
- 8 Clips (2)
- 9 M5x10 Screws (2)
- 10 M5 Nuts (2)
- 11 M6x14 Screws (4)

Install clips on rear bracket. Secure with M5 screws and nuts.

Install front caster assembly and secure with M6 screws.

- 12 Rear Axle
- 13 Spacer (2)
- 14 Rear Wheel (2)
- 15 21x37 Washer (2)
- 16 Seger Washer (2)

Install axle through clips on rear bracket. On each side, install spacer, wheel, washer, and seger washer.

- 17 Wire Feeder Mount
- 18 M6x25 Screws (3)
- 19 6x18 Washers (3)

Install wire feeder mount on top of power source. Secure with screws and washers as shown.

### 4-3. Selecting Cable Sizes\*

**NOTICE** – The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 30 m (100 ft) from the workpiece, the total cable length in the weld circuit is 60 m (2 cables x 30 m). Use the 60 m (200 ft) column to determine cable size.

	Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding***							
	30 m (100 ft) or Less		45 m (150 ft)	60 m (200 ft)	70 m (250 ft)	90 m (300 ft)	105 m (350 ft)	120 m (400 ft)
Welding Amperes	10 - 60% Duty Cycle mm <sup>2</sup> (AWG)	60 - 100% Duty Cycle mm <sup>2</sup> (AWG)	10 - 100% Duty Cycle mm <sup>2</sup> (AWG)					
100	20 (4)	20 (4)	20 (4)	30 (3)	35 (2)	50 (1)	60 (1/0)	60 (1/0)
150	30 (3)	30 (3)	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	95 (3/0)
200	30 (3)	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	120 (4/0)
250	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	2x70 (2x2/0)	2x70 (2x2/0)
300	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	2x70 (2x2/0)	2x95 (2x3/0)	2x95 (2x3/0)
350	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	2x70 (2x2/0)	2x95 (2x3/0)	2x95 (2x3/0)	2x120 (2x4/0)
400	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	2x70 (2x2/0)	2x95 (2x3/0)	2x120 (2x4/0)	2x120 (2x4/0)

\* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

\*\*Weld cable size is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.

\*\*\*For distances longer than those shown in this guide, see AWS Fact Sheet No. 39, Welding Cables, available from the American Welding Society at <http://www.aws.org>.

### 4-4. Weld Output Terminals

The diagram shows a front view of a welding power source. At the top left, there are three safety icons: a yellow warning triangle, a person being struck by a falling object, and a pair of safety glasses. Below these icons, the power source is shown with three callout lines: '1' points to the negative (-) terminal, '2' points to the positive (+) terminal, and '3' points to a connector on the top panel.

**⚠ Turn off power before connecting to weld output terminals.**

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

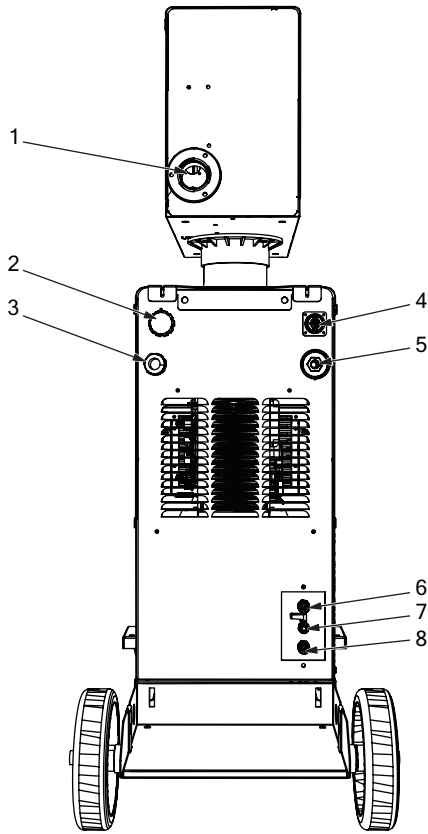
1 Negative (-) Weld Output Terminal

2 Positive (+) Weld Output Terminal

Terminals are 95 mm<sup>2</sup> Dinse connectors.

3 Euro Connector

## 4-5. Back Panel Connections

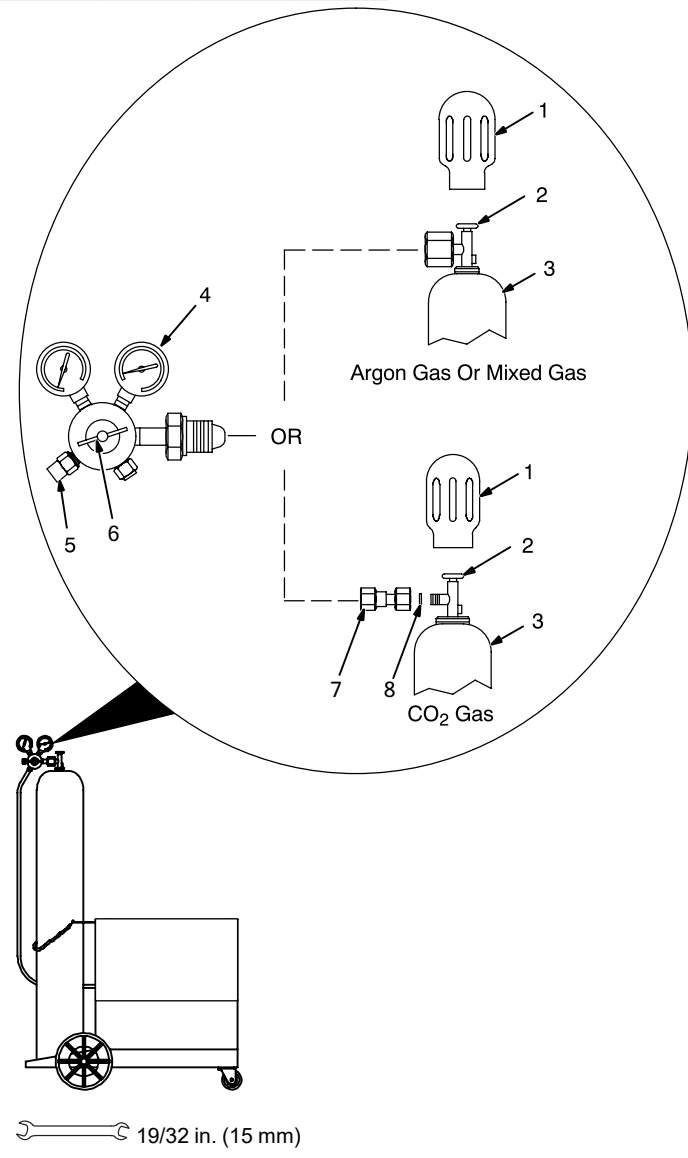
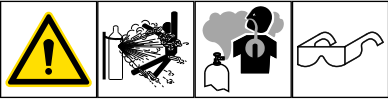


- 1 Connections To Wire Feeder
- 2 Power Switch
- 3 Input Power Cord
- 4 7- Pin Control Cable Receptacle (See Section 4-11)
- 5 Positive Weld Output Terminal Connection To Wire Feeder

Dinse connector, 95 mm<sup>2</sup>.

- 6 Cooler Connection
- 7 Water Purge Valve
- 8 Cooler Connection

## 4-6. Installing Gas Supply



Obtain gas cylinder and chain to running gear, wall, or other stationary support so cylinder cannot fall and break off valve.

- 1 Cap
- 2 Cylinder Valve

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

- 3 Cylinder
- 4 Regulator/Flowmeter

Install so face is vertical.

- 5 Regulator/Flowmeter Gas Hose Connection

For TIG welding, connect gas hose between regulator/flowmeter gas hose connection and TIG torch.

For MIG welding, connect gas hose from MIG gun to regulator/flowmeter gas hose connection.

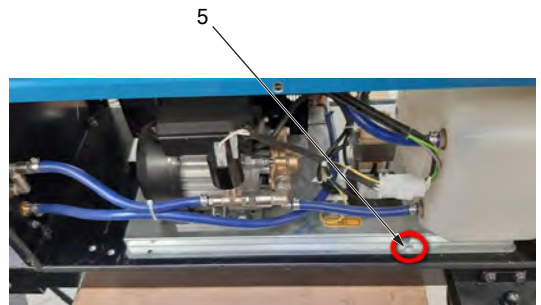
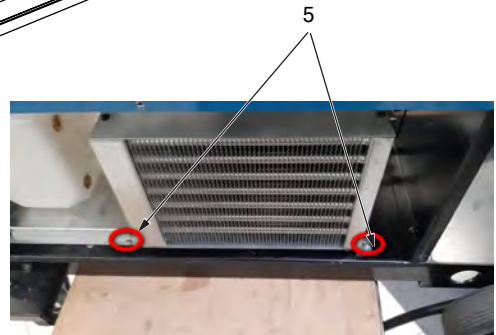
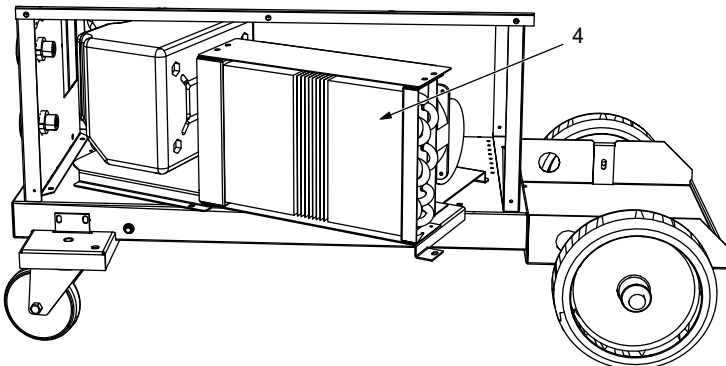
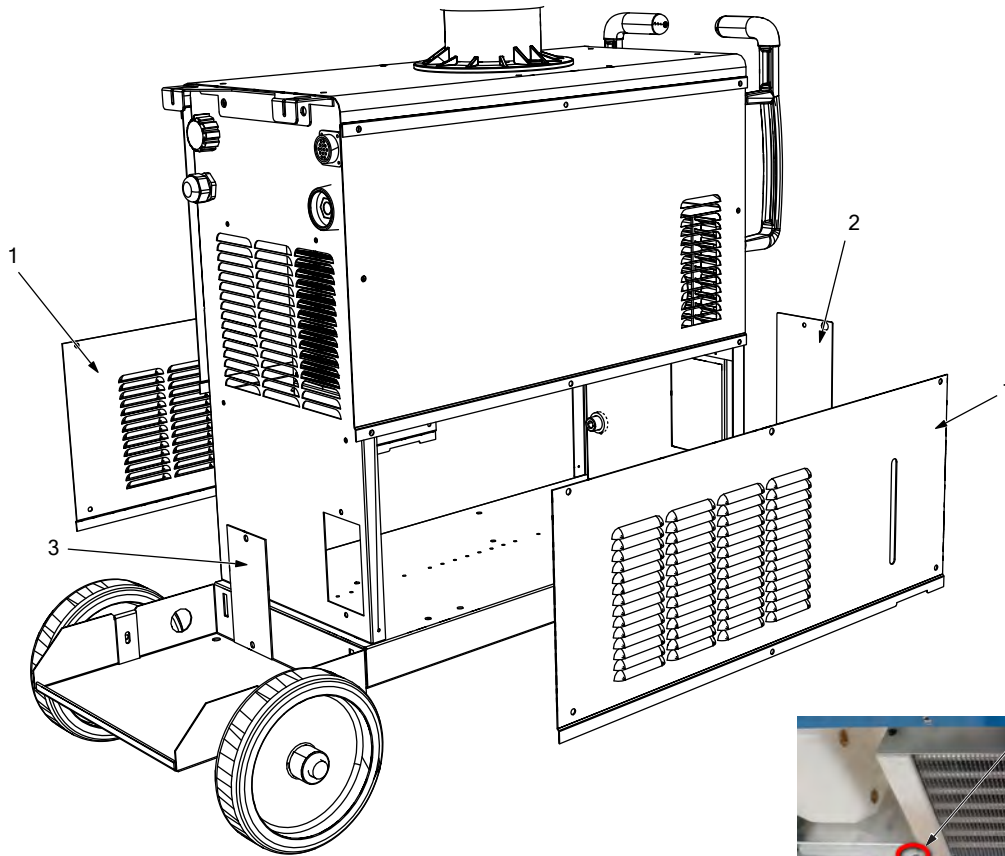
- 6 Flow Adjust

