

THANKS FOR PURCHASING OUR PRODUCT

WT - 315 D

DC INVERTER
AC/DC TIG/PULSE TIG
WELDING MACHINE



Operation Manual

(Read the manual carefully before installation, operation and maintenance)

Safety Depends on You

WEICO arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

SAFETY PRECAUTIONS

⚠ WARNING

PROPOSITION AND WARNINGS

For Diesel Engines: Diesel engine exhaust and some of its constituents are known to the State of California(USA) to cause cancer, birth defects, and other reproductive harm.

For Gasoline Engines: The engine exhaust from this product contains chemicals known to the State of California(USA) to cause cancer, birth defects, or other reproductive harm.

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting " from the Local Welding Society.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.



1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines.

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

- 2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
- 2.d.2. Never coil the electrode lead around your body.
- 2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- 2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
- 2.d.5. Do not work next to welding power source.



ELECTRIC SHOCK can kill.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- . Semiautomatic DC Constant Voltage (Wire) Welder.
- . DC Manual (Stick) Welder.
- . AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.



ARC RAYS can burn.

- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes

and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.

- 5.b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

- 5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

- 5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

- 5.e. Also see item 1.b.



WELDING SPARKS can cause fire or explosion.

- 6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (Standard) and the operating information for the equipment being used.
- 6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.



WELDING SPARKS can cause fire or explosion.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances".

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Don't use this machine to defrost pipes

6.i. Also see item 1.c.



CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:

. Away from areas where they may be struck or subjected to physical damage.

A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Local Association .



FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.



Electromagnetic disturbances may be transmitted through H.F.

Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- 9.a other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- 9.b radio and television transmitters and receivers;
- 9.c computer and other control equipment;
- 9.d safety critical equipment, e.g., guarding of industrial equipment;
- 9.e the health of the people around, e.g., the use of pacemakers and hearing aids;
- 9.f equipment used for calibration or measurement;
- 9.g the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- 9.h the time of day that welding or other activities are to be carried out.

Installation, use and area examination

The user is responsible for the installation and use of the equipment according to the manufacturer's instructions.

If any electromagnetic disturbance is noticed, the user must solve the problem, if necessary with the manufacturer's technical assistance.

In any case electromagnetic disturbances must be reduced until they are not a nuisance any longer.

Before installing this apparatus, the user must evaluate the potential electromagnetic problems that may arise in the surrounding area, considering in particular the health conditions of the persons in the vicinity, for example of persons fitted with pacemakers or hearing aids.

**WARNING****ELECTROMAGNETIC COMPATIBILITY (EMC)****10.a Conformance**

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 50 199(EN60974-10) Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with NTFREE Electric equipment. It is designed for industrial and professional use.

Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes.

Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuit of other equipment.

Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- b) radio and television transmitters and receivers;
- c) computer and other control equipment;
- d) safety critical equipment, e.g., guarding of industrial equipment;
- e) the health of the people around, e.g., the use of pacemakers and hearing aids;
- f) equipment used for calibration or measurement;
- g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- h) the time of day that welding or other activities are to be carried out.

ELECTROMAGNETIC COMPATIBILITY (EMC)

10.b Emission reduction methods	
MAINS POWER SUPPLY	
The welding power source must be connected to the supply mains according to the manufacturer's instructions. In case of interference, it may be necessary to take further precautions like the filtering of the mains power supply. It is also necessary to consider the possibility to shield the power supply cable.	
WELDING POWER SOURCE MAINTENANCE	
The welding power source needs routine maintenance according to the manufacturer's instructions. When the equipment is working, all the access and operating doors and covers must be closed and fixed. The welding power source must not be modified in any way.	
WELDING AND CUTTING CABLES	
The welding cables must be kept as short as possible, positioned near one another and laid at or approximately at ground level.	
EQUIPOTENTIAL CONNECTION	
The earth connection of all the metal component in the welding installation and near it must be taken in consideration. However, the metal component connected to the work-piece will increase the risk of electric shock for the operator, if he touches said metal component and the electrode at the same time. Therefore, the operator must be insulated from all the earthed metal components. The equipotential connection must be made according to the national regulations.	
EARTHING THE WORKPIECE	
When the workpiece is not earthed for electrical safety reasons or due to its size and position, the earthing of the workpiece may reduce the emission. It is important to remember that the earthing of the workpiece should neither increase the risk of accidents for the operators, nor damage other electric equipment. The earthing must be made according to the national regulations.	
SCREENING AND SHIELDING	
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.	
EQUIPOTENTIAL BONDING	
Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by, touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonding metallic components.	

