Inverter AC/DC Pulse TIG Welding Machine

Operation Manual

Model:TIG-315 AC/DC
TIG-315W AC/DC
TIG-400 AC/DC
TIG-400W AC/DC
TIG-500 AC/DC
TIG-500W AC/DC

Read this instruction manual carefully before install, operate and maintain this machine

Description: This machine is used to weld ferrous or nonferrous metals together.

Disclaimer: The information, illustrations and instructions described in this manual are based on the latest product information available at the time of publication. The manufacturer and distributors reserve the right to make modifications at any time as a result of product changes, and such modifications are not obligated to notify any organization or individual. In addition, welder is a special type of work, and welding equipment is special equipment. Welding work must be executed by qualified workers after professional training. Therefore, the manufacturer and distributors are only responsible for the quality of the product. They shall not be liable for direct or indirect joint and several liability including loss of profit caused by omissions or misdescriptions that may exist in this operation manual. This manual will contain as much as possible the safety operation and preventive measures related to this equipment, but cannot completely prevent the occurrence of accidents. The manufacturer and distributors shall not be liable for any direct or indirect joint and several liability, for any incidental or consequential damages caused by any accident that may occur outside of this manual. For more detailed health and safety information, please contact the relevant professional agencies, welding materials or welding flux manufacturers if necessary.

No warranty service is available in the following circumstances:

- ✓ The consumables of the machine are not covered by the warranty, such as welding wires, flux, fuse, protective tube, quick connector, wire feeder and tension roller, etc..
- ✓ Machine failures caused by incorrect input power voltage or instability are not covered by the warranty.
- ✓ Malfunction of the machine and parts damage caused by wrong connection or incorrect operation.
- ✓ The warranty will be invalid if the machine is disassembled or refitted without the permission of the manufacturer, resulting in accidental work or unexpected damage of the machine.
- ✓ Accidental damage during transportation, storage, and transshipment.
- ✓ Problems caused by man-made damage, natural disaster of force majeure and accidental damage

Contents

Safety precautions

The equipment is designed for the qualified personnel who have passed professional training. The operator shall have sufficient professional knowledge of welding, cutting and circuit, and have obtained the qualification certificate of welder. Only operate the machine after reading and fully understanding all the safety precautions and warnings in the manual and of welding operations. Basic safety precautions should always be followed when using tools, to reduce the risk of personal injury and damage to equipment. The device is simple and reliable in selecting and performing all of its functions. The operator must strictly follow the safety precautions below and execute them as required. Improper use and maintenance will reduce the safety performance of the machine.

1. The operator must have passed the systematic training and assessment of local welder's relevant learning institution and obtained the qualified certificate before operating the equipment.

2. The wire and cable connection of the equipment, as well as the installation, must be operated by qualified professional and technical personnel.

3. The welding and cutting protective equipment used by the operator must be provided by the manufacturer or distributor approved by the national safety supervision department of the local country.

4. Welding and cutting is dangerous work, which may cause harm to you or others, so sufficient protection should be done during welding and cutting. Please strictly abide by the relevant safety precautions of the job operation. For more details, please refer to the relevant safety guidelines for the operators to comply with the manufacturer's regulations on accident prevention.

5. Please make sure that the welding/cutting machine is reliably grounded when working. Please contact the professional electrician to solve the problems in time if there is any doubt that the socket is not grounded or the grounding is not reliable.

6. Before welding/cutting , check whether the insulation layer of all wires and cables of the machine is damaged or they are wrongly connected timely and fix them in a timely manner if they are.

7. The faulty machine must be repaired by professional technicians. The machine must be disconnected from the electricity supply before repair and maintenance.

8. Do not operate the welding/cutting machine in humid environment, otherwise it may cause electric shock or short circuit accident.

9. It is strictly forbidden to re-modify the equipment or the attached equipment related to the operation of the equipment without permission, to avoid accidents.

10. The disposal of the scrap equipment must comply with the relevant policies and regulations of the local government.

Warnings

Welding and cutting is a special type of work, with a certain degree of danger. Professional training, correct operation and necessary protective measures can effectively avoid and reduce the damage and loss caused by machine accidents.

Personal and others' safety protection	
	**When welding and cutting equipment is working, it will generate noise, strong light and high temperature sparks, which will cause harm to human hearing, eyes and skin. Correct protective measures and proper operation training are necessary to prevent injury accidents.**
1	A protective helmet with a shading filter must be worn to protect the face and eyes during welding and cutting operations or when watching welding/cutting operations.
2	Wear a helmet with the correct filter and cover plate to protect the eyes, face, neck and ears from arcing sparks and bright light during welding operation or observation. Warn bystanders not to look at the arc and not to expose their skin in the area of strong light arc or high temperature spark
3	Wear flame retardant gloves, flame retardant welding/cutting overalls, flame retardant shoes, and welding/cutting helmets or protective caps to protect against arcing bright lights, high temperature sparks or hot metal particles. A flame retardant apron is also available to protect against thermal radiation and high temperature sparks.
4	Hot sparks or metal can get into rolled-up sleeves, trouser legs or pockets. Before welding/cutting, sleeves and collars should be buttoned, and clothes with front pockets should not be worn.
5	Use appropriate flame retardant shields or curtains to protect other persons from arc radiation and high temperature sparks.

