Hobart®
IronMan 240

OWNER’S MANUAL

Processes
- MIG (GMAW) Welding
- Flux Cored (FCAW) Welding

Description
CV DC 1 Phase
Arc Welding Power Source And Wire Feeder

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# TABLE OF CONTENTS

**SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING** ................................................................. 1

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

**SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION** ............................................. 5

2-1. Symboles utilisés ............................................................................................................................ 5
2-2. Dangers relatifs au soudage à l’arc .............................................................................................. 5
2-3. Symboles de dangers supplémentaires en relation avec l’installation, le fonctionnement et la maintenance ........................................................................................................................................ 7
2-4. Proposition californienne 65 Avertissements ............................................................................. 8
2-5. Principales normes de sécurité ....................................................................................................... 8
2-6. Informations relatives aux CEM ................................................................................................... 8

**SECTION 3 – DEFINITIONS** ........................................................................................................ 9

3-1. Additional Safety Symbols And Definitions .................................................................................. 9
3-2. Miscellaneous Symbols And Definitions ...................................................................................... 10

**SECTION 4 – SPECIFICATIONS** ..................................................................................................... 11

4-1. Serial Number And Rating Label Location .................................................................................... 11
4-2. Software Licensing Agreement ..................................................................................................... 11
4-3. Information About Default Weld Parameters And Settings ....................................................... 11
4-4. Welding Power Source Specifications .......................................................................................... 11
4-5. Environmental Specifications ....................................................................................................... 11
4-6. Welding Power Source Duty Cycle And Overheating .................................................................. 12

**SECTION 5 – INSTALLATION** ........................................................................................................ 13

5-1. Selecting A Location ...................................................................................................................... 13
5-2. Weld Output Terminals And Selecting Cable Sizes ...................................................................... 14
5-3. Connecting Weld Output Cables ................................................................................................... 14
5-4. Installing Work Cable And Clamp ............................................................................................... 15
5-5. Connecting MIG Gun/Spool Gun to IronMan 240 ....................................................................... 16
5-6. Setting Gun Polarity For Wire Type ............................................................................................. 17
5-7. Installing Gas Supply .................................................................................................................... 17
5-8. Installing Wire Spool And Adjusting Hub T ension ..................................................................... 18
5-9. Positioning Jumper Links .............................................................................................................. 19
5-10. Electrical Service Guide ............................................................................................................. 19
5-11. Connecting Input Power .............................................................................................................. 20
5-12. Threading Welding Wire ............................................................................................................. 21
5-13. Weld Parameters ........................................................................................................................ 22

**SECTION 6 – OPERATION** ............................................................................................................. 24

6-1. Controls ...................................................................................................................................... 24

**SECTION 7 – MAINTENANCE & TROUBLESHOOTING** .................................................................. 25

7-1. Routine Maintenance .................................................................................................................... 25
7-2. Unit Overload .............................................................................................................................. 25
7-3. Changing Drive Roll and Wire Inlet Guide ................................................................................... 25
7-4. Aligning Drive Rolls and Wire Guide ........................................................................................... 26
7-5. Jog Mode .................................................................................................................................... 26
7-6. Diagnostic Light ........................................................................................................................... 26
7-7. Troubleshooting .......................................................................................................................... 27

**SECTION 8 – ELECTRICAL DIAGRAM** .......................................................................................... 28
# TABLE OF CONTENTS

**SECTION 9 – GUIDELINES FOR MIG WELDING (GMAW)** ............................................... 30
  9-1. Typical GMAW (MIG) Process Connections ......................................................... 30
  9-2. Typical GMAW (MIG) Process Control Settings ................................................. 30
  9-3. Holding And Positioning Welding Gun ............................................................... 31
  9-4. Conditions That Affect Weld Bead Shape ......................................................... 31
  9-5. Gun Movement During Welding ............................................................................ 32
  9-6. Poor Weld Bead Characteristics .......................................................................... 32
  9-7. Good Weld Bead Characteristics ......................................................................... 32
  9-8. Troubleshooting – Excessive Spatter ................................................................. 33
  9-9. Troubleshooting – Porosity .................................................................................. 33
  9-10. Troubleshooting – Excessive Penetration ......................................................... 33
  9-11. Troubleshooting – Lack Of Penetration ............................................................. 34
  9-12. Troubleshooting – Incomplete Fusion .................................................................. 34
  9-13. Troubleshooting – Burn-Through ....................................................................... 34
  9-14. Troubleshooting – Waviness Of Bead ............................................................... 35
  9-15. Troubleshooting – Distortion ............................................................................ 35
  9-16. Common GMAW (MIG) Shielding Gases ......................................................... 36

**SECTION 10 – PARTS LIST** ......................................................................................... 38

**WARRANTY**
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 wire – 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.

**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.
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 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.
- 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.

**OVERUSE can cause OVERHEATING**
- 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.
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 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

Pour écarté les risques de blessure pour vous–même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

2-1. Symboles utilisés

DANGER! – Indique une situation dangereuse qui si on l’évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

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AVIS – Indique des déclarations pas en relation avec des blessures personnelles.

2-2. Dangers relatifs au soudage à l’arc

Les symboles représentés ci-dessous sont utilisés dans ce manuel pour attirer l’attention et identifier les dangers possibles. En présence de l’un de ces symboles, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les consignes de sécurité présentées ci-après ne font que résumer les informations contenues dans les principales normes de sécurité énumérées à la section 2-5. Lire et observer toutes les normes de sécurité.

L’installation, l’utilisation, l’entretien et les réparations ne doivent être confiés qu’à des personnes qualifiées. Une personne qualifiée est définie comme celle qui, par la possession d’un diplôme reconnu, d’un certificat ou d’un statut professionnel, ou qui, par une connaissance, une formation et une expérience approfondies, a démontré avec succès sa capacité à résoudre les problèmes liés à la tâche, le travail ou le projet et a reçu une formation en sécurité afin de reconnaître et d’éviter les risques inhérents.

Pendant le fonctionnement, maintenir à distance toutes les personnes, notamment les enfants de l’appareil.

UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

Le contact d’organes électriques sous tension peut provoquer des accidents mortels ou des brûlures graves. Le circuit de l’électrode et de la pièce est sous tension lorsque le courant est délivré à la sortie. Le circuit d’alimentation et les circuits internes de la machine sont également sous tension lorsque l’alimentation est sur Marche. Dans le mode de soudage avec du fil, le fil, le dérouleur, le bloc de commande du rouleau et toutes les parties métalliques en contact avec le fil sont sous tension électrique. Un équipement installé ou mis à la terre de manière incorrecte ou impropre constitue un danger.