11. RISK ANALYSIS	
Risks posed by the machine	Solutions adopted to prevent them
Risk of wrong installation.	A manual with the instructions for use has been produced for this purpose.
Electrical risks.	Application of the EN 60974-1 Standard.
Risks connected with electromagnetic disturbances produced by the welding power source and induced on the welding power source.	Application of the EN 50199(EN60974-10) Standard.

I. MAIN USAGE AND THE RANGE OF USAGE

WT-315D Welder is triple functional machine used as AC TIG, DC TIG, PULSE TIG Welder. All ferrous metals copper, titanium and stainless steel material can be omnibearing welding in all position. The welding current is stable and stepless adjustable. The welding seam is nice. few spatter and low noise occurs during welding. The welder is small volume, light in weight and easy to move. It is particularly suitable for enterprise of pressure vessel, building, shipping and petrochemical works. It is the priority product to replace the AX series, ZX5 series and NSA series welding machine.

II. MAIN TECHNICAL SPECIFICATIONS

MODEL		WT-315D	
INPUT	Voltage	AC 3x380V 50Hz	
TIG		DC	AC
	Pulse Current Adjusting Range	5A ($\pm 3_0$ A) ~315A	30A~315A
	Welding(base) Current Adjusting Range	5A ($\pm 3_0$ A) ~315A	30A~315A
	Initial current Adjusting Range	5A ($\pm 3_0$ A) ~315A	40A~315A
	crater current Adjusting Range	5A ($\pm 3_0$ A) ~315A	40A~315A
	Rated Duty Cycle	60%	
	Current Up-slope Time	0~10S	
	Current Down-slope Time	0~10S	
	Pluse Width Ratio	0.1~0.9	
	Low Pluse Frequency	0.5~25Hz	
	High Pluse Frequency	10~500Hz	
	Post Flow Time	1~25s	
	Arc starting Mode	high frequency arc striking	
	Crater filler mode	ON/OFF/REPEAT	
	Torch cooled mode	water cooled/gas cooled	
AC mode		strong (60A~315A) or standard(30A ~315A) or soft(60A~315A)	
Efficiency		$\geq 80\%$	
Mass		48kg	
Protection Class of enclosure		IP21S	
Outline Dimensions mm ³		570x305x590	

III. OPERATING CONDITION AND WORK SURROUNDING

1. Operating condition:

Voltage of power source: AC 3x380V $\pm 10\%$

Frequency: 50/60Hz

Reliable grounding protection

2. Work surrounding

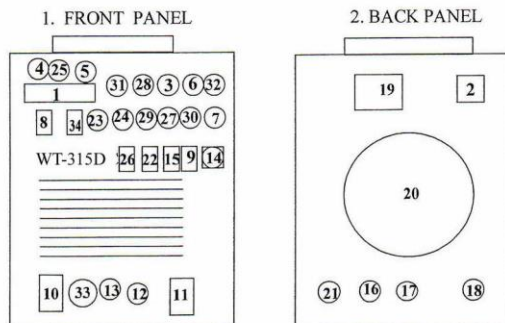
- ①. relative humidity: not more than 90 %(average monthly temperature not more than 20℃)
- ②. ambient temperature:-10℃ ~ 40℃
- ③. The welding site should have no harmful gas, Chemicals, molds and inflammable matter, explosive and corrosive medium, no big vibration and bump to the welder.
- ④. Avoiding rain water. Operating in rain is not allowed.