Typical flow rate is between 15-20 liters per minute. Check wire manufacturer's recommended flow rate.

- 7 CO<sub>2</sub> Adapter (Customer Supplied)
- 8 O-Ring (Customer Supplied)

Install adapter with O-ring between regulator/flow meter and CO<sub>2</sub> cylinder.

## 4-7. Cooler Connections

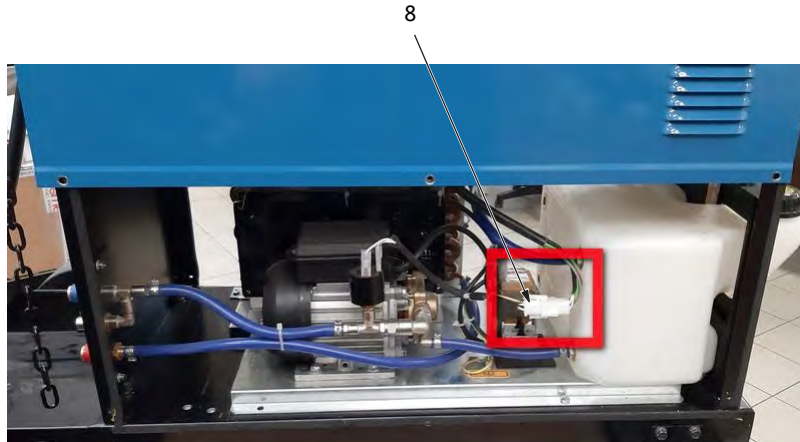
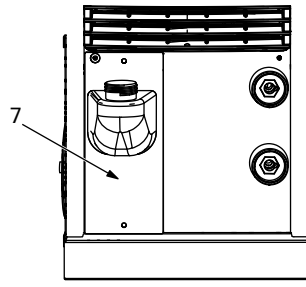
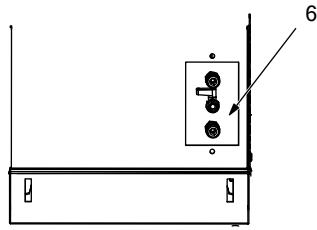


- 1 Cooler Side Panels
- 2 Cooler Front Knockout
- 3 Cooler Rear Knockout
- 4 Water Cooling Unit
- 5 No3 M5x12 Screws

Remove cooler side panels and knockouts.  
Retain hardware.

Install water cooling unit and secure with  
No3 M5x12 screws.





- 6 In/Out Plate
- 7 Tank Plate

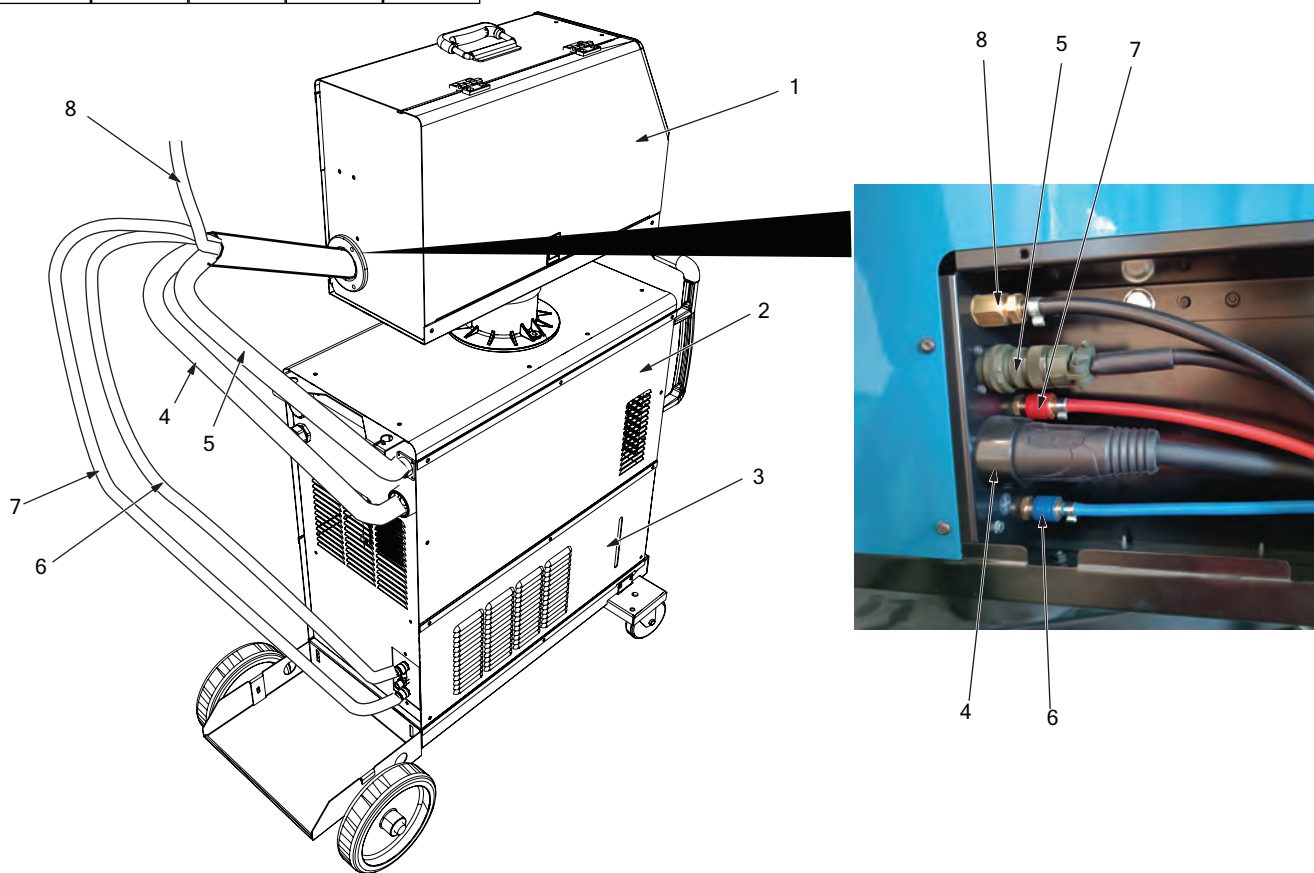
Install the In/Out plate on the rear of the machine. Install the metal plate to cover the water cooler tank on the front.

- 8 Water Cooler Connection

Connect the water cooler as shown.

Activate the cooler with the Initial Setup menu. See Section 5-2.

## 4-8. Wire Feeder Connections



 17 mm

- 1 Wire Feeder
- 2 Welding Power Source
- 3 Cooler
- 4 Weld Cable
- 5 Control Cable

Connect weld cable to positive weld output terminal on rear panel of welding power source.

Connect control cable to 7-pin receptacle on rear panel of welding power source.

6 Water In Connection

7 Water Out Connection

Connect to water in/out quick connectors on rear panel of cooler.

8 Gas Hose

Connect to gas cylinder.

## 4-9. Electrical Service Guide

**⚠** Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for an individual branch circuit sized for the rated output and duty cycle of one welding power source. In individual branch circuit installations, the National Electrical Code (NEC) allows the receptacle or conductor rating to be less than the rating of the circuit protection device. All components of the circuit must be physically compatible. See NEC articles 210.21, 630.11, and 630.12.

**⚠** CE-marked equipment shall only be used on a supply network that is a three-phase, four-wire system with an earthed neutral.