7	It is forbidden to touch the welding work piece with bare hands to avoid accidental scald and burn.

Fire and explosion precaution

During welding and cutting, high temperature flame and arc will be generated, which will cause fire; high temperature welding slag and sparks will also cause fire and explosion.

1	Protect yourself and others from flying sparks and hot metal
2	Flammable and explosive items are not allowed to be placed in the welding/cutting area. Flammable materials that needed to be used in welding/cutting process must be covered with flame retardant materials.
3	Hot sparks and metal can fly into cracked floors and walls, which need to be protected against fire hazards.
4	Do not weld and cut on sealed high-pressure gas tanks, which may cause explosions.
5	Fire extinguishing equipment, such as fire hose, water bucket, sand bucket or portable fire extinguisher, must be provided in the welding and cutting area. Furthermore, regularly check the effectiveness of these fire extinguishing equipment, and carry out the training on the safe use of these fire extinguishing equipment.
6	After finishing the welding/cutting operation, check whether there is high temperature spark or metal, which might cause fire and timely dispose. If necessary, go to the firefighter for help.

Prevention of Electric Shock Injuries

A person contacting with live electrical components or machine can produce an electric shock, which will cause serious injury to the human body or death. Do not use welding/cutting machines in humid environment where movement is limited or there is a risk of falling.

1	Ensure reliable grounding of the machine to prevent electric shock accident caused by electric leakage.
2	Make sure that the work piece connected to the ground clamp of the machine is reliably grounded.
3	Connect the ground clamp with the work piece reliably, or it might cause electric shock accident.
4	Check the wires and cables frequently, and replace it in time if the insulation layer is damaged.
5	Keep everything dry when welding/cutting, including clothing, working area, cables, flashlights, electrode stand and power supply.
6	Make sure that every part of your body will not contact with the live electrical parts.
7	Never stand directly on metal or the ground when have to work in a narrow or humid environment. Please stand on dry wood or insulating platform, wearing shoes with insulated rubber sole.
8	Please wear dry gloves without holes when turn on the machine power.
9	Please turn off the machine before taking off the gloves.
10	It is forbidden to replace the ground cable of the machine with other wires and cables.
11	There is high voltage inside the machine. Non-professionals are strictly forbidden to open the casing or start the machine for maintenance.

Protective Measures for Electromagnetic Fields

When an electric current flows through a conductor, it generates an electromagnetic field, which can be harmful to the human body.

1	Welders with cardiac pacemakers shall consult a doctor if they are suitable for welding and cutting operations.
2	Human exposed to the electromagnetic field may cause unknown health effects.
3	Welders should minimize electromagnetic field damage through the following methods.
3.1	Wrap the electrodes and the working cable with insulating cloth and secure them with tape if possible.
3.2	Do not wrap wires and cables around arms.
3.3	Do not put cables around your body. Put the cables on one side if possible.
3.4	The clamping position on the work piece, by the working cable, should be as close as possible to the area to be welded or cut.
3.5	The welding/cutting machine and cable shall not be close to the body during operation.

Protection Against Fumes and Gas

Welding and cutting produces a lot of fumes and gas, which is harmful to human health.

1	Keep your head out of the fumes. Do not breathe the fumes.
2	Keep well ventilation in welding/cutting working environment. Do not weld or cut in a confined space and there must be an air exhaust and dust remove system.

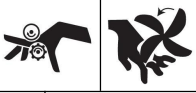
3	Do not weld in locations near degreasing or spraying operations. The heat and arc produced in the operation can react with chlorinated hydrocarbon to form highly toxic and irritating gases, which is harmful to the human body and might cause birth defects, and in some cases, can lead to cancer.
4	If you experience temporary eye, nose, or throat discomfort during welding/cutting operation, it may be caused by inadequate ventilation. Please stop the operation immediately and take measures to improve ventilation in the working area.
5	For specific ventilation requirements of welding and cutting working area, please refer to relevant documents of welder profession.

Gas Cylinder Safety

Cylinders connected to welding/cutting equipment may rupture and leak gas, if not being properly operated. A sudden rupture of a cylinder valve or relief valve can cause injury or even death to human body.

1	The cylinder should be away from high temperature and fire source. Do not use hard objects to scratch on the cylinder body.
2	A suitable gas should be selected and stored in the cylinder during welding and cutting. The pressure reducing valve should be installed on the cylinder according to the cylinder manufacturer's operating instructions. Do not use quick connectors for cylinder gas hose connection and please make sure that the gas hose and fittings is reliably connected, without any leakage.
3	Keep cylinders fixed upright at all times and the cylinder can be chained or belted to a suitable trolley, base, wall, post or shelf. Never fix the cylinder to the work table or machine, to avoid they become part of the circuit.
4	Ensure that the cylinder valve is closed when it is not in use. If there is no hose connected to the cylinder, put a dust cap on the valve port in time.

Moving Parts Safe Protection



Moving parts, such as fans, rotors and belts, can be hazardous.

