

USER'S MANUAL

MODEL: MIG series

Safety notices

For the sake of your and other's safety, please read the manual carefully before installation or operation of the equipment!

The people operating the equipment or nearby should fully know about safety measures. The Safety will be fulfilled through everyone's common effort.

- The complete equipment should be securely grounded.
- All operations must be performed:
 - In accordance with the operating instructions
 - By the special operator
 - Incorrect operation is likely to cause an accident, injure the operator, and damage the equipment.

When operating the equipment, every operator must know about:

- Control of the equipment
- Operation of the equipment
- All effective safety rules

For its convenient use, every selection switch, knob, button, amperemeter, and voltmeter is marked. Its function and usage are described clearly.

Safety information:

- Be sure to use appropriate personal safety outfit, for example, protective goggle, mask, and gloves. Do not wear a tie, bracelet, and loose clothing that are easy to twine the equipment.
- Put the fire extinguishers in the specially marked position (the fire extinguishers shall be provided by the user).
- Keep the arc-welding rectifier a certain distance away from flammable substances such as waste oil and clothing.
- The splashing can cause a fire and burn your skin. The arc light would damage your eyes and skin.
- Smoke and dust produced during the welding process are harmful to your body. Please try to remove them or avoid inhaling them.
- Check the emergency and safety devices every day.
- Be sure to cut the power off after finnish your work and/or when leave the welding site temporarily.
- Be sure to check the arc-welding rectifier before and after use of it. Be sure to find out the reason and correct the abnormality when any abnormality occurs. Do not use the equipment before correct the abnormality.
- Be sure to cut the power off before check the welder. Do not open the case before cut the power off to avoid an electric shock.

2. Normal operating conditions

- Environmental temperature
-10°C ~ 40°C
- Elevation
≤ 1000 meters
- Relative humidity
At 40°C: relative humidity ≤50%
At 20°C: relative humidity ≤90%
- Power requirements
Power supply: three-phase, 415V, 50Hz
Imbalance rate of the three-phase voltage: <±0.5%
Voltage fluctuation of the power grid: <±10%
Frequency fluctuation: <±1%
- Others

In the working site, there are no gas, vapor, chemical sediment, dust, dirt, mildew, and other flammable/corrosive substance, which severely affect the use of the arc-welding rectifier. In addition, avoid violent shake and jolt of it.

Put the equipment in a dry and ventilated place. Avoid direct exposure to sunlight and rain.

1. Main purposes and features

1.1 Main purposes

IGBT inverter gas-shielded welders of MIG series include Model 315, 500, and 630. They are mainly applicable to CO₂-shielded welding, consumable electrode argon arc-welding (MIG), and mixed gas-shielded welding (MAG). They conform to GB15579-2004 safety requirements of arc-welding equipment and JB/T 8748—1998 technical requirements of the welder

The model description of the series conforms to GB/T 10249-1998 standards of model description for the arc welder.

1.2 Features

- ✦ IGBT high frequency inverter technology is used. Up to 20KHz inverter frequency provides fast dynamic response.
- ✦ Use of current control mode provides high quality and reliable performance.
- ✦ Total digital presetting and display of welding current/voltage provides a visual and convenient operation.
- ✦ Current self-adaptation within 30mm dry extension is applicable to all-position welding.
- ✦ Perfect protection circuit and fault display function provides safety, reliability, and convenience to locate a fault.
- ✦ Metal transfer waveform control provides stable electric arc, little splashing, and well-shaped welding lines.
- ✦ Arc-striking and ball removal circuit is added to guarantee the arc-striking success rate.
- ✦ Small dimension, low weight, high efficiency, energy saving, high duty cycle, and no noise
- ✦ Reasonable structure and concise layout provides convenient maintenance.
- ✦ Applicable to CO₂ /MIG/MAG welding with solid/flux-cored welding wire of different welding specifications
- ✦ Stable welding process and strong immunity against power grid fluctuation (280~480V)

3. Main technical parameters

Table 1: Main technical parameters

Model Item	MIG-350	MIG-400	MIG-500	MIG-630
Supply voltage (V)	Three-phase 415V±15%			
Frequency (Hz)	50/60	50/60	50/60	50/60
Rated input current (A)	21.1	26.1	37.5	55
Output current adjustment (A)	50-350	50-400	80-500	100-630
Output voltage (V)	16.5-32	16.5-34	18-39	19-45
Duty cycle	100%	100%	100%	80%
Power factor	0.93	0.93	0.93	0.93
Efficiency (%)	85	85	85	85
Type of the wire feeder	Panasonic interface	Panasonic interface	Panasonic interface	Panasonic interface
Wire-feeding speed (m/min)	3-15	3-15	3-15	3-15
Post flow time (S)	1.5±0.5	1.5±0.5	1.5±0.5	1.5±0.5
Welding-wire diameter (mm)	0.8/1.0/1.2	0.8/1.0/1.2	1.0/1.2/1.6	1.2/1.4/1.6
Insulation grade	F	F	F	F
Case protection grade	IP21	IP21	IP21	IP21
Applicable plate thickness (mm)	0.8 above	0.8 above	1.0 above	1.2 above
Output cable (mm ²)	35 above	35 above	50 above	70 above
Weight of the welder(kg)	28	28	42	45
External dimension of the welder (mm)	515×265×405	515×265×405	685×302×660	685×302×660

Technical description:

- ① Air-cooling mode is used in the cooling system of the arc-welding rectifiers of the series.
- ② No-load power: no other loss except that of the control transformer and fan

4. Hoist and storage

- There are two handles on the top of the arc-welding rectifier for hoisting purpose.
- The arc-welding rectifier and wire feeder are packed with the carton. It can be transferred manually or with a forklift. However, be sure to avoid its hit or fall.
- The arc-welding rectifier and wire feeder should be stored in a dry, ventilated, and rainproof place. The storage temperature is -25~+55℃.

5. Installation and attention

5.1 Installation

First, please read the user's manual carefully. Check if the product and accessories are complete and in good condition.

Put the arc-welding rectifier in a dry, dustproof, rainproof, and anticorrosive place. Make the installation and connection in the following ways (refer to Diagram 2). Put the arc-welding rectifier in a well-ventilated environment to facilitate heat dissipation. Air outlet opening should be not less than 800mm away from the wall, and not less than 100mm away from the right and left wall.

The three-phase power cable must go to the arc-welding rectifier through the air switch. Select the capacity of the air switch in accordance with technical parameter requirements of the welder.

Attention:

* The case of the arc-welding rectifier must be securely grounded (in the place with a grounding mark) to avoid an electric shock.

* The arc-welding rectifier must be securely connected to the three-phase power cable. Otherwise, the equipment would function improperly, or the local area of the joint be heated and damaged.

* It is strictly prohibited to pull the air switch when the load is applied to avoid the damage.

The “+” output of the arc-welding rectifier should be connected to the wire-feeder, and the “-” output to the to-be-welded workpiece.

One end of the gas hose is connected to the gas outlet opening of the gas adjuster, and

the other end to the inlet opening of the gas valve of the wire feeder.

The male connector (pin) of the control cable is connected to the jack of the control cable of the arc-welding rectifier, and the female connector (hole) of the control cable to the jack of the control cable of the wire feeder.

The plug of the heater of the CO₂ adjuster should be inserted into the jack of the heater of the arc-welding rectifier.

Each connector of the welding gun should be connected to the related interface of the wire feeder.

Attention: Secure all bolts and plugs. Be sure to connect the workpiece securely with the power cable. Otherwise, the equipment would function improperly, or the local area of the joint be heated and damaged.

Secure the joint of the gas hose with a throat clamp to prevent gas leakage and affect the shielding effect.

When perform the CO₂-shielded welding, insert the plug of the gas heater into the jack of the heater of the arc-welding rectifier to protect the gas path from being frozen and blocked and affect the shielding effect.

The heater of the CO₂ adjuster uses 36V/AC power source. Do not connect it to 220V/AC to protect it from being burned and people from being injured.

If any other related device is used, please refer to the related manual and make the installation and connection accordingly.

5.2 Other important information

- The high voltage exists in the equipment, a non-professional person is strictly prohibited to open the case of the equipment for maintenance or repair.
- It is strictly prohibited to operate the arc-welding rectifier when a phase-lacking fault occurs.
- If the fan doesn't run after the power is turned on, it is strictly prohibited to use the arc-welding rectifier.
- The three-phase power grid fluctuation exceeds ±10, it is strictly prohibited to use the equipment.
- Do not pull the wire feeder through the welding gun.
- The automatic air switch of the arc-welding rectifier is normally closed. Do not pull it to avoid the damage.

6. Function description

6.1 Function diagram of the front/rear panel of the arc-welding rectifier (see Diagram 1)

6.2 Function diagram of the front/rear panel of the arc-welding rectifier (see Table 2)

Table 2 Function description of the front/rear panel

No.	Name	Description
1	Amperemeter	Preset and display the output current of the welder
2	Voltmeter	Preset and display the output voltage of the welder
3	Power indicator light	Indicate if the power supply of the welder is turned on/off.
4	Abnormality indicator light	The abnormality indicator light is on when an abnormality occurs.
5	Adjustment knob of arc-receiving current	Set the arc-receiving/manual welding current
6	Adjustment knob of arc-receiving voltage	Set the arc-receiving voltage for welding
7	Arc-receiving On/Off switch	Make sure if the arc-receiving specification is required
8	Gas check switch	Check gas flow and pre-adjust gas flow rate
9	Wire-selection switch	Select the welding-wire diameter
10	Function switch	Select manual/gas-shielded welding
11	Plug of the control cable	Connected to the control cable of the wire feeder
12	Output anode	Connected to the welding power cable of the wire feeder
13	Output cathode	Connected to the workpiece
14	Input terminal box	Connected to the input power cable of three-phase, 415V/AC, and 50Hz
15	Plug of the heater	Connected to the heater of the CO ₂ adjuster
16	Control power fuse	Protect the control circuit
17	Air switch	When the welder functions improperly, or is overloaded for a long time, protection function of the air switch is activated.
18	Nameplate	Indicate the related technical parameters and information of the welder
19	Grounding terminal	Be sure to connect it to the welding ground when use the welder to ensure safe use of electricity.

6.3 Function description of the wire feeder (see Diagram 1)

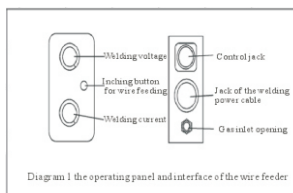


Diagram 1 The operating panel and interface of the wire feeder

7. Use and operation

7.1 Preparation before use

Connect the input power cable of the welder to the power grid according to the requirements. (Refer to 5. Installation and attention)

Attention: The three relatively thick wires are connected respectively to the phase wire of the three-phase power supply. Do not need to identify the phase sequence. The relatively thin wire is connected to the welding ground. The connection must be secure. Be sure not to make any wrong connection. Otherwise, the equipment would be damaged and human safety be endangered.

The air switch on the rear panel of the welder is put in closed state (“On” position), and the power switch in the power board is put in opened state (“Off” position).

Attention: The air switch should be normally closed. When the load is applied, it is strictly prohibited to pull it to avoid the damage.

Check if the circuit connection is correct and secure and the power supply of the power grid meets the requirements. Turn on the power switch in the power board after make sure all connections are correct.

Attention: At this time, the fan runs and the power indicator light is on. The preset voltage and current value (a minus value) is displayed in the voltmeter and amperemeter.

Put the “Gas check” switch to the “Gas check” position and adjust the gas flow rate. Then, put the “Gas check” switch to the “Welding” position.

Load the wire with the “Locking” button on the operating panel of the wire feeder.

Attention: The width of the wire groove of the wire-feeding reel should match with the

diameter of the used welding wire. The pressure of the wire-pressing roller should be adjusted to be just appropriate to dispense the welding wire.

Attention: The aperture of the contact tip of the welding gun and the wire-feeding hose should match with the diameter of the used welding wire.

Put the "Wire-selection" switch of the welding power panel to a correct position, which is the one to match the diameter of the welding wire.

Attention: If the "Wire-selection" switch is put to a incorrect position, the welding current will not match with the preset value.

The "Function" switch position is incorrect.

When the contact tip is burned or in a poor contact, it is necessary to replace it to avoid affecting the welding stability.

When the diverter or nozzle of the welding gun is damaged, it is necessary to replace it to avoid affecting the gas shielding effect.

When the wire-feeding hose of the welding gun is blocked, it is necessary to replace or clean it to avoid affecting the welding stability.

7.2 Welding

When perform the gas-shielded welding, turn the adjustment knob of the welding voltage and current to the desired value according to process requirement (The minus value displayed in the amperemeter and voltmeter is the preset value, and the plus value is the actual output value. The preset voltage value is actual output value and the preset current value is percent of the wire-feeding speed. The maximum value is 100%).

When the arc-receiving specification is required, it is necessary to put the "Arc-receiving On/Off" switch in the welding power panel to the "On" position, and turn the adjustment knob of the arc-receiving voltage and current to the desired value.

Attention: When the "Arc-receiving On/Off" switch is put to the "Off" position, press and hold the switch of the welding gun to start the welding, and release it to stop the welding.