*☞ Actual input voltage should not fall below 340 volts AC or rise above 460 volts AC. If actual input voltage is outside this range, unit may not operate according to specifications.*

	<b>S400i</b>
<b>Rated Supply Voltage (V)</b>	400
<b>Rated Maximum Supply Current <math>I_{1max}</math> (A)</b>	22.0
<b>Rated Effective Supply Current <math>I_{1eff}</math> (A)</b>	17.6
<b>Maximum Recommended Standard Fuse Rating In Amperes<sup>1</sup></b>	
<b>Time Delay Fuses<sup>2</sup></b>	30
<b>Normal Operating Fuses<sup>3</sup></b>	35
<b>Maximum Recommended Supply Conductor Length In Feet (Meters)<sup>4</sup></b>	248 (75)
<b>Raceway Installation</b>	
<b>Minimum Supply Conductor Size In AWG (mm<sup>2</sup>)<sup>5</sup></b>	10 (6)
<b>Minimum Grounding Conductor Size In AWG (mm<sup>2</sup>)<sup>5</sup></b>	10 (6)

Reference: 2023 National Electrical Code (NEC) (including article 630)

1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.

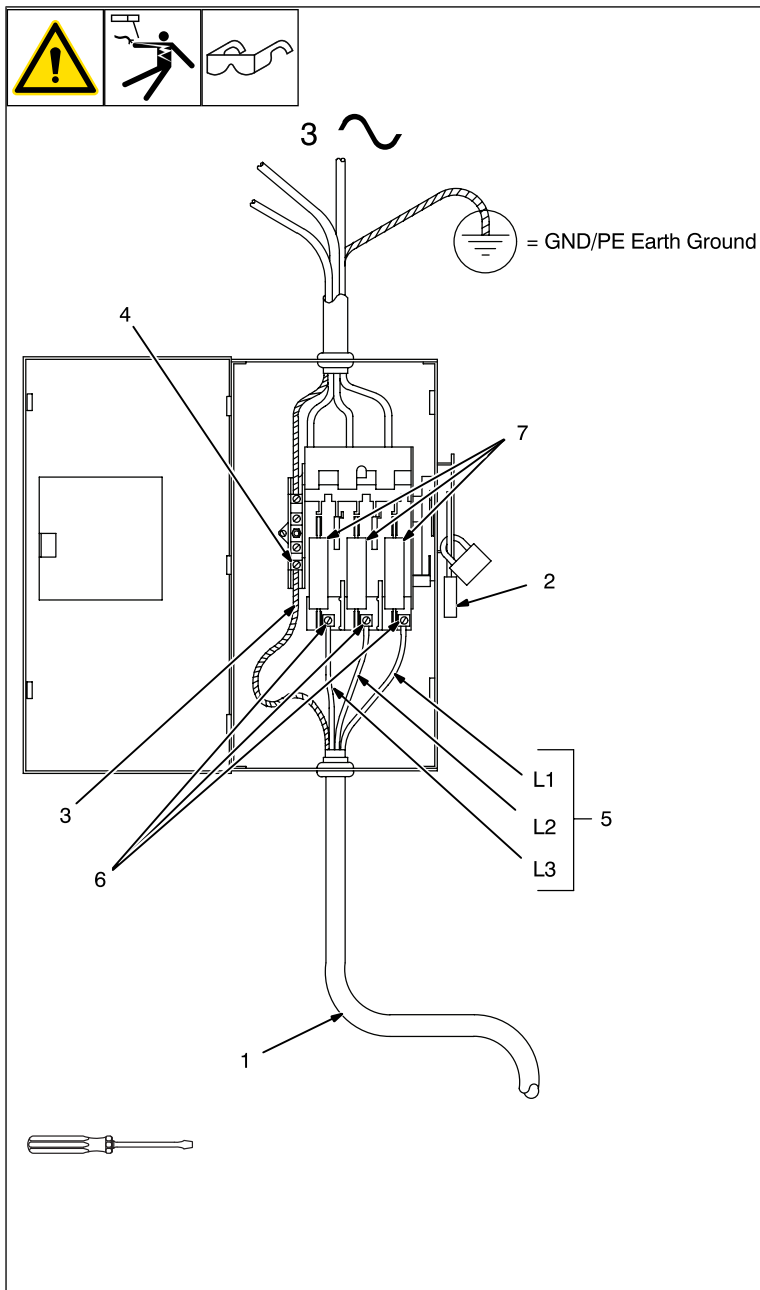
2 "Time-Delay" fuses are UL class "RK5" . See UL 248.




3 "Normal Operating" (general purpose - no intentional delay) fuses are UL class "K5" (up to and including 60 amps), and UL class "H" ( 65 amps and above). See UL 248.

4 Maximum total length of copper supply conductors in entire installation, raceway and/or flexible cord.

5 Raceway conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16 and is based on allowable ampacities of insulated copper conductors having a temperature rating of 75°C (167°F) with not more than three single current-carrying conductors in a raceway.

## 4-10. Connecting 3-Phase Input Power



-  Installation must meet all National and Local Codes—have only qualified persons make this installation.
-  Disconnect and lockout/tagout input power before connecting input conductors from unit. Follow established procedures regarding the installation and removal of lockout/tagout devices.
-  Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

See rating label on unit and check input voltage available at site.

### For Three-Phase Operation

- 1 Input Power Cord
- 2 Disconnect Device (switch shown in the OFF position)
- 3 Green Or Green/Yellow Grounding Conductor
- 4 Disconnect Device Grounding Terminal
- 5 Input Conductors (L1, L2, And L3)
- 6 Disconnect Device Line Terminals

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

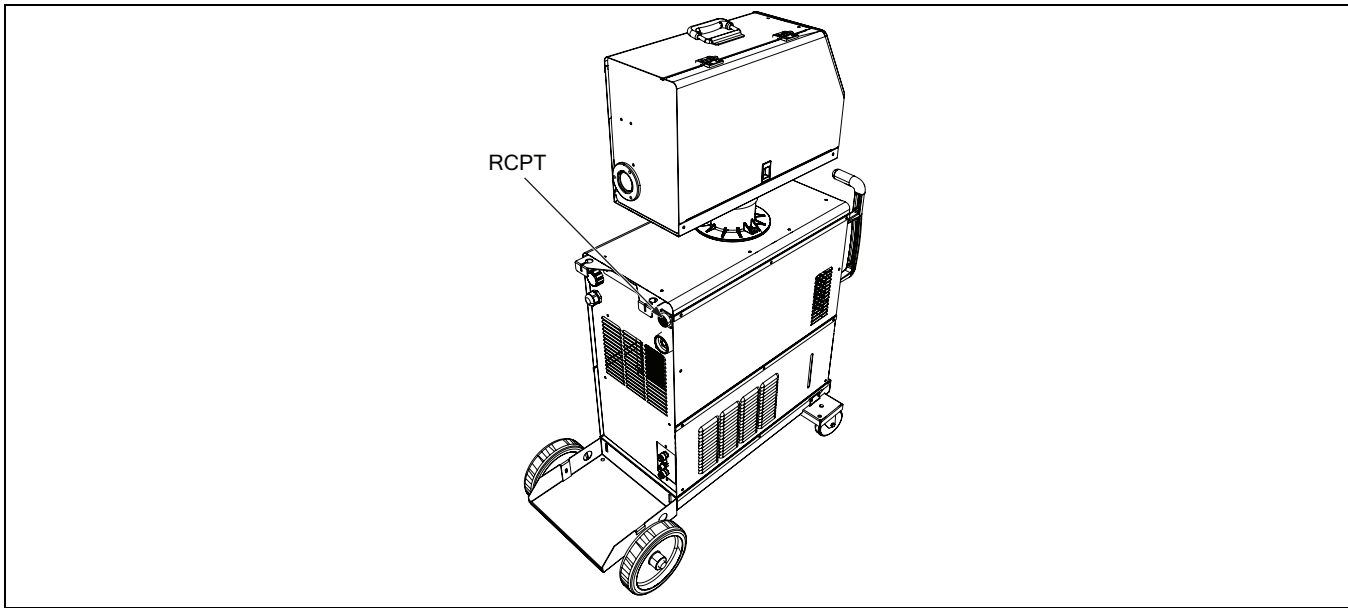
Connect input conductors L1, L2, and L3 to disconnect device line terminals.

### 7 Over-Current Protection

Select type and size of over-current protection using Electrical Service Guide (fused disconnect switch shown).

Close and secure door on disconnect device. Follow established lockout/tagout procedures to put unit in service.

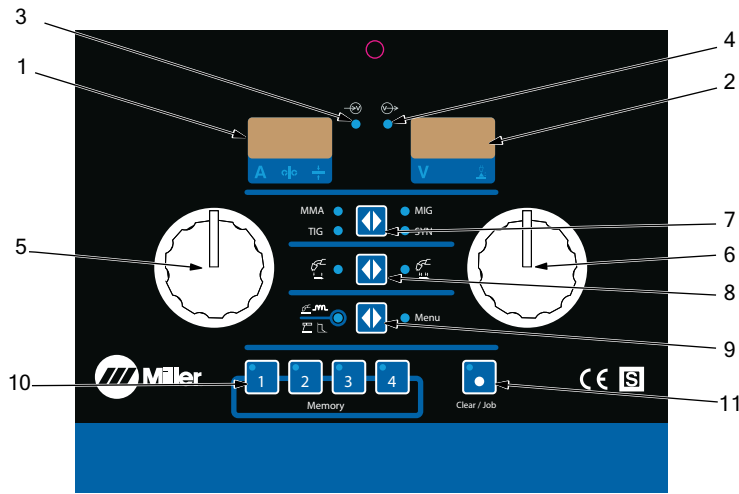
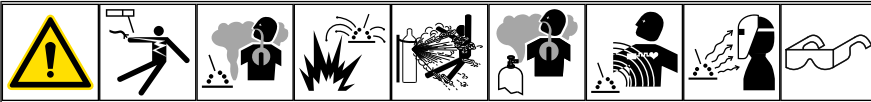
## 4-11. Extension Control Cable Connector



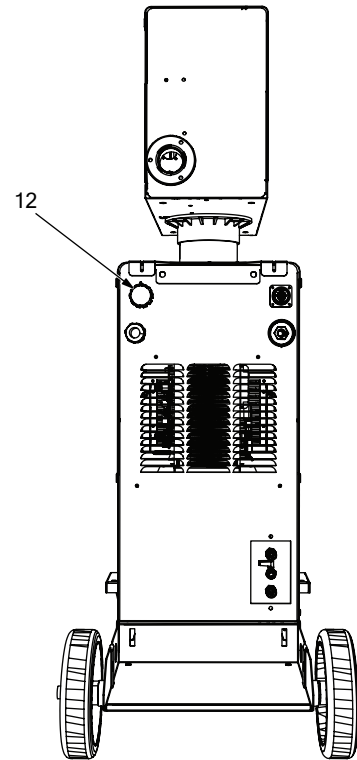
		Pin	Pin Information	
	F	ROSSO--RED	F	Positive power supply (32 volts DC)
	A	NERO--BLACK	A	Negative power supply (32 volts DC)
	B		B	No connection
	G		G	No connection
	E	GRIGIO--GREY	E	Signal GND
	D	BLU--BLUE	D	RX data
	C	MARRONE--BROWN	C	TX data

# SECTION 5 – OPERATION

## 5-1. Front Panel Controls



77650713



- |                   |                              |                                 |
|-------------------|------------------------------|---------------------------------|
| 1 Left Display    | 5 Left Encoder Knob          | 9 Menu Button                   |
| 2 Right Display   | 6 Right Encoder Knob         | 10 Memory Buttons               |
| 3 Input Power LED | 7 Process Select Button      | 11 Clear/Job Button             |
| 4 Output On LED   | 8 Trigger Mode Select Button | 12 Power Switch (On Rear Panel) |

## 5-2. Initial Setup Menu

1 Left Display  
2 Right Display  
3 Left Encoder Knob  
4 Right Encoder Knob  
5 Menu Button  
6 Process Button

The initial setup menu allows the user to set various parameters for the welding power source.

