IGBT Inverter Welder

USER’S MANUAL

Model: MMA120K/140K/160K/180K/201K

FOR YOUR SAFETY
Read and understand this manual before use. Keep this manual for future reference.
# TABLE OF CONTENTS

1. SAFETY .................................................................................................................. 2
2. GENERAL DESCRIPTION ................................................................................... 3
3. MAIN PARAMETERS ............................................................................................. 4
4. ELECTRIC BLOCK DIAGRAM ............................................................................... 5
5. OPERATION CONTROL AND DESCRIPTION ..................................................... 5
6. INSTALLATION DEBUGGING AND OPERATION ............................................... 7
7. CAUTION ............................................................................................................... 8
8. MAINTENANCE .................................................................................................... 9
9. TROUBLESHOOTING .......................................................................................... 10

---

## DECLARATION OF CONFORMITY

Hereby we declare that these machines are produced based on relative Chinese and international standards and they conform to the international safety standard IEC60974-1. The design and technology adopted in these machines are under patent protection.

Please read and understand this manual carefully before the installation and operation of these machines.

1. The contents of this manual may be revised without prior notice and without obligation.
2. Although carefully checked, there may still be some inaccuracies in this manual. Please consult us if any.
1. SAFETY

Welding is dangerous, and may cause damage to you and others, so take good protection when welding. For details, please refer to the operator safety guidelines in conformity with the accident prevention requirements of the manufacturer.

Professional training is needed before operating the machine.
- Use labor protection welding supplies authorized by national security supervision department.
- The operator must be qualified personnel with a valid "metal welding (OFC) operations" operation certificate.
- Cut off power before maintenance or repair.

Electric shock—may lead to serious injury or even death.
- Install earth device according to the application criteria.
- Never touch the live parts when skin bore or wearing wet gloves/clothes.
- Make sure that you are insulated from the ground and work piece.
- Make sure that your working position is safe.

Smoke& gas—may be harmful to health.
- Keep the head away from smoke and gas to avoid inhalation of exhaust gas from welding.
- Keep the working environment in good ventilation with exhaust or ventilation equipment when welding.

Arc radiation—may damage eyes or burn skin.
- Wear suitable welding masks and protective clothing to protect your eyes and body.
- Use suitable masks or screens to protect spectators from harm.

Improper operation may cause fire or explosion.
- Welding sparks may result in a fire, so please make sure no combustible materials nearby and pay attention to fire hazard.
- Have a fire extinguisher nearby, and have a trained person to use it.
- Airtight container welding is forbidden
- Must not use the machines for other purposes except welding, such as pipe thawing, battery charging, heating.
IGBT INVERTER

Hot work piece may cause severe scalding.
- Do not contact hot work piece with bare hands.
- Cooling is needed during continuous use of the welding torch.

Magnetic fields affect cardiac pacemaker.
- Pacemaker users should be away from the welding spot before medical consultation.

Moving parts may lead to personal injury.
- Keep yourself away from moving parts such as fan.
- All doors, panels, covers and other protective devices should be closed during operation.

Please seek professional help when encountering machine failure.
- Consult the relevant contents of this manual if you encounter any difficulties in installation and operation.
- Contact the service center of your supplier to seek professional help if you still can not fully understand after reading the manual or still can not solve the problem according to the manual.

2. GENERAL DESCRIPTION

➢ Advanced IGBT inverter technology
  ◆ High inverter frequency greatly reduces the volume and weight of the welder.
  ◆ Great reduction in magnetic and resistance loss obviously enhances the welding efficiency and energy saving effect.
  ◆ Switching frequency is beyond audio range, which almost eliminates noise pollution.

➢ Leading control mode
  ◆ Advanced control technology meets various welding applications and greatly improves the welding performance.
  ◆ It can be widely used in acid and basic electrode welding.
  ◆ Easy arc starting, less spatter, stable current and good shaping.