When the "Arc-receiving On/Off" switch is put to the "On" position, press the switch of the welding gun to start the welding. Press the switch again and hold it to enter arc-receiving state, and release it to stop the welding.

When make sure the arc-welding rectifier can function properly after adjustment, you can use and operate the welder according to your desired welding process requirements and methods.

When perform the manual welding, turn the arc-receiving current knob in the welder panel to preset the output current. The actual output current is the maximum output current of the welder multiplied by your preset percent.

7.3 Shutdown

When complete the welding and need to turn the welder off, put the power switch in the power board to the "Off" position.

8. Maintenance and troubleshooting

8.1 Maintenance

After the arc-welding rectifier is used for a period of time, it is necessary to remove dust and dirt in the equipment with the dry compressed air or in other way to ensure the arc-welding rectifier functions properly for a long time, and prolong its service life.

Check the fasteners and connections in the equipment to see if any is loose or broken. If yes, it is necessary to correct it in time.

Attention:

* Be sure to cut off the power supply of the arc-welding rectifier when remove dust and dirt.

* Do not fiddle with the connections in the equipment when remove dust and dirt to avoid damaging the component.

Check the grounding of the case of the arc-welding rectifier at all times to avoid an electric shock.

Check if the arc-welding rectifier is securely connected with the three-phase power supply of the power grid at all times to avoid the arc-welding rectifier functioning improperly or the local area of the joint being heated and damaged.

Check if the external bolts of the arc-welding rectifier is secured at all times to avoid the arc-welding rectifier functioning improperly or the local area of the joint being heated and damaged.

Clean the wire feeder at all times to keep it clean and well insulated. Make sure no foreign substance exists in the wire groove of the wire-feeding reel to ensure smooth wire feeding.

Clean the wire-feeding hose of the welding gun at all times to ensure its smoothness and intactness.

8.2 Troubleshooting

8.2.1 Make the following checks first when the arc-welding rectifier functions improperly:

- Is the three-phase supply voltage between 340V~420V?
- Does the three-phase power supply have a phase lacking fault?
- Is the input power cable of the arc-welding rectifier securely connected?
- Is the output power cable of the arc-welding rectifier correctly connected and in a good contact?
- Is any component burned, or any connection broken or loose in the equipment?

8.2.2 Troubleshooting

After you have checked the items listed in 8.2.1, and found the fault reason and corrected the fault, the arc-welding rectifier still functions improperly. Conduct the troubleshooting according to Table 3.


**WARNING:**
All maintenance and troubleshooting work should be conducted after the power supply is completely cut off. Make sure the power plug is removed before open the case.

Table 3: Troubleshooting

No.	Trouble	Reason	Remedy
1	The power indicator light is not on and the fan doesn't run. There is no display in the voltmeter and amperemeter.	The external power supply has a phase-lacking fault.	Check the three-phase power supply circuit.
		The automatic air switch is unclosed or damaged.	Close the automatic air switch or replace it.
		The input connection is broken.	Check the connection or replace the damaged part.
2	The fan doesn't run.	The control transformer is damaged.	Replace the transformer.
		The fan or the fan capacitor is damaged, or the related connection has a fault.	Replace the damaged part, or check the connection.
		The protection indicator light is not on and the welder doesn't work.	Please contact with our company.
3		The part is damaged.	It will resume work automatically after the voltage of the power grid returns to normal.
		The voltage of the power grid is too high. The arc-welding rectifier is in automatic protection state.	Ventilate the arc-welding rectifier for a while. It will resume work automatically.
		Internal temperature of the arc-welding rectifier is too high, the arc-welding rectifier is in automatic protection state.	
4	The heater doesn't work.	The fuse is burned.	Replace the fuse.
		The heater is damaged.	Replace the heater or the gas adjuster.
5	The wire feeder doesn't work properly.	The control cable is broken or in a poor contact.	Check the connection.
		The main control board has a fault.	Replace the main control board.
6	The air switch trips.	The component is damaged.	Please contact with our company.
		The automatic air switch is damaged.	Replace the automatic air switch.

Attention:

* Turn the equipment off immediately if any other fault occurs and can't be corrected, and give notice to our company or the local vendor as soon as possible. Be sure not to repair it on your own to avoid worsening the problem and causing unnecessary loss.

* When give notice to our company, please describe the problem as detailed as possible so that you problem can be handled in time.

9. Possible problems during the welding process

The problems listed here are related to the fittings, welding materials, environmental factors, and power supply. Please try to improve the environment and avoid the problems occurring.

A. Difficult in arc starting and prone to arc breaking:

- 1) Check if the welding ground clamp and the workpiece are in a good contact.
- 2) Check if all the joints are in a good contact.

B. The output current can't reach the rated value:

The supply voltage diverges from the rated value so that the output current value is not the same as the preset value. When the supply voltage is lower than the rated value, the maximum output current of the welder is likely to be lower than the rated value.

C. During the welding process, the current can't be kept stable:

The problem may be related to the following factors:

- 1) The voltage of the power grid has changed.
 - 2) There is severe interference from the power grid or other electric equipment.
- D Gas holes exist in the welding lines.


- 1) Check if gas leakage exists in the gas supply loop.

- 2) Check if any foreign substance such as oil, dirt, rust, or paint exists in the surface of the base material.

10. Daily check

Daily check is very important in making full use of the welder's performance and ensuring daily safe operation.

In a daily check, especially see if various parts in the welding gun and wire feeder are worn away or distorted and if the gas holes are blocked. Check the following parts one by one. When necessary, clean and replace some parts. Be sure to replace the parts with Hitronic original ones of the welder to maintain the original performance.

**WARNING:** Be sure to cut off the power supply of the switch cabinet and ensure the safety before make a daily check unless there is a special demand. Failure to following the above rule may cause a severe human accident such as electric shock or burn.

10.1 Welding power source

Part	Check point	Remarks
Operating control panel	1. Check the operation, switching, and installation of the switches. 2. Check if the power indicator light turns on/off correctly.	
Cooling fan	1. Check if there is a current of air the air and the sound is normal.	If the running sound is unheard or abnormal, it is necessary to check the inside.
Power section	1. When the power supply is turned on, check if there is any abnormal vibration or buzz. 2. When the power supply is turned on, check if there is any peculiar smell. 3. Check if there is any external color change or heating sign.	
Peripheral	1. Is the gas supply loop damaged, or the joint loose? 2. Is the case or other fastened part loose?	

	4. Blocked by dirt and welding-wire residue	It can cause poor wire feeding and unstable arc (wipe it with kerosene or replace it with a new wire-feeding hose)
	5. The wire-feeding hose is damaged. The "O" shaped ring is worn away.	It can cause splashing: 1. The heat-shrinkable tube is damaged. Replace it with a new one. 2. Replace the worn ring with a new one.
Gas diverter	Forgot to insert it, or the hole is blocked, or the component of other manufacturers is used.	It can cause the welding defect (splashing) or the burn of the welding gun body (the arc in the gun body) due to poor gas shielding, please handle the problem correctly.

10.3 Wire feeder

Part	Check point	Remarks
Nozzle	1. Is it securely mounted? Is its front end distorted?	It is the reason to cause gas holes
	2. Is it stuck with the splashing?	It is the reason to cause the welding gun to be damaged (using anti-splash agent is a useful way to avoid it occurring)
Contact tip	1. Is it securely mounted?	It is the reason to cause the screw thread of the welding gun to be damaged
	2. Is the tip damaged, or the hole worn away or blocked?	It is the reason to cause unstable arc or arc breaking
Wire-feeding hose	1. Measure the extension length of the wire-feeding hose.	Replace the wire-feeding hose when the length is less than 6mm. A too small length would cause unstable arc (it is better to use a new one with the extension length slightly longer than the specified one)
	2. Does the diameter of the welding wire match the inner diameter of the wire-feeding hose?	The mismatch is the reason to cause unstable arc. Replace the welding wire hose with a suitable hose.
	3. Local bending and elongation	It is the reason to cause poor wire feeding and unstable arc. Replace the wire-feeding hose.

Part	Check point	Remarks
Pressing handle	Is the pressing handle adjusted to an appropriate pressure-applied indicator line? (Special attention: it is strictly prohibited to damage the welding wire under $\Phi 1.2\text{mm}$)	It will cause unstable wire feeding and arc.
Wire-guide tube	1. Is the cut powder and scrap accumulated in the end of the wire-guide tube and the rim of wire-feeding reel?	Clean the cut powder and scrap. Check the reason and correct the problem thoroughly.
	2. Does the diameter of the welding wire match the inner diameter of the wire-guide tube?	The mismatch would cause unstable arc, or the cut powder and scrap.
	3. Check if the end center of the wire-guide tube is aligned with the groove center of the wire-feeding reel (visual inspection).	The misalignment would cause the cut powder and unstable arc.
Wire-feeding reel	1. Does the diameter of the welding wire match the nominal diameter of the wire-feeding reel? 2. Check if the groove of the wire-feeding reel is blocked.	1. It would cause the welding wire to produce the cut powder, the wire-feeding hose to be blocked, and the arc to be unstable. 2. Replace it with a new one if any abnormality occurs.
Pressing wheel	Check the running stability. Check if the pressure-applied side of the welding wire is worn away and the contact side is narrowed.	It would cause poor wire feeding and unstable arc.

10.4 Cables

Part	Check point	Remarks
Cable of the welding gun	1. Is the cable of the welding gun over-bended? 2. Is the metal joint of the first plug loose?	1. It would cause poor wire feeding. 2. The over-bended cable would cause unstable arc.
Output cable	1. The cable insulation is worn away and damaged. 2. The cable joint is exposed (the insulation is damaged) and loose. (the welded area of the power terminal, and the joint of the base material and the cable)	In order to ensure human safety and stable welding, please use appropriate check methods according to the working site. ● Daily check General and simple ● Regular check Thorough and detailed
Input cable	1. Is the input and output terminal of the input protection device of the switch cabinet securely connected? 2. Is the safety device securely connected? 3. Is the cable in the input terminal of the welding power source securely connected. 4. Is the input cable exposed as its insulation is worn away or damaged during the wiring.	
Grounding cable	1. Is the grounding cable of the welding power source broken? Is it securely connected? 2. Is the grounding cable of the base material broken. Is it securely connected?	Be sure to make daily check in order to prevent the current leakage and ensure the safety.

The following are early diagnosis tables of common welding abnormalities. Find the problem in the abnormality columns in the upper right corner of the table. If there is a "O" under the problem, please make a check and maintenance according to related items in the table.

Early diagnosis of welding abnormalities (1)

Check parts and items		Abnormalities							
		The arc can't be struck	No gas flows out	No welding wire goes out	Poor arc starting	Unstable arc	Unclean rim of the welded lines	Welding wire stuck to the base	Welding wire stuck to the wire
Switch cabinet (input protection device)	1. Is it connected? 2. Is the fuse burned? 3. Is the joint loose?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Input cable	1. Is the cable broken? 2. Is the joint loose? 3. Is there heating sign?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operation of the welding power source	1. Is the switch turned on? 2. Is there a phase-lacking fault?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas cylinder and gas adjuster	1. Is the lid of the cylinder opened? 2. Check the remaining quantity of the gas 3. Check the set value of the flow rate 4. Is the joint is loose?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas supply hose (the full path from the high pressure gas cylinder to the welding gun)	1. Is the joint loose? 2. Is the gas hose damaged?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1.5 Early diagnosis of abnormalities

Even if an abnormality happens, for example, the welding can't be conducted, the arc is unstable, or the welding effect is not good, do not make a judgment too early that the welder has a fault.

Even when the welder works normally, the above mentioned abnormalities may occur due to some problems far from faults, for example, fastener loosening, forgetting to turn a switch on/off, incorrect setting, cable breaking, and gas hose cracking. Therefore, please try to make a check before make a fault determination and send the welder for repair. Quite a few problems can be readily solved.

Early diagnosis of welding abnormalities (2)

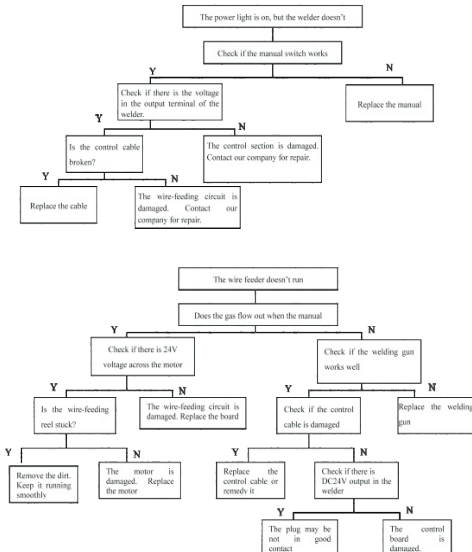
Abnormalities		The arc can't be struck	No gas flows out	No welding wire goes out	Poor arc starting	Unstable arc	Unclean rim of the welded lines	Welding wire stuck to the base	Welding wire stuck to the contact tip	Gas holes are produced
Check parts and items										
Wire feeder	1. Does the diameter of wire-feeding reel match that of the wire-guide tube? 2. Is the wire-feeding reel cracked, or the groove blocked? 3. Is the pressing handle too tight or loose? 4. Is the cut powder of the welding wire accumulated in the entrance of the SUS tube?			○	○	○	○		○	
Welding gun and its cable	1. Is the power cable of the welding gun folded and over-bended? 2. Is the diameter of the contact tip, wire-feeding hose, and welding wire matched? Are the contact tip and wire-feeding hose worn away, blocked, or distorted?				○	○	○		○	
Body of the welding gun	1. Are the contact tip, nozzle, and nozzle connector loose? 2. Is the body connector of the welding gun properly inserted and fastened?						○			○

The power cable of the welding gun and the switch control cable	1. Broken (bending fatigue) 2. Damaged by a heavy object	○	○	○	○	○	○	○	○	○
The surface condition of the base material and the extension of the welding wire	1. There is oil, dirty, rust, and or paint membrane on it. 2. The welding wire is over-extended				○	○	○	○	○	○
Output cable	1. The cross-sectional area of the cable connected to the base material is insufficient. 2. The joint of the (+) and (-) output cable is loose. 3. The electrical conductivity of the base material is poor.				○	○	○	○	○	○
Extended cable	1. The cross-sectional area of the cable is insufficient 2. The cable is folded or over-bended				○	○	○	○	○	○
Welding operating conditions	Check the welding current and voltage, the angle of the welding gun, the welding speed, and the extension length of the welding wire once again				○	○	○	○	○	○

10.6 Regular check

For other abnormalities not included in the "Early diagnosis of abnormalities" and "Display and handling measure of abnormalities", please find out the reason according to the following procedure and take the related handling measure.