- Ne pas toucher aux pièces électriques sous tension.
- Porter des gants isolants et des vêtements de protection secs et sans trous.
- S’isoler de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d’éviter tout contact physique avec la pièce à couper ou le sol.
- Ne pas utiliser de sortie de soudage CA dans des zones humides ou confinées ou s’il y a un risque de chute.
- Se servir d’une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l’utilisation d’une source électrique à courant électrique s’avère nécessaire, se servir de la fonction de télécommande si l’appareil en est équipé.
- D’autres consignes de sécurité sont nécessaires dans les conditions suivantes : risques électriques dans un environnement humide ou si l’on porte des vêtements mouillés ; sur des structures métalliques telles que sols, grilles ou échafaudages ; en position coincée comme assise, à genoux ou couchée ; ou s’il y a un risque élevé de contact involontaire ou accidentel avec la pièce à souder ou le sol. Dans ces conditions, utiliser les équipements suivants, dans l’ordre indiqué : 1) un poste à souder DC à tension constante (à fil), 2) un poste à souder DC manuel (électrode) ou 3) un poste à souder AC à tension à vide réduite. Dans la plupart des situations, l’utilisation d’un poste à souder DC à fil à tension constante est recommandée. En outre, ne pas travailler seul !
- Installer, mettre à la terre et utiliser correctement cet équipement conformément à son Manuel d’Utilisation et aux réglementations nationales, gouvernementales et locales.
- Toujours vérifier la terre du cordon d’alimentation. Vérifier et s’assurer que le fil de terre du cordon d’alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d’entrée, fixer d’abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d’humidité, d’huile et de graisse ; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d’alimentation et le conducteur de mise à la terre afin de s’assurer qu’il n’est pas altéré ou dénudé –, le remplacer immédiatement s’il l’est –. Un fil dénudé peut entraîner la mort.
- L’équipement doit être hors tension lorsqu’il n’est pas utilisé.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l’électrode quand on est en contact avec la pièce, la terre ou une étoile provenant d’une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d’une tension à vide doublée.
- N’utiliser qu’un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretienner l’appareil conformément à ce manuel.
- Porter un harnais de sécurité si l’on doit travailler au-dessus du sol.
- S’assurer que tous les panneaux et couvercles sont correctement en place.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.
- Ne pas raccorder plus d’une électrode ou plus d’un câble de masse à une même borne de sortie de soudage. Débrancher le câble pour le procédé non utilisé.
- Utiliser une protection différentielle lors de l’utilisation d’un équipement auxiliaire dans des endroits humides ou mouillés.

Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur UNE FOIS l’alimentation coupée.

- Éteignez l’unité, débranchez le courant électrique, et déchargez les condensateurs d’alimentation selon les instructions indiquées dans le manuel avant de toucher les pièces.
LES PIÈCES CHAUDES peuvent provoquer des brûlures.
- Ne pas toucher à mains nues les pièces chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.

LES FUMÉES ET LES GAZ peuvent être dangereux.
- Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.
- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la quantité de fumées et de gaz auxquelles est exposé le personnel.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissateurs, les flux et les métaux.
- Travailler dans un espace fermé seulement s’il est bien ventilé ou en portant un respirateur à alimentation d’air. Demandier toujours à un surveillant de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l’air et abaisser le niveau d’oxygène provoquant des blessures ou des accidents mortels. S’assurer que l’air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l’arc peuvent réagir en présence de vapeurs et formant des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d’un revêtement, tels que l’acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n’ait été enlevé dans la zone de soudure, que l’endroit soit bien ventilé, et en portant un respirateur à alimentation d’air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

LES RAYONS DE L’ARC peuvent provoquer des brûlures dans les yeux et sur la peau.
- Le rayonnement de l’arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.
- Porter un casque de soudage approuvé muni de verres filtrants appropriés pour protéger visage et yeux pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l’arc.
- Porter un équipement de protection pour le corps fait d’un matériau résistant et ignifugé (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huiile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.

LE SOUDAGE peut provoquer un incendie ou une explosion.
- Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu’ils n’aient été préparés correctement conformément à AWS F4.1 et AWS A6.0 (voir les Normes de Sécurité).
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu’ils n’aient été préparés correctement conformément à AWS F4.1 et AWS A6.0 (voir les Normes de Sécurité).
- Ne pas souder là où l’air ambiant pourrait contenir des poussières, gaz ou émanations inflammables (vapeur d’essence, par exemple).
- Brancher le câble de masse sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d’électrocution, d’étincelles et d’incendie.
- Ne pas utiliser le poste de soudage pour dégager des conduites gélées.
- En cas de non utilisation, enlever la baguette d’électrode du porte¬électrode ou couper le fil à la pointe de contact.
- Porter un équipement de protection pour le corps fait d’un matériau résistant et ignifugé (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huiile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Avant de souder, retirer toute substance combustible de vos poches telles qu’un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu’il ne reste aucune trace d’étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les porter.
- Suivre les recommandations dans OSHA 1910.252(a)(2)(iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissateurs, les flux et les métaux.

DES PIECES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.
- Le soudage, l’écaillage, le passage de la pièce à la Brosse ou en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort. 
- Fermer l’alimentation du gaz comprimé en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d’un respirateur d’adduction d’air homologué.
2-3. Symboles de dangers supplémentaires en relation avec l’installation, le fonctionnement et la maintenance

**Risque D’INCENDIE OU D’EXPLOSION.**
- Ne pas placer l’appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l’appareil à proximité de produits inflammables.
- Ne pas surcharger l’installation électrique – s’assurer que l’alimentation est correctement dimensionnée et protégée avant de mettre l’appareil en service.

**LA CHUTE DE L’ÉQUIPEMENT peut provoquer des blessures.**
- Utiliser l’anneau de levage uniquement pour soulever l’appareil, NON PAS les chariots, les bouteilles de gaz ou tout autre accessoire.
- Utilisez les procédures correctes et des équipements d’une capacité appropriée pour soulever et supporter l’appareil.
- En utilisant des foursches de levage pour déplacer l’unité, s’assurer que les foursches sont suffisamment longues pour dépasser du côté opposé de l’appareil.
- Tenir l’équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l’équation de levage NIOSH révisée (Publication Nº94–110) lors du levage manuel de pièces ou équipements lourds.

**L’EMPLOI EXCESSIF peut SURCHAUFFER L’ÉQUIPEMENT.**
- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre le soudage.
- Ne pas obstruer les passages d’air du poste.

**LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.**
- Porter un écran facial pour protéger le visage et les yeux.
- Allumer l’électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l’on porte l’équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie – éloigner toute substance inflammable.

**LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.**
- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.

**Les PIÈCES MOBILES peuvent causer des blessures.**
- Ne pas s’approcher des organes mobiles.
- Ne pas s’approcher des points de coincement tels que des rouleaux de commande.

**LES FILS DE SOUDAGE peuvent provoquer des blessures.**
- Ne pas appuyer sur la gâchette avant d’en avoir reçu l’instruction.
- Ne pas diriger le pistolet vers soi, d’autres personnes ou toute pièce mécanique en engageant le fil de soudage.

**L’EXPLOSION DE LA BATTERIE peut provoquer des blessures.**
- Ne pas utiliser l’appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l’aide de câbles de démarrage, sauf si l’appareil dispose d’une fonctionnalité de charge de batterie destinée à cet usage.

**Les PIÈCES MOBILES peuvent causer des blessures.**
- S’abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Lorsque cela est nécessaire pour des travaux d’entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l’entretien est terminé et avant de rebrancher l’alimentation électrique.
Pour plus d'informations, consulter www.P65Warnings.ca.gov.

5. Connecter la pince sur la pièce aussi près que possible à l'endroit ou le travail va être effectué.
6. Ne pas courber et ne pas entourer les câbles autour de votre corps.
7. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
8. Connecter la pince sur la pièce aussi près que possible de la soudure.
9. Ne pas travailler à proximité d'une source de soudage, ni s’asseoir ou se pencher dessus.
10. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux:
Les porteurs d’implants doivent d’abord consulter leur médecin avant de s’approcher des opérations de soudage à l’arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

2-4. Proposition californienne 65 Avertissements

AVIS DE SÉCURITÉ : ce produit peut vous exposer à des produits chimiques tels que le plomb, reconnus par l’État de Californie comme cancérigènes et sources de malformations ou d’autres troubles de la reproduction.