1	Before welding/cutting, keep all doors, panels, covers closed.
2	Only qualified professionals and technicians can remove the machine casing for maintenance.
3	Make sure that hands, hair, clothing and tools are out of movement range of the moving parts

Package and transportation

1. During packaging, storage and transportation, please pay attention to the placement identification, waterproof identification, bearing identification, layer number identification and other protective identifications on the package.

2. During the transportation and transshipment, it is prohibited to throw the products at will, and strong impact and vibration are prohibited.

3. Equipment should be stored in a rainproof, moisture-proof and well ventilated place, and the ambient temperature of storage should be -25℃~55℃.

Electromagnetic compatibility precautions

The welding machine will produce electromagnetic interference and electromagnetic radiation during welding operation. The influence of electromagnetic interference of arc welding equipment can be reduced to a minimum state by adopting proper installation and application methods. The equipment in this manual belongs to type A equipment, which suits for all occasions except residential areas supplied by public low-voltage power systems. The residential areas supplied by public low-voltage power systems is difficult to ensure the electromagnetic compatibility of the machine, so all type A equipment are not supposed to be used in such environment.

1. Environmental assessment of welding working area

Before installing arc welding equipment, the user must evaluate the potential electromagnetic interference problems in the environment surrounding the working area. The following contents should be included:

1.1. Whether there are power supply cables, control cables, signal cables and telephone lines around the welding equipment.

1.2. Whether there are radio and TV transmitting and receiving equipment around the equipment.

1.3. Whether there are computers and other control equipment around the equipment.

1.4. Whether there are high safety grade equipment, such as industrial protective equipment around the welding machine.

1.5. Whether there are people wearing hearing aids or cardiac pacemakers in the working area.

1.6. Whether there are equipment for calibrating or testing

around welding equipment.

1.7. Whether the equipment in the working area has electromagnetic compatibility with each other, and whether additional isolation measures are required, or whether the operation of the equipment need to be staggered.

1.8. Welding electromagnetic interference or radiation has a certain penetrating power, and it is necessary to consider whether the electromagnetic interference or radiation has exceeded the building area according to the building structure of the working area.

2. Measures to reduce electromagnetic interference of the welding equipment

2.1. Public power supply system

Arc welding equipment shall be connected to the public power supply system in the manner recommended by the manufacturer. If interference occurs, additional precautions should be taken, like access a filter to a public power supply system. For the arc welding equipment need fixed installation, the shielding of its power supply cable should be considered, and metal tubes or other equivalent methods can be used. The shielding method shall not affect electrical continuity. The shield layer shall also be connected to the welding power supply housing to ensure good electrical contact between the public power supply system and the welding equipment.

2.2. Welding machine maintenance

Arc welding equipment shall be regularly maintained as recommended by the manufacturer. All connecting ports, auxiliary side door and cover plate on the equipment should be closed and properly tightened while the welding equipment is running. Any re-modification of the equipment is not allowed, unless corresponding changes and adjustments are described in the manual. In particular, the spark gaps of arc starter and arc-stabilizer should be adjusted and maintained according to the manufacturer's recommendations.

2.3. Welding cable

Welding cables should be as short as possible and close to each other, and also as close as possible to the ground.

2.4. Equipotential bonding

Please be aware of the bonding of all metal objects in the surrounding environment. Metal objects and the work piece connect together will increase the risk of work. The operator might suffer from electric shock when they contact these metal objects and electrodes at the same time. Operators should keep insulated from all these metal objects.

2.5. Grounding of the work piece

Where the workpiece is not bonded to earth for electrical safety reasons or because of its size and position, e.g. ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to others or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by a suitable capacitance, selected according to national regulations.

2.6. Cable shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding/cutting installation may be considered for special applications.

Parameter

Model	TIG-315 AC/DC	TIG-315W AC/DC
Item	**Value**	
Rated input voltage	AC380V±10% 50/60Hz 3PH	
Rated input power	8.9kVA	8.9kVA
Rated input current	13.5A	13.5A
Rated duty cycle	60%	60%
Output current range	30-315A（DC） 50-315A（AC）	30-315A（DC） 50-315A（AC）
Open circuit voltage	45V	45V
Power factor	≥0.85	≥0.85
Efficiency	≥85%	≥85%
Insulation	F	F
IP grade	IP21	IP21
Cooling method	Air	Air
Package dimensions（mm）	750*400*710（Carton） 720*400*800(Wooden)	990*510*1090 (Wooden)
N.W.	39kg	63kg
Model	**TIG-400 AC/DC**	**TIG-400W AC/DC**
Item	**Value**	
Rated input voltage	AC380V±10% 50/60Hz 3PH	
Rated input power	12.5kVA	8.9kVA
Rated input current	18.6A	13.5A
Rated duty cycle	60%	60%
Output current range	30-400A（DC） 70-400A（AC）	30-315A（DC） 70-315A（AC）
Open circuit voltage	65V	45V
Power factor	≥0.85	≥0.85