Find out the reason



11. Recommended parameters

Recommended welding parameters

The values listed in the following table are common specification ones under standard conditions.

Correct the range to a narrow one when use them in the arc-welding power source of the ordinary silicon-controlled rectifier.

Correct the range to a wide one when use them in the arc-welding power source of IGBT Inverter.

	Plate thickness (mm)	Wire diameter (mm)	Clearance (mm)	Current (A)	Voltage (V)	Welding speed (cm/min)	Dry extension (mm)	Gas flow rate (L/min)
I-shaped butt welding	0.8	0.8,0.9	0	60~70	16~16.5	50~60	10	10
	1.0	0.8,0.9	0	75~85	17~17.5	50~60	10	10~15
	1.2	0.8,0.9	0	80~90	16~16.5	50~60	10	10~15
	1.6	0.8,0.9	0	95~105	17~18	45~50	10	10~15
	2.0	1.0,1.2	0~0.5	110~120	18~19	45~50	10	10~15
	2.3	1.0,1.2	0.5~1.0	120~130	19~19.5	45~50	10	10~15
	3.2	1.0,1.2	1.0~1.2	140~150	20~21	45~50	10~15	10~15
	4.5	1.0,1.2	1.0~1.5	160~180	22~23	45~50	15	15
		1.2	1.2~1.6	220~260	24~26	45~50	15	15~20
		1.2	1.2~1.6	220~260	24~26	45~50	15	15~20
		1.2	1.2~1.6	300~340	32~34	45~50	15	15~20
		1.2	1.2~1.6	300~340	32~34	45~50	15	15~20
High welding speed	0.8	0.8,0.9	0	100	17	130	10	15
	1.0	0.8,0.9	0	110	17.5	130	10	15
	1.2	0.8,0.9	0	120	18.5	130	10	15
	1.6	1.0,1.2	0	180	19.5	130	10	15
	2.0	1.0,1.2	0	200	21	100	15	15
	2.3	1.0,1.2	0	220	23	120	15	20
	3.2	1.2	0	260	26	120	15	20

	Plate thickness (mm)	Wire diameter (mm)	Current (A)	Voltage (V)	Welding speed (cm/min)	Dry extension (mm)	Gas flow rate (L/min)
Filler-joint welding	1.6	0.8,0.9	60~80	16~17	40~50	10	10
	2.3	0.8,0.9	80~100	19~20	40~55	10	10~15
	3.2	1.0,1.2	120~160	20~22	35~45	10~15	10~15
	4.5	1.0,1.2	150~180	21~23	30~40	10~15	20~25

	Plate thickness (mm)	Wire diameter (mm)	Vertical inclination of the welding gun (degree)	Current (A)	Voltage (V)	Welding speed (cm/min)	Dry extension (mm)	Gas flow rate (L/min)
Straight angle, T-shaped, and butt-welding joint. Low welding speed	1.0	0.8,0.9	45°	70~80	17~18	50~60	10	10~15
	1.2	0.9,1.0	45°	85~90	18~19	50~60	10	10~15
	1.6	1.0,1.2	45°	100~110	19~20	50~60	10	10~15
	2	1.0,1.2	45°	115~125	19~20	50~60	10	10~15
	2.3	1.0,1.2	45°	130~140	20~21	50~60	10	10~15
	3.2	1.0,1.2	45°	150~170	21~22	45~50	15	15~20
	4.5	1.0,1.2	45°	140~200	22~24	45~50	15	15~20
	6	1.2	45°	230~260	24~27	45~50	20	15~20

High welding speed	8.9	1.2,1.6	50°	270~415	29~35	45~50	25	20~25
	12	1.2,1.6	50°	400	32~36	35~40	25	20~25
	1.0	0.8,0.9	45°	140	19~20	160	10	15
	1.2	0.8,0.9	45°	130~150	19~20	120	10	15
	1.6	1.0,1.2	45°	180	22~23	120	10	15~20
	2	1.2	45°	210	24	120	15	20
	2.3	1.2	45°	230	25	110	20	25
	3.2	1.2	45°	270	27	110	20	25
	4.5	1.2	50°	290	30	80	20	25
	6	1.2	50°	310	33	70	25	25
Low welding speed	0.8	0.8,0.9	10°	60~70	16~17	40~45	10	10~15
	1.2	0.8,0.9	30°	80~90	18~19	45~50	10	10~15
	1.6	0.8,0.9	30°	90~100	19~20	45~50	10	10~15
	2.3	0.8,0.9	47°	100~130	20~21	45~50	10	10~15
	3.2	1.0,1.2	47°	120~150	20~21	45~50	10	10~15
	4.5	1.2	47°	150~180	20~22	35~45	10~15	20~25
	6	1.2	47°	200~250	24~26	45~50	10~15	20~25
	2.3	1.2	47°	220	24	150	15	15
	3.2	1.2	47°	300	26	250	15	15
	4.5	1.2	47°	300	26	250	15	15

12. Accompanying documents

- User's manual of IGBT inverter semiautomatic, consumable-electrode, and gas-shielded welder of MIG series
- Packing list
- Conformity certificate
- Warranty card

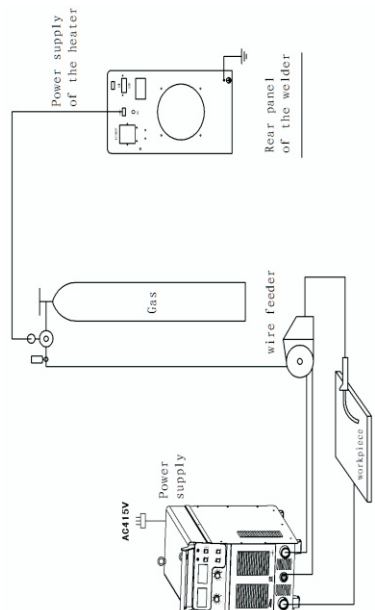
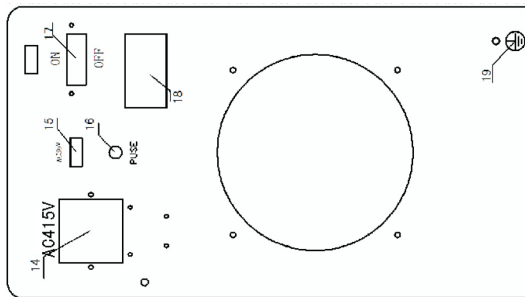


Diagram 2 system connection diagram of IGBT inverter gas-shielded welder of NH/L series

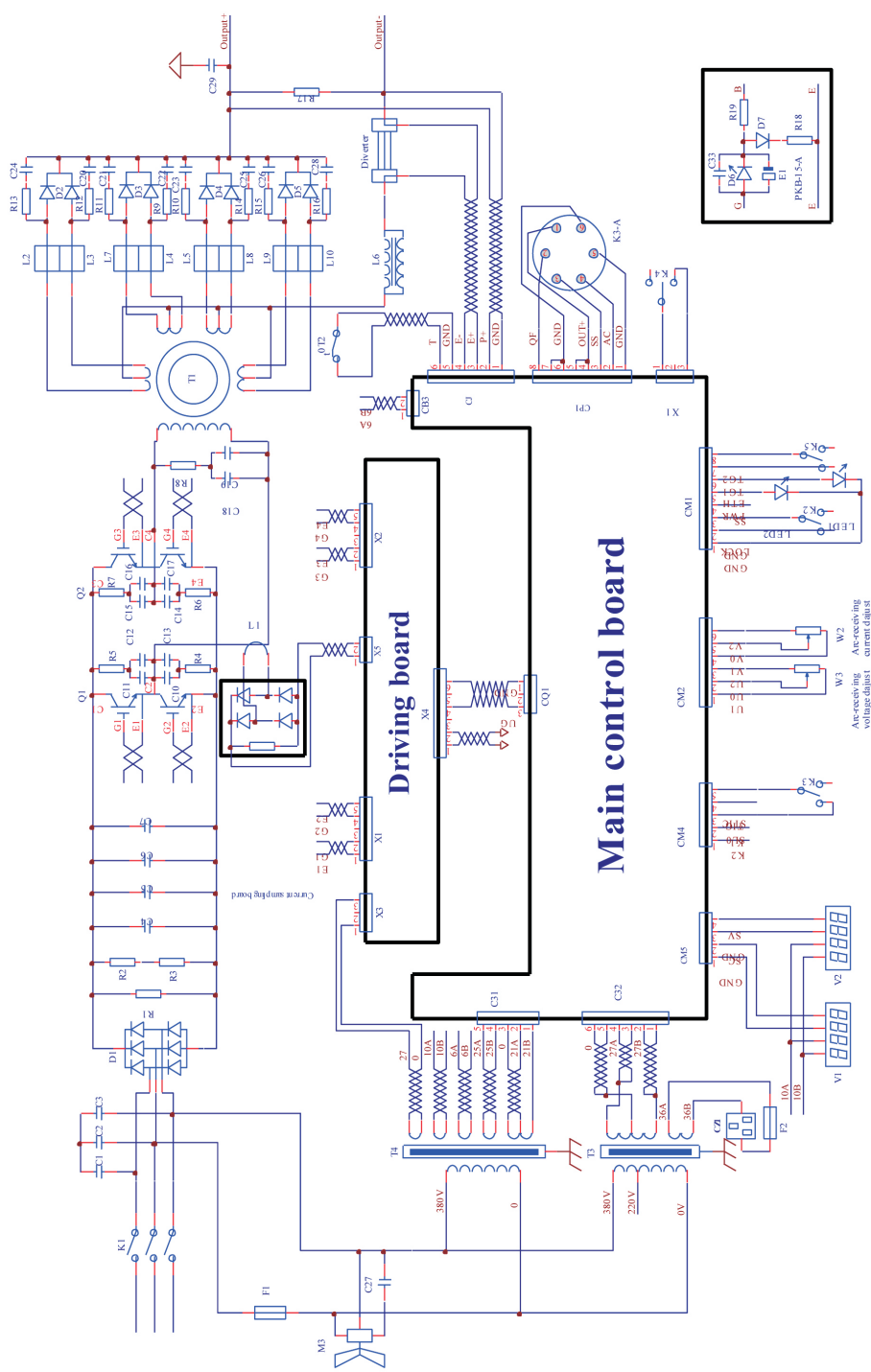
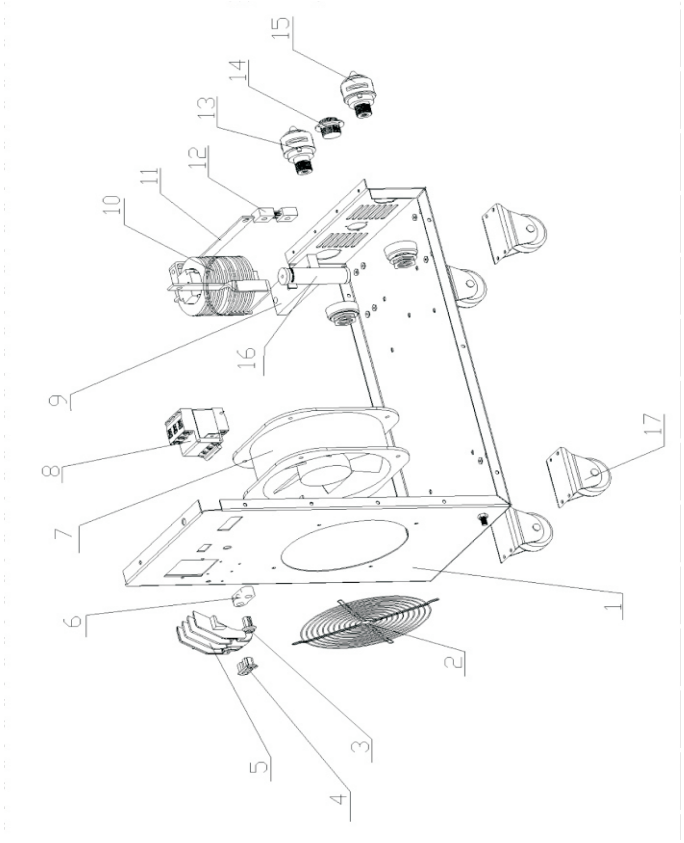


