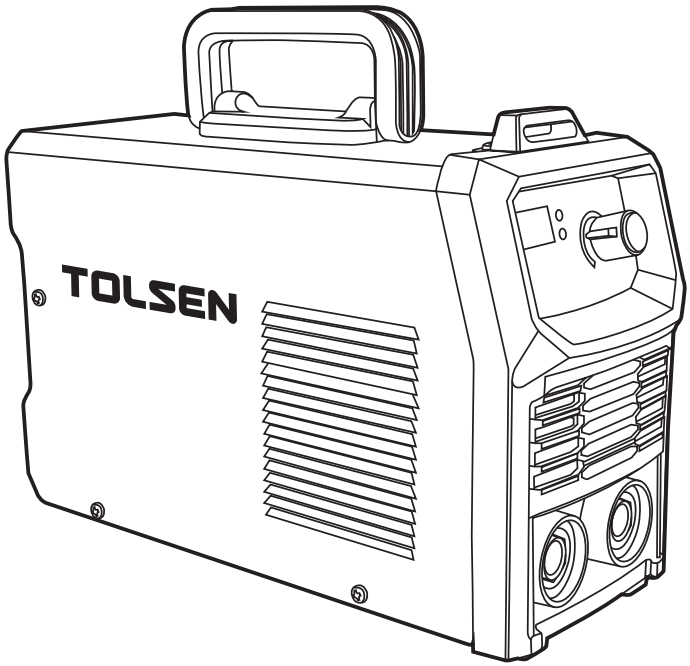
TOLSEN

44011/44012/44013

INVERTER MMA DC WELDING MACHINE

INSTRUCTION MANUAL



SAVE THIS MANUAL !
You will need this manual for safety instructions, operating procedures and warranty.
Put it and the original sales receipt in a safe dry place for future reference.

IMPORTANT SAFETY INFORMATION

⚠ Warning: Protect yourself and others from injury— read and follow these precautions.

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 Safety Standards. a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all
▲ Only qualified persons should install, operate, maintain, and repair this unit.
▲ 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 output in damp areas, if movement is confined, 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 voitage. 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 and ground 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 ind disconnect box or that cord plug is connected to a properly grounded receptadle outlet.
- When making input connections, attach proper grounding conductor first-double-check connections.
- Frequently inspect input power cord for damage or bare wiringreplace cord immediately if damaged-bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced 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 hamess if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workplece 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.

SIGNIFICANT DC VOLTAGE exists in inverter-type welding power sources after removal of input power.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

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.If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables,u coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or whiled wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air andd 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 ophighly toxic and irritating gases.erations. The heat and rays of the arc can react with vapors to form
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weldd area, the area is well ventilated, and while wearing an air-suppliedd respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

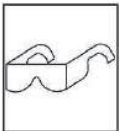
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of fil-d ter lenses to protect your face and eyes 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 protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

WELDING can cause fire or explosion.

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

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



FLYING METAL 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 inure or kill.

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

HOT PARTS can cause severe burns.

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

MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding 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 shielding 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.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard

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

FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

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.

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 cause injury.

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

WELDING WIRE can cause injury.

- 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.

MOVING PARTS can cause injury.

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

READ INSTRUCTIONS.

- Read Owner's Manual before using or servicing unit.
- Use only genuine Miller/Hobart replacement parts.

H.F. RADIATION can cause interference.

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

ARC WELDING can cause interference.

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

Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1,from Global Engineering Documents (website: www.global.ihs.com).Boulevard, Rexdale, Ontario, Canada M9W 1R3 (website:www.csa-international.org).Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping. American Welding Society Standard AWS F4.1 from Global Engineering Documents (website:www.global.ihs.com).Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002(website: www.ansi.org).National Electrical Code, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (website: www.nfpa.org).Standard for Fire Prevention During Welding. Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (website: www.nfpa.org).Safe Handiing of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highwav, Suite 1004, Arlington, VA 22202-4102 (website: www.cganet.com).Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 RexdaleOSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Requlations (CFR), Part 1910, Subpart Q. and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (website: www.osha.gov).

EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic FieldsWelding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concen about such fields. However, after examining more than 500 studies spanning 17 vears of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committees judgment, has not demonstrated that exposure to powerfrequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possibie

About Pacemakers: To reduce magnetic fields in the workplace, use the following procedures:Pacemaker wearers consult your doctor before welding or going near welding operations. If cleared by your doctor, then following the above procedures is recommended.