Efficiency	≥85%	≥85%
Insulation	F	F
IP grade	IP21	IP21
Package dimensions（mm）	740*410*780（Carton） 730*430*860（Wooden）	1030*550*1160 （Wooden）
N.W.	42kg	74kg
Model	**TIG-500 AC/DC**	**TIG-500W AC/DC**
Item	**Value**	
Rated input voltage	AC380V±10% 50/60Hz 3PH	
Rated input power	17.8kVA	17.8kVA
Rated input current	27.0A	27.0A
Rated duty cycle	60%	60%
Output current range	30-500A（DC） 70-450A（AC）	30-500A（DC） 70-450A（AC）
Open circuit voltage	65V	65
Power factor	≥0.85	≥0.85
Efficiency	≥85%	≥85%
Insulation	F	F
IP grade	IP21	IP21
Cooling method	Air	Air
Package dimensions（mm）	740*401*780（Carton） 730*430*860（Wooden）	1030*550*1160 （Wooden）
N.W.	43kg	75kg

Product Description

This series of inverter AC/DC pulse TIG welding machine TIG-315（W) AC/DC invert 50Hz/60Hz power supply into high frequency high voltage power supply (up to 100 KHz or above), through a power device Mosfet, While, TIG-400（W) AC/DC and TIG-500（W) AC/DC, through a high power device IGBT; and then after step-down rectifying and pulse width modulation (PWM) technology, output high power DC supply for welding. Thanks to the advanced inverter technology, the weight and volume of the main transformer are greatly reduced, and the efficiency is increased by 30%, which features stable and reliable quality, lightweight, and energy saving performance, etc..

In addition to the features of the inverter power supply above, it also has good dynamic characteristics, stable arc, good welding quality and is easy to control, etc.. Suitable for welding stainless steel, alloy steel, carbon steel, copper, aluminum, aluminum alloy and other non-ferrous metals; and could be applied to electric power construction, shipbuilding, machinery manufacturing, building construction, indoor and outdoor decoration, hardware products, furniture manufacturing, kitchen equipment and other industries

This series of inverter welding machines have reasonable static characteristics and good dynamic performance and they are manufactured in accordance with IEC60974-1 <Arc Welding Equipment -- Part 1: Welding Power Sources>, Safety Requirements for Arc Welding Equipment.

1. This series of welding machines have following features

1.1. Multi-purpose welder, could achieve various welding process for different kinds of metal materials;

1.2. High power and high duty cycle, ensure long time welding;

1.3. Pulse welding process available with adjustable pulse frequency, achieving high quality welding of thin metal sheets, different materials, different thickness, and double-sided forming process.

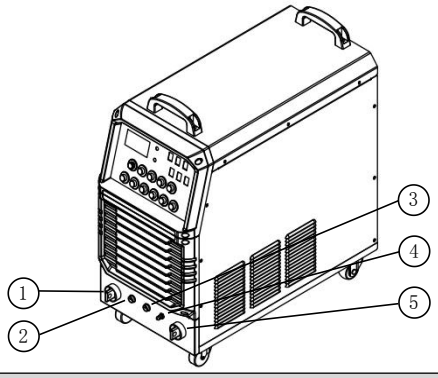
1.4. AC welding function with pure square wave output, achieves good arc stiffness, heat concentration, strong cleaning and welding seam protecting effect, wide clearance range and that the arc is not easy to break under small current, ensuring excellent welding characteristics of the machine.

1.5. Overheat protection improves high reliability of the machine;

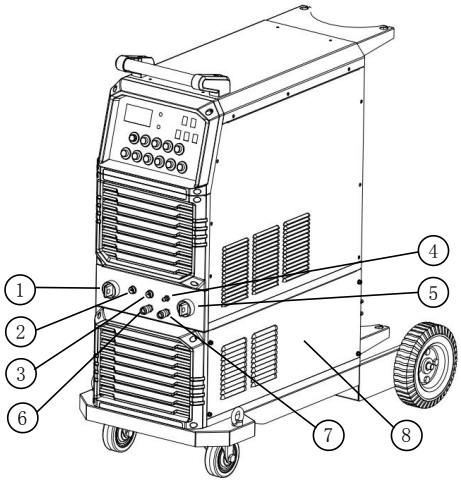
1.6. High successful rate of high frequency arc ignition, stable arc and excellent welding penetration.