Pour plus d’informations, consulter www.P65Warnings.ca.gov.

2-5. Principales normes de sécurité


2-6. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d’un soudage à l’arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les champs électromagnétiques produits peuvent causer interférence à certains implants médicaux, p. ex. les stimulateurs cardiaques. Des mesures de protection pour les porteurs d’implants médicaux doivent être prises: Limiter par exemple tout accès aux passants ou procéder à une évaluation des risques individuels pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l’exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d’un côté et à distance de l’opérateur.
3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d’une source de soudage, ni s’asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

L’énergie électromagnétique risque de provoquer des interférences pour l’équipement électronique sensible tel que les ordinateurs et l’équipement commandé par ordinateur tel que les robots.

Veiller à ce que tout l’équipement de la zone de soudage soit compatible électromagnétiquement.

Pour réduire la possibilité d’interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).

Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.

Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d’emploi.

En cas d’interférences après avoir pris les mesures précédentes, il incombe à l’utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l’utilisation de câbles blindés, l’utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

LIRE LES INSTRUCTIONS.

- N’utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l’installation, l’entretien et toute intervention selon les manuels d’utilisateurs, les normes nationales, provinciales et de l’industrie, ainsi que les codes municipaux.

LE SOUDAGE À L’ARC risque de provoquer des interférences.

- L’énergie électromagnétique risque de provoquer des interférences pour l’équipement électronique sensible tel que les ordinateurs et l’équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l’équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d’interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
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SAFE PRACTICES FOR WELDING AND CUTTING CONTAINERS THAT HAVE HELD COMBUSTIBLES, AMERICAN WELDING SOCIETY STANDARD AWS A6.0. Website: www.cdc.gov/NIOSH.


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.
### 3-1. Additional Safety Symbols And Definitions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Warning Symbol" /></td>
<td>Warning! Watch Out! There are possible hazards as shown by the symbols.</td>
</tr>
<tr>
<td><img src="image" alt="Drive Rolls Symbol" /></td>
<td>Drive rolls can injure fingers. Welding wire and drive parts are at welding voltage during operation – keep hands and metal objects away.</td>
</tr>
<tr>
<td><img src="image" alt="Beware Symbol" /></td>
<td>Beware of electric shock from wiring.</td>
</tr>
<tr>
<td><img src="image" alt="Explosion Symbol" /></td>
<td>When power is applied failed parts can explode or cause other parts to explode.</td>
</tr>
<tr>
<td><img src="image" alt="Instructions Symbol" /></td>
<td>Become trained and read the instructions before working on the machine or welding.</td>
</tr>
<tr>
<td><img src="image" alt="Capacitor Symbol" /></td>
<td>Hazardous voltage remains on input capacitors after power is turned off. Do not touch fully charged capacitors. Always wait 5 minutes after power is turned off before working on unit, OR check input capacitor voltage, and be sure it is near 0 before touching any parts.</td>
</tr>
</tbody>
</table>

---

**Notes**
### 3-2. Miscellaneous Symbols And Definitions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
<th>Circuit Breaker</th>
<th>Gas Metal Arc Welding (GMAW)</th>
<th>Gas Metal Arc Welding (GMAW) MIG / Gun Control</th>
<th>Self-Shielded Flux Cored Arc Welding (FCAW)</th>
<th>Wire Feed Spool Gun</th>
<th>Gas Postflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>U₀</td>
<td>Rated No Load Voltage (OCV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U₁</td>
<td>Primary Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U₂</td>
<td>Conventional Load Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I₂</td>
<td>Rated Welding Current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Input Power Or Input Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Gas Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP</td>
<td>Internal Protection Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Single Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- **A**: Amperage
- **V**: Voltage
- **X**: Duty Cycle
- **Hz**: Hertz
- **I₂**: Gas Postflow
SECTION 4 – SPECIFICATIONS

4-1. Serial Number And Rating Label Location
The serial number and rating information for this product is located on 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.

4-2. 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.hobartwelders.com/eula, and are incorporated by reference herein.

4-3. 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.

4-4. Welding Power Source Specifications

<table>
<thead>
<tr>
<th>Rated Welding Output</th>
<th>Amperage Range</th>
<th>Maximum Open-Circuit Voltage DC</th>
<th>Amperes Input At Rated Load Output, 60 Hz, Single Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 A, 26.5 volts DC, 40% Duty Cycle</td>
<td>30–280 A</td>
<td>40</td>
<td>62.6 55.7 12.6 9.4</td>
</tr>
<tr>
<td>200 A, 24.0 volts DC, 60% Duty Cycle</td>
<td>30–280 A</td>
<td>40</td>
<td>57.0 50.8 11.4 7.1</td>
</tr>
</tbody>
</table>

**Wire Type and Diameter**

<table>
<thead>
<tr>
<th>Wire Type</th>
<th>Diameter</th>
<th>Wire Feed Speed</th>
<th>Dimensions</th>
<th>Net Weight Without Gun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Steel</td>
<td>.023 – .045 in. (0.6 – 1.2 mm)</td>
<td>50–700 IPM (1.3–17.8 m/min)</td>
<td>H: 30 in. (762 mm) W: 19 in. (483 mm) D: 40 in. (1016 mm)</td>
<td>205 lb (93 kg)</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>.023 – .045 in. (0.6 – 1.2 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flux Cored</td>
<td>.030 – .045 in. (0.8 – 1.2 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum*</td>
<td>.030 – .047 in. (0.8 – 1.2 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*SpoolRunner 200 required for welding aluminum

4-5. Environmental Specifications

**A. IP Rating**

<table>
<thead>
<tr>
<th>IP Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP21</td>
</tr>
</tbody>
</table>

This equipment is designed for indoor use and is not intended to be used or stored outside.

**B. Temperature Specifications**

<table>
<thead>
<tr>
<th>Operating Temperature Range*</th>
<th>Storage/Transportation Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4 to 104°F (-20 to 40°C)</td>
<td>-22 to 122°F (-30 to 50°C)</td>
</tr>
</tbody>
</table>

*Output is derated at temperatures above 104°F (40°C).
4-6. Welding Power Source Duty Cycle And Overheating

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

If unit overheats, Thermistor (RT1) 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.

<table>
<thead>
<tr>
<th>Output Amperes</th>
<th>% Duty Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>200</td>
<td>40</td>
</tr>
<tr>
<td>250</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>60</td>
</tr>
<tr>
<td>350</td>
<td>70</td>
</tr>
<tr>
<td>400</td>
<td>80</td>
</tr>
</tbody>
</table>

**60% Duty Cycle At 200 Amperes**
- 6 Minutes Welding
- 4 Minutes Resting

**40% Duty Cycle At 250 Amperes**
- 4 Minutes Welding
- 6 Minutes Resting

Overheating

- 0 Minutes Welding
- 15 Minutes
- Reduce Duty Cycle
- A or V

**NOTICE** – Exceeding duty cycle can damage unit and void warranty.
5-1. Selecting A Location

**Movement**

- **Warning:** Do not move or operate unit where it could tip.

**Location And Airflow**

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

1. **Line Disconnect Device**
   - Locate unit near correct input power supply.
5-2. Weld Output Terminals And 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 100 ft (30 m) from the workpiece, the total cable length in the weld circuit is 200 ft (2 cables x 100 ft). Use the 200 ft (60 m) column to determine cable size.