Diagram3. main circuit diagram of IGBT inverter gas - shielded welder of NB/KL series

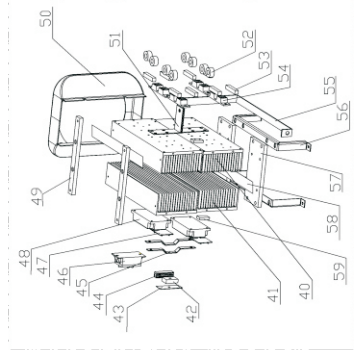
Appendix: General assembly diagram and part list of MIG series

1. Assembly diagram and part list of the chassis module



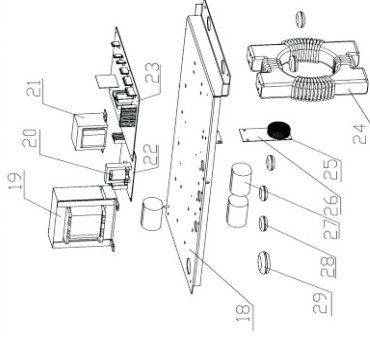
No.	Part name	Specification	Quantity
1	Chassis	MIG500/630 chassis	1
2	Fan shield	Model 200, 200FZ2-D	1
3	Fuse holder	250V/205W/6.3A	1
4	Imported plug	RT-22	1
5	Terminal box	DRZ-60	1
6	Wire fastener		1
7	Fan	Model 200 AC415V	1
8	Air switch	DZ47-63A/3P, blue	1
9	Fixing plate of the reactor	Bakelite, 4 holes, 135*50	1
10	Vertically-coiled reactor	MIG630	1
11	Connector between the cathode and the reactor	MIG500/630	1
12	Diverter	750A/75mV	1
13	Connection-type cable jack	KDZ120b, red	1
14	Aviation jack	Six wires	1
15	Connection-type cable jack	KDZ120b, black	1
16	Enamel-coated resistor	50W/160Ω	1
17	Fixed wheel	Fixed wheel 2.5 " , white	4

No.	Part name	Specification	Quantity
40/41	Radiator	GM-21A/GM-21B	2 each
43	Absorption PCB board	PH-33-A0	6
44	Aluminum-cased resistor	50W1R	1
45	Connector	S=1, 5*12 IGBT connection	2
46	Three phase rectifying bridge	100A/1400V	1
47	IGBT driving board	FKB-15-A	2
48	IGBT	FF150R12KS4	2
49	Connector between the radiator and the partition	210*20*16 (4 holes)	2
50	Fast cover	rectifying module	2
51	Connector	rectifying module output	2
52	Magnetic ring	25*12	8
53	Current resistor	10W15R	8
54	Fast recovery rectifying module	DK12100AB60	4
55	Connector between the anode and the cathode of the rectifying tube	MG5000G30	1
56	Support	ø=1.5~1/1" slanted	2
57	Connecting plate	UY34	2
58	Sealing plate of the radiator		2
59	Connecting piece		4



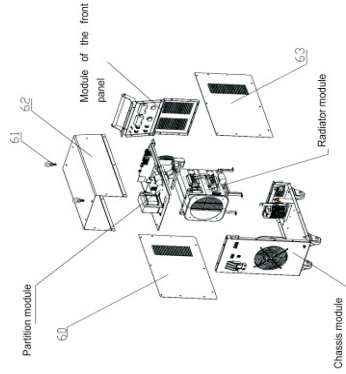
4. Assembly diagram and part list of the radiator module

No.	Part name	Specification	Quantity
18	Partition plate	ø=1.555*297, galvanized	1
19	Power-frequency transformer	JSY-5614	1
21	Power-frequency transformer	Power supply for the control board	1
22	Driving control board	MG5000G30	1
23	Main control board	MG630	1
24	Main transformer	MG630	1
25	Current mutual inductor	30ø: 1	1
26	Current sampling PCB board		1
27	CB3 capacitor	CHB20 36G250V	4
28	Rubber ring	ø30	3
29	Rubber ring	ø20	3



2. Assembly diagram and part list of the partition module

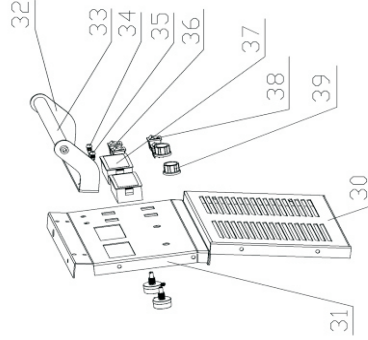
5. Module assembly diagram and part list of the complete equipment



No.	Part name	Specification	Quantity
60	Left plate		1
61	Lifting eye bolt	M12	2
62	Top cover		1
63	Right plate		1
	Module of the front panel		1
	Partition module		1
	Radiator module		1
	Chassis module		1

3. Assembly diagram and part list of the panel module

No.	Part name	Specification	Quantity
30	MG5000G30 bottom panel	Black	1
31	MG5000G30 top panel	Black	1
32	Rail holder	Black, MG5000G30	1
33	Rail	Black, MG5000G30	1
34	LED	ø5, red	1
35	LED	ø5, green	1
36	Boot-shaped switch	Single-pole three-way	1
37	Digital meter	XL5135V2 range: ±1.999, AC9V power supply	2
38	Boot-shaped switch	Single-pole double-way	3
39	Potentiometer	4.7K2W	2



USER'S MANUAL

MODEL: CUT40/50/60/80/100/120/160

SAFETY CAUTION!



On the process of welding or cutting, there will be possibility of injury. Please take protection into consideration during operation. For more details please review the Operator Safety Guide, which complies with the preventive requirements of the manufacturer

Electric shock——may lead to death !!

- Set the earth fitting according to applying standard.
- It is forbidden to touch the electric parts and electrode when the skin is bare, wearing wet gloves or clothes.
- Make sure you are insulated from the ground and the workshop.
- Make sure you are in safe position.

Gas——may be harmful to health!

- Keep your head out of the gas.
- When operating with arc welding, air extractor should be used to avoid breathing gas.

Arc radiation——harmful to your eyes and burn your skin.

- Use suitable helmet and light filter, wear protective garment to protect eyes and body.
- Use suitable helmet or curtain to protect looker-on.

Fire

- Welding spark may cause fire, make sure there is no tinder stuff around the welding area.

Noise——extreme noise will be harmful to hearing .

- Use ear protector or others means to protect ear.
- Warn that noise is harmful to hearing if there is looker-on around.

Malfunction——when trouble happens, contact the professionals

- If trouble happens during installation and operation, please follow this manual instruction to check up.
- If you fail to fully understand the manual, or fail to solve the problem with the instruction, you should contact the suppliers or our service center for professional help.

ABOUT THE MACHINE

The welding machines are rectifiers adopting the most advanced inverter technology, which can apply in plasma cutting system of using pressing air.

The development of inverter gas-shielded welding equipment benefits from the development of the inverter power supply theory and components. Inverter current firstly commutates the working voltage of 50/60 Hz To Direct Current (DC). Then inverter gas-shielded welding power source utilizes high-power component IGBT to transfer 50/60Hz frequency, then reduces the voltage and commutates, and exports high-power voltage via PWM technology, resulting in the great reduce of the main transformer's weight and volume and the efficiency increasing by 30%. Arc initiation system adopts HF surging theory. It is easy for arc initiation and have function for early feeding air and shutting air and its characteristics are arc stable, reliable, power saving and no electromagnetic noise high speed of cutting, the glabrous shear-out and without polish.

Plasma Cutting Machine series can product the stronger, the more concentrated and the more stable arc. The arc is pressed fiercely by the quickly flowing air and the temperature can be up to 10000-15000 centigrade degree. That forms the electrolyte estate and then form strong plasma arc. It has the functions of arc initiation current, arc stop current, welding current, basic value current, current ascending time, current descending time, gas delay time, continuous adjustment. What's more, pulse frequency and pulse duty can also be adjusted independently. It has the characteristics of automatic control of arc initiation, arc stop and stable arc, which make the best result for shape and inner quality of the welding surface. Its exclusive design is especially suitable for bicycle industry.

Compared with the others cutting machine ,the cutting machine series are using the advanced electron circuit to supply the quick power and control it .Moreover, they have top-ranking cutting operation and the extremely high transfer efficiency .

The welding machine series can easily design into different cutting power; and the output current is constant and adjustable as well as excellent operation performance. In common situation its transfer efficiency is above 85%.

The machine is used widely, it is easier to design into welding machine with different dynamic characteristics. And it can weld stainless steel, carbon steel, copper and other color metal, and also can be used for traditional electric welding.

Thanks for purchasing our products and hope for your precious advice. We will be dedicated to produce the best products and offer the best service.



CAUTION!

The machine is mainly used in industry. It will produce radio wave, so the worker should make fully preparation for protection.

CAUTION!

Creepage-protecting switch should be added when you are using the machine!!!

PARAMETERS

Data Item	CUT 40	CUT50	CUT60
Power voltage (v)	Single phase 220V±15%	Single phase 220V±15%	Single phase 220V±15%
Rated input power (kVA)	5	6.3	7.9
No-load voltage (v)	230	230	240
Rated input current (A)	22	28.7	35.8
Current Range (A)	20-40	20-50	20-60
Rated output voltage (v)	96	100	104
Duty cycle	60%	60%	60%
Efficiency (%)	85	85	85
Power factor	0.93	0.93	0.93
Pilot arc model	HF oscillating	HF oscillating	HF oscillating
Burner inter diameter (mm)	1.0	1.0	1.0
Housing Protection grade	IP21	IP21	IP21
Arcing Way	Untouched	Untouched	Untouched
Pressure of air compressor (kg)	4-5	4-5	4-5
Thickness (mm)	1-14	1-16	1-16
Weight (kg)	9	9	19
Dimensions (mm)	371×153×232	371×153×232	480×204×303

PARAMETERS

Model Parameters	CUT 60	CUT 80	CUT 100	CUT120	CUT 160
Power voltage (V)	AC380V±15%	AC380V±15%	AC380V±15%	AC380V±15%	AC380V±15%
Rated input current (A)	10.4	17	23	31	38.2
No-load voltage (V)	240	311	311	288	307
Current Range (A)	20-60	20-80	20-100	20-120	20-160
Rated output voltage (V)	104	112	120	130	144
Duty cycle (%)	60	60	60	60	60
Efficiency (%)	85	85	85	85	85
Power factor	0.93	0.93	0.93	0.93	0.93
Insulation grade	F	F	F	F	F
Housing Protection grade	IP21	IP21	IP21	IP21	IP21
Arcing Way	Untouched	Untouched	Untouched	Untouched	Untouched
Pressure of air compressor (kg)	4-5	4-5	4-5	4-6	4-6
Nozzle Inside Hole (mm)	1.2	1.3	1.4	1.4	1.4
Thickness (mm)	1-20	1-30	1-40	1-45	1-50
Weight (kg)	19	25	36.5	36.5	60
Dimensions (mm)	480×204×303	515×263×372	500×370×330	580×370×330	670×337×510

INSTALLATION

The plasma cutter is equipped with power voltage compensation equipment. When power voltage fluctuation between $\pm 15\%$ of rated voltage, it still can work normally.

When the machine is used with long cables, in order to prevent voltage from going down, bigger section cable is suggested. If cable is too long, it may affect the performance of the power system. So we suggest you use cables of configured length.

1. Make sure the intake of the machine not blocked or covered to avoid the malfunction of system.

2. Use cable (section not less than 6mm) to connect the housing and the ground. The way is from the connecting screw in the back of the power source, or make sure ground firmly.

For absolute safety, both ways can be used.

3. Use pressure-resisting air pipe to connect the air intake and compressed air source, and use hoop and other way to tighten the joint. Air source should supply suitable pressure, flow and be dry. If your air source does not meet the above requirements, you should consider using solo compressor of the right power and air-decompressing filter, in order to supply suitable pressure and eliminate the impurity and moisture in the air.

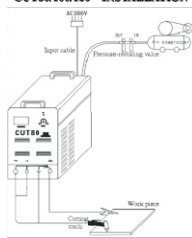
4. Install the air-electricity system plug to the socket in the panel and fix it clockwise. Air plug of the cutting torch and arc-keeping cable (for CUT80/100/160) should be connected to relevant socket, and fix the screw.

5. Put the loop cable plug to the fastening socket, and tighten clockwise, another terminal holds the work piece.

6. According to input voltage grade, connect power cable with power supply box of relevant voltage grade. Make sure there is no mistake and make sure the voltage is different among permission range.

7. Connect the cable as the picture shows. You can start cutting.

CUT80/100/160 INSTALLATION



INSTALLATION

Input cable connection (enclose installing diagram)

1. Every machine has been disposed a power cable which must be connected to coordinated voltage class in compliance according to input voltage of cutting machine. If cutting machine whose power voltage is 220v is connected wrong to AC 380v, that will cause components of inter-machine are burned up.