2. Appearance:

TIG-315(400/500) AC/DC

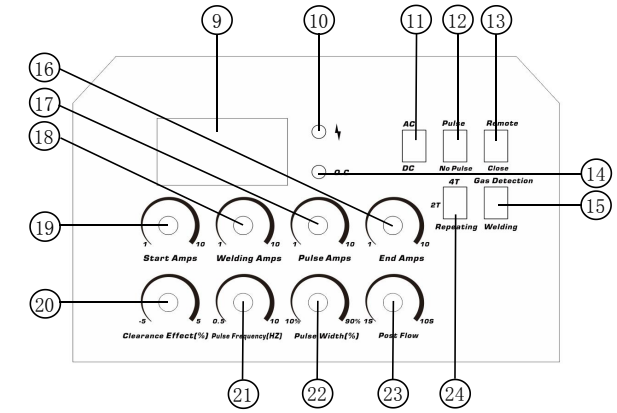


TIG-315(400/500)W AC/DC



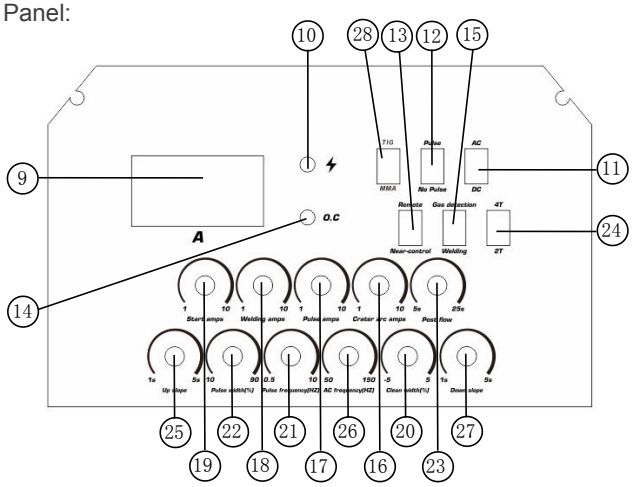
TIG-315(W) AC/DC

Panel:



TIG-400/500(W) AC/DC

Panel:

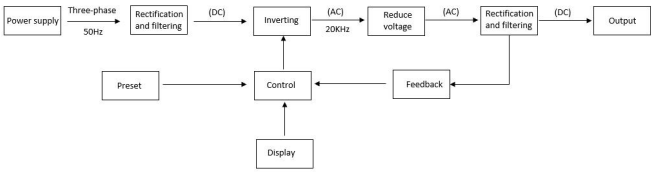


1	Welding cable coupling device (+): connect with the earth clamp, which then will be connected to the work piece.
2	Remote control line socket: connect with remote control box or foot pedal switch control line.
3	TIG welding torch control line socket: connect with TIG welding torch trigger control line.
4	Gas outlet: Argon gas output, connected with air hose of TIG welding torch.
5	Welding cable coupling device (-): connect with TIG welding torch; connect with MMA welding torch when perform MMA welding process.
6	Quick water inlet connector (red): circulation water returning inlet, connect with welding torch water outlet hose.
7	Quick water outlet connector (blue): circulation water outlet, connect with welding torch water inlet hose.
8	Water tank: welding torch cooling circulation tank, consist of water pump, radiator, fan, water circulation system, water storage tank and other components.
9	Digital display: shows parameters and real-time output current value
10	Error indicator light: When the machine functions normally, this light is always off. It will lit (yellow) when abnormal conditions occur.
11	AC/DC switch: switch between AC mode / DC mode
12	Pulse/No pulse switch: press the “Pulse” side, it will be pulsed welding process; and press “No pulse” side, constant current welding.
13	Remote control/Close control switch: press “Remote” side, the machine is controlled by remote control box or foot pedal switch; press “Close” side, panel potentiometer adjustment and control.
14	AC380V power indicator light: this light is always on when the machine functions well
15	Gas detection switch: press “Gas detection” and the gas is directly vented, to check whether the gas circuit works normally; press “Welding” and the gas comes out from the torch.
16	End Amps adjust knob: rotate it to adjust the arc ending current, which means the welding current at which welding is to be stopped; in general, end amps is for filling arc crater.
17	Pulse Amps adjust knob: rotate it to adjust the pulsed ending current; In pulsed welding process, the peak current and base current are formed by welding current adjustment
18	Welding Amps adjust knob: rotate it to adjust the welding ending current; in no pulse mode, it is welding current adjustment, while in pulse mode, the peak current and base current are formed by pulse current adjustment
19	Start Amps adjust knob: rotate it to adjust the arc starting current; which means the welding current at when press torch trigger and turn on the power source, to preheat the work piece in the welding process.
20	Clearance Effect adjust knob: in AC TIG welding, it is used to adjust AC positive and negative half-wave width ratio and use AC negative half-wave to clean the surface oxide film of the work piece. Generally, it is placed in the middle of the scale, if the ball formed in the end of tungsten electrode is not in good condition or the welding brightness is not enough, it can be placed in the position of 1 or 2. The potentiometer does not work in MMA or DC TIG welding.
21	Pulse Frequency adjust knob: rotate to adjust pulse frequency, which refers to, per unit time, number of pulse period change per second.

22	Pulse Width adjust knob: rotate to adjust the pulse width, which is, per unit time, the ratio of the peak current per second during the pulse period. When the pulse width is larger, the welding spot of the welding seam is larger, and vice versa.
23	Post Flow adjust knob: rotate to adjust post flow time, which means the time of continuous air supply after the welding stops and the nozzle of the welding torch should keep to be pointed at the welding seam, to cool the work piece and ensure the welding quality.
24	2T/4T switch: switch between 2T/4Twelding mode
25	Up Slope adjust knob: rotate to adjust up slope time, which indicates the time from arc starting current to welding current.
26	AC Frequency adjust knob: rotate to adjust AC frequency. When in DC TIG welding, the potentiometer does not work. Low AC frequency is suitable for large current, and wide welding seam requirement; When AC frequency is high, the melting speed and strength are obviously strengthened, which is suitable for thin plate, and narrow welding bead.
27	Down Slope adjust knob: rotate to adjust down slope time, which refers to the time from the normal welding current to arc ending current.
28	TIG/MMA switch: switch between TIG/MMA welding process.