<table>
<thead>
<tr>
<th>Welding Amperes</th>
<th>Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 ft (30 m) or Less</td>
</tr>
<tr>
<td>10 – 60% Duty Cycle</td>
<td>60 – 100% Duty Cycle</td>
</tr>
<tr>
<td>AWG (mm²)</td>
<td>AWG (mm²)</td>
</tr>
<tr>
<td>100</td>
<td>4 (20)</td>
</tr>
<tr>
<td>150</td>
<td>3 (30)</td>
</tr>
<tr>
<td>200</td>
<td>3 (30)</td>
</tr>
<tr>
<td>250</td>
<td>2 (35)</td>
</tr>
<tr>
<td>300</td>
<td>1 (50)</td>
</tr>
<tr>
<td>350</td>
<td>1/0 (60)</td>
</tr>
</tbody>
</table>

* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.
**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
( ) = mm² for metric use
***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.

Ref. S-0007-M 2017–08

5-3. Connecting Weld Output Cables

- Turn off power before connecting to weld output terminals.
- Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.
- Do not place anything between weld cable terminal and copper bar. Make sure that the surfaces of the weld cable terminal and copper bar are clean.

![Diagram](803778-B)

Tools Needed: 3/4 in. (19 mm)

1 Correct Weld Cable Connection
2 Incorrect Weld Cable Connection
3 Weld Output Terminal
4 Supplied Weld Output Terminal Nut
5 Weld Cable Terminal
6 Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.
5-4. Installing Work Cable And Clamp

Tools Needed:

- 3/4 in.

1. Work Cable
2. Boot
3. Negative (-) Output Terminal

Route cable through front panel opening. Slide boot onto work cable.
Connect cable to terminal and cover connection with boot.
Close door.

Notes
5-5. Connecting MIG Gun/Spool Gun to IronMan 240

1. MIG Gun
2. Spool Gun
3. Drive Assembly
4. Gun End
5. Gun Securing Knob
6. Gun Trigger Plug

Loosen gun securing knob. Insert gun end through opening until it bottoms against the drive assembly. Tighten the gun securing knob.

Insert plug into receptacle, and tighten threaded collar.
## 5-6. Setting Gun Polarity For Wire Type

### Changing Polarity

- **Positive Terminal**
- **Negative Terminal**

Shown as shipped – **Electrode Positive** (DCEP): For solid steel, stainless steel, aluminum, or flux core with gas wires (GMAW).

**Electrode Negative** (DCEN): Reverse lead connections at terminals from that shown above for gasless flux core wires (FCAW). Drive assembly becomes negative.

Ref. 190821-A

## 5-7. Installing Gas Supply

### Tools Needed:
- **Cap**
- **Cylinder Valve**
- **Cylinder**
- **Argon Gas Or Mixed Gas**
- **Regulator/Flowmeter Gas Hose Connection**
- **Welding Power Source Gas Hose Connection**
- **CO₂ Gas**
- **Flow Adjust**
- **CO₂ Adapter (Customer Supplied)**
- **O-Ring (Customer Supplied)**

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**
- **3 Cylinder**
- **4 Regulator/Flowmeter**
- **5 Regulator/Flowmeter Gas Hose Connection**
- **6 Welding Power Source Gas Hose Connection**
- **7 Flow Adjust**
- **8 CO₂ Adapter (Customer Supplied)**
- **9 O-Ring (Customer Supplied)**

Typical flow rate is 25–45 cfh (cubic feet per hour). Check wire manufacturer's recommended flow rate.

Ref. 804654-A / Ref. 804912-A

Ref. 804654-A / Ref. 804912-A
5-8. Installing Wire Spool And Adjusting Hub Tension

Hand tighten knob clockwise. When a slight force is needed to turn spool, tension is set.

Installing 1 Or 2 lb Wire Spool

To install either a 1 lb or 2 lb wire spool, follow the procedure as shown in the illustration.

Spindle

Remove these components from spindle.

Order two additional 5/8 washers
Part No. 605941

Install these components onto spindle.

Order additional spring
Part No. 186437
5-9. Positioning Jumper Links

Tools Needed:
- Philips Screw Driver #1
- 3/8 in.

Check input voltage available at site.
1. Jumper Links Access Door
   Open door.
2. Jumper Link Label
   Check label – only one is on unit.
3. Input Voltage Jumper Links
   Move jumper links to match input voltage.
Close and secure access door.

5-10. 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.

<table>
<thead>
<tr>
<th></th>
<th>208 VOLTS</th>
<th>240 VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Supply Voltage (V)</td>
<td>208</td>
<td>240</td>
</tr>
<tr>
<td>Rated Maximum Supply Current $I_{\text{max}}$ (A)</td>
<td>62.6</td>
<td>55.7</td>
</tr>
<tr>
<td>Maximum Effective Supply Current $I_{\text{eff}}$ (A)</td>
<td>46.3</td>
<td>40</td>
</tr>
<tr>
<td>Maximum Recommended Standard Fuse Rating In Amperes $^1$</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Time-Delay Fuses $^2$</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>Normal Operating Fuses $^3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Recommended Supply Conductor Length In Feet (Meters) $^4$</td>
<td>79 (24)</td>
<td>105 (32)</td>
</tr>
<tr>
<td>Raceway Installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Supply Conductor Size In AWG (mm$^2$) $^5$</td>
<td>8 (10)</td>
<td>8 (10)</td>
</tr>
<tr>
<td>Minimum Grounding Conductor Size In AWG (mm$^2$) $^5$</td>
<td>8 (10)</td>
<td>8 (10)</td>
</tr>
</tbody>
</table>

Reference: 2020 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).
4. Maximum total length of copper input 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 310.15(B)(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.
5-11. Connecting 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.
- 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.

1. Plug (NEMA Type 6-50P)
2. Receptacle [NEMA Type 6-50R (Customer Supplied)]
3. Input Power Cord. Connect directly to line disconnect device if hard wiring is required.
4. Disconnect Device (switch shown in the OFF position)
5. Disconnect Device Grounding Terminal
6. Disconnect Device Line Terminals
7. Green Or Green/Yellow Grounding Conductor
8. Black and White Input Conductor (L1 and L2)

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.
Connect input conductors L1 and L2 to disconnect device line terminals.

9. Over-Current Protection
Select type and size of over-current protection using Section 5-10 (fused disconnect switch shown).
Connect plug to receptacle if hard wiring method is not used.
Close and secure door on disconnect device. Remove lockout/tagout device, and place switch in the On position.
5-12. Threading Welding Wire

- Wire Spool
- Welding Wire
- Inlet Wire Guide
- Pressure Adjustment Knob
- Drive Roll
- Outlet Wire Guide
- Gun Conduit Cable

Tools Needed:
- 6 in. (150 mm)

1. Lay gun cable out straight.
2. Hold wire tightly to keep it from unraveling.
3. Open pressure assembly. Pull and hold wire; cut off end. Push wire thru guides into gun; continue to hold wire.
4. Close and tighten pressure assembly, and let go of wire.
5. Remove gun nozzle and contact tip. Turn On.
6. Press gun trigger until wire comes out of gun. Reinstall contact tip and nozzle.
7. Feed wire to check drive roll pressure. Tighten knob enough to prevent slipping.

