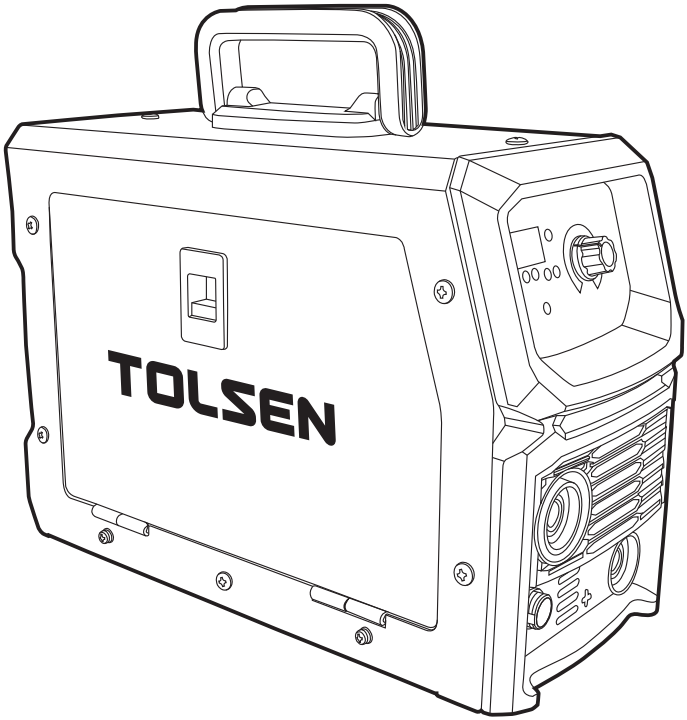
TOLSEN

44021

INVERTER MIG DC WELDING MACHINE

INSTRUCTION MANUAL



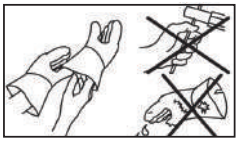
SAVE THIS MANUAL !
You will need this manual for safety instructions, operating procedures and warranty.
Put it and the original sales receipt in a safe dry place for future reference.

IMPORTANT SAFETY INFORMATION

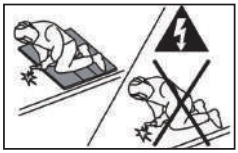
Safety Rules

ELECTRICAL SHOCK COULD BE FATAL

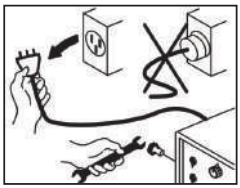
Installation procedure must comply with national electricity standards and other relevant regulations and ensure thatinstallationis performed by qualified persons.



- Wear dry, hole-free insulating gloves and body protection.
- Do not touch electrode with bare hand. Do not wear wet or damaged gloves and body protection.
- Do not touch live electrical parts.
- Never touch electrode while in contact with working surface, ground or another electrode which is connected to a different machine .



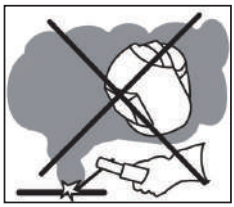
- Protect yourself from electric shock by insulating yourself from work and ground. Use non-flammable, dry insulating material if possible, or use dry rubber mats, dry wood or plywood, or other dry insulating material big enough to cover your full area of contact with the work or ground, and watch for fire.
- Never connect up more than 1 electrodes or wires to the machine.



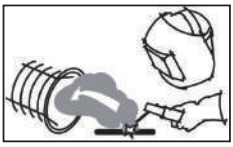
- Turn off the machine, when not in use .
- Disconnect input plug or power before working on machine.
- Frequently inspect input power cord for damage or bare wiring - repair or replace cord immediately if damaged.
- Be sure input ground wire is properly connected to a ground terminal in disconnect box or receptacle.

ELECTRICAL SHOCK COULD BE FATAL

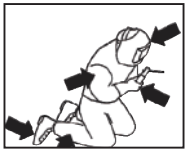
Inhaling fumes and gases over a long period of time, generated during welding is dangerous and forbidden .