2. Make sure power cable is connected to power switch reliably and prevent from oxidizing.

Make sure power voltage is inside the waved range .

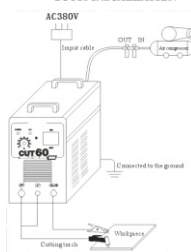
Output cable connection

1. Make sure tube of pressed air is connected to copper connector by high pressure rubber tube firmly .

2. Make sure copper screw of another end of torch is connected to electrify integration terminal then tighten them clockwise relation (prevent from leaking gas). Mobile plug of another end of grounding cable pincer is connected to positive terminal of front panel then tighten it .

3. Make sure air plug of torch is connected to switch connector of panel (If it is arc-supporting cutter, arc-supporting cable of torch is connected to terminal of arc-supporting .)

CUT60 INSTALLATION



INSTALLATION

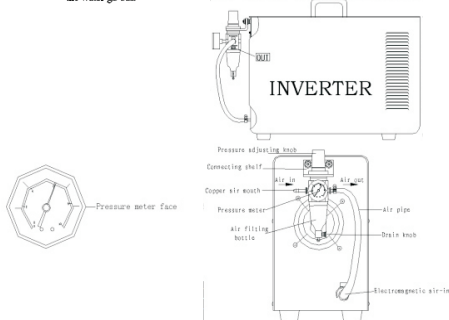
Air regulator installation and operation

1. Firmly tight and seal the copper air hole at IN and OUT terminal . by high pressure rubber tube firmly .
2. Tight and seal the meter with meter face rubber tube.
3. Fix the connecting shelf with screw as the regulator position.
4. Get down the plastic screw and fix the regulator on the shelf.
5. Turn on the air valve, turn up the pressure adjusting knob, Turn the pressure to rated volume (meter inside shows kg), and then put down the knob. (+ means increasing pressure, - means decreasing pressure.)

Regulator Installation

6. Scale of the meter is as follow. The volume in the picture is 6 kg.

7. If the water in the gas filtering bottle is too much, please turn on the water valve to let the water go out.



OPERATION

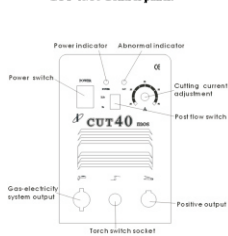
1. Open the power switch of front panel, make the power switch is in "on" position .At this time indicator of power switch is on .The screen will show the current volume .

2. Adjust the gas pressure to be adequate to machine , open the valve of pressed air .

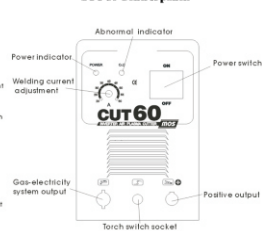
3. Press the control knob of torch, electromagnetic valve is starting , sound of HF arc-striking can be heard and burner of torch should flow out gas (Burner of arc-supporting cutter should spurt fire)

4. It is 1mm from copper tip to work piece (it is further if it is arc-supporting cutter), press knob of torch and turn and strike arc , sparks of HF arc-striking will diminished immediately . Welding machine can begin to cut .

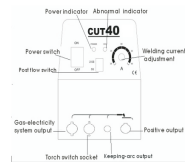
CUT 40/50 Control panel:



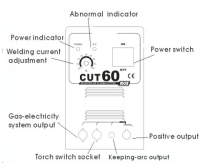
CUT 60 Control panel:



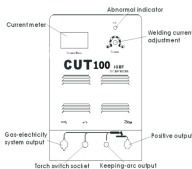
CUT 40/50 Control panel:



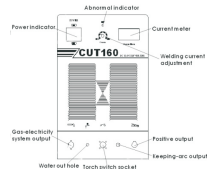
CUT 60 Control panel:



CUT 80/100/120 Control panel:



CUT 160 Control panel:

**NOTICE:**

In order to let Plasma cutting machine to reach its best capacity and result, current and air pressure must be matched well. So when the current is set, the pressure and flow must be adjusted suitably. If the air flow is too big and cooling effect is too strong, it will cause arc pause, and if the air flow is too small, the nozzle and electrode will be too hot and burnt out.

QUESTIONS IS BE RUN INTO DURIGN WELDING

Fittings, welding materials, environment factor, supply powers maybe have something to do with welding. User must try to improve the level of welding environment.

A. Cutting surface is rough, poor cutting result

The machine may be not well operated. You can check it as follow:

1. Make sure the compressed air supply has enough pressure which is not less than 0.3MPa ($3\text{kg}/\text{cm}^2$), and its range is $\pm 0.05\text{MPa}$.
2. Electrode and nozzle are not matched with current. Check as follow:

Current	10-30A	30-40A	60-100A	100-120A
Nozzle	$\phi 1.0\text{mm}$	$\phi 1.2\text{mm}$	$\phi 1.3\text{mm}$	$\phi 1.4\text{mm}$

B. Arc-striking is difficult and easy to pause:

1. Make sure quality of tungsten electrode is high.
2. Cutting current is too small and air flow is too big. And if cooling effect is too strong, it will lead to arc pause.
3. Power net voltage is low and input cable is too long.

C. Output current is not up to the rated value:

When power voltage departs from the rated value, it will make the output current not matched with rated value; When voltage is lower than rated value, the max output may be also lower than rated value.

D. Current is not stabilizing when machine is been operating:

It has something to do with factors as following:

1. Electric wire net voltage has been changed.
2. There is harmful interference from electric wire net or other equipment.

E. Electrode or nozzle burnt often:

1. Current is too big or nozzle is too small.
2. Air pressure is low and cooling effect is weak and nozzle is too hot.

F. Arc can not cut into the steel plate fully, or too much spatter.

1. Maybe the machine capacity can not meet the demand of that thickness, please use bigger machine.
2. Electrode or nozzle is burnt, please change it.



For normal operation you should cut from the edge of the work piece, in this way you can protect the torch from damage by spatter conglutination.

NOTES OR PREVENTIVE MEASURES**1. Environment**

- 1) The machine can be performed in environment where conditions are dry with a dampness lever of max 90%.
- 2) Ambient temperature is between -10 to 40 degrees centigrade.
- 3) Avoid welding in sunshine or drippings condition.
- 4) Do not use the machine in environment where condition is polluted with conductive dust in the air or corrosiveness gas on the air.
- 5) Avoid gas welding in the environment of strong airflow.

2. Safety norms

The cutting machine has been installed protection circuit of over voltage and over current and over heat. When voltage and output current and temperature of machine are exceeding the rate standard, welding machine will stop working automatically. Because that will be damage to welding machine, user must pay attention to the following notice.

1) The working area is adequately ventilated!

The cutting machine is powerful machine, when it is being operated, it is generated by high currents, and natural wind will not satisfy machine cool demands. So there is a fan in inter-machine to cool down machine. Make sure the intake is not in block or covered, it is 0.3 meter from welding machine to objects of environment. User should make sure the working area is adequately ventilated. It is important for the performance and the longevity of the machine.

2) Do not over load!

The operator should remember to watch the max duty current (Response to the selected duty cycle).

Keep welding current is not exceed max duty cycle current.

Over-load current will damage and burn up machine.

3) No over voltage!

Power voltage can be found in diagram of main technical data. Automatic compensation circuit of voltage will assure that welding current kept in allowable arrangement. If power voltage is exceeding allowance arrangement limited, it will damage the components of machine. The operator should understand the situation and take preventive measures.

4) There is a grounding screw behind welding machine, with grounding marker on it

Machine must be grounded reliable with cable which section is over 6 square millimeter in order to prevent from static electricity and leaking.

5) If welding time is exceeded duty cycle limited, welding machine will stop working for protection.

If the machine is overheated, temperature control switch is on "ON" position and the indicator light is red. In this situation, you don't have to pull the plug, in order to let the fan cool the machine. When the indicator light is off, and the temperature goes down to the standard range, so it can weld again.

MAINTENANCE**CAUTION:**

Before maintenance and checking, power must be turned off, and before opening the housing, make sure the power plug is pulled off.

1. Remove dust by dry and clean compressed air regularly, if welding machine is operating in environment where is polluted with smokes and pollution air, the machine need removing dust everyday.
2. Pressure of compressed air must be inside the reasonable arrangement in order to prevent damaging to small components of inter-machine.
3. Check inter circuit of welding machine regularly and make sure the cable circuit is connected correctly and connectors are connected tightly (especially insert connector and components). If scale and loose are found, please give a good polish to them, then connect them again tightly.
4. Avoid water and steam enter into inter-machine, if they enter into machine, please dry inter-machine then check insulation of machine.
5. If welding machine will not be operated long time, it must be put into packing box And store in dry environment.
6. When wire machine operates for every 300 hours, the electric carbon brush and armature rectifier should be polished, the reducer should be cleaned, and lubricator should be added to the turbo and bearing.

BEFORE CHECKING**WARNING**

Blind experiment and careless repair may lead to more problem of the machine that will make formal check and repair more difficult. When the machine is electrified, the naked parts contain life-threatening voltage. Any direct and indirect touch will cause electric shock, and severe electric shock will lead to death.



Notice: In the period of guarantee maintenance, if user makes wrong check and repair for the induction power without our permission, the free maintenance guarantee offered by the supplier will be invalid.

CHECK FAULT



Notes: If user wants to operate machine as following, the operator must be a personnel in a specific field of electricity and safety and hold the relevant certificate that proves their ability and knowledge. Before maintenance, contacting with our company for authorization is suggested.

CUT 40/50/60(220V)

Faults	Resolvable Methods
1. Switch indicator is on, fan is not working and control knob is out of work.	1. Over voltage protection is working. Close machine then Open it again after several minutes.
2. Switch indicator is lit and fan is working. However, press control knob of torch, there is no HF arc-striking sound and electromagnetic valve is not working.	1. Check if torch is open circuit. 2. Check if control knob of torch is damaged. 3. Part of assistant power of top board is damaged and there is no DC 24V output.
3. Switch indicator is lit and fan is working. However, press control knob of torch, there is no HF arc striking sound and inter red diode is lit.	1. Check if MOS K2837 of top board is damaged (driver mould is damaged). 2. Rising transformer of bottom board is damaged. 3. Control mould is damaged.
4. Switch indicator is lit and fan and electromagnetic valve are working. However, there is no sound of HF arc-striking and inter red diode is not lit.	There is some trouble in part of arc-striking, such as: 1. It is too far between discharge tip or there is adhesion in discharge tip. 2. Primary coil of arc-striking transformer is damaged or poor contact. 3. Check if four times voltage rectifier diode is stricken. 4. Check if HF electric capacity 102/10KV is leaking. Relay is damaged.

CHECK FAULT



Notes: If user wants to operate machine as following, the operator must be a personnel in a specific field of electricity and safety and hold the relevant certificate that proves their ability and knowledge. Before maintenance, contacting with our company for authorization is suggested.

CUT60/80/100/120/160 (380V)

Faults	Resolvable methods
Meter can not display. Fan can not run	1、Make sure air switch is on . 2、Power source of input cable has electricity. 3、Make sure power source not lack of phase.
Meter is normal, Fan is normal Cutting gun switch can not work	1、Check if cable is loosen. 2、Control wire of gun broken or switch broken. 3、Control circuit is broken. (Contact factory)
Abnormal indicator is lit. Meter is normal, Fan is normal	1、High-pressure device is broken. 2、IGBT is broken. 3、Rectifier broken. 4、Control board is broken. 5、Feeding circuit broken(abnormal indicator lit), contact factory.
Meter is normal, Fan is normal, Electromagnetic valve is abnormal, No arc output Abnormal indicator is not lit	1、Arcing part has problem. 2、Electricity-releasing nozzle is too far away. 3、High-pressure device is broken. 4、Relay is broken. 5、Control circuit broken.
Air switch can not close	1、Air switch quality is poor. 2、Three phase rectifying bridge is broken. 3、Check if any short circuit inside.

If after checking and adjustment it still can not work normally, please contact the local distributor or our service center.

USER'S MANUAL

MODEL: ARC400/ARC500/ARC630

MODEL: ARC630/ARC800/ARC1000

Please read

Thank you for using welder!

For your safety and someone else's, please read this manual and understand it before operate.

CAUTIONS:



You may be faced with dangers during the course of welding, so please be careful and read the manuals carefully before working.

Electric-shock it may be fatal to life

- Install the earth cable to the standard.
- No touching electric parts with bare hands, wet hands or wet clothes.
- Make sure that you and working piece are insulation circumstance.
- Make sure that your working is in safety.

Smoke it may be harmful to your health.

- Keep your head out of the smoke.
- When welding, make sure the air is flowing to avoid breathing in the smoke.

Air-emission---may be harmful to your eyes and skin

- Wear suitable welding mask and clothes to protect your eyes and skin.
- Use suitable screen or curtain to keep the look-ups from the emission.

Fire

- The welding sparkle may lead the fire, so make sure there is no tinder near the workpiece.

Noises---too much noise may be harmful to your hearing.

- Please wear something to protect your ears from the noises.
- Warn the look-ups of the hidden harm the noise may cause.

Break-down: ask the professional for help

- If you have any problems in setting up or operating, please first consult this manual.
- If you still can not understand after reading this manual, please contact your supplier or manufacturer to get professional's help.