Ref. 804913-B

Use pressure indicator scale to set a desired drive roll pressure.
### 5-13. Weld Parameters

#### Selecting Wire, Gas and Control Settings

<table>
<thead>
<tr>
<th>Material</th>
<th>Suggested Wire Types and Polarity</th>
<th>Suggested Shielding Gases</th>
<th>Wire Sizes (Diameters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEEL</td>
<td>Solid Wire ER70s-6 DCEP</td>
<td>100% CO₂</td>
<td>0.024&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.045&quot;</td>
</tr>
<tr>
<td>STEEL</td>
<td>Flux-Cored E71T-11 DCEN</td>
<td>No shielding gas required.</td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.045&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Suggested Wire Types and Polarity</th>
<th>Suggested Shielding Gases</th>
<th>Wire Sizes (Diameters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEEL</td>
<td>Solid Wire ER70s-6 DCEP</td>
<td>75% Ar/25% CO₂</td>
<td>0.024&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.045&quot;</td>
</tr>
<tr>
<td></td>
<td>Solid Wire ER70s-6 DCEP</td>
<td>90% Ar/10% CO₂</td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.045&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Suggested Wire Types and Polarity</th>
<th>Suggested Shielding Gases</th>
<th>Wire Sizes (Diameters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAINLESS STEEL</td>
<td>Stainless Steel ER 308 ER 308L ER 308LSi DCEP</td>
<td>98% Ar/2% CO₂</td>
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<td>0.035&quot;</td>
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<tr>
<td>ALUMINUM with SpoolRunner™ 200 Spoolgun</td>
<td>Aluminum ER4043 DCEP</td>
<td>100% Ar</td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
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<td>0.047&quot;</td>
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<tr>
<td></td>
<td>Aluminum ER5356 DCEP</td>
<td>100% Ar</td>
<td>0.030&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.035&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.047&quot;</td>
</tr>
<tr>
<td>24 ga. (0.5mm)</td>
<td>22 ga. (0.8mm)</td>
<td>18 ga. (1.2mm)</td>
<td>16 ga. (1.6mm)</td>
</tr>
<tr>
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<td>----------------</td>
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</tr>
<tr>
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<td>3/21</td>
<td>3.4/28</td>
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<td>2.1/21</td>
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</table>

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<thead>
<tr>
<th>24 ga. (0.5mm)</th>
<th>22 ga. (0.8mm)</th>
<th>18 ga. (1.2mm)</th>
<th>16 ga. (1.6mm)</th>
<th>14 ga. (2.0mm)</th>
<th>1/8&quot; (3.2mm)</th>
<th>3/16&quot; (4.8mm)</th>
<th>1/4&quot; (6.4mm)</th>
<th>3/8&quot; (9.5mm)</th>
<th>1/2&quot; (12.7mm)</th>
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<td>7.5/43</td>
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<table>
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<th>24 ga. (0.5mm)</th>
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<th>3/16&quot; (4.8mm)</th>
<th>1/4&quot; (6.4mm)</th>
<th>3/8&quot; (9.5mm)</th>
<th>1/2&quot; (12.7mm)</th>
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<td>1/42</td>
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<td>5/54</td>
<td>6.9/70</td>
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</tr>
</tbody>
</table>

A complete Parts List is available at www.HobartWelders.com
SECTION 6 – OPERATION

6-1. Controls

1. Voltage Control
   Turn control clockwise to increase voltage.

2. Wire Feed Control
   Turn control clockwise to increase wire feed speed.

3. Diagnostic Light
   Refer to section 7-6 if light is illuminated or flashing.

4. Power On Light
   Power should be on when S1 is turned on.

This unit has three automatic timers included in its operation to help save contact tips, gas, and wire:

Tip Saver – Weld output shuts off if tip is shorted to work surface.
Safety shut-off – Weld output will shut off if no arc is detected within 3 seconds after gun trigger is depressed.
SECTION 7 – MAINTENANCE & TROUBLESHOOTING

7-1. Routine Maintenance

<table>
<thead>
<tr>
<th></th>
<th>Every 3 Months</th>
<th>Every 6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>⊗ = Check</td>
<td>⊗ = Change</td>
</tr>
<tr>
<td>⊖ = Replace</td>
<td>⊖ = Clean</td>
<td></td>
</tr>
<tr>
<td>* To be done by Factory Authorized Service Agent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unreadable Labels</td>
<td>Weld Terminals</td>
<td>Weld Cables</td>
</tr>
<tr>
<td>Inside Unit</td>
<td></td>
<td>Clean Drive Rolls</td>
</tr>
<tr>
<td>Apply Light Coat Of Oil Or Grease To Drive Motor Shaft</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7-2. Unit Overload

Thermistor RT1 in SCR1 protects the unit from damage due to overheating. If Over Temp light illuminates, output and wire feed will shut down. Wait for unit to cool down allowing fan motor to run until Over Temp light turns off. If unit is cool and no weld output continues, contact Factory Authorized Service Agent.

7-3. Changing Drive Roll and Wire Inlet Guide

1 Securing Screw
2 Inlet Wire Guide
Loosen screw. Slide tip as close to drive rolls as possible without touching. Tighten screw.
3 Drive Roll
The drive roll consists of two different sized grooves. The stamped markings on the end surface of the drive roll refers to the groove on the opposite side of the drive roll. The groove closest to the motor shaft is the proper groove to thread (see Section 5-12).
4 Drive Roll Securing Nut
Turn nut one click to secure drive roll.

Tools Needed:
7/16 in.
7-4. Aligning Drive Rolls and Wire Guide

![Diagram of drive rolls and wire guide alignment]

- **Correct**
- **Incorrect**

**Tools Needed:**

- Screwdriver

**Turn Off power.**

View is from top of drive rolls looking down with pressure assembly open.

1. Drive Roll Securing Nut
2. Drive Roll
3. Wire Guide
4. Welding Wire
5. Drive Gear

Insert screwdriver, and turn screw in or out until drive roll groove lines up with wire guide.

Close pressure roll assembly.

7-5. Jog Mode

When using the internal motor, if the trigger is held for more than 3 seconds without striking an arc, the unit will automatically shut off weld power and shielding gas, but will feed wire continuously at the preset wire feed speed for up to 20 feet (6.1 m). Once 20 feet (6.1 m) of wire is delivered, a trigger error will occur until trigger is released. When using a spoolgun, if the trigger is held for 3 seconds without striking an arc the unit will automatically shut off weld power and shielding gas, but will feed wire continuously at the preset wire feed speed for up to 10 seconds. After 10 seconds, a trigger error will occur until the trigger is released.

7-6. Diagnostic Light

The Diagnostic light provides diagnostic modes to help troubleshoot various malfunctions with the unit.

<table>
<thead>
<tr>
<th>Status</th>
<th>Condition</th>
<th>Error</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Normal</td>
<td>Unit working properly</td>
<td>None</td>
</tr>
<tr>
<td>On</td>
<td>Over Temperature</td>
<td>Unit overheated and output stopped.</td>
<td>Release trigger and allow cooling fan to run until diagnostic light turns off.</td>
</tr>
<tr>
<td></td>
<td>Trigger Error</td>
<td>Gun trigger is closed or shorted when unit power is turned on.</td>
<td>Release trigger, then pull trigger again to continue welding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spoolrunner 200 gun trigger was held closed for more than 10 seconds without striking an arc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard MIG gun trigger was held closed while more than 20 feet (6.1 m) of wire was delivered without striking an arc.</td>
<td></td>
</tr>
<tr>
<td>Flashing 2 Times</td>
<td>Shorted Secondary</td>
<td>Contact tip is directly shorted to the workpiece. Arc shuts off in this condition.</td>
<td>Release trigger, move contact tip off of workpiece and then pull trigger again to continue welding.</td>
</tr>
<tr>
<td>Flashing 3 Times</td>
<td>Motor Overcurrent</td>
<td>Malfunction in wire drive system or motor overcurrent.</td>
<td>Release trigger, then pull trigger again to continue welding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for proper spool brake adjustment or obstruction in the wire feed system.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check wire guides, gun liner and contact tip for obstruction.</td>
<td></td>
</tr>
<tr>
<td>Flashing 6 Times</td>
<td>Thermistor Error</td>
<td>Malfunction in thermal protection system.</td>
<td>Contact factory authorized service agent.</td>
</tr>
</tbody>
</table>
## 7-7. Troubleshooting