- Irritation of the eyes, nose and throat are symptoms of inadequate ventilation. Take immediate steps to improve ventilation. Do not continue welding if symptoms persist.
- Install a natural or forced air ventilation system in the work area.
- Install an adequate ventilation system in the welding and cutting area, if needed install a system that can remove the fume and vapor accumulated in the entire work area, to prevent pollution use adequate filtration in discharge.
- In the event of welding in small, confined places, or welding lead, beryllium, cadmium, zinc, zinc coated or painted materials; also wear a fresh air supplied respirator in addition to the above mentioned rules .
- Always have a trained watch-person nearby, while working in small confined places. Avoid working in such confined places if possible.
- If gas cylinders are grouped in a different area, make sure that it is a well-ventilated area. When not being used, turn off the cylinder valve .
- Shielding gasses such as argon is denser than air and when being used in confined places, can be inhaled in place ofair, and this is dangerous for your health.
- Do not perform welding operations near chlorinated hydrocarbon vapors produced by degreasing or painting.



ARC RAYS CAN BURN EYES AND SKIN



- Use adequate welding helmet with correct shade of filter (4 or 13 considering TS EN 379) to protect your eyes and face.
- Protect open parts of your body (arms, neck and ears) from arc rays by adequate protective clothing.
- To protect others by arc rays and hot metals, surround the working area with flame proof curtains which are higher than eye level and put up warning boards.

FLYING METALS CAN INJURE EYES

- Welding, wire brushing and grinding cause sparks and flying metal.
- To prevent injuries wear appropriate safety glasses with side shields even under your welding helmet .

NOISE CAN DAMAGE HEARING

- Noise from certain industrial processes or equipmentcan damage hearing.
- Wear approved ear protection if noise level is high.

HOT PARTS CAN CAUSE SEVERE BURNS

- Do not touch hot parts.
- Allow cooling time before servicing.
- If needed to hold hot parts, use appropriate tool, insulating gloves and fireproof clothes.

MOVING PARTS CAN CAUSE INJURY

- Keep away from moving parts.
- Keep all doors, panels, and guards closed and secured.
- Wear shoes with metal protection over the fingers.

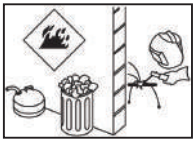
WORKING IN SMALL AND CONFINED PLACES CAN BE DANGEROUS

- While welding and cutting in small, confined places, always have a trained watch-person nearby.
- Avoid working in such confined places.

WELDING WIRE MAY CAUSE INJURY

- Do not point the gun toward any part of a human body, other persons or any type of metal when unwinding welding wire.
- While extracting the wire from the spool by hand, it may spring suddenly and injure you or a nearby person, protect especially your eyes and face.
- Make sure that there is no one close.

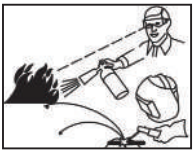
WELDING CAN CAUSE FIRE OR EXPLOSION



- Never weld near flammable material. It may cause fire or explosions.
- Before starting to weld, move flammables away or protect them with flame-proof covers.

- Do not weld on and cut closed tubes or pipes.
- Before welding on closed containers, open and clear them entirely. Welding operations on these parts must be performed with the utmost caution.
- Never weld containers or pipes containing or which have contained substances that could give rise to explosions.

Welding equipmentwarms up so never position them on flammable surfaces.



- Welding sparks can cause fire. For that reason, keep extinguishing means, such as fire extinguishers, water and sand easy reach.
- Have and maintain security valves, regulators and other valves on the flammable, explosive and compressed gas circuits in good condition by periodical controls, used for welding and cutting operations.

FALLING UNIT CAN CAUSE INJURY

Wrong positioned power source or other equipment may cause serious injury to persons or damage to objects.