CAUTIONS!

Before using you need to fix creepage protection switch!

ABOUT THIS MACHINE

welding machine is a rectifier which based on high inverter technology.

Inverter are welding machine profit from the appearance of inverter power concept and the components. 50Hz/60Hz frequency is inverted to high frequency (frequency is over 20KHz) by IGBT which is a high-power part, then step down voltage and rectify current, inverter are welding power supply generates powerful DC welding current through PWM so that the cube and weight of the main transformer has been reduced greatly. It has increased the efficiency by 30%. The appearance of inverter welding machine has been called one revolution of welding industry.

arc welding machine can supply more concentrated, more steady and stronger arc. When the short-circuit happens, it will react more rapidly. What's more, the power can be assembled arc adjusting device which means it can be designed into the welding machine with different dynamic characteristic. The arc will become more strong or more soft if the dynamic characteristic has been adjusted.

High efficiency, save-energy lightness, sensitive reaction, steady arc and easy controlled melting pool are characteristics of welding machine series. It has high no-load voltage and good power compensation which has been widely used for stainless steel, alloy steel, carbon steel, cooper and other metal. The electrode of different specification and different material including acidic, basic and cellulosic electrode can be applicable for the welder. The welding machine is suitable for job of high-altitude and outdoor and fitment of inside or outside. Compared to the same products in the domestic and overseas market, it has more advantage such as light weight, easy installing and operation.

Welcome all the customers to give us more valued suggestions, we will try our best to supply you better service.

CAUTIONS



This equipment is used mainly in industry. Under room temperature, this equipment may cause wireless interruption, please take enough precautionary measures.

THE MAIN PARAMETER

Item \ Model	ARC400	ARC500	ARC630
Power voltage (V)	AC3-380 V±15%	AC3-380 V±15%	AC3-380 V±15%
Frequency (HZ)	50/60	50/60	50/60
Rated input current (A)	28	38	58
No-load voltage (V)	72	72	80
Output current adjust (A)	40-400	40-500	80-630
Rated output voltage (V)	36	40	44
Arcl force adjust (A)	60	60	--
Duty cycle (%)	60	60	60
No-load loss (W)	40	40	40
Efficiency (%)	85	85	85
Power factor	0.93	0.93	0.93
Insulation class	B	B	B
Protection class	IP21	IP21	IP21
Weight (kg)	18.6	20	24.5
Overall dimension (mm)	490×240×460	490×240×460	490×240×460

INSTALLATION

OPERATION

1. Turn on the power switch on the front panel. The meter will show enacted current volume, meanwhile, the cooling fan in the machine works right now .
2. Choose right welding current and arc-force current according to the thickness of the work piece, the diameter of the electrode and the technology needs.
3. Hold the electrode with stick holder and now the machine is ready for stick welding.

The electrode specification for flat welding:

Rod model	φ2.5	φ3.2	φ4.0
Welding current	70-100A	110-140A	170-220A

4. If welding machine has remote control device:
 - 1) Make sure the switch position of remote control device before operation .If switch is on "OFF" position that is out of remote control. Switch is on "ON" position that is using remote control device.
 - 2) Insert plug of remote control in socket of remote control correctly and tighten firmly in order to prevent poor connection. If remote control device is not used, make sure the switch is on "OFF" position , otherwise welding current will not be adjusted on the panel.

When machine is being moved, the switch of remote control is not on current position by bump which causes welding adjustment is out of work will be misunderstood as a fault of machine. Please pay attention to the circumstance.

The power voltage is listed in the "Main Parameter" table , generally , the automatic compensating circuit may make sure the current is in rated range .If the voltage surpasses the allowed value, the machine may be damaged. The operator should be familiar with it and take certain actions to prevent it.

- 4) Every welder has an earth screw , and earth connecting mark. Before operation , please choose a cable whose section is more than 6 square millimeter, make the case firm earth -connecting to avoid accidents which may be caused by electricity -leaking .
- 5) If the working time of the welder surpasses the standard load cycle, the machine may suddenly enter protection condition and stop working , which shows that the machine has been over the standard load cycle, and over-heating works the thermal-control switch, thus making the machine stop working .Meanwhile, the red pilot light on the panel board is on . Under this circumstance, you needn't pull off the plug , so that the fan can continue working , thus cooling the machine. When the red light is off , the temperature decreases to the standard range , then you begin to weld again.

QUESTIONS MAY BE FACED DURING THE WELDING

These situations may be connected with your using accessories, welding materials, environment and power supplying . So you need to create a better environment that you can avoid similar circumstances.

A. It is difficult for arc-starting and easily stopped.

1. Make sure that you need use high quality welding rod if not you will not weld successfully.
2. The electrode which doesn't been dried is difficult to start arc. It will cause the unstable arc and more welding gap which result in a worse welding.
3. If the prolong cable has lower down the output voltage , we suggest you try to shorten the cable.

B. Output current can't reach rate current

The large discrepancy between the power voltage and rated voltage will cause the output current is ununiform with the adjusted value. When the power voltage is lower than rated value, the largest output current may be lower than rated value.

C. Welding current is not stabilizing .

This circumstance may have something to do with the follow factors:

1. Power voltage has changed ;
2. The severe interfering from the electrical net or other device.
- D. Much splash
1. Maybe the current is too large but the diameter of the electrode is too small.
2. The out put terminal has been wrong connected. The positive polarity welding should be used in normal operation. Namely the electrode should be connected to the negative power and the work piece should be connected to the positive terminal.

welding machine are equipped with power voltage compensation device which can still work when the power voltage ranges between +/- 15%.

When long cable is used , we suggest you choose cables with wider section in order to reduce voltage-decreasing; but if the cable is too long , it may influence the arc starting and other system, so we recommend you to use the given length.

1. Make sure the ventilating mouth is not blocked or covered lest the cooling system is disabled.
2. Connect the case to earth with cables whose section is no less than 6mm² , from the back of the welding machine to earth screw to earth-connecting equipment or make sure the earth terminal has been connected to the ground separately. You can also take the two measures for safety.
3. Connect the electrode holder and earth clamp correctly according to the below drawing. Make sure the cable has been connected with the electrode holder and air-plug. Plug the air-plug to the air-socket "+-" and wind around clockwise at a full tilt.
4. Plug the air-plug of the back circuit cable to the air-socket "+-", and wind around clockwise at a full tilt, the other terminal of the earth clamp is tied to the work piece.
5. Please pay attention to the connection polarity. There is usually two measures for DC welder connection: 1. Plus connection which means the electrode holder should be connected to negative pole and the work piece should be connected to the positive pole. 2. reverse connection which means the electrode holder should be connected to the positive pole but the work piece should be connected to the negative pole. The measures should depend on the technics request. The unsteady arc, great splash and sticking will be caused if the wrong measures has been chosen. In this circumstance, you can exchange the air-plug conveniently in order to change the polarity.
6. Connect the power cable(not smaller than 3*2.52) to the switch box with relative voltage level(). Please note connect with wrong voltage and make sure the error of the input voltage should within the allowed range.



If it is too far (50-100m) between work workpiece and welding cables (electrode holder cable and earth clamp cable) is too longer, so section of the cable must be bigger in order to reduce voltage drop.



WARNING!

Any connection should be operated under power off. Right operation is to connect the electrode holder and earth clamp to the welding machine. Make sure that it is reliable and tightened and then connect the power.

NOTICE OR PREVENTIVE MEASURE



1. Operation Environment

- 1) The operation should be in a relative dry environment, the air humidity usually doesn't overrun 90%.
- 2) The temperature around should be between -10 and +40 degrees centigrade.
- 3) Avoid working in the sun or in the rain. Make sure the water or rain don't infiltrate the machine.
- 4) Avoid working under the circumstance of dusty area or air with corrosive.
- 5) Avoid doing gas shield working under the condition of strong airflow.

2. Safety

welders are equipped with over-voltage and over-current and over-thermal protection circuit, when the output voltage, output current and inner temperature is over the rated ones, the machine will stop working automatically. But over-use (e.g. over-voltage) may damage the welding machine, so pay attention to the following tips:

1) Make sure of good ventilation

welders are large technical welding machines, and has huge current through it when working, and natural air flow can not satisfy its cooling need, so we put two embodied fans to cool it and make it work normally. The operator should make sure the fan not blocked or covered, and the distance between the welder and surroundings shouldn't be less than 0.3m. The users should always pay attention to the flowing condition of the machine, because it is very important for the working quality and working year of the machine.

2) No over-load!

The users should pay second attention to the allowed max loading current (comparative load cycle), and make sure the welding current not surpass the allowed max. Over-current may obviously shorten the working year of the machine, and even may fire the machine to pieces.

3) No over-voltage!

Maintenance

- 1 Remove dust by compresses air regularly ,generally if machine is operated in environment where is polluted with more dust and smoke ,welding machine must be remove dust twice every month.
- 2 Pressure is adequated to welding machine in order to protect little components.
- 3 Check the electrify connectors and make sure the connectors are connected firmly(specially connectors and inserts) Tighten the relaxing connector,if component is oxidized ,these oxide must be get rid of and connect then again.
- 4 Avoid water and steam enter iner-machine,if machine has been affected with damp ,please dry inter-machine and check insulation of machine.
- 5 If the machine will not be used for long time ,it must be put in its own packing box and stored in dry environment.
- 6 Do not throw and bump machine.

CHECK FAULT



Cautions: The operators are supposed to have enough knowledge of electric-gas and common sense of safety, and concerning certificates are needed. We suggest you contact **Company** before operation and meanwhile get permission.

MMA400、MMA500、MMA630 Fault and Solution

Faults	Resolvable methods
Indicator of power switch is not lit,fan is not working and there is not welding output.	<ol style="list-style-type: none">1. Make sure power switch is close.2. Make sure electrify wire net(which is connected to input cable)is in work.
Power indicator is lit,fan does not work and there is no welding output.	<ol style="list-style-type: none">1. Maybe be connected wrong to 380V power cause machine is in protection circuit ,connect to 220V power and operate machine again.2. 220V power is not stabilizing (input cable is too slender) or input cable is connected to electrify wire net cause machine is in protection circuit .Increase the section of input cable and tighten input connect firmly .Close machine 5-10minutes then open it again.3. Open and close power switch in short time cause protection circuit is working .Close machine and open it again after 5-10 minutes.4.Cables are relaxed between power switch and power source

Please read

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CAUTIONS:



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	board ,tighten them again .
Fan is working ,welding current is not stabilizing or out of potential control.	<ol style="list-style-type: none">1. Quality of 1 K potential is bad ,replace it .2. Terminal of output is broken circuit or poor connect,check them.
Fan is working and abnormal indicator is not lit ,there is no welding output.	<ol style="list-style-type: none">1. Check if components is poor connect.2. Check if connect of output terminal is broken circuit and poor connect.3. Check voltage between power source board and MOS board (VII-07) is about DC380V.4. If indicator is not lit in assistant power of MOS board ,pleasease contact with seller or our company.5. If there is some question in control circuit ,please contact our company.
Fan is working and abnormal indicator is lit ,but there is no welding output.	<ol style="list-style-type: none">1. Maybe over-current protection is working ,please close machine and waiting .After abnormal indicator is not on ,open machine.2. Maybe overheated protection is working ,wait for 5-10minutes.3. Maybe inverter circuit is in fault ,please pull up the power plug of main transformer (near VII-07 fan)which is on MOS board then open the machine again. <p>(1) If abnormal indicator is still lit ,some of MOS board is damaged ,check and replace it .</p> <p>(2) If abnormal indicator is not lit :</p> <ol style="list-style-type: none">a. Maybe transformer of middle board is damaged ,measure primary inductance volume and Q volume of main transformer by inductance bridge.b. Maybe some of secondary rectifier tube of transformer is broken ,check and replace rectifier tube. <p>4. Maybe feedback circuit is in fault .</p>

Electric-shock :it may be fatal to life

- Install the earth cable to the standard.
- No touching electric parts with bare hands,wet hands or wet clothes.
- Make sure that you and working piece are insulation circumstance.
- Make sure that your working is in safety.

Smoke:it may be harmful to your health.

- Keep your head out of the smoke.
- When welding, make sure the air is flowing to avoid breathing in the smoke.

Air-emission—may be harmful to your eyes and skin

- Wear suitable welding mask and clothes to protect your eyes and skin.
- Use suitable screen or curtain to keep the look-ups from the emission.

Fire

- The welding sparkle may lead the fire, so make sure there is no tinder near the workpiece.

Noises-too much noise may be harmful to your hearing.

- Please wear something to protect your ears from the noises.
- Warn the look-ups of the hidden harm the noise may course.

Break-down: ask the professional for help

- If you have any problems in setting up or operating, please first consult this manual.
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ABOUT THIS MACHINE

welding machine is a rectifier which based on high inverter technology.

Inverter arc welding machine profit from the appearance of inverter power concept and the components.50Hz/60Hz frequency is inverted to high frequency (frequency is over 20KHz) by IGBT which is a high-power part ,then step down voltage and rectify current ,inverter arc welding power supply generates powerful DC welding current through PWM so that the cube and weight of the main transformer has been reduced greatly. It has increased the efficiency by 30%.The appearance of inverter welding machine has been called one revolution of welding industry.