IV. DESCRIPTION OF THE ERECTION

1. Before welding, the operator should read the operation instructions.

2. Check the welder appearance for deformation and damage.
3. For the safety of the equipment and the persons, the customer must correctly make grounding or protection according to the power supply system: using 4mm² lead to connect the protection grounding of the welder
4. Welding operation should be carried out in dry and good ventilating area. The surrounding objects should be not less than 0.5m away from the welder.
5. Checking the welder output connector for tightness.
6. The welder can not be moved and the cover can not be opened during the power is on and welding operation is carried out.
7. The welder should be cared, used and managed by specialized person.
8. Current of the distribution board: not less than 60A

V. SKETCH THE PANEL FUNCTION



- 1.indication of welding current 2.power switch 3.Welding(base) current regulator 4.indicating light of power
5. over current warning indicating light 6. current down-slope time regulator 7. post flow time regulator

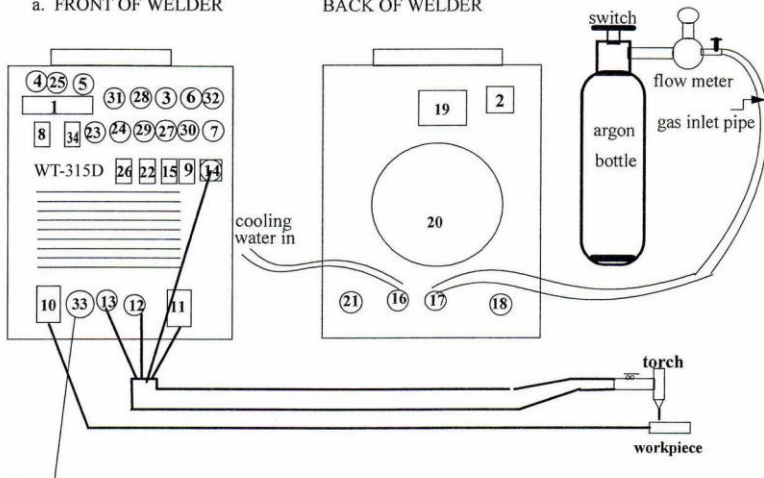
8. AC mode 9. test gas switch 10. output"+" 11. output"-" 12. cooling water outlet 13. argon outlet
 14. Torch control 15. cooling method switch 16. cooling water inlet 17. argon inlet 18. power supply
 19.nameplate 20. fan 21. safety earthing column 22. pulse select switch 23AC freq.24. SP(AC
 BALANCE) 25. indication of ABS.water 26. crater filler mode switch 27. pulse current regulator 28.
 current up-slope time regulator 29. pulse Freq. regulator30. pulse width regulator 31. Initial current
 regulator 32. crater current regulator 33.Remote jack 34.welding mode(AC/DC SWITCH)

VI.METHOD OF THE OPERATION

1. DC ARGON ARC WELDING(DC TIG)

a. FRONT OF WELDER

BACK OF WELDER



Connect with remote control box

1.1 CLEARING BEFORE WELDING

Tungsten argon arc welding is very sensitive to surface contamination of filled metal. Therefore before welding is carried out, grease, paint and coating on the surface, lubricant for machining and oxidized film should be removed.

1.2 DC ARGON ARC WELDING

Put switch "34" (AC/DC SWITCH) onto the position "DC".

- ①. Connecting the gas inlet pipe to inlet "17" of the welding.
- ②. It needs the water cooling when the current is large. (the current not less than 160A).

Connecting the water pipe to cooling water "16", and connecting the water output pipe of the welding torch at the same time.

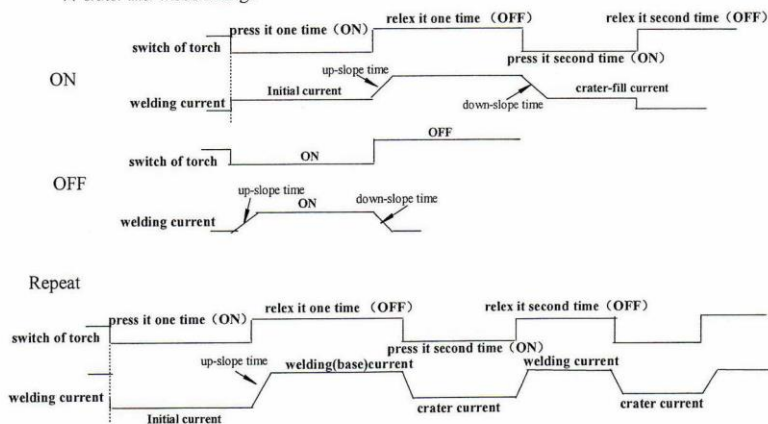
- ③.Connecting gas inlet pipe of the welding torch to argon output of welder "13".
- ④.Putting the aerial plug of the welding torch in the argon arc control socket "14".
- ⑤.Testing gas: get the power of the welder ready and switch on the power "22", open the argon bottle switch and switch on the flow meter, press the torch switch, select suitable argon flow.
- ⑥.Regulating the welding current knob "3"(pulse current regulating to minimum, turning it anti- clockwise to the end) . Selecting suitable welding current according to thickness of the workpiece to be welded.. Selecting suitable current down slope time and after flow time according to the current.

