

ARC 315GTS

WELDING MACHINE




***USER MANUAL***

## Preface

This manual includes hardware description and operation introduction of equipment. For your and other people's safety, please read the manual carefully.

### Pay attention

Pay attention to the words after the signs below.

Sign	Description
 <b>DANGER</b>	The words after this sign means there is great potential danger, which may cause major accident, damage or even death, if it is not followed.
 <b>WARNING</b>	The words after this sign means there is some potential danger, which may cause hurt or property lose, if it is not followed.
 <b>ATTENTION</b>	The words after this sign means there is potential risk, which may cause equipment fault or break, if it is not followed.

### Version

Version YF-TAE-0010, A3, Released at 14th, Jan., 2021.

The contents of this manual are updated irregularly for updating of product. The manual is only used as operation guide, except for other promises. No warranties of any kind, either express or implied are made in relation to the description, information or suggestion or any other contents of the manual.

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## SAFETY WARNING

The safety notes listed in this manual is to ensure correct use of the machine and to keep you and other people from being hurt.

The design and manufacture of welding machine considers safety. Please refer to the safety warning listed in the manual to avoid accidents.

Different damage would be caused by wrong operation of the equipment as follows. Please read the user manual carefully to reduce such damage.

Sign	Description
	<ul style="list-style-type: none"> <li>◇ Any contact of electric parts may cause fatal electric shock or burnt.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Gas and fumes are harmful to health.</li> <li>◇ Operation in narrow space may cause choke .</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Spark and hot workpiece after welding may cause fire.</li> <li>◇ Bad connected cable may cause fire.</li> <li>◇ Incompletion connection of workpiece side circuit may cause fire.</li> <li>◇ Never weld on the case of tinder stuff, or it may cause explode.</li> <li>◇ Never weld airtight containers such as slot, pipe etc., or it may break.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Arc ray may cause eye inflammation or skin burnt.</li> <li>◇ Spark and residue will burn your eyes and skin.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Toppling over of the gas cylinder will cause body hurt.</li> <li>◇ Wrong use of the gas cylinder will lead to high-pressure gas eruption and cause human hurt.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Never let fingers, hair, clothes or etc. near the moving parts such as the fan.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ The wire shoot out of the torch may stab eyes, face and other naked parts.</li> </ul>
	<ul style="list-style-type: none"> <li>◇ Never stand in front of the swang equipment or under it, or it may fail and cause injury.</li> </ul>



**Please follow the rules below to avoid heavy accidents.**

- Never use the equipment to do other things but welding.
- Follow related regulations for the construction of the input-driven power source, choice of place, usage of high-pressure gas, storage, configuration, safe-keeping of workpiece after welding and disposal of waste, etc.
- Nonessentials do not enter the welding area.
- People using heart pacemaker is not allowed to get close to the welding machine or area without doctor's permission. The magnetism created by energizing the welding machine can have a bad effect to the pacemaker.
- Install, operation, check and maintain the equipment by profession personnel.
- Understanding the contents of the user manual for safety.



**Please follow the rules below to avoid electric shock.**

- Keep away from any electric parts.
- Earth the machine and workpiece by professional personnel.
- Cut off the power before installation or checking, and restart 5 minutes later. The capacitance is chargeable device. Please ensure it has no voltage before start again even if the power source is cut off.
- Do not use wire with inadequate section surface or damage insulation sleeve or even exposed conductor.
- Do ensure well isolation of wire connection.
- Never use the device when the enclosure is removed.
- Never use broken or wet insulation gloves.
- Use firenet when work at high position.
- Check and maintain regularly, don't use it until the broken parts are fixed well.
- Turn off the power when not in used.
- Follow the national or local related standard and regulations when using the AC welding machine at narrow or high position.



**DANGER** Please follow the below notes to avoid fire and explode, etc.

- No combustible in welding area.
- Keep off combustible when welding.
- Keep hot workpiece after welding away from flammable gas.
- Do move away the combustible around when weld the dooryard, ground and wall,.
- The wire connection of base metal should be as close to the welding place as possible.
- Never weld those facilities with gas pipe or airtight slot.
- Put fire extinguisher around the welding area to prevent fire.