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Welcome all the customers to give us more valued suggestions, we will try our best to supply you better service.


CAUTIONS

welding machine are equipped with power voltage compensation device which can still work when the power voltage ranges between + - 15%.

When long cable is used , we suggest you choose cables with wider section to in order to reduce voltage-decreasing; but if the cable is too long ,it may influence the arc starting and other system, so we recommend you to use the given length.

1. Make sure the ventilating mouth is not blocked or covered lest the cooling system is disabled.
2. Connect the case to earth with cables whose section is no less than 6mm²,from the back of the welding machine to earth screw to earth-connecting equipment or make sure the earth terminal has been connected to the ground separately. You can also take the two measures for safety.
3. Connect the electrode holder and earth clamp correctly according to the below drawing. Make sure the cable has been connected well with the electrode holder and air-plug. Plug the air-plug to the air-socket "-" and wind around clockwise at a full tilt.
4. Plug the air-plug of the back circuit cable to the air-socket "+", and wind around clockwise at a full tilt, the other terminal of the earth clamp is tied to the work piece.
5. Please pay attention to the connection polarity. There is usually two measures for DC welder connection: 1. Plus connection which means the electrode holder should be connected to negative pole and the work piece should be connected to the positive pole. 2.reverse connection which means the electrode holder should be connected to the positive pole but the work piece should be connected to the negative pole. The measures should depend on the technics request. The unsteady arc, great splash and sticking will be caused if the wrong measures has been chosen. In this circumstance, you can exchange the air-plug conveniently in order to change the polarity.
6. Connect the power cable(not smaller than 3*2.5²) to the switch box with relative voltage level(). Please note connect with wrong voltage and make sure the error of the input voltage should within the allowed range.

 If it is too far (50-100m) between work workpiece and welding cables and second cables (electrode holder cable and earth clamp cable)s too longer, so section of the cable must be bigger in order to reduce voltage drop.

 This equipment is used mainly in industry. Under room temperature ,this equipment may cause wireless interruption ,please take enough precautionary measures.

THE MAIN PARAMETER

Model	ARC1000	ARC800	ARC630
Item			
Power voltage (V)	AC3-415V±15%	AC3-415V±15%	AC3-415V±15%
Frequency (HZ)	50/60	50/60	50/60
Rate input current (A)	50	40	31
No- load voltage (V)	80	80	80
Output current adjust (A)	80-1000	80-800	80-630
Rated output voltage (V)	44	44	44
Duty cycle (%)	60	60	60
No-load loss (W)	40	40	40
Efficiency (%)	85	85	85
Power factor	0.93	0.93	0.93
Insulation class	B	B	B
Protection class	IP21	IP21	IP21
Weight (kg)	18.6	20	24.5
Overall dimension (mm)	490×240×460	490×240×460	490×240×460

INSTALLATION

OPERATION

1. Turn on the power switch on the front panel. The meter will show enacted current volume, meanwhile, the cooling fan in the machine works right now .
2. Choose right welding current and arc-force current according to the thickness of the work piece, the diameter of the electrode and the technology needs.
3. Hold the electrode with stick holder and now the machine is ready for stick welding.

The electrode specification for flat welding:

Rod model	φ 2.5	φ 3.2	φ 4.0
Welding current	70-100A	110-140A	170-220A

4. If welding machine has remote control device:
 - 1) Make sure the switch position of remote control device before operation .If switch is on "OFF" position that is out of remote control. Switch is on "ON" position that is using remote control device.
 - 2) Insert plug of remote control in socket of remote control correctly and tighten firmly in order to prevent poor connection. If remote control device is not used, make sure the switch is on "OFF" position , otherwise welding current will not be adjusted on the panel.

When machine is being moved, the switch of remote control is not on current position by bump which causes welding adjustment is out of work will be misunderstood as a fault of machine. Please pay attention to the circumstance.



WARNING!

Any connection should be operated under power off. Right operation is to connect the electrode holder and earth clamp to the welding machine. Make sure that it is reliable and tightened and then connect the power.

NOTICE OR PREVENTIVE MEASURE



1. Operation Environment

- 1) The operation should be in a relative dry environment, the air humidity usually doesn't overrun 90%.
- 2) The temperature around should be between -10 and +40 degrees centigrade.
- 3) Avoid working in the sun or in the rain. Make sure the water or rain don't infiltrate the machine.
- 4) Avoid working under the circumstance of dusty area or air with corrosive.
- 5) Avoid doing gas shield working under the condition of strong airflow.

2. Safety

welders are equipped with over-voltage and over-current and over-thermal protection circuit,when the output voltage ,output current and inner temperature is over the rated ones ,the machine will stop working automatically.But over-use(c,over-voltage) may damage the welding machine,so pay attention to the following tips:

1) Make sure of good ventilation

welders are large technical welding machines ,and has huge current through it when working ,and natural air flow can not satisfy its cooling need,so we put two embodied fans to cool it and makes it work normally .The operator should make sure the fan not blocked or covered ,and the distance between the welder and surroundings shouldn't be less than 0.3m.The users should always pay attention to the flowing condition of the machine,because it is very important for the working quality and working year of the machine.

2) No over-load!

The users should pay second attention to the allowed max loading current (comparative load cycle), and make sure the welding current not surpass the allowed max.Over-current may obviously shorten the working year of the machine,and even may fire the machine to pieces.

3) No over-voltage!

The power voltage is listed in the "Main Parameter"table ,generally ,the

automatic compensating circuit may make sure the current is in rated range .If the voltage surpasses the allowed value ,the machine may be damaged. The operator should be familiar with it and take certain actions to prevent it.

- 4) Every welder has an earth screw ,and earth connecting mark.Before operation ,please choose a cable whose section is more than 6 square millimeter,make the case firm earth -connecting to avoid accidents which may be caused by electricity -leaking .
- 5) If the working time of the welder surpasses the standard load cycle, the machine may suddenly enter **protection condition** and stop working ,which shows that the machine has been over the standard load cycle, and over-heating works the thermal-control switch, thus making the machine stop working ,Meanwhile, the red pilot light on the panel board is on .Under this circumstance, you needn't pull off the plug ,so that the fan can continue working ,thus cooling the machine. When the red light is off ,the temperature decreases to the standard range ,then you begin to weld again.

QUESTIONS MAY BE FACED DURING THE WELDING

These situations may be connected with your using accessories ,welding materials,environment and power supplying .So you need to create a better environment that you can avoid similar circumstances.

A. It is difficult for arc-starting and easily stopped.

1. Make sure that you need use high quality welding rod ,if not you will not weld successfully.
2. The electrode which doesn't been dried is difficult to start arc. It will course the unstable arc and more welding gap which result in a worse welding.
3. If the prolong cable has lower down the output voltage, we suggest you try to shorten the cable.

B. Output current can't reach rate current

The large discrepancy between the power voltage and rated voltage will course the output current is uncomform with the adjusted value. When the power voltage is lower than rated value, the largest output current may be lower than rated value.

C. Welding current is not stabilizing .

This circumstance may have something to do with the follow factors:

1. Power voltage has changed;
2. The severe interfering from the electrical net or other device.

D. Much splash

1. Maybe the current is too large but the diameter of the electrode is too small.
2. The out put terminal has been wrong connected. The positive polarity welding should be used in normal operation. Namely the electrode should be connected to the negative power and the work piece should be connected to the positive terminal.

Maintenance

- 1 Remove dust by compresses air regularly ,generally if machine is operated in environment where is polluted with more dust and smoke ,welding machine must be remove dust twice every month.
- 2 Pressure is adequate to welding machine in order to protect little components.
- 3 Check the electrify connectors and make sure the connectors are connected firmly(specially connectors and inserts) Tighten the relating connector,if component is oxidized ,these oxide must be get rid of and connect them again.
- 4 Avoid water and steam enter iner-machine,if machine has been affected with damp ,please dry inter-machine and check insulation of machine.
- 5 If the machine will not be used for long time ,it must be put in its own packing box and stored in dry environment.
- 6 Do not throw and bump machine.

CHECK FAULT



Cautions: The operators are supposed to have enough knowledge of electric-gas and common sense of safety ,and concerning certificates are needed. We suggest you contact **Company** before operation and meanwhile get permission.

MMA400、MMA500、MMA630 Fault and Solution


Faults	Resolvable methods
Indicator of power switch is not lit,fan is not working and there is not welding output.	<ol style="list-style-type: none">1. Make sure power switch is close.2. Make sure electrify wire net(which is connected to input cable)is in work.
Power indicator is lit,fan does not work and there is no welding output.	<ol style="list-style-type: none">1. Maybe be connected wrong to 380V power cause machine is in protection circuit , connect to 220V power and operate machine again.2. 220V power is not stabilizing (input cable is too slender) or input cable is connected to electrify wire net cause machine is in protection circuit , Increase the section of input cable and tighten input connect firmly. Close machine 5-10minutes then open it again.3. Open and close power switch in short time cause protection circuit is working .Close machine and open it again after 5-10 minutes.4. Cables are relaxed between power switch and power source

	board , tighten them again .
Fan is working ,welding current is not stabilizing or out of potential control.	<ol style="list-style-type: none">1. Quality of 1 K potential is bad ,replace it .2. Terminal of output is broken circuit or poor connect,check them.
Fan is working and abnormal indicator is not lit ,there is no welding output.	<ol style="list-style-type: none">1. Check if components is poor connect.2. Check if connect of output terminal is broken circuit and poor connect.3. Check voltage between power source board and MOS board (VH-07) is about 1C380V.4. If indicator is not lit in assistant power of MOS board ,please contact with seller or our company.5. If there is some question in control circuit ,please contact our company.
Fan is working and abnormal indicator is lit ,but there is no welding output.	<ol style="list-style-type: none">1. Maybe over-current protection is working , please close machine and waiting .After abnormal indicator is not on ,open machine.2. Maybe overheated protection is working , wait for 5-10minutes.3. Maybe inverter circuit is in fault ,please pull up the power plug of main transformer (near VH-07 fan)which is on MOS board then open the machine again. <p>(1) If abnormal indicator is still lit , some of MOS board is damaged ,check and replace it .</p> <p>(2) If abnormal indicator is not lit :</p> <ol style="list-style-type: none">a. Maybe transformer of middle board is damaged ,measure primary inductance volume and Q volume of main transformer by inductance bridge.b. Maybe some of secondary rectifier tube of transformer is broken ,check and replace rectifier tube. <p>4. Maybe feedback circuit is in fault .</p>

USER'S MANUAL

MODEL:TIG400MIJ

SAFETY WARNING



On the process of welding or cutting, there will be possibility of injury, so please take protection into consideration during operation. For more details please review the Operator Safety Guide, which complies with the preventive requirements of the manufacturer.

Electric shock——May lead to death !!

- Set the earth fitting according to applying standard.
- Forbidden to touch the bare electric parts and electrode with uncovered skin, wet gloves or clothes.
- Make sure you are insulated from the ground and the work piece.
- Make sure you are in safe position.

Gases and fumes——May be harmful to health!

- Keep your head out of the gases and fumes.
- When arc welding, ventilators or air extractors should be used to avoid breathing gases.

Arc rays——Harmful to your eyes, burn your skin.

- Wear suitable protective mask, light filter and protective garment to protect eyes and body.
- Prepare suitable protective mask or curtain to protect looker-on.

Fire


- Welding spark may cause fire, make sure there is no flinder stuff around the welding area.

Noise——Excessive noises will be harmful to hearing .

- Use ear protector or others means to protect ear.
- Warn looker-on that noise is harmful to hearing.

Malfunction——When trouble happens, contact with authorized professionals

- If trouble happens during installation and operation, please follow this manual instruction to check up.
- If you fail to fully understand the manual, or fail to solve the problem with the instruction, you should contact the suppliers or the service center for professional help.



WARNING !
Creepage-protecting switch should be added when using the machine!!!!

MACHINE DESCRIPTION

Welding machine is a rectifier adopting the most advanced inverter technology.


The development of welding equipment benefits from the appearance of the inverter power supply theory and components. Inverter arc welding power source utilizes high-power component IGBT to transfer 50/60Hz frequency up to 19KHz, then reduce the voltage and commutate, and output high-power voltage via PWM technology. Because of the great reduce of the main transformer's weight and volume, the efficiency increases by 30%. The appearance of inverter welding equipment is considered to be a revolution for welding industry.

Welding power source can offer stronger, more concentrated and more stable arc. When stick and work piece get short, its response will be quicker. It means that it is easier to design into welding machine with different dynamic characteristics, and it even can be adjusted for specially to make arc softer or harder.

TIG welding machine is easy for arc initiation and has the functions of arc initiation current, arc stop current, welding current, basic value current, current ascending time, current descending time, gas delay time, continuous adjustment. What's more, pulse frequency and pulse duty can also be adjusted independently. It has the characteristics of automatic control of arc initiation, arc stop and stable arc, which make the best result for shape and inner quality of the welding surface. Its exclusive design is specially suitable for bicycle industry.

The machine can be for multi-use, and can weld stainless steel, carbon steel, copper and other color metal, and also can use for traditional electric welding, its transfer efficiency is above 85%.

Thanks for purchasing our products and looking forward to your precious advice, we will try our best to perfect our products and service



WARNING !
The machine is mainly used in industry. It will produce radio wave, so the worker should make fully preparation for protection.