- While re-positioning the power source always carry by using the lifting eye. Never pull cable, hose or Gun. Always carry the gas cylinders separately.
- Before carrying the welding and cutting equipment, disassemble all the connections between and separately carry the small ones by handgrips and the big ones by lifting eyes or by using appropriate vehicles like forklifts.
- Install your machine on flat platforms having maximum 10° slope that it does not fall over. Install it on well ventilated, non-confined places away from the dust, also avoiding the risk of falling caused by cables and hoses. For gas cylinders not to fall over, attach it to the mobile machine or to the wall with a chain.
- Ensure that operators easily reach the controls and connections on the machine.

MAINTENANCE MADE BY UNQUALIFIED PERSONS MAY CAUSE INJURIES

- Electrical devices should not be repaired by unqualified persons. Improper repairs can cause serious injuries or even death during applications.
- The components of the gas circuit works under pressure. The service given by unqualified persons may cause explosions and operators can be injured seriously.

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 airflow to unit.
- Do not filter airflow to unit without the approval of manufacturer.

ARC WELDING CAN CAUSE INTERFERENCE

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

STATIC (ESD) CAN DAMAGE PC BOARDS

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

PROTECTION

- Do not expose the welding machine to rain, protect from water drops and vapour.

ELECTROMAGNETIC COMPATIBILITY(EMC)

Electromagnetic Emission

- All electrical equipment generates small amounts of electromagnetic emission due to current transferring in the equipment. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result . Electrical emissions may affect not only welding machines but also many kinds of electrical equipment like radio and TV reception, numerical controlled machines, telephone systems, computers etc.
- Welding and cutting machines have been designed to work for professional and industrial use; for other applications to contact the manufacturers.
- The user is responsible for installing and using the equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing the welding the welding circuit, in other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.
- The circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g. by allowing parallel welding current return paths which may damage the earth circuits of other equipment.
- Extra precaution may be required when the welding power source is used in a domestic establishment.
- Special measures shall be taken to achieve compliance with welding power source including HF frequency for arc ignition and stabilizing; it may be required use of shielded cables and in any case to resolve the particular implementation (e.g. with robot, computer and any other electrical and electronic equipment connected to welding power source) to call the technical assistance of the manufacturer.
- EMC is Class A according to CISPR II.

Assesment Of The Surrounding Area

Before installing the welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account- if needed arrange the working hours that not coincide with those.

- Other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment,
- Radio and television transmitters and receivers,
- Computer and other control equipment,
- Safety critical equipment,
- Presence of heart beat regulators, heart cells, hearing devices or etc. nearby,
- Equipment used for calibration or measurement,
- The immunity of other equipment in the environment.

The user shall ensure that other equipment being used in the environment is compatible. This may require additional protectionmeasures.

Methods Of Reducing Emissions

- Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. Our welding machines are filtered against emission according to standards. If interference still occurs, it may be necessary to take additional precautions such as filtering of the mains supply.
- The equipment should be routinely maintained according to the manufacturer's recommendations. The welding equipment should not be modified without the approval of manufacturer.
- The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level. Power cables and signal cables should be kept separately.
- Keeping cables in the shape of -8- and taping together reduce emission.
- Connect earth clamp to work-piece as close to the weld as possible. But the user should be control whether this situation damage to people and equipment or not.

TECHNICAL INFORMATION

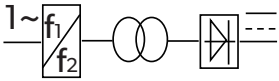
General Explanations

- MIG-120FII welding machine is 1 phase, Constant Voltage (CV) and Constant Current (CC) welding power source especially designed for the no shielded gas flux wire welding and MMA welding.
- All the controls of welding powersource are placed on to the front panel for easy operation.
- Wire feeding unit is wheel drive and it is installed in the power source.
- Wire feeder contains motor and driving wheel, etc.
- Welding parameters (for example,welding voltage,wire feed speed or welding current,)of the MIG-120FII welding machine can be adjusted by the parameters options or adjustment knob.