PRINCIPLES OF MANUAL METAL ARCWELDING (MMA)

Shielded Metal Arc Welding, MMA or Stick welding is a process which melts and joins metals by heating them withl an arc between a coated metal electrode and the workpiece, The electrode outer coating, called flux, assists in creating the arc and provides the shielding gas and slag covering to protect the weld from contamination. The electrodel core provides most of the weld filler metal.

When the electrode is moved along the workpiece at the correct speed the metal deposits in a uniform layer called a bead. The Stick welding power source provides constant current (CC) and may be either alternating current (AC) or directl current (DC), depending on the electrode being used. The best welding characteristics are usually obtained using Dcl power sources. The power in a welding circuit is measured in voltage and current. The voltage (Volts) is governed by the arc lengthl between the electrode and the workpiece and is influenced by electrode diameter. Current is a more practical measure of the power in a weld circuit and is measured in amperes (Amps).

The amperage needed to weld depends on electrode diameter, the size and thickness of the pieces to be welded,land the position of the welding. Generally, a smaller electrode and lower amperage is needed to weld a small piece than a large piece of the same thickness. Thin metals require less current than thick metals, and a smail electrodel requires less amperage than a large one.

It is preferable to weld on work in the flat or horizontal position. However, when forced to weld in vertical or overheadl positions it is helpful to reduce the amperage from that used when welding horizontally.

Best welding results arel achieved by maintaining a short arc, moving the electrode at a uniform speed, and feeding the electrode downwardl at a constant speed as it melts.

More specific information on the Stick welding procedure is provided in the following sections.

No one can learn to weld simply by reading about it .Skill comes only with practice. The following pages will help the inexperienced welder to understand welding and develop his skill .For more detailed information order a book on Arc Welding.

The operator's knowledge of arc welding must go beyond the arc itself .He must known how to control the arc, and this requires a knowledge of welding circuit and the equipment that provides the electric current used in the arc. The welding circuit begins where the electrode cable is attached to the welding machine and ends where the work cable is attached to the welding machine .Current flows through the electrode cable to the electrode holder, through the electrode and across the arc. On the work side of the arc, the current flows through base metal to the work cable and back to the welding machine .the circuit must be compete for the current to flow. To weld, the work clamp must be tightly connected to clean base metal .Remove paint, rust ,etc. as necessary to get a good connection .Connect the work clamp as close as possible to the area you wish to weld. Avoid the welding circuit to pass through hinges, bearings, electronic components or similar devices that can be damaged.

The electric arc is made between the work and the tip end of a small metal wire, the electrode, which is clamped in a holder and the holder is held by the welder. A gap is made in the welding circuit by holding the tip of the electrode 1.5-2.0mm away from the work or base metal being welded. The electric arc is established in this gap and is held and moved along the joint to be welded, melting the metal as it is moved.

Arc welding is manual skill requiring a steady hand, good physical condition, and good eyesight .the operator controls the welding arc and, therefore, the quality of the weld made.

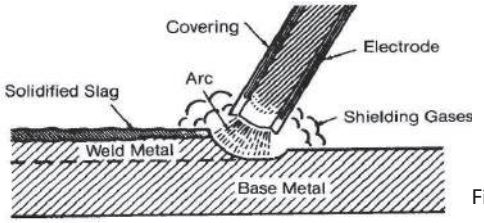


Figure 1 The welding arc

What Happens in the Arc

Figure 1 illustrates the action that takes place in the electric arc. it closely resembles what is actually seen during welding . The "arc stream "is seen in the middle of the picture .this is the arc created by the current flowing through the space between the end of the electrode and the work .The temperature of this arc is about 60000 F. ,Which is more than enough to melt the base metal .The arc is very bright ,as well as hot ,and cannot be looked at with the naked eye without risking painful injury.The very dark lens, specially designed for arc welding, must be used with the hand or face shield whenever viewing the arc.