➢ Features of MMA series
  ◆ Efficiency, energy saving, portable, stable arc, high no-load voltage, and with good compensation of arc force, are able to meet various welding requirements in field work.
3. MAIN PARAMETERS

3.1 Technical parameters table:

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MMA120K</th>
<th>MMA140K</th>
<th>MMA160K</th>
<th>MMA180K</th>
<th>MMA201K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated input voltage (V)</td>
<td>4.7</td>
<td>5.6</td>
<td>6.6</td>
<td>7.7</td>
<td>9.0</td>
</tr>
<tr>
<td>Rated input power (KVA)</td>
<td>21</td>
<td>25</td>
<td>29</td>
<td>34</td>
<td>41</td>
</tr>
<tr>
<td>Rated output</td>
<td>120A/24.8V</td>
<td>140A/25.6V</td>
<td>160A/26.4V</td>
<td>180A/27.2V</td>
<td>200A/28V</td>
</tr>
<tr>
<td>Welding current range (A)</td>
<td>10~120A</td>
<td>10~140A</td>
<td>10~160A</td>
<td>10~180A</td>
<td>10~200A</td>
</tr>
<tr>
<td>No-load voltage (V)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Rated duty cycle</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Power factor</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP21S</td>
<td>IP21S</td>
<td>IP21S</td>
<td>IP21S</td>
<td>IP21S</td>
</tr>
<tr>
<td>Insulation class</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

*Note: The duty cycle is tested at 40°C has been determined by simulation.*

3.2 Output characteristic drawing:

\[ U_2 = 20 + 0.04I_2 \]
5. OPERATION CONTROL AND DESCRIPTION

- **Front control panel** (see Figure 1)
  1. **"+" output terminal**: To connect the electrode holder.
  2. **"-" output terminal**: To connect the work clamp.
  3. **Plastic cover**: only available on plastic model. (optional)
  4. **Power LED**: To indicate the power. Power LED on indicates that the power switch of the machine is on.
  5. **Overheating LED**: To indicate overheating. Overheating LED on indicates that the temperature inside the machine is too high and the machine is under overheating protection status.
  6. **Output current adjustment knob**: To adjust the output current.

- **Back control panel** (see Figure 2)
  7. **Fan**
  8. **Power switch**: Power ON/OFF switch.
  9. **Power input**: Power input cable.
6. INSTALLATION DEBUGGING AND OPERATION

Note: Please install the machine strictly according to the following steps.
Turn off the power supply switch before any electric connection operation.
The protection class of this machine is IP21S, so avoid using it in rain.

6.1 Installation method
(1) A primary power supply cable is available for this welding machine. Connect the power supply cable to the rated input power.
(2) The primary cable should be tightly connected to the correct socket to avoid oxidization.
(3) Check whether the voltage value varies in acceptable range with a multi-meter.
(4) Insert the cable plug with electrode holder into the “+” socket on the front panel of the welding machine, and tighten it clockwise.
(5) Insert the cable plug with work clamp into the “—” socket on the front panel of the welding machine, and tighten it clockwise.
(6) Ground connection is needed for safety purpose.
The connection as mentioned above in 6.1(4) and 6.1(5) is DCEP connection. Operator can choose DCEN connection according to work piece and electrode application requirement. Generally, DCEP connection is recommended for basic electrode, while no special requirement for acid electrode.

6.2 Operation method
(1) After being installed according to the above method, and the power switch being switched on, the machine is started with the power LED on and the fan working.
(2) Pay attention to the polarity when connecting. Phenomena such as unstable arc, spatter, and electrode sticking could happen if improper mode is selected. Exchange the polarity if necessary.
(3) When switching the MMA/TIG switch to MMA mode, normal welding can be carried out under rated output current. When switching the MMA/TIG switch to TIG position and using lift arc ignition, arc can be successfully started under rated arc ignition current, and normal welding can be carried out under rated welding current.
(4) Select cable with larger cross-section to reduce the voltage drop if the secondary cables (welding cable and earth cable) are long.
(5) Preset the welding current according to the type and size of the electrode, clip the electrode and then welding can be carried out by short circuit arc starting. For welding parameters, please refer to 6.3.
6.3 Welding parameters table (for reference only)

<table>
<thead>
<tr>
<th>Electrode dia. (mm)</th>
<th>Recommended welding current (A)</th>
<th>Recommended welding voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>20~60</td>
<td>20.8~22.4</td>
</tr>
<tr>
<td>1.6</td>
<td>44~84</td>
<td>21.76~23.36</td>
</tr>
<tr>
<td>2.0</td>
<td>60~100</td>
<td>22.4~24.0</td>
</tr>
<tr>
<td>2.5</td>
<td>80~120</td>
<td>23.2~24.8</td>
</tr>
<tr>
<td>3.2</td>
<td>108~148</td>
<td>23.32~24.92</td>
</tr>
<tr>
<td>4.0</td>
<td>140~180</td>
<td>24.6~27.2</td>
</tr>
<tr>
<td>5.0</td>
<td>180~220</td>
<td>27.2~28.8</td>
</tr>
<tr>
<td>6.0</td>
<td>220~260</td>
<td>28.8~30.4</td>
</tr>
</tbody>
</table>

Note: This table is suitable for common carbon steel welding. For other materials, consult related materials and welding process for reference.