Application Area

- MIG-120FII is very good selection for welding 0.7~4 mm thickness metal. It is a very good choice for mild steel,stainless steel and alloy steel,etc.
- MIG-120FII can use no shielded gas flux wire welding and MMA welding.

Symbol And Meaning On Data Plate



Single phase input AC power supply, inverter, Rectifier,Transformer, DC current or voltage output

No shielded gas flux wire welding process,

MMA or Stick welding process

No Shielded Gas Flux Wire welding is also called self-Shielded Metal Arc Welding, the arc is maintained between a continuous self-shielded wire or electrode and the work piece. The arc and weld pool are shielded by a stream of the shielded gas. The process is suitable for most materials and filler wires are available for a wide range of metals.

No Shielded Gas Flux Wire welding is inherently more productive than MMA, where productivity losses occur each time a welder stops to replace a consumed electrode. Material losses also result from MMA welding when the stub of each electrode is thrown away. For every kilogram of coated stick electrode purchased, about 65 per cent becomes part of the weld (the rest being discarded). The use of the flux cored wire has increased this efficiency to 80-95 percent. No Shielded Gas Flux Wire welding is a versatile process, which can deposit weld metal at a very high rate and in all positions. The process is widely used on light to medium gauge steel fabrications and on alloy structures particularly where high-rate manual operator production is required. The introduction of flux cored wires is finding increased application in heavy steel structures.

Norm: Application standards,for example,EN IEC 60974-1.
U1: Rated AC input voltage of the welding power source, **for example,1~(1 phase), 230V.**
50/60HZ : Rated frequency of single phase AC power supply.
I_{1max}: Max. input current
I_{1eff}: Max. effective input current
X: Rated 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 **20%**, the loaded time shall be **2 minutes** and rest time shall be **8 minutes**. Duty cycle is based on a ten minute period.This means that the arc may be drawn for **2 minutes** out of each
ten minute period without any danger of overheating.If it is used more than **2 minutes** during several successive ten minutes periods, it may overheat.
U_0: Non-load voltage. It is the open-circuit output voltage of the welding power source.
I_2: output current or welding current
U_2: Output load voltage or welding voltage.The rated loaded output voltage U2=14+0.05I2 for No shielded gas flux
wire welding. U2=20+0.04I2 for MMA welding.
A / V—A / V: The adjustable range of current and its corresponding load voltage.
S1: The rated Input Power, KVA
IP: Protection grade. For example, IP21S,approving the welding machine as suitable for use indoors; IP23S,. approving the welding machine as suitable for use outdoors in the rain.

Suitable for hazardous environments

Beyond rain

H: Insulation grade

The Main Technical Specifications

Input voltage	230V
Frequency	50/60Hz
Rated input capacity	5.1KVA
No load voltage	60V
Output current	MIG: 40-120A MMA: 20-120A
Duty cycle	MIG: 0.9mm MMA: 1.6-3.2mm
Electrode size	20% @ 40°C

INSTALLATION

Work Area

- Make sure that your line voltage is single Phase , 230V,50Hz for MIG-120FII. And you have a neutral and earth line present at your work place.
- In order to cool down the machine and have an efficient work, keep the machine at least 30cm away from the surrounding objects. Do not place any heat source, as oven, to front side of the machine where the cooling air is taken from. Welding machine must not be effected of heat directly.
- Do not place the machine in small and narrow places. Beware of excessive dust and dirt.
- Keep your machine away from wet and humid places.
- Do not operate the machine under direct sunlight, rain and wind. Machines should be operated on lower capacities when ambient air temperature exceeds 40°C.
- Please use a suitable exhaust system for gases . Use breathing apparatus if there is a risk of inhaling any welding.
- Avoid welding where air-flow is high. Protect the welding area with curtains or mobile screens.
- Transport and place the device on firm and level ground so that it may not fall over. The maximum permissible angle of inclination for transport and assembly is 10°.
- If the cylinder is placed on the machine lock the chain to secure the tube, if not be sure that gas cylinder is chained vertically to a wall.
- This machine is protected electronically against overloading. Do not use stronger fuses than those stated on the type plate of the device.
- Ensure that the earth clamp has good and direct contact near the welding location. Do not direct welding current over chains, ball bearings, steel cables, protection conductors etc., Otherwise they may melt.
- Ensure that operators can easily reach the machine controls and equipment connections.
- Use lifting eyes for lifting the machine. Do not lift the machine by using a fork-lift or a similar vehicle.