Notice: When the remote jack "33" is connected with ' remote control box'. using ' remote control box 'regulating the base current and crater current. the welding current regulator and crater current regulator in front of welder fail.

⑦. When high frequency arc striking is used, putting arc striking switch "9" on the position of high frequency arc striking. Tungsten electrode end is 2-3mm away from the welding workpiece. Press the torch switch,arc striking will occur,when arc striking is generated by contacting, putting the switch "9" on the position of contacting striking. Pressing the torch switch, tungsten electrode and the workpiece gets contacting and striking arcing occurs.

Notice: During welding, when the" crater filler mode"on "OFF", switch of the torch must be pressed and can not be released.otherwise the arc will be broken.

★ crater filler mode change



Notice 2 : During welding, when the" 26. crater filler mode " is "REPEAT", when switch of the torch can be pressed or can not be pressed,the welding current will be changed.the arc will be broken when you lift the torch .

⑧. Releasing the switch of the torch, welding current will reduce gradually (time is adjustable) and arc extinguishes. The welding torch can not be removed as soon as the arc extinguishing. Let the protection gas cooling down for the welding seam not to be oxidized.

⑨. When the welding operation is finished, turn off argon bottle switch and cut off input power of the welder.

1.3 PULSE ARGON ARC WELDING

①. Selection of welding current and pulse current (current regulation):

To carry out the pulse argon arc welding, the welding current "3" should be lower than pulse current "27" (current regulation). If both the knobs are regulated clockwise, the current will be increased, conversely, it will be decreased.

②. Pulse frequency regulating: when the knob "29" is regulated clockwise, the frequency is high and pulse speed is high; conversely the speed is low. The frequency changes between 0.5-25Hz when the '22. pulse select switch.' is putted on 'low'. The frequency changes between 10-500Hz when the '22. pulse select switch.' is putted on 'high'.

③. Regulation of pulse width ratio; when the knob "30" is regulated clockwise, the width ratio increase, conversely, it decrease. It can be selected between 0.1-0.9.

④. Regulation of up-slope time: when the knob "7" is regulated clockwise, the time increase, conversely, it decrease. It can be selected between 0-10S.

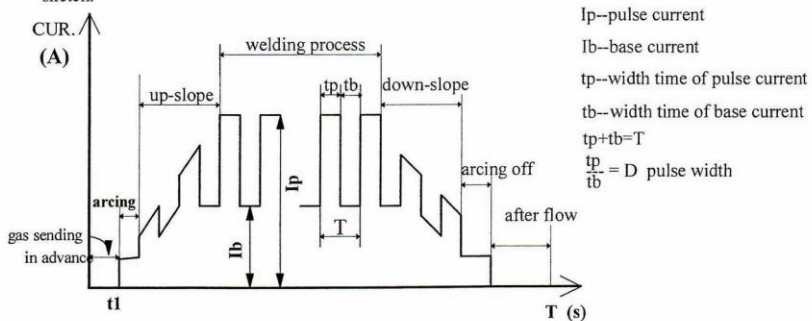
⑤. Regulation of down-slope time: when the knob "6" is regulated clockwise, the time increase, conversely, it decrease. It can be selected between 0-10S.

⑥. Gas connecting and testing, are generating and are blowing off etc. are all the same as DC arc welding.

1.4 PULSE ARGON TUNGSTEN WELDING PROCESS (only for reference)

①. Features and application scope of the process.

The pulse type argon tungsten arc welding is different from the continuous (DC) argon arc welding. The welding current is pulsed. The wave form of the current is shown in the following sketch.



I_p and I_b and their continuous time tp and tb can be regulated according to requirements of the process. The amplitude value of electric current changes periodically with certain

frequency in case of the pulse current, molten base will be formed in the workpiece and the molten bath will be solidified in case of base current. The welding seam is formed by reciprocal overlaps. Welding heat input can be controlled by regulating pulse frequency, pulse current amplitude, size of base current, continuous time of pulse current and base current and therefore the welding seam, size and quality of the zone influenced from heat can be controlled.