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No weld output; wire does not feed.</td>
<td>Secure power cord plug in receptacle (see Section 5-11).&lt;br&gt;Check and replace power switch if necessary.&lt;br&gt;Replace building line fuse or reset circuit breaker if open (see Section 5-11).&lt;br&gt;Secure gun plug in receptacle or repair leads, or replace trigger switch (see welding gun Owner’s Manual).</td>
</tr>
<tr>
<td>No weld output; wire feeds.</td>
<td>Connect work clamp to get good metal to metal contact.&lt;br&gt;Replace contact tip (see welding gun Owner’s Manual).&lt;br&gt;Check connections at output terminals of welder.</td>
</tr>
<tr>
<td>Low weld output.</td>
<td>Connect unit to proper input voltage or check for low line voltage (see Section 5-11).</td>
</tr>
<tr>
<td>Low, high, or erratic wire speed.</td>
<td>Readjust front panel settings (see Section 6-1).&lt;br&gt;Change to correct size drive roll (see Section 7-3).&lt;br&gt;Readjust drive roll pressure (see Section 5-12).&lt;br&gt;Replace inlet guide, contact tip, and/or liner if necessary (see welding gun Owner’s Manual).</td>
</tr>
</tbody>
</table>

### Wire Drive/Gun Trouble

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire feeding stops during welding.</td>
<td>Straighten gun cable and/or replace damaged parts (see welding gun Owner’s Manual).&lt;br&gt;Adjust drive roll pressure (see Section 5-12).&lt;br&gt;Readjust hub tension (see Section 5-8).&lt;br&gt;Replace contact tip if blocked (see welding gun Owner’s Manual).&lt;br&gt;Clean or replace wire inlet guide or liner if dirty or plugged (see welding gun Owner’s Manual).&lt;br&gt;Replace drive roll if worn or slipping (see Section 7-3).&lt;br&gt;Secure gun plug in receptacle or repair leads, or replace trigger switch (see welding gun Owner’s Manual).&lt;br&gt;Check and clear any restrictions at drive assembly and liner (see welding gun Owner’s Manual).&lt;br&gt;Have nearest Factory Authorized Service Agent check drive motor.</td>
</tr>
</tbody>
</table>

---

*A complete Parts List is available at [www.HobartWelders.com](http://www.HobartWelders.com)*
Figure 8-1. Welding Power Source Circuit Diagram
9-1. Typical GMAW (MIG) Process Connections

- **Wire Feeder/Welding Power Source**
- **Regulator/Flowmeter**
- **Shielding Gas**
- **Gas**
- **Gun**
- **Work Clamp**
- **Workpiece**

⚠️ Weld current can damage electronic parts in vehicles. Disconnect both battery cables before welding on a vehicle. Place work clamp as close to the weld as possible.

9-2. Typical GMAW (MIG) Process Control Settings

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Amperage Range</th>
<th>Recommended Wire Feed Speed</th>
<th>Wire Feed Speed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.023 in. (0.58 mm)</td>
<td>30–90 A</td>
<td>3.5 in. (89 mm) per amp</td>
<td>3.5 x 62.5 A = 219 ipm (5.56 mpm)</td>
</tr>
<tr>
<td>0.030 in. (0.76 mm)</td>
<td>40–145 A</td>
<td>2 in. (51 mm) per amp</td>
<td>2 x 62.5 A = 125 ipm (3.19 mpm)</td>
</tr>
<tr>
<td>0.035 in. (0.89 mm)</td>
<td>50–180 A</td>
<td>1.6 in. (41 mm) per amp</td>
<td>1.6 x 62.5 A = 100 ipm (2.56 mpm)</td>
</tr>
</tbody>
</table>

*62.5 A based on 1/16 in. (1.6 mm) material thickness.

These settings are guidelines only. Material and wire type, joint design, fitup, position, shielding gas, etc., affect settings. Test welds to be sure they comply to specifications.

1. **Material Thickness**
   - Material thickness determines weld parameters.
   - Convert material thickness to amperage (A):
     - 0.001 in. (0.025 mm) = 1 ampere
     - 0.0625 in. (1.59 mm) ÷ 0.001 = 62.5 A

2. **Select Wire Size**
   - See table below.

3. **Select Wire Feed Speed (Amperage)**
   - See table below.

4. **Select Voltage**
   - Voltage controls height and width of weld bead.
   - Low Voltage: wire stubs into work
   - High Voltage: arc is unstable (spatter)
   - Set voltage midway between high and low voltage.
9-3. Holding And Positioning Welding Gun

Welding wire is energized when gun trigger is pressed. Before lowering helmet and pressing trigger, be sure wire is no more than 1/2 in. (13 mm) past end of nozzle, and tip of wire is positioned correctly on seam.

1 Hold Gun and Control Gun Trigger
2 Workpiece
3 Work Clamp
4 Electrode Extension (Stickout) Solid Wire – 3/8 to 1/2 in. (9 to 13 mm)
5 Cradle Gun and Rest Hand on Workpiece

End View of Work Angle
Side View of Gun Angle
Groove Welds

End View of Work Angle
Side View of Gun Angle
Fillet Welds

9-4. Conditions That Affect Weld Bead Shape

Weld bead shape depends on gun angle, direction of travel, electrode extension (stickout), travel speed, thickness of base metal, wire feed speed (weld current), and voltage.

Push Perpendicular Drag
Gun Angles And Weld Bead Profiles

Short Normal Long
Electrode Extensions (Stickout)

Short Normal Long
Fillet Weld Electrode Extensions (Stickout)

Slow Normal Fast
Gun Travel Speed
9-5. Gun Movement During Welding

![Diagram showing gun movement](image)

Normal: a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads works better.

1. Stringer Bead – Steady Movement Along Seam
2. Weave Bead – Side To Side Movement Along Seam
3. Weave Patterns
Use weave patterns to cover a wide area in one pass of the electrode.

9-6. Poor Weld Bead Characteristics

![Diagram showing weld bead characteristics](image)

1. Large Spatter Deposits
2. Rough, Uneven Bead
3. Slight Crater During Welding
4. Bad Overlap
5. Poor Penetration

9-7. Good Weld Bead Characteristics

![Diagram showing good weld bead characteristics](image)

1. Fine Spatter
2. Uniform Bead
3. Moderate Crater During Welding
Weld a new bead or layer for each 1/8 in. (3.2 mm) thickness in metals being welded.
4. No Overlap
5. Good Penetration into Base Metal
### 9-8. Troubleshooting – Excessive Spatter

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire feed speed too high.</td>
<td>Select lower wire feed speed.</td>
</tr>
<tr>
<td>Voltage too high.</td>
<td>Select lower voltage range.</td>
</tr>
<tr>
<td>Electrode extension (stickout) too long.</td>
<td>Use shorter electrode extension (stickout).</td>
</tr>
<tr>
<td>Workpiece dirty.</td>
<td>Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.</td>
</tr>
<tr>
<td>Insufficient shielding gas at welding arc.</td>
<td>Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.</td>
</tr>
<tr>
<td>Dirty welding wire.</td>
<td>Use clean, dry welding wire.</td>
</tr>
<tr>
<td>Incorrect polarity.</td>
<td>Check polarity required by welding wire, and change to correct polarity at welding power source.</td>
</tr>
</tbody>
</table>