INSTALLATION AND USAGE OF THE MACHINE

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 electrically live parts.

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.

- 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.
- 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!

- Connect the "PE" or green/yellow grounding wire in the input cord to a system ground per the applicable national and local codes.

Connect the machine to power supply

- The connection to the main lines is made by the end user. It has to be performed by qualified electricians or by the people trained in this area.
- Power supply cable to the machine must be connected to the main power supply switch.The main power supply has been labeled in the nameplate of the machine,for example,1~,230VAC,50Hz.
- For MIG-120FII, the 3G1.5-2.0mm² power supply cable should be used.
- Before turning on the main power supply switch user must check carefully these connections of the power supply cable and earth cable (Yellow/Green) to the machine.

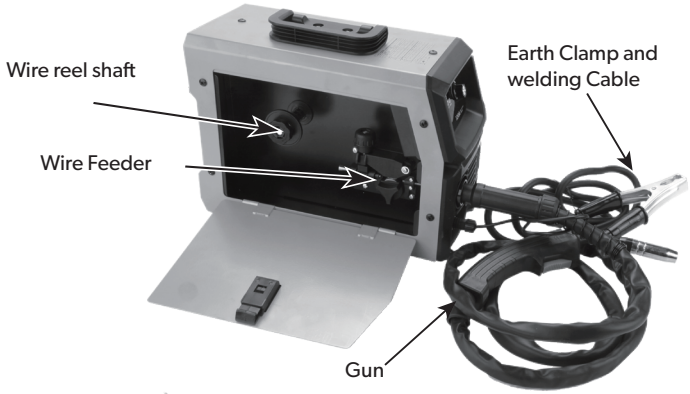
Be sure tha t connections are fastened tightly. Loose or incorrect fastening may cause the connection to overheat or burn. Unexpected results may occur if a mistake is made in the network connection.Pay attention that the connection of the earth cable (Yellow/Green) to P E e n d o f the machine.

Connection for no shielded gas flux wire welding

- For No gas flux wire welding, connect the work-piece and welding cable to Output (+) of the welding machine.

Connection for mma or stick welding

- For MMA or STICK welding, connect the work-piece and welding cable to Output (-) of the welding machine.
- Connect the electrode holder and welding cable to Output (+) of the welding machine.



On the back panel of the welding power source,these are Fan, Power Source cable and Power Source ON/OFF Switch.

Thread the welding wire

To avoid any problems during operation, this part has to be understood correctly. Inappropriate and incomplete operation may result in poor welding quality and harm the gun, this kind of failures are out of warranty.

- Ensure that the diameters of the drive rolls are correct.
- Raise the pressure assembly of the drive rolls.
- Thread the wire to the gun through the guides into the liner.
- Close and tighten pressure assembly

USAGE INFORMATION

The Power Source Back Panel

- SW1: ON/OFF Switch of the welding power source.
- Power source cable, for example,1～, 230V,50Hz

The Power Source Control Panel

- **Welding method or process** and **SYN control mode selection key**: MMA （or STICK）or FLUX（No shielded gas flux wire）welding and **SYN control mode** selection key.

SYN control mode: SINGLE KNOB or SYNERGIC controlling technology is called SINGLE KNOB or SYNERGIC controlling.For example,When Welding Current is adjusted by the knob of welding current,welding voltage and other welding parameters will be automatically changed.When Welding voltage is adjusted by the knob of welding voltage,welding current and other welding parameters will be automatically changed. In this way, the welding parameters adjustment will be simplified, much more convenient than adjusting each parameters.