**WARNING** The gas and fumes are harmful to health, please wear protective device according to regulations.

- Wear exhaust equipment and breathe preventive facilities to prevent gas poisoning or choke.
- Use suggested part exhaust equipment and breathe preventive facilities to prevent hurt or poisoning by gas and other powder, please.
- To prevent oxygen-deficiency, air out the gas-filled room which is full of CO<sub>2</sub> and argon on the bottom, When operating on trunks, boilers, cabins, etc.
- Please accept the supervisor's inspection when operating in narrow space. Air the room and wear breathe preventive facilities.
- Never operate in degrease, washing or spray space.
- Using breathe preventive facilities when weld shielded steel for it will cause poisonous dust and gas.



**WARNING** The arc, spark, residue and noise are harmful to health, please wear protective appliance.

- Eye protection against arc is recommended when welding or supervise welding.
- Please wear preventive spectacles.
- Welder's gloves, welder's goggles, long sleeve clothes, leather apron, and other standard protection equipments must be worn for welding operation.
- A screen to protect other people against the arc must be set in the welding place.



**WARNING** Please follow the notes below to avoid gas cylinder toppling over or broken.

- Use the gas cylinder correctly.
- Use the equipped or recommended gaseous regulator.
- Read the manual of gaseous regulator carefully before using it, and pay attention to the safety notes.
- Fix the gas cylinder with appropriate holder and other relative parts.
- Never put the cylinder under high temperature or sunshine environment.
- Keep your face away from the gas cylinder exit when opening it.
- Put on the gas shield when it is not used.
- Never put the torch on the gas cylinder. The electrode can not meet the gas cylinder.



**WARNING** Any touch of the switch part will cause injury, please note the following.

- Never use the machine when the enclosure is off.
- Install, operate, check and maintain the machine by professional person.
- Keep your fingers, hair, clothes etc. away from the switch parts such as the fan.



**WARNING** The wire end may deal damage, please note the following.

- Never look into the electric conduction hole when checking the wire feeding is normal or not, , or the shooting wire may stab your eyes and face.
- Keep your eyes, face or other naked parts away from the end of torch when feeding the wire manually or pressing the switch.



**ATTENTION** For better work efficiency and power source maintenance, please note the following.

- Precautions against toppling over.
- Never use the welding equipment for pipe thawing.
- Lift the power source from side when use the up-down forklift truck to avoid toppling over.
- When using the crane for lift, tie the rope to the ears with an angle no more than  $\phi 15$  to the vertical direction.
- When lifting the welding machine which equipped with gas cylinder and wire feeder, download them from the power source and ensure the horizontal of the machine. Do fix the gas cylinder with belt or chain when moving it to avoid body hurt.
- Ensure fastness and insulation when lifting the wire feeder through the swing ring for welding.



## ATTENTION

### Electromagnetic interference needing attention.

- It may need extra preventive measures when the equipment is used in particular location.
- Before the installation, please estimate the potential electromagnetism problems of the environment as follows.
  - a) Upper and lower parts of the welding equipments and other nearby power cable, control cable, signal cable and phone cable.
  - b) Wireless electric as well as TV radiation and reception equipment.
  - c) Computer and other control equipments.
  - d) Safety-recognition equipment etc. Such as supervise of industrial equipments.
  - e) Health of people around. Such as personnel using the heart pacemaker or audiphone.
  - f) Equipments for adjustment and measurement.
  - g) Anti-disturb capability of other used equipments .Users should ensure these equipments and the environment are compatible, which may need extra preventive measures.
  - h) Practical state of the welding and other activities.
- Users should observe the following dos and don'ts to decrease radiation interference.
  - a) Connect the welding equipments to the power supply lines.
  - b) Maintain the welding equipments regularly.
  - c) The cable should be short enough to be close to each other and the ground.
  - d) Ensure the safety of all the welding metal parts and other parts nearby.
  - e) The workpiece should be well earth.
  - f) Shield or protect the other cable and equipments to decrease the effects of disturbances. The welding equipments can be complete shielded in some special conditions.
- Users are responsible for interference due to welding.