To enter initial setup menu, first turn off the welder.

Hold down the menu button and turn the welder on.

Use the left encoder knob or press the menu button to scroll through parameters (see table below).

Use the right encoder knob to change settings.

To exit the initial setup menu, press the Process button.

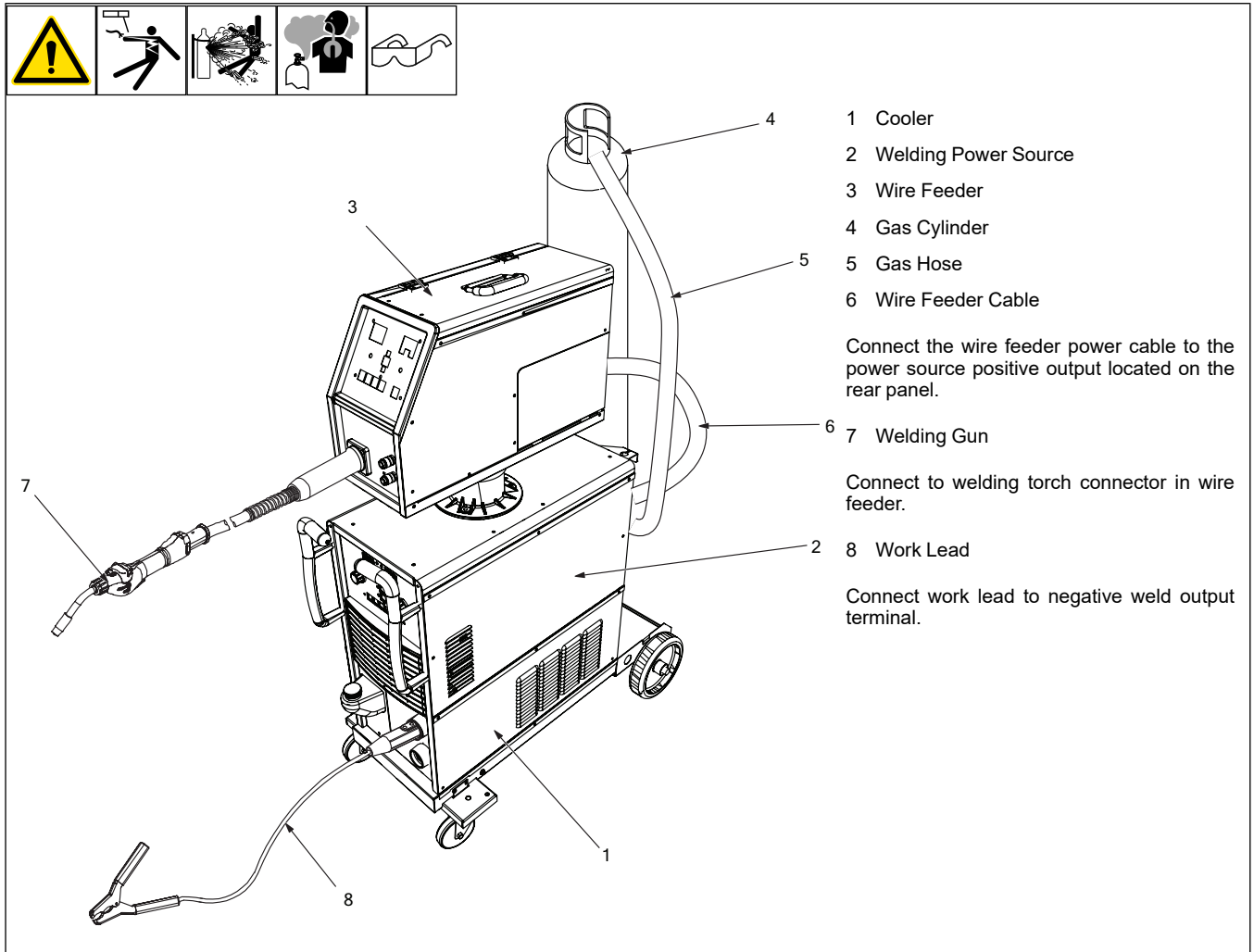
77650713

Left Display	Parameter	Settings (Right Display)
P01	Water Cooler	<b>Off:</b> cooler is always disabled (default value) <b>On:</b> cooler runs on demand (recommended value for standard water cooling units) <b>Aut:</b> cooling unit with self-recognition (value only for special cooling units)
P02	Digital Meter	Setting of the seconds in which the welding parameters, voltage and current, are displayed after the welding is stopped (0.0 to 10.0 seconds; default 3.0 seconds)
P03	Unit	<b>MET:</b> metric units (default value) <b>IMP:</b> imperial/English units
P04	Start Mode Motor management during MIG striking	<b>SFT:</b> active wire approach to limit sprays (default value) <b>Hrd:</b> wire approach not active
P05	Pinch Cutting of the wire ball formed after blowback time	<b>On:</b> wire ball cutting activated; assists striking arc in MIG (default value) <b>Off:</b> wire ball cutting not activated; not recommended for MIG
P06	Plus Mode	<b>Off:</b> the functioning of the torch trigger in 2T and 4T remains active (default value) <b>On:</b> functions in 2T, 4T, 2TP, 4TP modes get activated (additional menu settings available; see Section 6-4)  2TP and 4TP stand for the PLUS modes, i.e. the MIG welding with the slopes enabling.  To change the slope parameters and for correct setting, consult a factory authorized service agent.
P07	VCut	<b>Aut (Automatic):</b> the extinguishing voltage varies with the set current (default value) <b>15 V - 40 V:</b> fixed arc extinguishing length <b>Off:</b> extinguishing voltage is the same as the no-load voltage of the welding power source
P08	VRD	<b>On:</b> no-load voltage lowered to 12 V <b>Off:</b> not lowered no-load voltage (default value)
P09	Output Cable Length	<b>Off:</b> (default value) 3, 5, 10, 15, 20, 30 meter