- V: **Welding Voltage parameter adjustment knob:** adjust welding voltage parameter for no shielded gas flux wire welding.
- A: **Welding Current or wire feeding speed parameter adjustment knob:** Adjust welding current or wire feeding speed parameter for no shielded gas flux wire welding. Adjust welding current for MMA or STICK welding.
- POWER: Power LED.
- O.H: Over-Heat LED.

No Shielded Gas Flux Wire Welding Process

- Connect the work-piece and cable to Output (+) of the welding power source.
- Select **FLUX** welding by using **selection key**. At the same time, **SYN mode** (SYN LED is lit up)or **No SYN mode** (SYN LED is not lit up)is selected by using **selection key.**
- Select or set **welding parameters (V--welding voltage, A--wire feed speed or welding current)** according to the thickness of the work-piece, electrode diameter and welding position,etc.

MMA Or Stick Welding Process

- Connect the work-piece and cable to Output (-) of the welding power source.
- Connect the electrode holder and cable to Output (+) of the welding power source.
- Select **MMA** welding by using selection key.
- Select or set **welding parameters (welding current)** according to the thickness of the work-piece, electrode diameter （Max. ℄3.2mm）and welding position,etc. **The welding current is about 35~45 times the diameter of the electrode.**

Aligning Drive Rolls For Appropriatewire Diameter

- Both sides of the rolls are labeled according to appropriate wire diameter.
- Rolls must be inserted into the flange in such a way that appropriate diameter of the wire to be feed is seen from outside. After installing the rolls, the screws should be positioned and fastened.

Adjusting The Free Wire Length,welding Current And Voltage

- In order to obtain good welding characteristics, free wire length (L1) has to be adjusted by the following instructions. The diameter of the wire (d) and the distance (L) between the nozzle and the contact tip is important.
- Free wire length (L1) is the distance between the end of wire and the contact tip.
- Free wire length (L1) may be varied by the adjusting welding current (I2) and voltage(U2).
- For Short Circuit Transfer Arc,L is about 0~3mm, L1 is about 10d.For example,d=1.0mm,L1=10mm. For Short Circuit Transfer Arc,U2 is about 16~20V,I2 is about 90~120A.

TROUBLESHOOTING

TROUBLE	REASON	REMEDY
1.Machine does not work.	Power source switch is out of order.	Change the switch.
	Fuse is blown out.	Change the fuse.
	Electronic Card is out oforder.	Contact your authorized technical service.
2. The welding machine is operated, no output, the fan is not running.	Possible function failure of power switch.	Compensate it if necessary.
	Possible short circuit ofi nput cable.	Compensate it if necessary.
	Fan is out of order.	Change the Fan.
3. Wire feeder works but wire is not fed.	The drive roll is not appropriate for the wire diameter.	Select the appropriate drive roll.
	Pressure in the pressure roll is not enough.	Adjust the pressure.
4.Trouble in welding operation.	Contact tip size is wrong or bad.	Change the contact tip.
	Pressure in the pressure roll is not enough.	Adjust the pressure roll.
	Bending welding gun cable	Check it if necessary.
	Welding parameters are inappropriate.	Check welding parameters and adjustment.
5. While this welding machine is operated, O.C LED is Lit, no current output.	It is possible of over-heating protection status.	Wait till it is not flash, and the welding operation will be available.
	It is possible of over-current protection status.	Wait till it is not flash, or switch off the power supply, restart ON/OFF Switch of the welding machine.
6. Welding parameters cannot be adjusted. 7. Welding current or voltage isn't stabilized.	The main control PCB is out of order.	Change the control PCB
	Pressure in the pressure roll is not enough.	Adjust the pressure roll.
	Circuits are possibly damaged.	Check and replace them if necessary.
	Possible capacitors are possibly damaged.	Replace them if necessary
	Possible unavailability of connection inside this welding machine.	Check and reconnect if necessary.
	Possible disconnection of earth cable, or unavailability of connection of the earth cable and work-piece.	Check and reconnect if necessary.