Working Principle

1. Welding machine working principle diagram



1.1 Covert the alternating-current input into direct-current output by a bridge rectifier;

1.2 Under the control of PWM, IGBT inverts the above-mentioned direct current into 20KHz alternating-current and transmits power through high-frequency transformer;

1.3 Output the welding current that meets the requirements set after secondary rectification and reactor filtering;

1.4 Protection circuit works in time and provides signal to PWM circuit (overheat, overcurrent);

1.5 The closed-loop control method is adopted to make the welding power source have good anti-grid fluctuation ability and excellent welding performance.

Installation and wiring

1. Requirements for installation location

1.1. The welding machine should not be installed in a location exposed to direct sunlight and rain. Install and keep it in a low humidity environment with little dust, where the ambient air temperature range is of - 10 ℃ ~ 40 ℃.

1.2. The welding machine shall not be placed on an inclined surface, the ground surface shall be flat, and the inclination of the machine shall not exceed 10 °.

1.3. Ensure no wind at the welding position, and suitable precautions should be taken to prevent wind.

1.4. Keep at least 20cm space in front and back of the welding machine body, and at least 10cm space on the left and right sides to ensure good ventilation conditions around the machine.

2. Requirements of power input

The power supply waveform should be standard sin wave, the rated voltage is 380V±10% with 50Hz or 60Hz frequency. Phase unbalance of three-phase voltage ≤ 5%.

Model	**TIG-315（W）AC/DC**	**TIG-400（W）AC/DC**	**TIG-500（W）AC/DC**
Parameter	**Value**		
Power supply:	AC380V±10% 50/60Hz 3PH		
Rated input current:	13.5A	18.6A	27.0A
Input cable:	≥2.5mm^2	≥4mm^2	≥6mm^2
Output cable:	35mm^2	50mm^2	70mm^2
Ground cable:	≥2.5mm^2	≥4mm^2	≥6mm^2

3. Connection of welding machine power supply

Pay attention to prevent electric shock	Wear goggles

Warning: The followings should be aware of when connecting the welding machine to a power supply.

a) The welding machine has high voltage power input, and the connection of power cord must be carried out by qualified electricians and technicians.

b) The connection of power cord must comply with national and local policies and regulations.

c) Before connecting the power supply, the power supply of the electric control box must be disconnected.

d) A ground cable must be connected from the power supply to the work, and the ground cable has a reliable grounding terminal. The yellow green earth

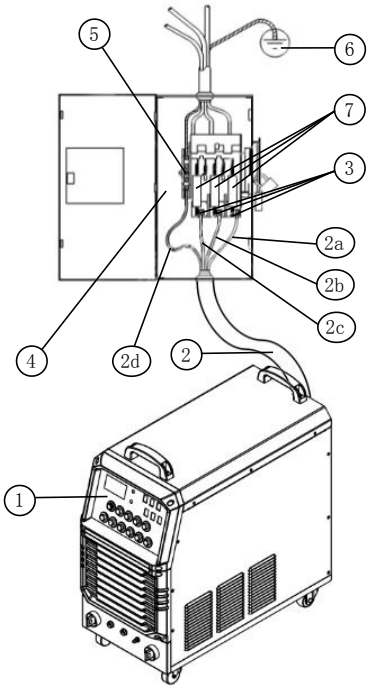
wire of the machine must be reliably connected with the grounding cable.

e) Before connecting the power cords, it is necessary to confirm the parameters of the power supply on the name plate of the machine which allowed to be connected to the machine, and verify the input power supply, which is consistent with the allowable power supply of the machine

f) The thread pressing screws must be pressed tightly, and cannot be loose and fake connection

g) Power supply wiring:

Power supply wiring of three phase AC380V 50/60Hzwelding machine



No.	Item	No.	Item
1	Welding machine	3	Live wire terminal block
2	Power cord	4	Electric control box
2a	Live wire L1	5	Earth wire terminal block
2b	Live wire L2	6	GND
2c	Live wire L3	7	Overcurrent protection device
2d	Earth wire		

Brief instruction for welding operation

1. Welding process:

1.1. Wear necessary and qualified protective equipment, such as helmet, face shield, goggles, earplugs, protective clothing, gloves, insulating shoes, etc.

1.2. Check and confirm that the power supply to be connected to the welding machine is consistent with the power supply allowed.

1.3. Check and confirm that the insulation layer of all wires and cables of the welding machine is not damaged, the welding cable and the grounding cable are connect to the welding machine correctly.

1.4. Check and confirm that the ventilation around the welding machine is freely vented, and no sundries stacking on the machine.

1.5. Make sure that the vent of welding machine is not covered and blocked to prevent failure of cooling system.

1.6. Connect the shielding gas source. The gas supply channel shall include gas cylinders, argon gas pressure reducing valve and air hose. The connection part of the hose should be tightened with a hose clamp or other articles to prevent leakage and prevent air from getting in.

1.7. Connect the welding torch cable connector to the negative pole of welding cable coupling socket on the front panel and tighten them clockwise. The aviation plug, air nozzle plug and water nozzle plug on the welding torch are connected to the corresponding interface of the welding machine panel respectively, and tighten the screws.