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## MACHINE DESCRIPTION

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The welding machine is a rectifier adopting the most advanced inverter technology.

The development of inverter welding equipment profits from the development of the inverter power supply theory and components. The inverter welding power source utilizes high-power component single tube IGBT to transfer 50/60Hz frequency up to 15KHz, 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.

The 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 specialty to make arc softer or harder.

ARC welding machine has the following characteristics: effective, power saving, compact, stable arc, good welding pool, high no-load voltage, and good capacity of force compensation and multi-use. It can weld stainless steel, alloy steel, carbon steel, copper and other color metal. It can apply to electrode of different specifications and materials, including acidity, alkalescence, and fiber. It can apply in high altitude, the open air and inside and outside decoration. Compared with the same products of home and abroad, it is compact in volume, light in weight, easy to install and operate.

The welding machine is most suitable for those places where require high quality welding performance, such as welding on pipeline, boiler, vacuum pressure vessel, which can achieve very excellent effect. Moreover, this machine, which possesses high enough no-load voltage and output capacity, suitability for wide electric grid (it can go on working under the power supply range from 160V to 460V), and built-in voltage automatic transfer equipment, can work reliable under 1 phase AC220V and 2phase AC380V, adapt to different power voltage, so that to satisfy the clients' requirements better.

Thanks for purchasing our product and hope for your precious advice. We will dedicate to produce the best products and offer the best 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	ARC 315GTS	
Power voltage (V)	1phaseAC 220V	1phaseAC 380V
Frequency (Hz)	50/60	
Rated input current (A)	39	37
No-load voltage (V)	U <sub>0</sub> =78V U <sub>r</sub> =15V	U <sub>0</sub> =68V U <sub>r</sub> =15V
Output current (A)	30-210	30-280
Rated output voltage (V)	28.4	31.2
Force range (A)	0-100	
Duty cycle (%)	30	
No-load loss (W)	60	
Efficiency	85	
Power factor	0.70	
Insulation grade	H	
Housing protection grade	IP21	
Weight (kg)	15	
Dimensions (mm)	466×212×371	

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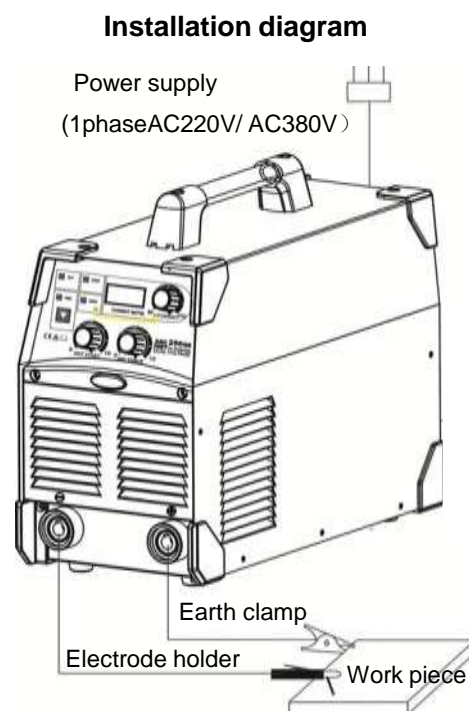
## INSTALLATION INSTRUCTION

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The machine is equipped with power voltage automatic transfer device. When the power voltage fluctuated between 1 phase AC220V and 2 phase AC380V, the machine would transfer automatically to relevant working station. What's more, it can adapt to the electric grid very well, and also can work continuously in allowable range(AC160V~460V).