### 9-9. Troubleshooting – Porosity

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient shielding gas at welding arc.</td>
<td>Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.</td>
</tr>
<tr>
<td></td>
<td>Remove spatter from gun nozzle.</td>
</tr>
<tr>
<td></td>
<td>Check gas hoses for leaks.</td>
</tr>
<tr>
<td></td>
<td>Place nozzle 1/4 to 1/2 in. (6-13 mm) from workpiece.</td>
</tr>
<tr>
<td></td>
<td>Hold gun near bead at end of weld until molten metal solidifies.</td>
</tr>
<tr>
<td>Wrong gas.</td>
<td>Use welding grade shielding gas; change to different gas.</td>
</tr>
<tr>
<td>Dirty welding wire.</td>
<td>Use clean, dry welding wire.</td>
</tr>
<tr>
<td></td>
<td>Eliminate pick up of oil or lubricant on welding wire from feeder or liner.</td>
</tr>
<tr>
<td>Workpiece dirty.</td>
<td>Remove all grease, oil, moisture, rust, paint, coatings, and dirt from work surface before welding.</td>
</tr>
<tr>
<td></td>
<td>Use a more highly deoxidizing welding wire (contact supplier).</td>
</tr>
<tr>
<td>Welding wire extends too far out of nozzle.</td>
<td>Be sure welding wire extends not more than 1/2 in. (13 mm) beyond nozzle.</td>
</tr>
</tbody>
</table>

### 9-10. Troubleshooting – Excessive Penetration

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive heat input.</td>
<td>Select lower voltage range and reduce wire feed speed.</td>
</tr>
<tr>
<td></td>
<td>Increase travel speed.</td>
</tr>
</tbody>
</table>
9-11. Troubleshooting – Lack Of Penetration

Lack Of Penetration – shallow fusion between weld metal and base metal.

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper joint preparation.</td>
<td>Material too thick. Joint preparation and design must provide access to bottom of groove while maintaining proper welding wire extension and arc characteristics.</td>
</tr>
<tr>
<td>Improper weld technique.</td>
<td>Maintain normal gun angle of 0 to 15 degrees to achieve maximum penetration.</td>
</tr>
<tr>
<td></td>
<td>Keep arc on leading edge of weld puddle.</td>
</tr>
<tr>
<td></td>
<td>Be sure welding wire extends not more than 1/2 in. (13 mm) beyond nozzle.</td>
</tr>
<tr>
<td>Insufficient heat input.</td>
<td>Select higher wire feed speed and/or select higher voltage range.</td>
</tr>
<tr>
<td></td>
<td>Reduce travel speed.</td>
</tr>
<tr>
<td>Incorrect polarity.</td>
<td>Check polarity required by welding wire, and change to correct polarity at welding power source.</td>
</tr>
</tbody>
</table>

9-12. Troubleshooting – Incomplete Fusion

Incomplete Fusion – failure of weld metal to fuse completely with base metal or a preceding weld bead.

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece dirty.</td>
<td>Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.</td>
</tr>
<tr>
<td>Insufficient heat input.</td>
<td>Select higher voltage range and/or adjust wire feed speed.</td>
</tr>
<tr>
<td>Improper welding technique.</td>
<td>Place stringer bead in proper location(s) at joint during welding.</td>
</tr>
<tr>
<td></td>
<td>Adjust work angle or widen groove to access bottom during welding.</td>
</tr>
<tr>
<td></td>
<td>Momentarily hold arc on groove side walls when using weaving technique.</td>
</tr>
<tr>
<td></td>
<td>Keep arc on leading edge of weld puddle.</td>
</tr>
<tr>
<td></td>
<td>Use correct gun angle of 0 to 15 degrees.</td>
</tr>
</tbody>
</table>

9-13. Troubleshooting – Burn-Through

Burn-Through – weld metal melting completely through base metal resulting in holes where no metal remains.

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive heat input.</td>
<td>Select lower voltage range and reduce wire feed speed.</td>
</tr>
<tr>
<td></td>
<td>Increase and/or maintain steady travel speed.</td>
</tr>
</tbody>
</table>
9-14. Troubleshooting – Waviness Of Bead

Waviness Of Bead – weld metal that is not parallel and does not cover joint formed by base metal.

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welding wire extends too far out of nozzle.</td>
<td>Be sure welding wire extends not more than 1/2 in. (13 mm) beyond nozzle.</td>
</tr>
<tr>
<td>Unsteady hand.</td>
<td>Support hand on solid surface or use two hands.</td>
</tr>
</tbody>
</table>

9-15. Troubleshooting – Distortion

Distortion – contraction of weld metal during welding that forces base metal to move.

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive heat input.</td>
<td>Use restraint (clamp) to hold base metal in position.</td>
</tr>
<tr>
<td></td>
<td>Make tack welds along joint before starting welding operation.</td>
</tr>
<tr>
<td></td>
<td>Select lower voltage range and/or reduce wire feed speed.</td>
</tr>
<tr>
<td></td>
<td>Increase travel speed.</td>
</tr>
<tr>
<td></td>
<td>Weld in small segments and allow cooling between welds.</td>
</tr>
</tbody>
</table>

Notes

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9-16. Common GMAW (MIG) Shielding Gases

This is a general chart for common gases and where they are used. Many different combinations (mixtures) of shielding gases have been developed over the years. The most commonly used shielding gases are listed in the following table.

<table>
<thead>
<tr>
<th>Gas</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spray Arc Steel</td>
</tr>
<tr>
<td>Argon</td>
<td></td>
</tr>
<tr>
<td>Argon + 1% O₂</td>
<td>Flat &amp; Horizontal Fillet</td>
</tr>
<tr>
<td>Argon + 2% O₂</td>
<td>Flat &amp; Horizontal Fillet</td>
</tr>
<tr>
<td>Argon + 5% CO₂</td>
<td>Flat &amp; Horizontal Fillet</td>
</tr>
<tr>
<td>Argon + 10% CO₂</td>
<td>Flat &amp; Horizontal Fillet</td>
</tr>
<tr>
<td>Argon + 25% CO₂</td>
<td>All Positions</td>
</tr>
<tr>
<td>Argon + 50% CO₂</td>
<td>All Positions</td>
</tr>
<tr>
<td>CO₂</td>
<td>All Positions</td>
</tr>
<tr>
<td>Helium</td>
<td></td>
</tr>
<tr>
<td>Argon + Helium</td>
<td></td>
</tr>
<tr>
<td>Tri-Mix²</td>
<td></td>
</tr>
</tbody>
</table>