1.8. Connect the quick connector of the work piece cable to the positive pole of welding cable coupling socket on the front panel and tighten them clockwise. The earth clamp on the other end, clamps the work piece.

1.9. Connect the power cord to the distribution box with corresponding input voltage level according to the welding machine's; do not connect the wrong voltage, and ensure that the error of the power supply voltage is within the allowable range.

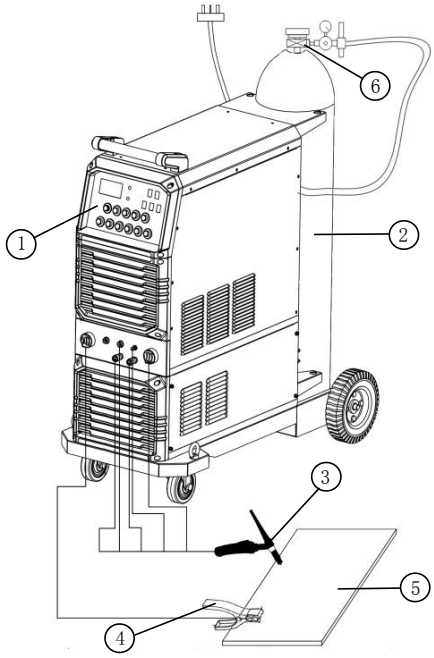
1.10. Turn on the machine with pressing the power switch, work LED is lit, and fan works.

1.11. Set parameters on the control panel according to the requirements and start welding operation.

1.12. Carry out the welding operation according to the normal procedure. During the welding process, the welding parameters can be modified according to the actual situation.

1.13. After welding operation, turn off the machine power switch and turn off the switch of the distribution box.

2. Schematic diagram of welding machine



No.	Item	No.	Item
1	Welding power supply	4	Earth clamp
2	Argon gas cylinder	5	Work piece
3	TIG torch	6	Argon gas meter

3. Tungsten electrode selection advice

Type / Diameter (mm)	Range of current allowed (A)	
	Pure Tungsten	Thorium-Tungsten / Cerium-Tungsten
0.5	5-15	5-15
1.0	10-65	10-65
1.6	55-120	75-150
2.0	85--150	105-170
2.4	120-200	140-220
3.2	220-320	240-340
4.0	320-400	340-420
4.8	400-640	420-660

4、Safety Precautions

This series inverter welding machines have overvoltage, overcurrent and overheat protection circuit, when the power grid voltage, output current and temperature inside the machine exceed the standard set, the welding machine will automatically stop working. However, overusing the machine (such as operating under a voltage that is higher than the allowable range), will result in machine damage. Therefore, please pay attention to the following precaution when using the machine:

4.1. Make sure the working position is well vented

This series inverter welding machine is for industrial use and there is a cooling fan inside the machine, effectively cooling the welder to make it work smoothly. Operators should confirm the vent is not covered or blocked, and the distance between the machine and the surrounding objects should be no less than 0.3 meters. The user should always pay attention to good ventilation, which is essential for the welding machine to work better and ensures a long service life.

4.2. Overuse is prohibited

Users should observe the max. allowable load current (relatively selectable duty cycle) at all times, to keep welding current not exceeding the max. allowable load current. Current overload will significantly shorten the service life of the welding machine, and may even burn up the machine.

4.3. High voltage is prohibited

The input power of the welding machine is shown in the table of technical parameters. Generally, the automatic voltage compensation circuit in the welder will ensure that the welding current is kept in the allowable range, if the supply voltage exceeds the allowable value, the welding machine will be damaged. Please be fully aware of the situation above and take appropriate preventive measures.

4.4. The machine shell must be reliably grounded

Each welding machine has a ground screw attached to the back panel, on where marked with a grounding mark. Before use, select a cable with a cross section larger than 6mm^2 and reliably ground the machine shell, to release static electricity or prevent possible accidents due to leakage of electricity.

4.5. Overload protection

If working time of the welding machine exceeds the rated duty cycle, it will automatically enter the self-protection mode and stop welding, which means that the machine has exceeded the standard duty cycle. Overheating triggers the temperature control switch, causing the welding machine to stop working and the error indicator light on the front panel lights up. In this case, it is not necessary to unplug the power so that the cooling fan can work continuously to cool the welder. When the error indicator light is off and the temperature drops to the standard range, the welding can be resumed.

5. Problems might occur during welding:

The phenomena listed here are mainly related to the use of accessories and tools, gas, environmental factors, power supply, etc. Please try to improve the working environment to avoid such situations.

5.1 Welding spots get black

These phenomena indicate that the welding spots has not been effectively protected and oxidized. The following inspections can be performed:

5.1.1. Make sure the valve of argon gas cylinder is open

and there is enough pressure. Generally, if the pressure in the bottle is lower than 0.5mpa, it is necessary to refill the gas.

5.1.2. Check whether the argon gas flowmeter is on and whether there is sufficient flow rate. To avoid gas waste, choose different flow rate according to different welding current. However, if the flow is too small, it may result in insufficient shielding gas stiffness, which fails to cover the whole welding spots. No matter how small the current is, the flow rate of argon gas should not be lower than 3L/min.