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

1. Make sure the intake of the machine is not blocked or covered to avoid malfunction of cooling system.
2. Make sure the earth end of power interface has been reliably and independently grounded.
3. Correctly connect the arc torch or holder according to the sketch. Make sure the cable, holder and fastening plug have been connected with the ground. Put the fastening plug into the fastening socket at the “-” terminal and fasten it clockwise.
4. Put the fastening plug of the cable to fastening socket of “+” terminal at the front panel, fasten it clockwise, and the earth clamp at the other terminal clamps the work piece.
5. Please pay attention to the connecting terminal, DC welding machine has two connecting ways: positive connection and negative connection. Positive connection: holder connects with “-” terminal, while work piece with the “+” terminal. Negative connection work piece with the“-” terminal, holder with the “+” terminal. Choose suitable way according to the working situation. If unsuitable choice is made, it will cause unstable arc, more spatters and conglutination. If such problems occur, please change the polarity of the fastening plug.
6. According to input voltage grade, 1 phase AC220V or 2 phase AC 380V. Connect power cable with power supply box of relevant voltage grade. Make sure no mistake is made and make sure the voltage difference is among permission range. After the above job, installation is finished and welding is available.



**If distance of work piece and machine is too far (50-100m), and the cables (torch cable and earth cable) are too long, please choose cable of bigger section to minimize the reduction of the voltage.**

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## OPERATION INSTRUCTION

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1. Turn on the power switch, the power indicator of the front panel is in work and indicate 220V or 380V and the fan is beginning to run.
2. The delay startup function is installed in the machine ,when the machine is begin 6 to 8 seconds ,make sure power voltage automatic transfer equipment can work reliable, and then begin to welding.
3. Choose suitable Welding current and Arc force current , according to the thickness of the Work piece , diameter of the welding rod , the working situation and the techniques demands.
4. Generally, welding current is adequate to welding electrode according with as following:.

Specification	φ2.5	φ3.2	φ4.0	φ5.0
Current	50-90A	90-130A	140-210A	190-270A

5. Arc force adjustment knob is used for adjusting the welding preferment, when stand-welding and admire-welding, we can work in Arc force adjustment knob together, would attainability perfectly welding effect.
6. If the anti-shock device is installed in the machine. When the switch of back panel is put "ON" position, the VRD indicator is lit, and when the switch is put "OFF" position, the VRD indicator is off, then the no-load voltage is 60-70V. Switch of VRD is put inside the machine, with the "on" condition. the no-load voltage changes to be less than 15V, which is safe for people.
7. Hot initiation: Heavy current, perfect effect, striking easier.

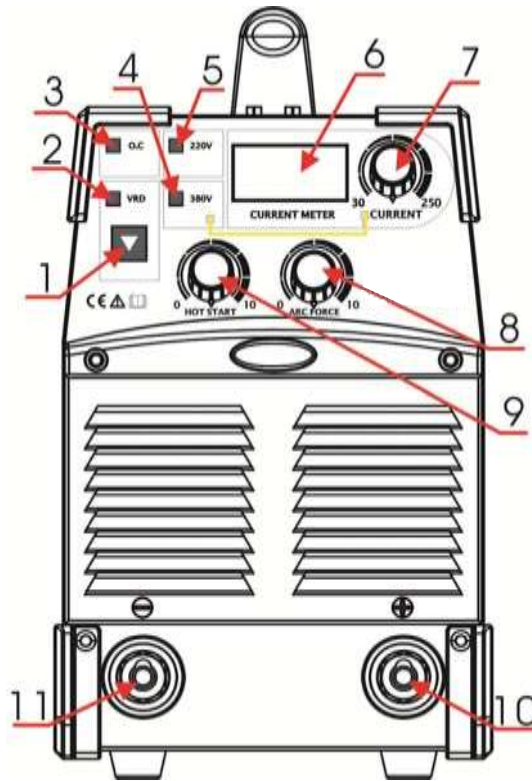


### **WARNING!**

**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

## FRONT PANEL LAYOUT



1	VRD switch
2	VRD indicator
3	Abnormal indicator
4	380V power indicator
5	220V power indicator
6	Current meter
7	Current adjustment knob
8	ARC force adjustment knob
9	Host start adjustment knob
10	Positive output terminal
11	Negative output terminal

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



### 1. Environment

- 1) The machine should be operated in dry environments with humidity levels of max 90%.2
- ) Ambient temperature should be between -10 to 40 degrees centigrade.
- 3) Avoid welding in sunshine or drippings. Do not let water infiter the machine.4
- ) Avoid welding in dust area or the environment with corrosive gas.
- 5) Avoid gas welding in the environment with strong airflow.