②. Advantages and application scope of pulse argon gas tungsten arc welding

a. Precisely control the size of the bath inputting heat to workpiece to increase penetration resistance of molten seam and preservation of bath. It is easy to obtain even fusing deepness. This process is specially applicable to omni-bearing welding of sheet and formation to be done with both sides through one side welding.

b. Heating and cooling of each welding point is very fast. Therefore, the process is applicable for the workpiece with great difference of heat conductivity and thickness.

c. Pulse arc can obtain greater fusing deepness with lower heat input. Therefore under the same condition, the zone influenced from welding heat and deformation from welding can be reduced. This is very important for sheet and ultra-thin sheet welding.

d. Fast cooling of the bath metal and short duration time of high temperature during welding can reduce cracks caused to the thermo-sensitive materials during welding.

③. Selection of welding parameters

Except for pulse current and the width time (width ratio) as well as pulse frequency, welding parameters of pulse argon gas tungsten arc welding are as same as general tungsten DC argon arc welding. Pulse current increasing means electric arc can obtain greater penetration ability. But too much current can cause local melting of tungsten electrode. Generally, welding current required for DC tungsten argon arc welding or greater current is used. Arc holding current and base current influences cooling and crystallizing of the metal in the bath. The range is determined by performance of the welding materials. When sheet is welded, smaller arc holding current (base current) is usually used in order to reduce welding through and deformation. When pulse width ratio (holding time of pulse current and base current) is selected, both the heat input and features of pulse welding should be considered. Usually, it can be selected between 30% - 60%. Selection of pulse frequency (periodical change time of pulse current) mainly depends on thickness of sheet and welding speed and operation custom of the operator should be also considered.

1.5 AC ARGON ARC WELDING

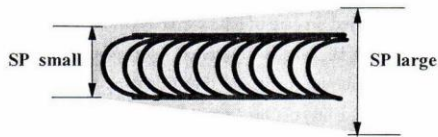
1. put switch "34" (AC/DC SWITCH) onto the position "AC".

2. The method of the connection same as 1.1

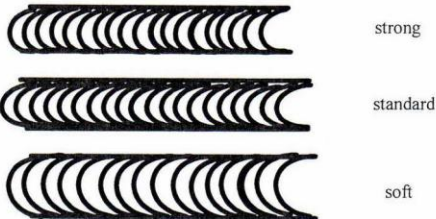
3. Regulating "23" to select right "sp"

$$SP = \frac{tp}{tn} * 100\%$$

tp: the time of I_2 at positive tn: the time of I_n at Negative

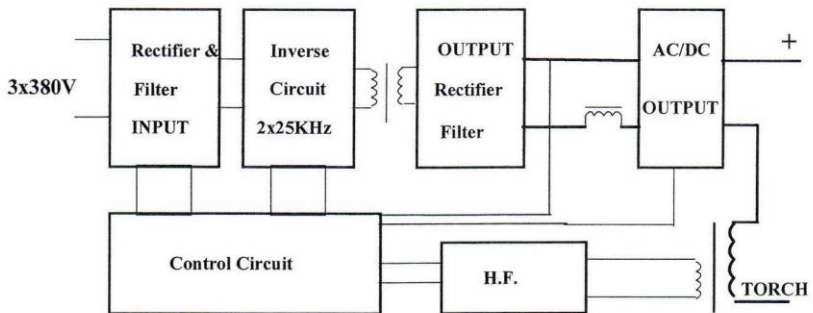


4. Regulating "24" to select right AC square wave frequency.
5. electing suitable welding mode according to thickness of the workpiece to be welded.put switch "8" (AC mode SWITCH) onto the suitable position