5.1.3. Check whether the gas channel of the welding torch is blocked. The easiest way to check it is putting your hand close to the nozzle of the torch and see if there is gas coming out.

5.1.4. Sometimes welding quality problems might occur when the gas channel is of bad sealing or the gas is not pure enough.

5.1.5. If there is strong air flow in the welding environment, the welding quality may also be affected.

5.2. Hard arc starting and the arc is easy to broke

5.2.1. Confirm the tungsten electrode used is of good quality. The discharge capacity of a poor quality tungsten electrode might fail to meet the requirements.

5.2.2. Tungsten electrodes that have not been sharpen processed are also less likely to perform successful arc starting and cause arc instability.

5.3. Output current fail to meet the rated value

Deviation of the supply voltage from the rated value will cause the output current value to be inconsistent with the set value. When the supply voltage is lower than the rated value, the max. output current of the welder may also be lower than the rated current.

5.4. The current cannot be kept stable during the welding

Check whether the grid voltage has changed; and whether it is subject to serious interference from the power grid or other electrical equipment.

Maintenance

In order to ensure operation safety, please regularly maintain and overhaul the welding machine. Must turn off the power switch of input distribution box before checking the connection terminal blocks inside/outside the machine.

1. Daily precautions：

1.1. Whether there is any abnormal vibrations, sounds or smells?

1.2. Whether there is any sign of overheating in cable connection?

1.3. Whether the fan works smoothly after turning on the power switch?

1.4. Whether the power switch is faulty?

1.5. Whether the cable is correctly connected and properly insulated.

1.6. Whether there is any cable damage?

2. Check lists that should be carried out every 3 ~ 6 months

2.1. Dust remove

Inspection by professional maintenance personnel every 3 to 6 months. Clean all parts inside the welding machine with dry compressed air. After cleaning the inside of the machine, the removed side plate should be reset before using the machine again. Note that if the removed side plate is not reset, the cooling effect of the fan will be invalid, which may lead to the burning of transformer and semiconductor power devices. Meanwhile, pay attention to check whether the fastening screws of input and output connecting cable are loose, whether the contact is tight, and whether the machine shell is grounded or not.

2.2. Inspection of wire and cable

Inspect the wire and cable every time before welding operation to ensure that the insulation layer is not damaged, the wiring is correct, and the joint piece is not loose.

Common machine malfunctions and solutions

Warning：

Machine maintenance must be carried out by qualified professional and technical personnel!

The highest voltage inside the machine can be reach to 600V!!!

For your safety, do not open the machine cover at will. During maintenance, safety protection such as preventing electric shock should be prepared well.

The power supply of the machine must be turned off when installing the wiring and replacing the welding torch accessories

Do not overhaul the machine immediately after the welder has just be turned off. Please wait at least 5 minutes after turning off the power switch of the machine and distribution box, so that the capacitor inside the welding machine can be fully discharged .

1. Inspection before overhaul

1.1. Check whether the line voltage of single-phase power supply is within the range of 340V ~ 420V, and whether there is phase loss phenomenon;

1.2. Check if power cable of the welding machine is correctly and reliably connected;

1.3. Check if earth wire of the welding machine is correctly and reliably connected;

1.4. Check whether the wiring connection is correct and whether the contact is firm and reliable;

2. Common machine problems and troubleshooting

No.	Problem	Root cause	Remedies
1	Auto air switch does not work	Auto air switch damage	Replace auto air switch
		Three phase rectifier bridge damage	Replace three phase rectifier bridge
		Internal short circuit	Check the wiring inside the machine and troubleshoot the short circuit
2	Turn on the machine, the power light is not on. Cooling fan does not work. No welding output	Phase-loss of power supply	Check the power supply and troubleshoot phase-loss problem
		Power switch on the back panel damage	Replace the power switch
		Whether the power grid connected to the output cable has electricity	Check the power grid
3	The power light is lit. Digital display meter and fan works. Error indicator light is off. No high frequency discharge sound when press torch trigger. No no-load output	Whether the torch trigger is in poor contact and the terminal of torch trigger connecting wire is loose	Re-connect the torch trigger and fasten the connecting wire of torch trigger
		The control wire on the welding torch is broken or the torch trigger is damaged	Replace torch trigger
		Control circuit problems	Check control circuit and replace the control board
4	The power light is lit. Digital display meter and fan works. Error indicator light is on.	Booster transformer set breakdown	Replace booster Transformer set
		IGBT damage	Replace IGBT
		Quick recovery rectifier tube damage	Replace quick recovery rectifier tube
		Control circuit problems	Check control circuit and replace the control board
5	The power light is lit. Digital display meter, fan and solenoid valve work. No high frequency discharge sound. Error indicator light is off.	Poor contact of arc ignition coil's primary wire	Fasten the connecting wire
		Oxidation of spark gap assembly or the distance of spark gap is too great	Polish the oxide film formed on the surface of the spark gap or adjust the spark gap at 1mm
		High frequency arc ignition circuit device damage	Figure out and replace the damaged components
		Booster transformer set breakdown	Replace booster Transformer set
		Poor contact of high temperature wire terminal of main transformer	Tighten the terminal blocks
		Control circuit problems	Check control circuit and replace the control board