1  Heavy Thicknesses
2  90% HE + 7-1/2% AR + 2-1/2% CO₂

9-17. Troubleshooting Guide For GMAW (MIG) Welding Process

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire feed motor operates, but wire does not feed.</td>
<td>Too little pressure on wire feed rolls.</td>
<td>Increase pressure setting on wire feed rolls.</td>
</tr>
<tr>
<td></td>
<td>Incorrect wire feed rolls.</td>
<td>Check size stamped on wire feed rolls, replace to match wire size and type if necessary.</td>
</tr>
<tr>
<td></td>
<td>Wire spool brake pressure too high.</td>
<td>Decrease brake pressure on wire spool.</td>
</tr>
<tr>
<td></td>
<td>Restriction in the gun and/or assembly.</td>
<td>Check and replace cable, gun, and contact tip if damaged. Check size of contact tip and cable liner, replace if necessary.</td>
</tr>
<tr>
<td>Wire curling up in front of the wire feed rolls (bird nesting).</td>
<td>Too much pressure on wire feed rolls.</td>
<td>Decrease pressure setting on wire feed rolls.</td>
</tr>
<tr>
<td></td>
<td>Incorrect cable liner or gun contact tip size.</td>
<td>Check size of contact tip and check cable liner length and diameter, replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Gun end not inserted into drive housing properly.</td>
<td>Loosen gun securing bolt in drive housing and push gun end into housing just enough so it does not touch wire feed rolls.</td>
</tr>
<tr>
<td></td>
<td>Dirty or damaged (kinked) liner.</td>
<td>Replace liner.</td>
</tr>
<tr>
<td>Problem</td>
<td>Probable Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Wire feeds, but no gas flows.</td>
<td>Gas cylinder empty.</td>
<td>Replace empty gas cylinder.</td>
</tr>
<tr>
<td></td>
<td>Gas nozzle plugged.</td>
<td>Clean or replace gas nozzle.</td>
</tr>
<tr>
<td></td>
<td>Gas cylinder valve not open or flowmeter not adjusted.</td>
<td>Open gas valve at cylinder and adjust flow rate.</td>
</tr>
<tr>
<td></td>
<td>Restriction in gas line.</td>
<td>Check gas hose between flowmeter and wire feeder, and gas hose in gun and cable assembly.</td>
</tr>
<tr>
<td></td>
<td>Loose or broken wires to gas solenoid.</td>
<td>Have Factory Authorized Service Agent repair wiring.</td>
</tr>
<tr>
<td></td>
<td>Gas solenoid valve not operating.</td>
<td>Have Factory Authorized Service Agent replace gas solenoid valve.</td>
</tr>
<tr>
<td></td>
<td>Incorrect primary voltage connected to welding power source.</td>
<td>Check primary voltage and relink welding power source for correct voltage.</td>
</tr>
<tr>
<td>Welding arc not stable.</td>
<td>Wire slipping in drive rolls.</td>
<td>Adjust pressure setting on wire feed rolls. Replace worn drive rolls if necessary.</td>
</tr>
<tr>
<td></td>
<td>Wrong size gun liner or contact tip.</td>
<td>Match liner and contact tip to wire size and type.</td>
</tr>
<tr>
<td></td>
<td>Incorrect voltage setting for selected wire feed speed on welding power source.</td>
<td>Readjust welding parameters.</td>
</tr>
<tr>
<td></td>
<td>Loose connections at the gun weld cable or work cable.</td>
<td>Check and tighten all connections.</td>
</tr>
<tr>
<td></td>
<td>Gun in poor shape or loose connection inside gun.</td>
<td>Repair or replace gun as necessary.</td>
</tr>
</tbody>
</table>
10-1. Drive Roll And Wire Guide Kits

Base selection of drive rolls upon the following recommended usages:

1. V-Grooved rolls for hard wire (solid steel and metal cored).
2. U-Grooved rolls for soft and soft shelled cored wires (aluminum).
3. U-Cogged rolls for extremely soft shelled wires (usually hard surfacing types).
5. Drive roll types may be mixed to suit particular requirements (example: V-Knurled roll in combination with U-Grooved).

<table>
<thead>
<tr>
<th>Wire Diameter</th>
<th>Kit No.</th>
<th>Drive Roll</th>
<th>Inlet Wire Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction</td>
<td>Decimal</td>
<td>Metric</td>
<td>Part No.</td>
</tr>
<tr>
<td>.023/.025 in.</td>
<td>.023/.025 in</td>
<td>0.6 mm</td>
<td>087 131</td>
</tr>
<tr>
<td>.030/.035 in.</td>
<td>.030/.035 in</td>
<td>0.8/0.9 mm</td>
<td>204 579</td>
</tr>
<tr>
<td>.030 in.</td>
<td>.030 in.</td>
<td>0.8 mm</td>
<td>079 594</td>
</tr>
<tr>
<td>.035 in.</td>
<td>.035 in.</td>
<td>0.9 mm</td>
<td>079 595</td>
</tr>
<tr>
<td>.045 in.</td>
<td>.045 in.</td>
<td>1.2 mm</td>
<td>079 596</td>
</tr>
</tbody>
</table>

Ref. S-0026-B/7-91

A complete Parts List is available on-line at www.HobartWelders.com
WARRANTY

5/3/1 WARRANTY applies to all Hobart welding equipment, plasma cutters and spot welders with a serial number preface of NA or newer.

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

Hobart products are serviced by Hobart or Miller Authorized Service Agencies.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. LLC, dba Hobart Welding Products, Appleton, Wisconsin, warrants to its original retail purchaser that new Hobart equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped. 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, Hobart/Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Hobart/Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Hobart/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.

Hobart/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 original retail purchaser, or 12 months after the equipment is shipped to a North American or international distributor, whichever occurs first.

1. 5 Years — Parts and Labor
   * Original Main Power Rectifiers only to include SCRs, diodes, and discrete rectifier modules
   * Reactors
   * Stabilizers
   * Transformers

2. 3 Years — Parts and Labor Unless Specified
   * Drive Systems
   * Idle Module
   * PC Boards
   * Rotors, Stators and Brushes
   * Solenoid Valves
   * Switches and Controls

3. 1 Year — Parts and Labor Unless Specified (90 days for industrial use)
   * Accessories (Kits)
   * Contactors
   * Field Options
   (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or a minimum of one year — whichever is greater.)
   * HF Units
   * MIG Flowgauge Regulators (No Labor)
   * MIG Guns/TIG Torches
   * Motor-Driven Guns
   * Plasma Cutting Torches
   * Relays
   * Remote Controls
   * Replacement Parts (No labor) – 90 days
   * Running Gear/Trailers
   * Spoolguns

4. 6 Months — Parts
   * Batteries

5. Engines and tires are warranted separately by the manufacturer.

Hobart’s 5/3/1 Limited Warranty shall not apply to:

1. Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station tables, 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 Hobart/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 Hobart/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.

HOBART 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 Hobart’s/Miller’s option, either: (1) repair; or (2) replacement; or, if approved in writing by Hobart/Miller, (3) the pre-approved cost of repair or replacement at an authorized Hobart/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 Hobart’s/Miller’s written approval. Return shipment shall be at customer’s risk and expense.

The above remedies are F.O.B. Appleton, WI, or Hobart’s/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 HOBART/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, GUARANTEE, OR REPRESENTATION, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, ARE EXCLUDED AND DISCLAIMED BY HOBART/MILLER.

Some US states do not allow limiting the duration of an implied warranty or the exclusion of certain damages, so the above limitations may not apply to you. This warranty provides specific legal rights, and other rights may be available depending on your state. In Canada, some provinces provide additional warranties or remedies, and to the extent the law prohibits their waiver, the limitations set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary by province.
Owner’s Record

Please complete and retain with your personal records.

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Serial/Style Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Purchase Date</th>
<th>(Date which equipment was delivered to original customer.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City</th>
</tr>
</thead>
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Thank you for purchasing Hobart. Our trained technical support team is dedicated to your satisfaction. For questions regarding performance, operation, or service, contact us!

Resources Available

Always provide Model Name and Serial/Style Number.

To locate a Service Center:
Call 1-800-332-3281
or visit our website at www.HobartWelders.com/wheretobuy

For Technical Assistance:
Call 1-800-332-3281
8 AM to 5 PM EST – Monday through Friday