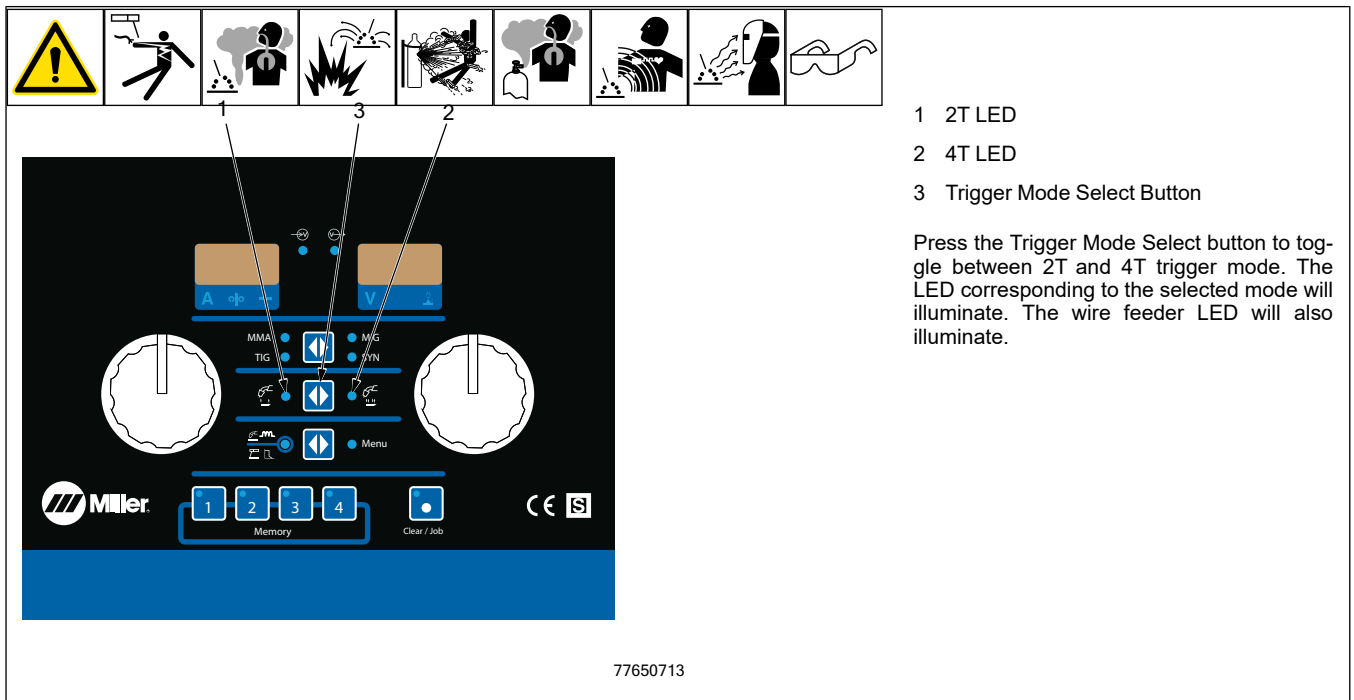


# SECTION 6 – MIG OPERATION

## 6-1. MIG Connections

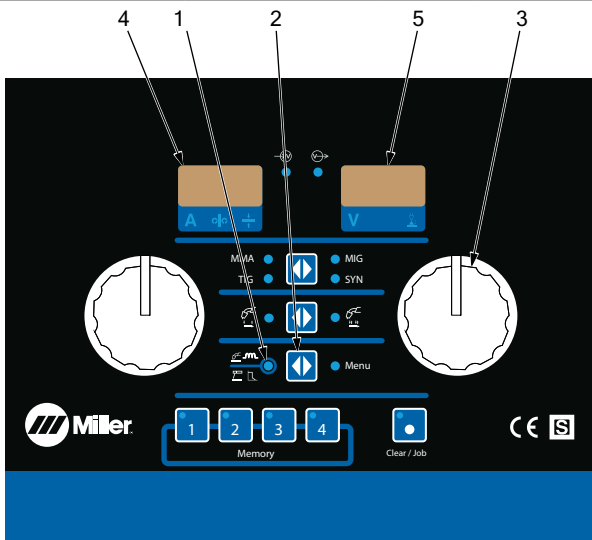
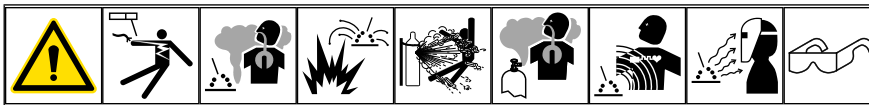


## 6-2. 2T/4T Mode



77650713

### 6-3. Inductance



- 1 Inductance LED
- 2 Menu Button
- 3 Right Encoder Knob
- 4 Left Display
- 5 Right Display

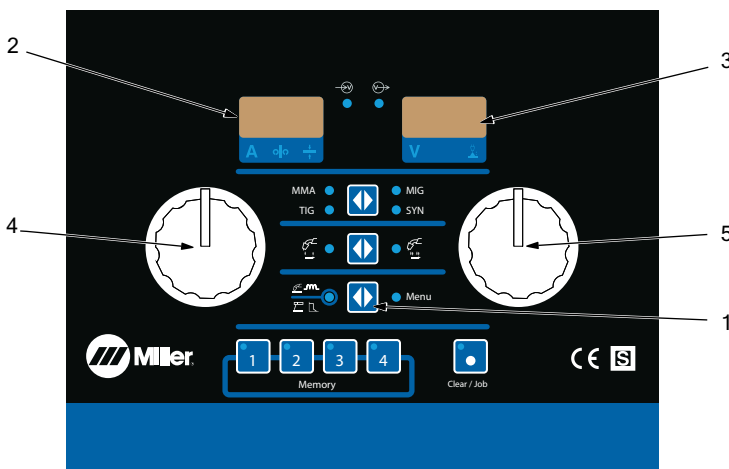
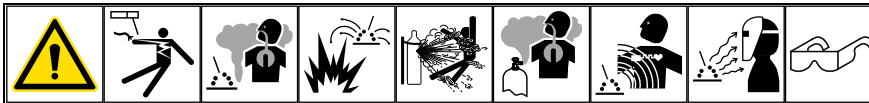
When in the MIG process, press the Menu button to set inductance.

The Inductance LED will blink. The left display will read P50. The right display will show an inductance value between 0 and 50. Use the right encoder knob to change the inductance setting.

Press the Menu button again to exit the inductance menu, or wait five seconds for the LED to stop blinking.

77650713

### 6-4. MIG Setup Menu



- 1 Menu Button
- 2 Left Display
- 3 Right Display
- 4 Left Encoder Knob
- 5 Right Encoder Knob

In MIG mode, hold the Menu button for at least 5 seconds to enter the MIG setup menu.

Change the parameter by turning the left encoder knob. Change the value by turning the right encoder knob.

When finished, press the Menu button to exit.

77650713

Standard Mode Settings		
Left Display	Parameter	Settings (Right Display)
P60	Gas Pre-Flow	0.0 (default) to 10.0 seconds
P61	Slope	0.00 (default) to 2.50
P70	Burnback Time	1 to 100; default value 50
P71	Gas Postflow	0.0 to 25.0 seconds; default value 3.0 seconds

Plus Mode					
Left Display	Parameter	Manual 2T	Manual 4T	Synergic 2T	Synergic 4T
P50	Dynamic/Inductance	0 to 50		-20 to 20	
P62	Hot Start WFS	m/min		% (m/min)	
P63	Hot Start Voltage/Arc Length	12.0 volts to Max voltage		-9.9 to 9.9 volts	
P64	Hot Start Time	0.0 to 10.0 seconds		0.0 to 10.0 seconds	
P65	Hot Start Ramp Time	0.0 to 10.0 seconds			
P66	Crater Ramp Time	0.0 to 10.0 seconds			
P67	Crater WFS	m/min		% (m/min)	
P68	Crater Voltage/Arc Length	1 to 100 (default 50)			
P69	Crater Time	0.0 to 25.0 seconds (default 3.0)			

## 6-5. Synergic MIG Mode

1 Process Button  
 2 Synergic MIG LED  
 3 Left Display  
 4 Right Display  
 5 Left Encoder Knob  
 6 Right Encoder Knob  
 7 Menu Button

Press the Process button until the Synergic MIG LED illuminates to enable Synergic MIG mode.

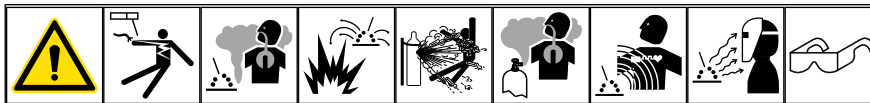
Press and hold the Clear/Job button for two seconds to access the Synergic MIG menu and select a program from the Job List.

77650713

## 6-6. Synergic MIG Job List

Number	Material	Gas	Wire Diameter
01	Fe	Ar80-20CO <sub>2</sub>	0.8
02	Fe	Ar80-20CO <sub>2</sub>	1.0
03	Fe	Ar80-20CO <sub>2</sub>	1.2
05	Fe	Ar92-8CO <sub>2</sub>	0.8
06	Fe	Ar92-8CO <sub>2</sub>	1.0
07	Fe	Ar92-8CO <sub>2</sub>	1.2
09	Fe	CO <sub>2</sub>	0.8
10	Fe	CO <sub>2</sub>	1.0
11	Fe	CO <sub>2</sub>	1.2
13	SS 3** Series	Ar92-8CO <sub>2</sub>	0.8
14	SS 3** Series	Ar92-8CO <sub>2</sub>	1.0
15	SS 3** Series	Ar92-8CO <sub>2</sub>	1.2
20	AlSi	Ar	1.2
24	AlMg	Ar	1.0
25	AlMg	Ar	1.2
30	Fe metal	Ar80-20CO <sub>2</sub>	1.2
31	Fe rutil	Ar80-20CO <sub>2</sub>	1.2

## 6-7. Save And Recall (MIG Only)



1 Program Buttons 1–4

2 Left Display

3 Right Display

### Save

To save weld settings, press and hold the desired Program button (1–4). The left display will show SAV. The right display will show the program number.

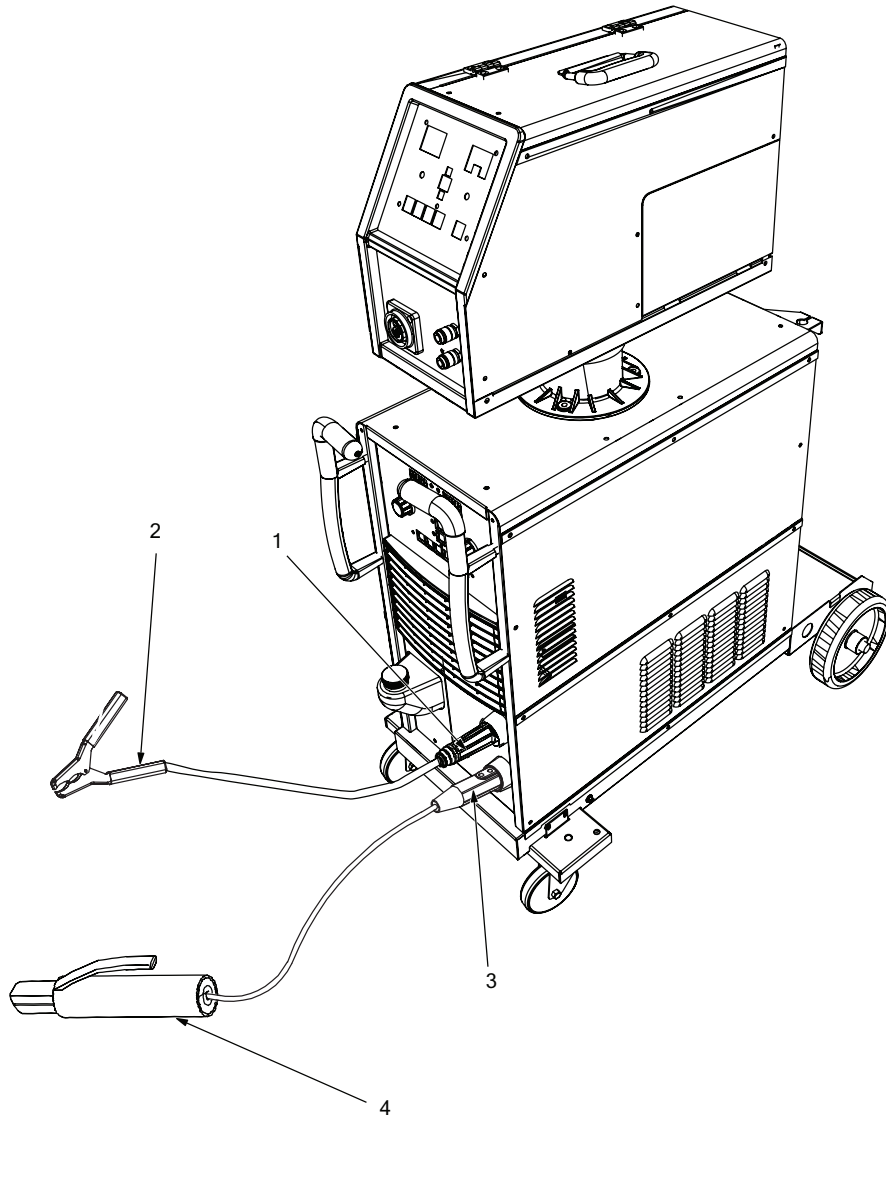
### Recall

To load saved weld settings, press the desired Program button (1–4). The left and right displays will show REC and the program number for approximately three seconds. The saved settings will then be displayed.