MAINTENANCE

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 electrically live parts.

⚠ WARNING

ELECTRIC SHOCK CAN KILL

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.

WARNING: Before removing any screw on the machine for maintenance, power supply must be disconnected from the electric lines and enough time should be allowed for capacitor discharging. During maintenance, pay attention to the moving parts in the machine such as ventilator, wire feeding motor, rolls and, wire spool.

Periodic Maintenance

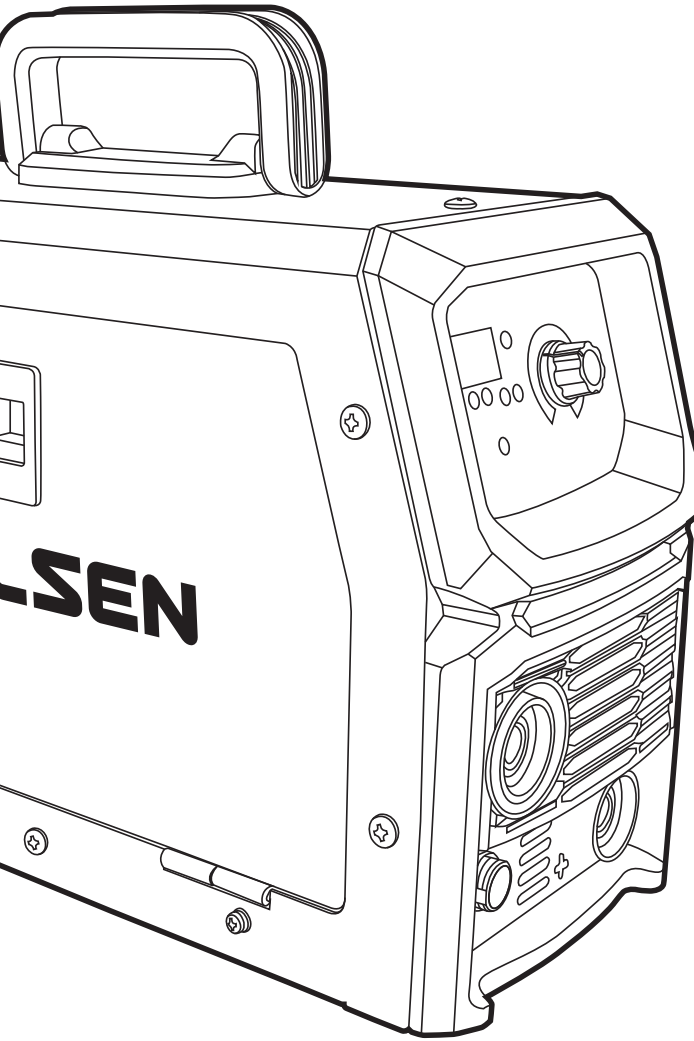
Once every three months
- Clean the labels on the machine. Repair or replace the worn out labels.
- Repair or replace the worn out welding cables.
- Clean and tighten weld terminals.
- Check Gun, earth clamp and their cables.
- Check the main connections inside the machine.

Once every six months
- Open the covers of the machine and clean with dry air.

NOTE: The above recommended maintenance periods are indicative according to our general experience, these may vary from work shop to work shop and the conditions of the welding site.

Nonperiodic Maintenance

- Wire feeding rolls and the surrounding parts should be kept clean and the surface of the drive rolls should definitely not be lubricated. Each time the wire is replaced, the dirt accumulated on the mechanism must be cleaned with dry air .
- Contact tip and nozzle on the gun have to be cleaned regularly and changed if required. Contact tips must be in good condition, longer tips generally give better results.



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