TECHNICAL PARAMETERS TABLE

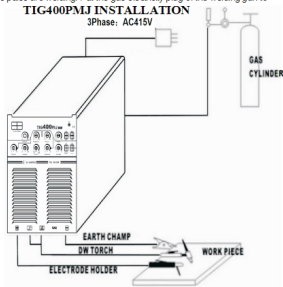
Model	
Parameters	TIG400MIJ
Power voltage(V)	3 phaseAC415V ±15%
frequency(Hz)	50/60
Rated input current(A)	ARC:24
	TIG:17
No-load voit.(V)	68
Output current voit.(A)	10~400
Rated working voit.(V)	ARC:36
	TIG:26
Force adjustment(A)	0~100
Duty cycle(%)	60
No-load loss(W)	100
Time of downslop(S)	0~5
Arcing way	HF
Efficiency(%)	85
Power factor	0.93
Insulation grade	F
Housing protection grade	IP21S
weight(kg)	29.5
Dimensions(mm)	550X280X545


INSTALLATION INSTRUCTION

The machine is equipped with power voltage compensation equipment. When power voltage fluctuates between415V±15% of rated voltage, it still can work normally.

When use long cable, in order to prevent voltage form going down, bigger section cable is suggested. If cable is too long, it may affect the performance of the power system. So we suggest you to use configured length.

1. Make sure intake of the machine not blocked or covered, lest cooling system could not work.
2. Make good connection of shielded gas source. Gas supply passage includes cylinder, argon decompress flow meter and pipe. Connecting part of pipe should used hoop or other things to fasten, lest argon leaks out and air gets in.
3. Use inducting cable whose section is not less than 6 mm* to connect the housing to the ground. The way is from the ground-connecting screw at the back to the earth device.
4. Correctly conned the arc torch or holder according to the sketch. When use ARC welding: Make sure the cable, holder and fastening plug have been conned with the ground. Put the fastening plug into the fastening socket at the "-" terminal and fasten it clockwise. When use pulse arc welding: Put the gas-electricity plug of the welding gun to the joint at the front panel, and fasten clockwise. Put the air switch on the gun to the relevant joint at the front panel, and fasten the screw.
5. Put the fastening plug of the cable to fastening socket of "+" polarity at the front panel, fasten it clockwise, and the earth clamp at the other terminal clamps the work piece.
6. According to input voltage grade, conned power cable with power supply box of relevant voltage grade. Make sure so mistake and make sure the voltage difference among permission range. After the above job, installation is finished and welding is available.

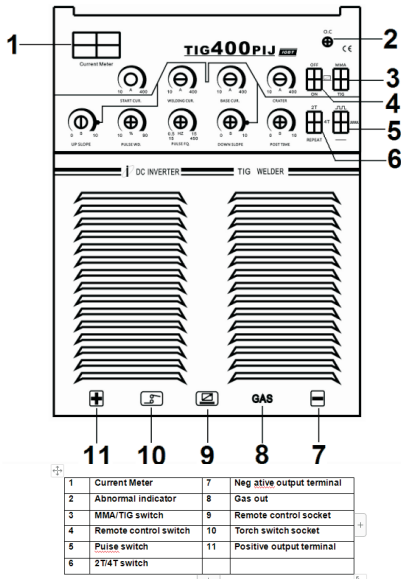




WARNING !
Before connecting operation please make sure all the power is turned off. The right order is to connect the welding cable and ground cable to the machine first, and make sure they are firmly connected and then put the power plug to the power source.

PANEL FUNCTION INSTRUCTION

THE PANEL OF TIG400PIJ:



The panel picture above is for reference only. If any discrepancy with the real machine, please follow with the real machine.

OPERATION INSTRUCTION

1. Environment

- The machine can perform in environment where conditions are dry with a dampness lever of max 90%.
- Ambient temperature is between -10 to 40 degrees centigrade.
- Avoid welding in sunshine or drippings.
- Do not use the machine in environment where condition is polluted with conductive dust on the air or corrosiveness gas on the air.
- Avoid gas welding in the environment of strong airflow.

2. Safety norms

The welding machine has installed protection circuit of over voltage and current and heat. When voltage and output current and temperature of machine are exceeding the rate standard, welding machine will stop working automatically. Because that will be damage to welding machine, user must pay attention as following.

1) The working area is adequately ventilated!

The welding machine is powerful machine, when it is being operated, it generated by high currents, and natural wind will not satisfy machine cool demands. So there is a fan in inter-machine to cool down machine. Make sure the intake is not in block or covered, it is 0.3 meter from welding machine to objects of environment. User should make sure the working area is adequately ventilated. It is important for the performance and the longevity of the machine.

2) Do not over load!

The operator should remember to watch the max duty current (Response to the selected duty cycle).

Keep welding current is not exceed max duty cycle current.
Over-load current will damage and burn up machine.

3) No over voltage!

Power voltage can be found in diagram of main technical data. Automatic compensation circuit of voltage will assure that welding current keep in allowable arrangement. If power voltage is exceeding allowance arrangement limited, it is damaged to components of machine. The operator should understand the situation and take preventive measures.

4) There is a grounding screw behind welding machine, there is grounding marker on it. Mantle must be grounded reliable with a cable which section is over 6 square millimeter in order to prevent from static electricity and leaking.

5) If welding time is exceeded duty cycle limited, welding machine will stop working for protection. Because machine is overheated, temperature control switch is on "ON" position and the indicator light is red. In this situation, you don't have to pull the plug in order to let the fan cool the machine. When the indicator light is off, and the temperature goes down to the standard range, it can weld again.

TIG WELDING DESCRIPTION

- Turn on the power switch at the back panel, digital current meter is normal, fan begins to wheel.
- Open the valve of argon cylinder, adjust the volume of flow meter and make it is adequate to welding.
- Press switch of torch, electromagnetic valve is started. Sound of HF arc striking can be heard. At the same time argon is flowing from torch burner. **NOTES:** When welding is first operated, user must press switch of torch several seconds and **begin** to weld until all of air is be drained out. When welding is over, argon will still flow out in several seconds in order to protect welding spot before cooled down. So torch must be kept welding place some time before arc has been extinguished.
- According to the thickness and processing techniques of workpiece under welding, adjust current down slope time turnout.
- Set suitable welding current and make sure welding current is adequate to thickness of work piece and process demand.
- It is 2-4 mm from welding tungsten electrode to work piece, press control knob of torch, burn and strike arc, sound of HF arc striking will be diminished. The welding machine can be operated now.

STICKING DESCRIPTION

- Open the power switch, the screen will show set current volume and ventilator is beginning to revolve.
- Adjust knob of welding current and arc-striking push, make welding function complies with demands.

Generally, welding current is adequate to welding electrode according with as following:

Specification	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Current	70-100A	110-140A	170-220A	230-280A

- Knob of arc-striking drive is use to adjust welding function, specially in low current arrange, that is cooperated with knob of welding current adjustment, they may adjust current of arc striking and be out of control of knob of welding current adjustment. So machine can gain powerful energy and push current can achieve effect that may.

- The welding machine has been coordinated with remote control device:

- Check the switch position of remote control device before operation. If the switch is on "OFF" position then is out of remote control. Switch is on "ON" position then is using remote control device.
- Insert plug of remote control in socket of remote control correctly and tighten firmly in order to prevent poor contact.
- If remote control of device is not used, make sure the switch is on "OFF" position, or welding current will not be able to be adjusted on panel.

WARNING:

During welding, it is forbidden to pull off any plug or cable in use, or it will lead to life-threatening danger and sever damage of the machine.

NOTES OR PREVENTIVE MEASURES

try to improve welding environment.

A. Black welding spot

—Welding spot is not prevented from oxidizing. User may check as following:

- Make sure the valve of argon cylinder is opened and its pressure is enough. argon cylinder must be filled up to enough pressure again if pressure of cylinder is be low 0.5Mpa.
- Check if the flow meter is opened and has enough flow. User can choose different flow according to welding current in order to save gas. But too small flow maybe cause black welding spot because preventive gas is too short to cover welding spot. We suggest that flow of argon must be kept min 5L/min.
- Check if torch is in block.
- If gas circuit is not air-tight or gas is not pure can lower welding quality.
- If air is flowing powerfully in welding environment, that can lower welding quality.

B. Arc-striking is difficult and easy to pause

- Make sure quality of tungsten electrode is high.
- Grind end of the tungsten electrode to taper. If tungsten electrode is not grinded that will be difficult to strike arc and cause unstable arc.

C. Output current not to rated value.

When power voltage departs from the rated value, it will make the output current not matched with rated value. When voltage is lower than rated value, the max output may lower than rated value.

D. Current is not stabilizing when machine is been operating.

It has following with factors as following:

- Electric wire net voltage has been changed.
- There is harmful interference from electric wire net or other equipment.

E. When use ARC welding, too much spatter.

- Maybe current is too big and stick's diameter is too small.
- Output terminal polarity connection is wrong, it should apply the opposite polarity at the normal technics, which means that the stick should be connected with the negative polarity of power source, and work piece should be connected with the positive polarity. So please change the polarity.

QUESTIONS TO BE RUN INTO DURING WELDING

Fittings, welding materials, environment factor, supply powers maybe have something to do with welding. User must

MAINTENANCE

**CAUTION:**

Before Maintenance and checking, power must be turned off, and before opening the housing, make sure the power plug is pulled off.

1. Remove dust by dry and clean compressed air regularly, if welding machine is operating in environment where is polluted with smokes and pollution air, the machine need remove dust each month.
2. Pressure of compressed air must be inside the reasonable arrangement in order to prevent damaging to small components of inner-machine.
3. Check inner circuit of welding machine regularly and make sure the cable circuit is connected correctly and connectors are connected tightly (especially insert connector and components). If scale and loose are found, please give a good polish to them, then connect them again tightly.
4. Avoid water and steam enter into inner-machine, if them enter into machine, please dry inner-machine then check insulation of machine.
5. If welding machine will not be operated long time, it must be put into packing box and store in dry environment.

NOTES BEFORE CHECKING**WARNING**

Blind experiment and careless repair may lead to more problem of the machine that will make formal check and repair more difficult. When the machine is electrified, the naked parts contain life-threatening voltage. Any direct and indirect touch will cause electric shock, and severe electric shock will lead to death.

TROUBLESHOOTING AND FAULT FINDING**TIG400PIJ fault symptom and remedy**

Fault symptom	Remedy
Power indicator is not lit, fan does not work and no welding output	<ol style="list-style-type: none"> 1. Power switch is out of work. 2. Check if electrify wire net (which is connected to input cable) is in work. 3. Check if input cable is out of circuit.
Power indicator is lit, fan does not work or revolve several circles, no welding output	<ol style="list-style-type: none"> 1. Cable is loosed from switch to power panel, tighten them again. 2. Turn on and turn off power switch constantly in short time cause machine is in protection circuit. Turn off machine 2-3 minutes then turn on it again.
Fan is working, indicator is not lit and sound of HF arc-striking can not be heard, wiping welding can not strike arc.	<ol style="list-style-type: none"> 1. Check if connectors is poor contact. 2. Check control circuit and find out reasons or connect with seller. 3. Check if control cable of torch is broken.
Abnormal indicator is not on, sound of HF arc-striking can be heard, but there is no welding output.	<ol style="list-style-type: none"> 1. Check if torch cable is broken. 2. Check if grounding cable is broken or not connected to welding piece. 3. Output terminal of positive electrode or torch electrify is loosed from inner-machine.
Abnormal indicator is not lit, sound of HF arc-striking can not be heard, wiping welding can strike arc.	<ol style="list-style-type: none"> 1. Primary cable of arc-striking transformer is not connected to power panel firmly, tighten it again. 2. Arc-striking tip is oxidized or too far, give a good polish to it or change it is about 1 mm between arc-striking tip. 3. Switch (sticking/argon-arc welding) is damaged, replace it. 4. Some of HF arc-striking circuit components is damage, find out and replace it.
Abnormal indicator is lit but there is no welding output.	<ol style="list-style-type: none"> 1. Maybe it is overheated protection, wait for 2-3 minutes (argon-arc welding does not have overheated protection function). 2. Maybe it is overheated protection, wait for 2-3 minutes (argon-arc welding does not have overheated protection function). 3. If abnormal indicator is still lit, close machine and pull up supply power plug of HF arc-striking power source (which is near the VN-07 insert of fan), then open machine. 4. If abnormal indicator is not lit, rise transformer of HF arc-striking circuit is damaged, replace it. 5. Maybe transformer of middle board is damage, measure inductance volume and Q volume of main transformer by inductance bridge (L=0.9-1.6mH Q>35). If volume is too low, please replace it. 6. Maybe secondary rectifier tube of transformer is damaged, find out faults and replace rectifier tube with same model. 7. Maybe feedback circuit is broken.
Output current is not stabilizing or out of potentiometer control and sometime is high, sometime is low.	<ol style="list-style-type: none"> 1. 1K potentiometer is damage, replace it. 2. All kinds of connectors are poor contact, specially inserts etc. please check it.
Sticking spatter is much and caustic electrode of is difficult.	Electrode is connected wrong, exchange grounding cable and handle cable.