The arc melts the base metal and actually digs into it, much as water through a nozzle on a garden hose digs into the earth . The molten metal forms a molten pool or crater and tends to flow away from the arc .As it moves away from the arc, it cools and solidifies. A slag forms on top of the weld to protect it during cooling

The function of the covered electrode is much more than simply to carry current to the arc .The electrode is composed of a core of metal wire around which has been extruded and baked chemical covering. The core wire melts in the arc and tiny droplets of molten metal shoot across the arc into the molten pool .The electrode provides additional filler metal for the joint to fill the groove or gap between the two pieces of the base metal. The covering also melts or burns in the arc.It has several functions.It makes the arc steadier, provides a shield of smoke-like gas around the arc to keep oxygen and nitrogen in the air away from the molten metal, and provides a fluxe for the molten pool. The flux picks up impurities and forms the protective slag .The principal differences between the various types of electrodes are in their coatings. By varying the coating, it is possible to greatly alter the operating characteristics of electrodes. By understanding the differences in the various coating, you will gain a better understanding of selecting the best electrode for the job you have at hand .In selecting an electrode you should consider:

1. The type of deposit you want, e.g. mild steel, stainless, low alloy.
2. The thickness of the plate or base metal you want to weld.
3. The position it must be welded in (down hand, out-of-position).
4. The surface condition of the base metal to be weld.
5. Your ability to handle and obtain the desired electrode.

Four simple manipulations are of prime importance. Without complete mastery of these four, further welding is futile .With compete mastery of the four, welding will be easy.

1. The Correct Welding Position

Illustrated is the correct welding position for right-handed people (For left-handed it is opposite):

a. Hold the electrode holder in your right hand
b. Touch left hand to underside of right hand.
c. Put the left elbow into your left side.

Weld with two the hand whenever possible .This gives complete control over the movements of electrode. Whenever possible, weld from left to right (if right-hand).This enables you to see clearly what you are doing. Hold the electrode at a slight angle as shown.

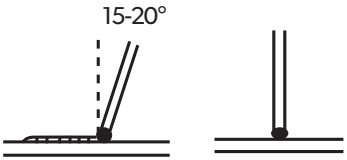


Figure 2 Correct Welding Position

2. The Correct Way to Strike An Arc

Be sure the work clamp makes good electrical contract to the work .

Lower your headshield and scratch the electrode slowly over the metal, and you will see sparks flying.

While scratching, lift the electrode 3 mm and the arc is established.

NOTE: If you stop moving the electrode while scratching, the electrode will stick.

NOTE: Most beginners try to strike the arc by a fast jabbing motion down on the plate .

Result: They either stick or their motion is so fast that they break the arc immediately

3. The Correct Arc Length

The arc length is the distance from the tip of the electrode core wire to the base metal.

Once the arc has been established, maintaining the correct arc length becomes extremely important .The arc should be short,approximately 1.5-3.0 mm long .As the electrode burns off the electrode must be fed to the work to maintain correct arc length.

The easiest way to tell whether the arc has the correct length is by listening to its sound. A nice,short arc has a distinctive,"crackling"sound ,very much like eggs frying in a pan.The incorrect, long arc has a hollow, blowing or hissing sound.

4. The Correct Welding Speed

The important thing to watch while welding is the puddle of molten metal right behind the arc.

DO NOT watch the arc itself.It is the appearance of the puddle and the ridge where the molten puddle solidifies that indicate correct welding speed.The ridge should be approximately 10mm behind the electrode.

Most beginners tend to weld too fast, resulting in a thin, uneven,"wormy" looking bead.They are not watching the molten metal.

IMPORTANT: For general welding it is not necessary to weave the arc; neither forwards and backwards nor sideways. Weld along at a steady pace. You will find it easier.
NOTE: When welding on thin plate, you will find that you will have to increase the welding speed, whereas when welding on heavy plate ,it is necessary to go more slowly in order to get good penetration.

WELDING PRACTICE
The best way of getting practice in the four skills that enable you to maintain :
1. Correct Welding Position
2. Correct Way to Strike An Arc
3. Correct Arc Length
4. Correct Welding Speed
is to spend a little more time on the following exercise.

Use the following:
Mild Steel Plate: 5 mm or heavier
Electrode: 1/8'' (3.2mm)
Current Setting: 100~120 Amps AC

Do the following:
1. Learn to strike the arc by scratching the electrode over the plate .Be sure the angle of the electrode is right and Be sure to use both hands.
2. When you can strike an arc without sticking, practice the correct arc length.Learn to distinguish it by its sound.
3. When you are sure that you can hold a short, crackling arc, start moving.Look at the molten puddle constantly, and look for the ridge where the metal solidifies.
4. Run beads on a flat plate.Run them parallel to the top edge (the edge farthest away from you) .This gives you practice in running straight welds,and also,it gives you an easy way to check your progress .the 10th weld will look considerderably better than the first weld,By constantly checking on your mistakes and your progress, welding will soon be a matter of routine.