7. CAUTION

1. Working Environment

   (1) Welding should be carried out in dry environment with its humidity of 90% or less.
   (2) The temperature of the working environment should be between -10℃ to 40℃.
   (3) Avoid welding in the open air unless sheltered from sunlight and rain. Keep it dry anytime and do not place it on wet ground or in puddles.
   (4) Avoid welding in dusty area or environment with corrosive chemical gas.
   (5) Gas shielded arc welding should be operated in environment without strong airflow.

2. Safety Tips

   Over-current/over-voltage/over-heating protection circuit is installed in this machine. If the input voltage or the output current is too high or machine inside temperature over heating inside, the machine will stop automatically. However, excessive use (e.g. too high voltage) of machine may also damage machine, so please note:

   2.1 Ventilation

   High current passes when welding is carried out, thus natural ventilation can not satisfy the machine’s cooling requirement. Maintain good ventilation through the louvers of the machine. The minimum distance between the machine and any other objects in or near the working area should be 30cm. Good ventilation is of critical importance for the normal performance and lifespan of the machine.

   2.2 Welding operation is forbidden while the machine is overload. Remember to observe the max load current at any moment (refer to the corresponding duty cycle). Make sure that the welding current should not exceed the max load current. Overload could obviously shorten the machine’s lifespan, or even damage the machine.

   2.3 Over-voltage is forbidden.

   Regarding the power supply voltage range of the machine, please refer to “Main Parameters”
The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is cut off from the electricity utility before uncovering the welding machine.

8. MAINTENANCE

WARNING

(1) Check periodically whether inner circuit connection is in good condition (esp. plugs). Tighten the loose connection. If there is oxidization, remove it with sandpaper and then reconnect.
(2) Keep hands, hair and tools away from the moving parts such as the fan to avoid personal injury or machine damage.
(3) Clean the dust periodically with dry and clean compressed air. If welding environment with heavy smoke and pollution, the machine should be cleaned daily. The pressure of compressed air should be at a proper level in order to avoid the small parts inside the machine to be damaged.
(4) Avoid rain, water and vapor in filter the machine. If there is, dry it and check the insulation with equipment (including that between the connections and that between the connection and the enclosure). Only when there are no abnormal phenomena anymore, then the machine can be used.
(5) Check periodically whether the insulation covers of all cables is in good condition. If there is any dilapidation, rewrap it or replace it.
(6) Put the machine into the original packing in dry location if it is not to be used for a long time.

Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.
9. TROUBLESHOOTING

**WARNING** The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is cut off from the electricity utility before uncovering the welding machine.

Common Malfunction Analysis and Solution:

<table>
<thead>
<tr>
<th>Malfunction Phenomena</th>
<th>Cause and Solution</th>
</tr>
</thead>
</table>
| Turn on the machine, the power LED is off, the fan doesn't work, and no welding output. | (1) Check if the power switch is closed.  
(2) No input power. |
| Turn on the machine, the fan works, but the output current is unstable and can't be controlled by potentiometer when welding. | (1) The current potentiometer fails. Replace it.  
(2) Check if any loose contact exists inside the machine. If any, reconnect. |
| Turn on the machine, the power LED is on, the fan works, but no welding output. | (1) Check if any loose contact exists inside the machine.  
(2) Open circuit or loose contact occurs at the joint of output terminal.  
(3) The overheating LED is on.  
  a) The machine is under over-heating protection status. It can recover automatically after the welding machine is cooled.  
  b) Check if the thermal switch is ok. Replace it if damaged. |
| The electrode holder becomes very hot. | The rated current of the electrode holder is smaller than its actual working current. Replace it with a bigger rated current. |
| Excessive spatter in MMA welding. | The output polarity connection is incorrect. Exchange the polarity. |

We are still constantly improving this welder, therefore, some parts of this welder may be changed in order to achieve the better quality, but the main functions and operations will not be alternated and changed. Your understanding would be greatly appreciated.