77650713

# SECTION 7 – MMA (STICK) OPERATION

## 7-1. MMA (Stick) Connections

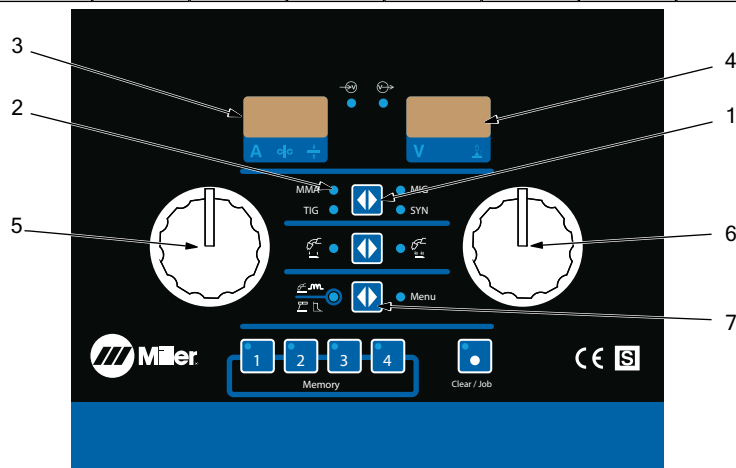
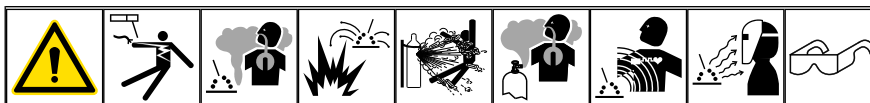


- 1 Negative Weld Output Terminal
- 2 Work Cable
- 3 Positive Weld Output Terminal
- 4 Electrode Holder

Disconnect wire feeder from welding power source.

Connect work cable to negative weld output terminal. Connect electrode holder to positive weld output terminal.

## 7-2. MMA (Stick) Welding



77650713

- 1 Process Button
- 2 MMA LED
- 3 Left Display
- 4 Right Display
- 5 Left Encoder Knob
- 6 Right Encoder Knob
- 7 Menu Button

### MMA Mode

Press the Process button until the MMA LED illuminates to enable MMA mode.

Amperage will be shown on the left display. Use the left encoder knob to adjust amperage.

Hot Start is the percentage increase of arc starting current from the set welding current. The right display shows the Hot Start value from H0 to H50. Adjust with right encoder knob.

### Arc Force

In MMA mode, press the Menu button to adjust Arc Force (Dig).

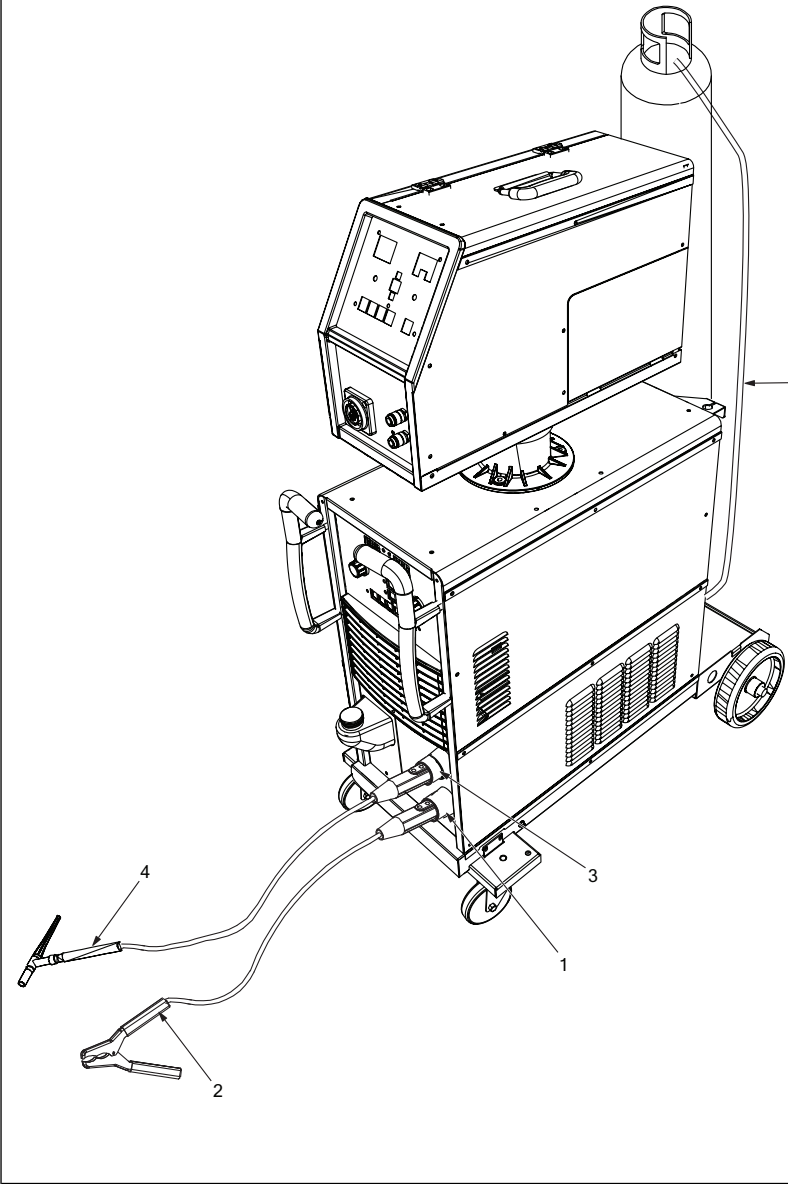
The left display will show Arc. The right display will show an Arc Force value from A0 to A20. Use the right encoder knob to adjust Arc Force.

### Voltage Reduction Device (VRD)

Enter the Initial Setup menu to enable or disable VRD. See Section 5-2.

# SECTION 8 – TIG OPERATION

## 8-1. TIG Connections



- 1 Positive Weld Output Terminal
- 2 Work Cable
- 3 Negative Weld Output Terminal
- 4 TIG Torch
- 5 Gas Hose

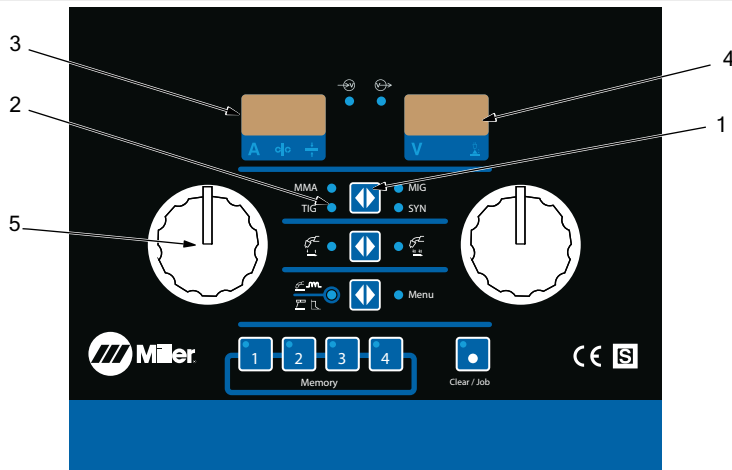
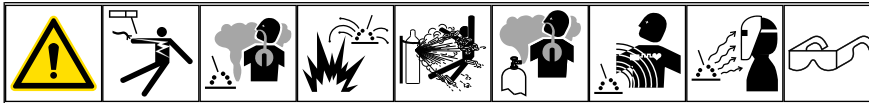
Connect the work cable to the positive weld output terminal. Connect the work clamp to the workpiece.

Connect the TIG torch to the negative weld output terminal.

5 Connect the gas hose from the regulator to the gas valve on the rear of the cooler.



## 8-2. TIG Welding



77650713

- 1 Process Button
- 2 TIG LED
- 3 Left Display
- 4 Right Display
- 5 Left Encoder Knob

### TIG Mode

Press the Process button until the TIG LED illuminates to enable TIG mode.

Amperage will be shown on the left display. Use the left encoder knob to adjust amperage.

The right display will be blank.

### TIG (VCut)

The VCut parameter varies the TIG lift arc extinguishing voltage to avoid defects on the welded piece.

Enter the Initial Setup menu to adjust the VCut parameter. See Section 5-2.