Common Metals
Most metals found around the farm or small shop are low carbon steel, sometimes referred to as mild steel. Typical items made with this type of steel include most sheet metal, plate, pipe and rolled shapes such as channels, angel irons and "I" beams .This Type of steel can usually be easily welded without special precautions.Some steel, however,contains higher carbon. Typical applications include wear plates, axles, connecting rods, shafts, plowshares and scraper blades. These higher carbon steels cabin be welded successfully in most cases; however ,care must be taken to follow proper procedures, including preheating the metal to be welded and, in some cases, carefully controlling the temperatures during and after the welding process ,For further information on identifying various types of steel and other metals ,and for proper procedures for welding them ,we again suggest you purchase a book on Arc Welding.
Regardless of the type of metal being welded, it is important in order to get a quality weld that it be free of oil, paint, rust or other contaminants.

INSTALLATION AND CONNECTION INSTRUCTIONS

General Description

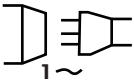
The welding machine is a stick welder designed for those who have an occasional need for a welder.It is suitable for light fabrication and repair welding .It is compact to allow portability and easy storage on a shelf or under a workbench. It is developed specifically for the nonprofessional welder.
INVERTER MMA series welding machines are one types of AC arc welding machines. The technical specifications or parameters of these products are showed on its nameplate.
CAUTION: For different type welding machine,the technical specifications or parameters is different.

Descriptions Of The Nameplate Marks And Symbols

Application standards: IEC60974-1:2005 or EN60974-1:2005
U1： Rated AC input voltage of the welding power source (tolerance: ±10%)
I1max： Max. input current
I1eff： Max. effective input current
X: duty cycle
It is the ratio between the load duration time and the full cycle time.
Note1: This ratio is between 0~100%.
Note2: For this standard, one full cycle time is 10min.For example, if the rate is 40%, the loaded time shall be 4 minutes
and rest time shall be 6 minutes.
Duty cycle is based on a ten minute period.This means that the arc may be drawn for two minutes out of each ten minute period without any danger of overheating .If it is used more than two minutes during several successive ten minutes peiods, it may overheat.
U0: Non-load voltage
It is the open-circuit output voltage of the welding power source.
I2: output current
U2: Output load voltage
The rated loaded output voltage U2=20+0.04I2 or U2=18+0.04I2
A / V—A / V: The adjustable range of current and its corresponding load voltage.
IP: Protection grade . For example, IP21,approving the welding machine as suitable for use indoors; IP23. approving the welding machine as suitable for use outdoors in the rain.

Suitable for hazardous environments


Please read the User's Manual carefully before use.



Symbol of single-phase AC power supply and rated frequency （e.g.50HZ or 60 HZ）.


Beyond rain

H or F： Insulation grade.

Installation

WARNING: Only qualified personnel should install,use,or service the welding machine.

Have an electrician install and service this equipment.
Turn the input power off at the fuse box before working on equipment.
Do not touch electrically hot parts.

Machine Installation Location - Place the welding machine to there where is free circulation of air.

Welding Machine Assembly

For **INVERTER MMA** series welding machines, movable welding cables should be connected to the welding power source Outputs .The input power cable should be connected to power supply.

Input Power and Grounding Connections

Only qualified persons should install,use or service this equipment. Protect yourself and others from possible serious injury or death.

WARNING: Do not operate with covers removed.Disconnect input power before servicing.

Do not touch electically live parts.

Before starting the installation,check with the power company to be sure your power supply is adequate for the voltage, amperes,phase,and frequency specified on the welding machine nameplate,Also be sure the planned installation will meet all local and national code requirements.Some welding machines may be operated from a single phase line or from one phase of a two or three phase line.

CAUTION: INVERTER MMA welding machines may be connected to either 220V or 230V input power .

1. Before connecting the input cable to the power supply,check that the power(on-off) switch operates in the position corresponding to the input voltage that the machine will be connected to.

CAUTION: If the power switch setting does not match the input power voltage,you may burn up the welding machine!

2. Connect the **"PE"** or **green/yellow grounding wire** in the input cord to a system ground per the applicable national and local codes.
3. Connect the flexible input cord of the welding machine to a single phase power supply of the proper voltage and ampacity through a fused two-pole disconnect.