### 2. Safety norms

The welding machine is installed with protection circuit of over voltage, over current and over heat. When voltage, output current and temperature of machine exceed the required standard, welding machine will stop working automatically. However, overuse (such as over voltage) will still result in damage to the welding machine. To avoid this, the user must pay attention to the 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 inner-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 keeps in allowable range(160V ~ 460V). If power voltage is exceeding allowable range limited, it will damage to components of machine. The operator should understand this situation and take preventive measures.

#### 4) There is a grounding screw behind welding machine, with a grounding marker on it. Before operation, welding crust must be grounded reliable with cable which section is over 6 squaremillimeters, in order to prevent from static electricity, and accidents because of electricity 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.

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## QUESTIONS TO BE RUN INTO DURING WELDING

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

User must try to improve welding environment.

### A. Arc-striking is difficult and easy to pause

1. Make sure quality of tungsten electrode is high.
2. If the electrode is not dried, it will cause unstable arc, welding defect increases and the quality is down.
3. If use extra-long cable, the output voltage will decrease, so please shorten the cable

### B. 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.

when the single phase voltage is higher than 250V, the output is little, So please not use the machine.

### C. Current is not stabilizing when machine is being operated

It has something with factors as following:

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

### D. Too much spatter when use MMA welding

1. Maybe current is too big and stick's diameter is too small.
2. 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.

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## **MAINTENANCE**

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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 every month.
2. Pressure of compressed air must be within the reasonable range in order to prevent damaging to small components of inner-machine.
3. Check internal circuit of welding machine regularly and make sure the circuit connections are connected correctly and tightly (especially plug-in connector and components). If scale and rust are found, please clean it, and connect again tightly.
4. Prevent water and steam from entering into the machine. If that happens, please blow it dry and check insulation of machine.
5. If welding machine will not be used for long time, it must be put into the packing box and stored in dry and clean environment.



## TROUBLESHOOTING AND FAULT FINDING



Notes: The following operations must be performed by qualified electricians with valid certifications. Before maintenance, please contact with us for professional suggestion.

### ARC 315GTS faults symptom and solutions:

Fault symptom	Solution
Meter doesn't display, fan doesn't work, no welding output.	<ol style="list-style-type: none"> <li>1. Make sure power switch is off.</li> <li>2. Make sure the power source connecting to input cable is working alright.</li> <li>3. Make sure the input voltage is 3 phase.</li> </ol>
Meter is normal, fan is working, no welding output.	<ol style="list-style-type: none"> <li>1. Check if all kinds of components of machine are poor contact.</li> <li>2. Check if connector of output terminal is broken or damaged.</li> <li>3. Check if the control board is damaged (contact with the supplier or manufacturer).</li> </ol>
Abnormal indicator is on, fan is working, meter is normal	<ol style="list-style-type: none"> <li>1. IGBT is damaged.</li> <li>2. Rectifier of quick recovery is damaged.</li> <li>3. Control board is broken.</li> <li>4. The feedback circuit is in fault. Please contact with the supplier or manufacturer.</li> </ol>
Too much spatter during MMA welding	Output terminal polarity connection is wrong. So please change the polarity.
Erratic welding output current or out of control of potentiometer.	<ol style="list-style-type: none"> <li>1. The potentiometer is damaged.</li> <li>2. All kinds of connectors are poor contact, especially plugs. Check them.</li> </ol>
Power switch doesn't work	<ol style="list-style-type: none"> <li>1. Power switch is broken.</li> <li>2. Three phase rectifier bridge is broken, replace it.</li> <li>3. Check if there is any short circuit of inner-machine.</li> </ol>