**Aut (Automatic):** the extinguishing voltage varies with the set current (default value)

**15 V - 40 V:** a fixed arc extinguishing length can be set

**Off:** extinguishing voltage is the same as the no-load voltage

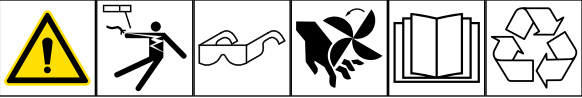
# SECTION 9 – MAINTENANCE AND TROUBLESHOOTING

## 9-1. Routine Maintenance



		Every 3 Months	Every 6 Months	Every 12 Months	Reference Section
 <p><b>⚠</b> Disconnect power before maintaining.</p> <p><i>👉 Service equipment more often if used in severe conditions.</i></p>					
Maintenance Schedule		Every 3 Months	Every 6 Months	Every 12 Months	Reference Section
<b>Coolant Filter</b>	Clean coolant filter. <b>NOTICE</b> – Severe conditions may require more frequent cleaning (continuous use, high/low temperatures, dirty environment, etc.). Failure to properly clean coolant filter voids pump warranty.	•			
<b>Cords and Cables</b>	Visually check condition of cords and cables. Replace damaged cords and cables.	•			
<b>Torch Body</b>	Visually check condition of weld torches and guns. Replace if damaged.	•			
<b>Gas Hoses</b>	Visually check condition of gas hoses. Replace damaged hoses.	•			
<b>Labels</b>	Check and replace labels if damaged.	•			
<b>Weld Terminals</b>	Clean weld terminals.	•			
<b>Inside of Unit</b>	Clean inside unit.		•		Section 9-3

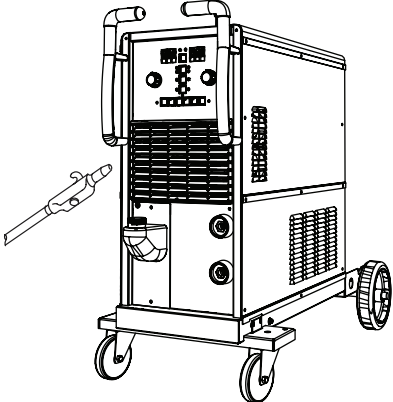
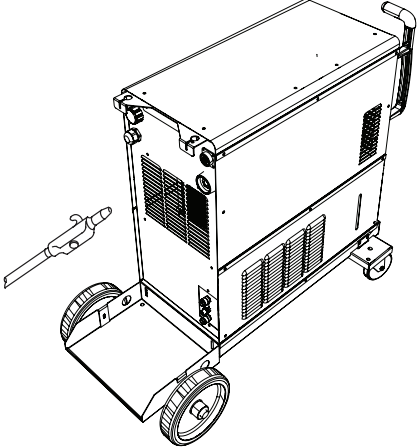
\*To be done by factory authorized service agent.

## 9-2. Coolant Maintenance

 <p><b>⚠</b> Disconnect cooler plug from welding power source receptacle before maintaining.</p> <p><b>⚠</b> Dispose of used coolant according to national, state, and local codes. Do not pour down drain.</p> <p>Unscrew housing to clean filter and housing.</p> <p><b>Changing Coolant</b></p> <p>Drain coolant by tipping unit forward. Fill with clean water and run for 10 minutes. Drain and refill.</p> <p><b>NOTICE</b> – If replacing hoses, use hoses compatible with ethylene glycol, such as Buna-n, Neoprene, or Hypalon. Oxy-acetylene hoses are not compatible with any product containing ethylene glycol.</p>	
---	--

### 9-3. Blowing Out Inside Of Unit

**⚠ Do not remove case when blowing out inside of unit.**

To blow out unit, direct airflow through front and back louvers as shown.

To clean cooler, remove panels and clean radiator and matrix.

### 9-4. Error Codes

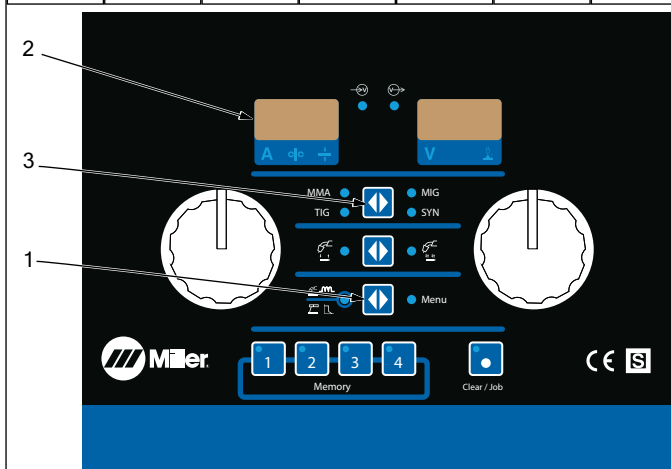
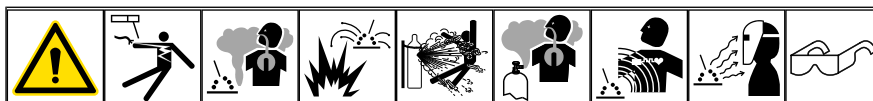
Code	Description	Remedy
1	Current sensor error.	Cycle power to the welding power source. If error persists, contact factory authorized service agent.
2	Primary over temperature.	Leave welding power source on and let cool until error disappears.
3	Secondary over temperature.	Leave welding power source on and let cool until error disappears.
8	Output voltage error: VRD voltage not present. At power up or when switching from MIG to MMA, the machine checks the VRD voltage. If voltage is not present, the machine shows an error.	Short-circuited output. Check that there are no short circuits between positive and negative (e.g. torch left on the piece to be welded) Disconnect all power cables from the output. If error persists, contact factory authorized service agent
9	Maximum output current exceeded.	If in MIG mode, lower the welding parameter. Malfunction with the control circuits: contact factory authorized service agent
10	Primary current sensor disconnect.	Contact factory authorized service agent.
14	Wire feeder motor overcurrent.	Check that torch and wire liner are not clogged or worn. Check that the friction of the wire spool is correctly adjusted. Check if the wire uncoils correctly (overlapped wire)
15	Water cooling pressure error.	Check for the proper working of the water cooling unit. Check the coolant level and that liquid circulates correctly.
16	Data error.	Check cable between power source and wire feeder.
17	Internal error.	Contact factory authorized service agent.

## 9-5. Troubleshooting



Trouble	Remedy
No weld output; unit completely inoperative.	Place line disconnect switch in On position (see Section 4-10).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 4-10).
	Check for proper input power connections (see Section 4-10).
No weld output.	Input voltage outside acceptable range of variation (see Section 4-9, 4-10).
	Check, repair, or replace remote control.
	Unit overheated. Allow unit to cool with fan on (see Section 3-9).
Erratic or improper weld output.	Use proper size and type of weld cables (see Section 4-3).
	Have Factory Authorized Service Agent check front panel board PC1 and replace if necessary.

## 9-6. Factory Reset



- 1 Menu Button
- 2 Left Display
- 3 Process Button

Turn off the welder and disconnect the wire feeder.

Hold the Menu button and turn the welder on. The left display will read P01.

Hold the Process button for five seconds. The displays will show "def - - -" and the LEDs will flash.

The unit has been reset.