Operating Instructions

CAUTION: Duty cycle is based on a ten minute period.This means that the arc may be drawn for two minutes out of each ten minute period without any danger of overheating .If it is used more than two minutes during several successive ten minutes peiods, it may overheat.

Control Functions

The desired welding curent is set by turning the handwheel.Clockwise rotation raises the welding current, counterclockwise rotation reduces the welding current.

Maintenance

WARNING: ELECTRIC SHOCK can kill.Do not touch electrically live parts such as output terminals or internal wiring. MOVING PARTS can injure.

Routine preventative maintenance is not required.

Substitution of output cable with larger sizes requiring connections to be made internally is not recommended.Connections for additional lengths or larger sizes should be properly made externally.

If either output cable requires replacement for other reasons, it should be replaced with the appropriate part -and only by qualified personnel .It is important that the connection to the transformer lead is made in the same manner that it was originally

MANUAL METAL ARC WELDING (MMA) PROCEDURE

Typical Stick Welding Set-Up

Welding current starts as soon as electrode touches the workpiece.

1.Workpiece

Make sure workpiece is clean before welding.

2 Work Clamp

Place as close to the weld as possible.

3 Electrode

Before striking an arc, insert an electrode in the electrode holder. A small diameter electrode requires less current than a large one. Follow recommendations of the electrode manufacturer when setting weld amperage (see Section 3-2).

4 . Insulated Electrode Holder

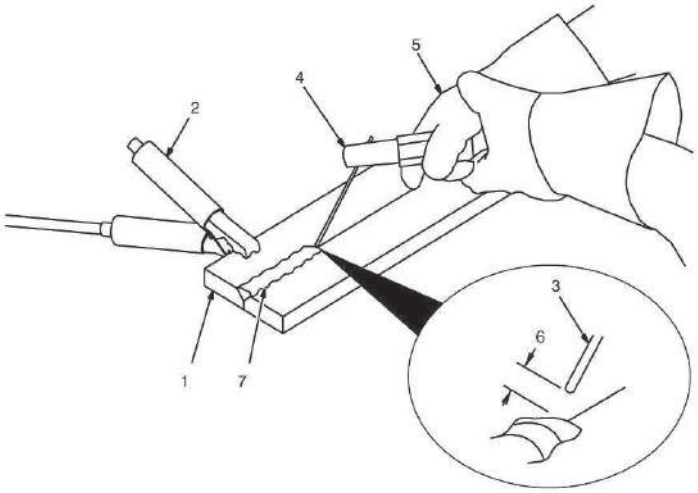
5. Electrode Holder Position

6. Arc Length

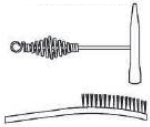
Arc length is the distance from the electrode to the workpiece. A short arc with correct amperage will give a sharp. crackling sound. Correct arc length is related to electrode diameter. Examine the weld bead to determine if the arc length is correct. Arc length for 1/16 and 3/32 in diameter electrodes should be about 1/16 in (1.6 mm); arc length for 1/8 and 5/32 in electrodes should be about 1/8 in (3 mm).

7. Slag

Use a chipping hammer and wire brush to remove slag. Remove slag and check weld bead before making another weld pass.

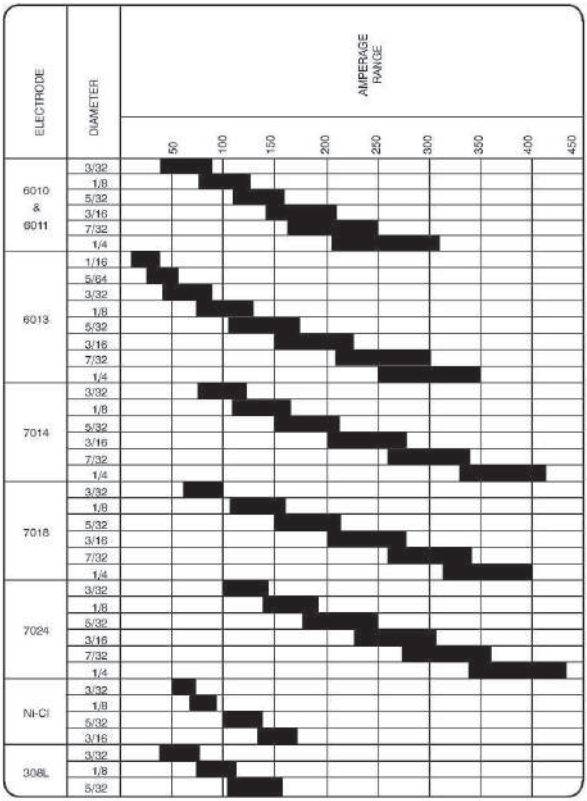


Tools Needed:



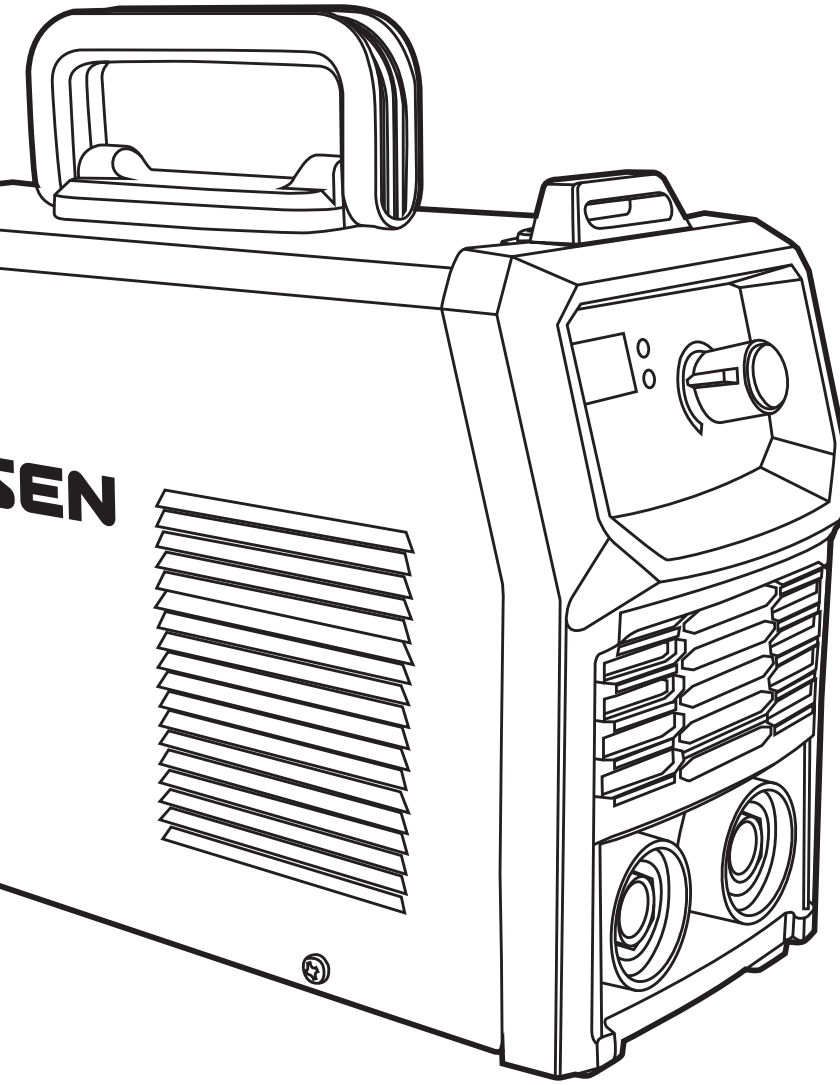
MANUAL METAL ARC WELDING (MMA) PROCEDURE

Electrode And Amperage Selection Chart



ELECTRODE	DC*	AC	POSITION	PENETRATION	USAGE
6010	EP		ALL	DEEP	MIN. PREP, ROUGH HIGH SPATTER
6011	EP	√	ALL	DEEP	
6013	EP,EN	√	ALL	LOW	GENERAL
7014	EP,EN	√	ALL	MED	SMOOTH, EASY, FAST
7018	EP	√	ALL	LOW	LOW HYDROGEN, STRONG
7024	EP,EN	√	FLAT HORIZ FILLET	LOW	SMOOTH, EASY, FASTER
NI-CL	EP	√	ALL	LOW	CAST IRON
308L	EP	√	ALL	LOW	STAINLESS

*EP = ELECTRODE POSITIVE (REVERSE POLARITY)
EN = ELECTRODE NEGATIVE (STRAIGHT POLARITY)



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