77650713



# SECTION 10 – ELECTRICAL DIAGRAMS

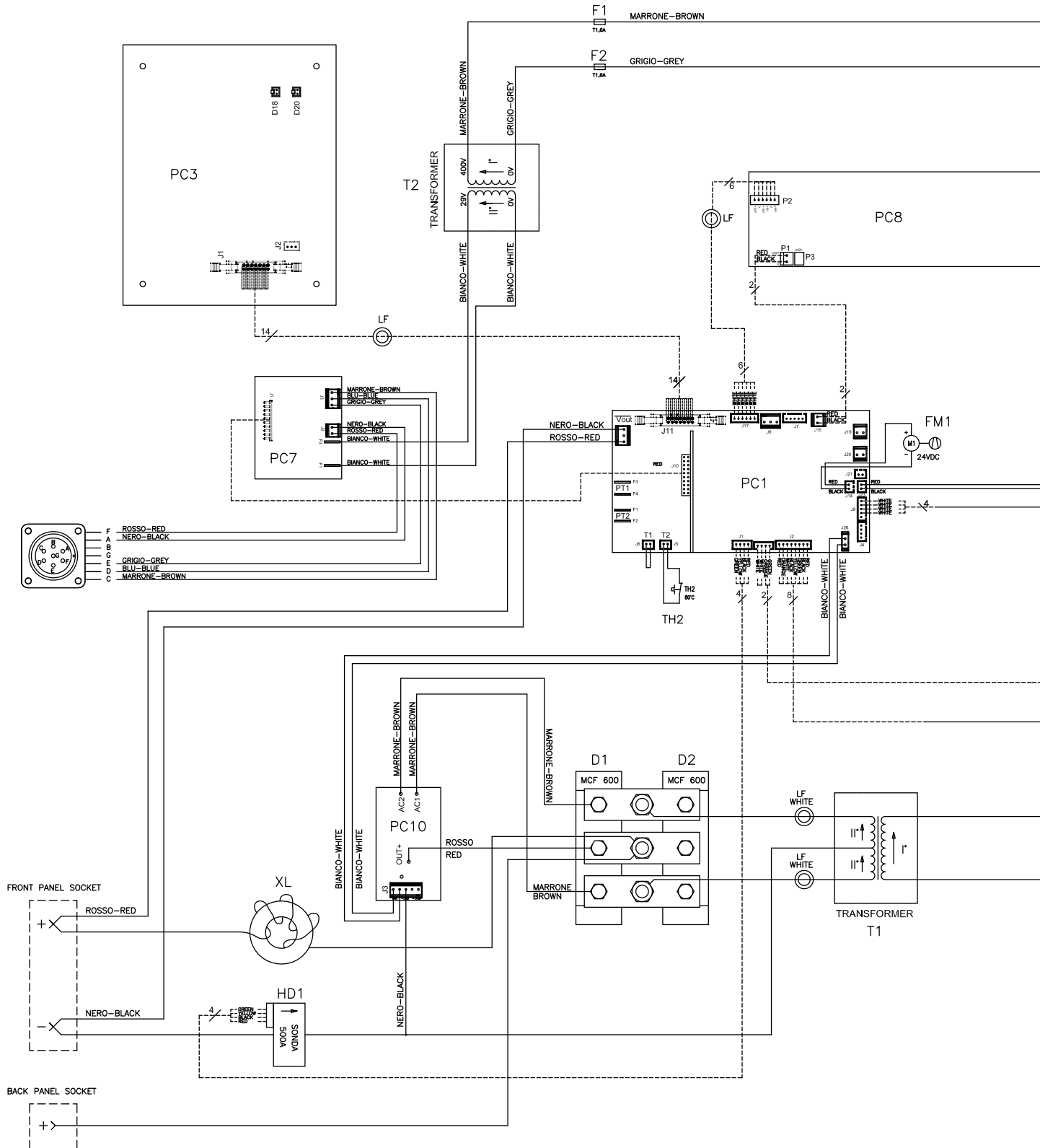
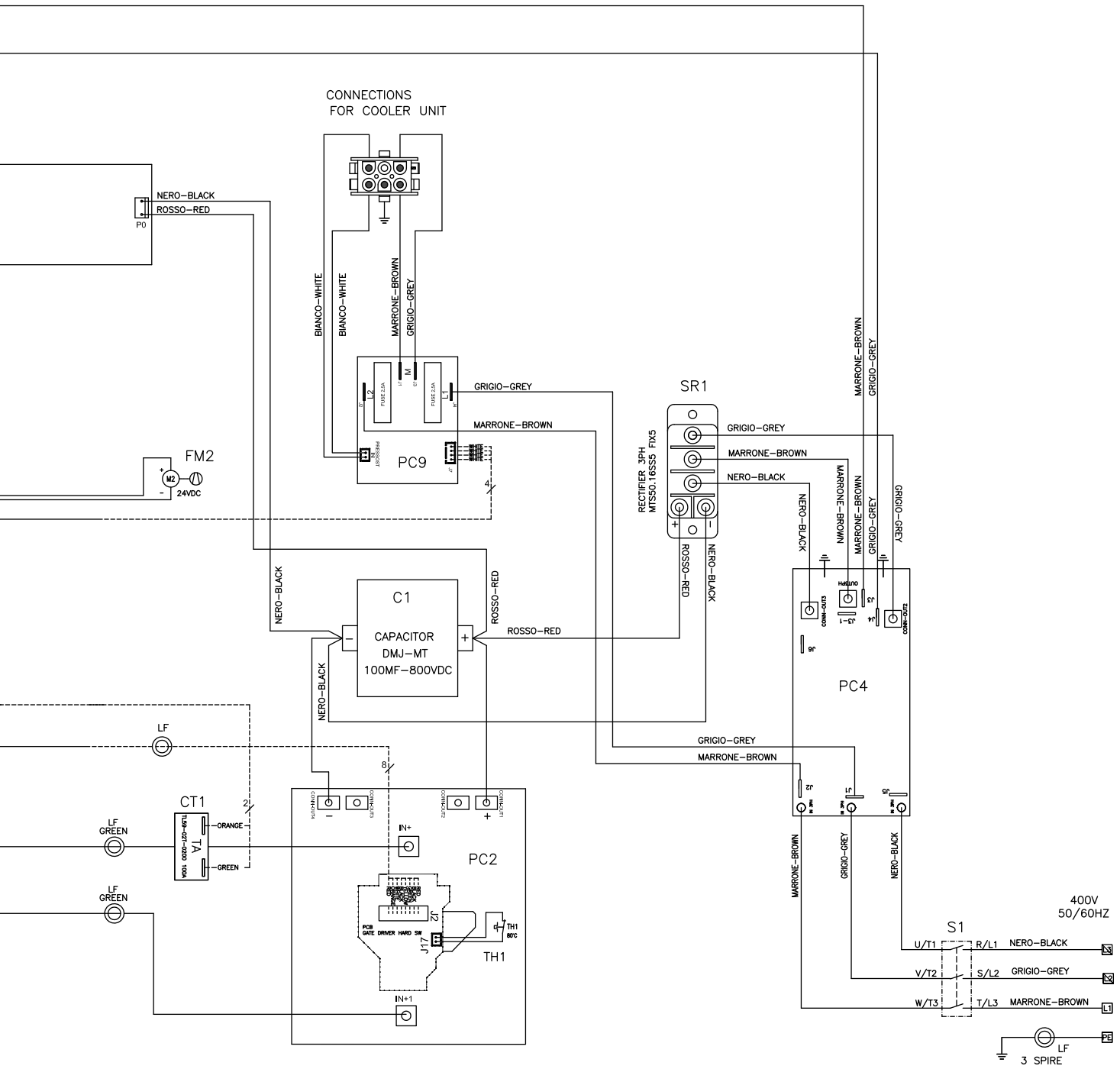
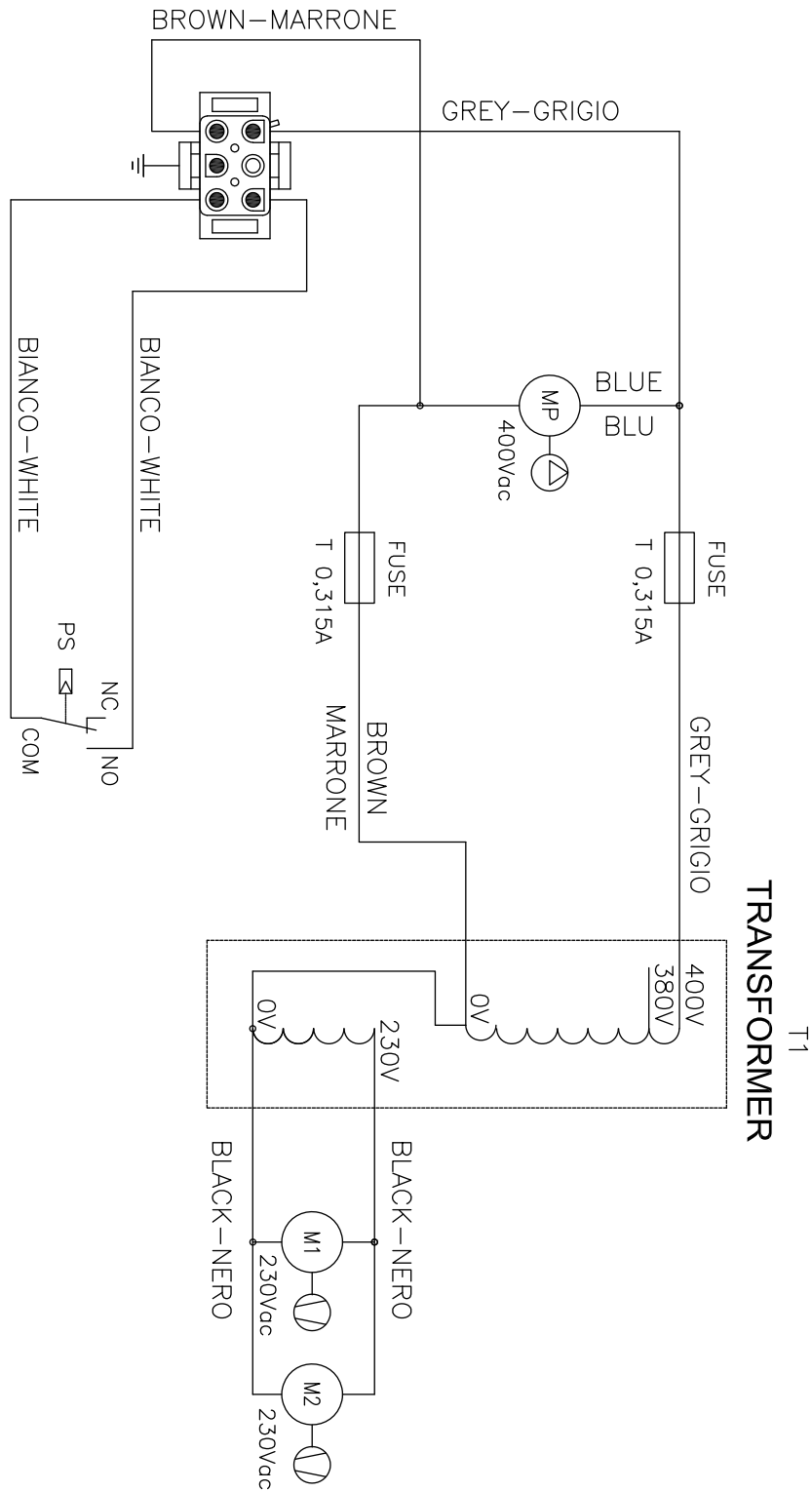



Figure 10-1. Circuit Diagram



<p><b>⚠ WARNING</b></p> <p><b>ELECTRIC SHOCK HAZARD</b></p>	<ul style="list-style-type: none"> <li>• Do not touch live electrical parts.</li> <li>• Disconnect input power or stop engine before servicing.</li> <li>• Do not operate with covers removed.</li> <li>• Have only qualified persons install, use, or service this unit.</li> </ul>
---	--

S9855018



 <b>ELECTRIC SHOCK HAZARD</b>	<b>WARNING</b>
	<ul style="list-style-type: none"> <li>• Do not touch live electrical parts.</li> <li>• Disconnect input power or stop engine before servicing.</li> <li>• Do not operate with covers removed.</li> <li>• Have only qualified persons install, use, or service this unit.</li> </ul>

**Figure 10-2. Cooler Circuit**









Effective January 1, 2023 (Equipment with a serial number preface of ND or newer)

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

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. 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.

1 5 Years Parts — 3 Years Labor

- Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules in non-inverter products

2 4 Years Parts (No Labor)

- Auto-Darkening ClearLight 2.0 Helmet Lenses

3 3 Years — Parts and Labor Unless Specified

- Auto-Darkening Helmet Lenses (No Labor)
- Engine Driven Welder/Generators (Including EnPak) (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

4 2 Years — Parts and Labor

- Auto-Darkening Weld Masks (No Labor)
- Fume Extractors - Filtair 215, Capture 5, and Industrial Collector Series

5 1 Year — Parts and Labor Unless Specified

- ArcReach Heater
- AugmentedArc, LiveArc, and MobileArc Welding Systems

- Automatic Motion Devices
  - Bernard BTB Air-Cooled MIG Guns (No Labor)
  - CoolBelt, PAPR Blower, and PAPR Face Shield (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.)
  - Insight Sensors
  - Load Banks
  - Motor-Driven Guns (except Spoolmate Spoolguns)
  - 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 6 Months — Parts
- 12 Volt Automotive-Style Batteries
- 7 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

1. 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.)
2. 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.
3. 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.
4. 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.

Warranty Questions?  
Call your ITW Welding Regional Office.

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

# 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 \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

## 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

Personal Protective Equipment (PPE)

Service and Repair Replacement Parts

Training (Schools, Videos, Books)

Welding Process Handbooks

To locate a Distributor or Service Agency visit  
[www.millerwelds.com](http://www.millerwelds.com) or call 1-800-4-A-Miller

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.

Miller Europe / Orbitalum Tools  
GmbH  
Singen, DE  
Phone: +49 7731 792400