5. The Method of the welding same as 1.1

VII.SYSTEMATIC BLOCK DIAGRAM

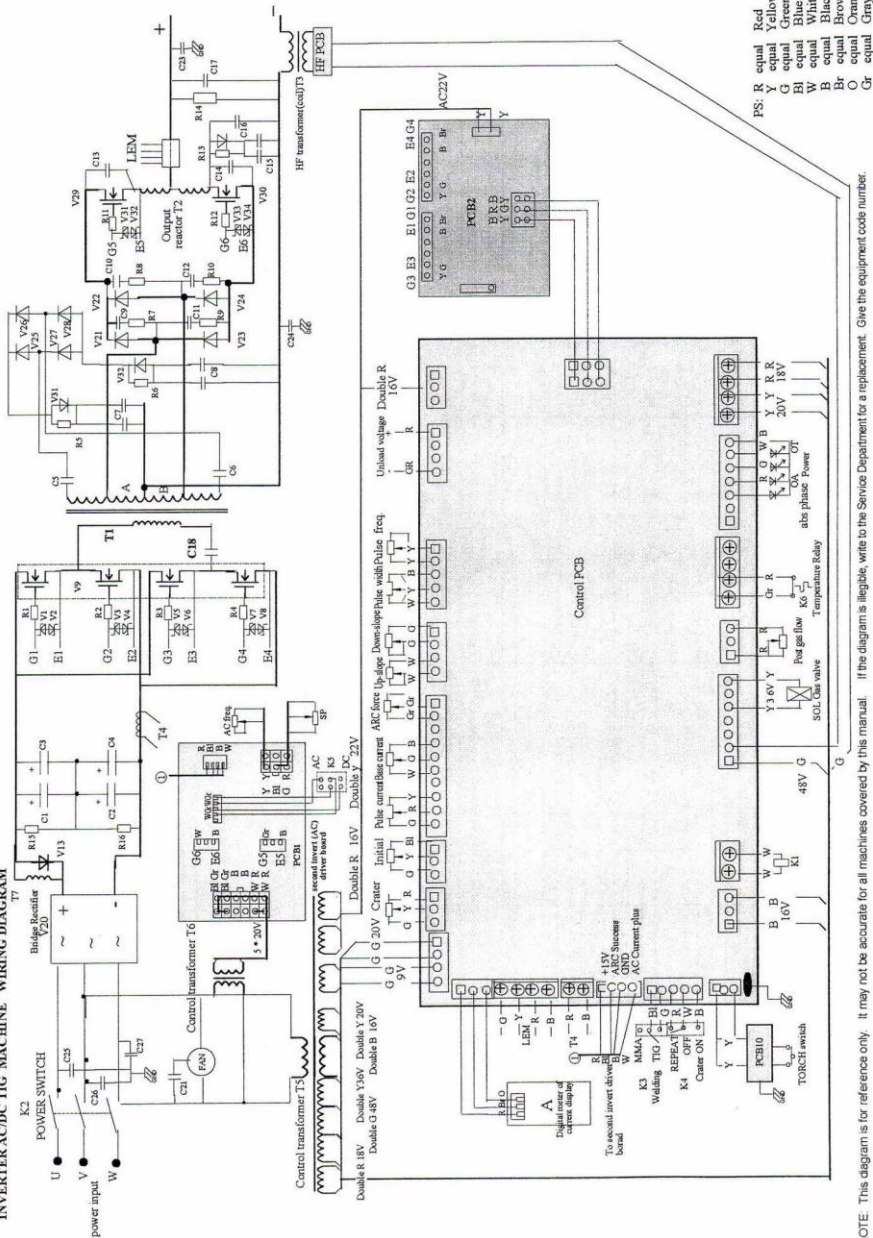


VIII. This product is sold subject to the understanding that if any defect in manufacture or material shall appear within 12 months from date of consumer sale, the manufacturer will arrange for such defect to be rectified without charge on the sales invoice and warranty card . (except for any personal trouble)

General Troubles and Problem Solving:

Trouble	Causes	Problem Solving
Power lamp not light	1.No electricity input 2.Switch of welder fails. 3.incoming line do not connect properly	1.Check incoming line . 2.Replace the switch 3.Check incoming line.
Fan not rotating	1.Fan power line is off. 2.Enclosure blocks the fan due to deformation 3.The fan fails.	1.Reconnect the line 2.Reform the enclosure . 3.Replace the fan
Warning lamp lights	1.Over heat(yellow lamp lights) 2.Over current(red lamp lights) 3. When using water cooled, but without water passing or water is not enough (yellow lamp lights)	1.Welding after cooling. 2.Input voltage too low or the machine fails. 3.Cneck incoming line 4.Enough water passing or using th e air cooling (not more than 160A)
No output of welder	1.Warning lamp lights 2.Over current protection 3.Welder fails	1.Check according to"Warning lam p lights" 2.Over load using 3.Maintenance in manufacturer or service center
Output current decreased	1. Input Voltage is low 2. Input line is too thin	2. Power line is thickened
Current can not be regulated	1.Connecting line of the potentiometer is off 2.Potentiometer for current regulation fails	1.Reconnecting the line 2.Replace potentiometer
High frequency are can not be generated	1.The switch fails 2.Interval of high frequency discharging is too big 3.Distance of the torch and workpiece is too far 4.High frequency arc generator fails	1.Replace torch switch 2.Regulating discharging interval to 0.8-1.0mm 3.Put torch tungsten electrode close to workpiece 4.Replace high frequency arc generator
Arc of argon welding is broken or tungsten electrode is burnt	1.Argon gas flow is not regulated well 2.Tungsten electrode fails 3.Value of current does not match with dia. of tungsten electrode 4.After flow time too short	1.Regulated well 2.Replace or sharpen 3.Select the electrode dia. and current correctly 4.Enlarge the time
Welding torch overheat	1.Not use the water cooling when the current is more than 160A 2.The argon flow is the low current	1.Use water cooling 2.Enlarge the argon flow

INVERTER AC/DC TIG MACHINE WIRING DIAGRAM



INVERTER AC/DC TIG MACHINE COMPONENT LISTS

No	Mark	Description	Code OR Model	QTY	Remark
1	T1	Invert transformer	WT-11SD 20	1	
2	T3	Output reactor	WT-13SD 24	1	
3	T3	HF transformer (coil)	WT-13SD 24	1	
4	T4	Mutual inductance	WT-13SD 24	1	
5	T5	Control transformer	ATX-40025	1	
6	T5	Control transformer	ATX-40025	1	
7	V1,V3,V5,V7,V11,V33	Voltage regulation Diode	IN4748	apiece 1	40V (0.5A)+56V(0.5A)+80V(1.0A)+100V (0.5A)+200V(0.5A)+60V(5A)+60V(5A)
8	V2,V4,V6,V8,V12,V14	Voltage regulation Diode	IN4748	apiece 1	
9	V9	Voltage regulation Diode	IN4748	1	
10	V13	Bridge Rectifier	FA-100R12K-S4	1	
11	V1,V21	Bridge Rectifier	KBR-C3510	1	
12	V1,V22	Bridge Rectifier	MD5660A1600V	apiece 1	
13	V1,V23	Diode Rectifier	DB-2720V08S	apiece 1	
14	V25,V26,V27,V28	Diode Rectifier	DB-2720V08S	apiece 1	
15	V29,V30	second invert IGBT module	BSM400V1A120D258K44000A12BD	apiece 1	
16	R1,R2,R3,R4	Resistance	150Ω 5W	apiece 1	
17	R5,R6	Resistance	200Ω/50W	apiece 1	
18	R7,R8,R9,R10	Resistance	5.0Ω/5W	apiece 1	
19	R11,R12	Resistance	240Ω 5W	apiece 1	
20	R13	Resistance	50Ω/50W	1	
21	R14	Resistance	10Ω/50W	1	
22	C1,C4	Electrolytical Capacitance	560V/450V	apiece 1	
23	C5~C6	Capacitance	224K630V	apiece 1	
24	C7,C8,C15	Capacitance	33V/250V	apiece 1	
25	C9,C10,C11,C12	Capacitance	22V/1600V	apiece 1	
26	C13,C14,C16,C17	Capacitance	0.47μ/250V	apiece 1	
27	C19,C20	Capacitance	33V/158V	apiece 1	
28	C21	Fan startup Capacitance	FRD11010400VAC	1	
29	C22	Start-up capacitor	Digital meter	A suit of	
30	LBM	Light emitting diode	Digital meter	A suit of	
31	K1	Soft start Relay	GPR1120N4PDC12V	1	
32	K2	Power switch	DZ47-D32/2P	1	
33	K3	Welding switch	KCD1-102	1	
34	K4	Center switch	KCD1-102	1	
35	K5	DC/AC switch	KCD1-102	1	
36	K6	Temperature Relay	27UP680V	1	
37	K7	Temperature Relay	22V/250V/60V	1	
38	FAN	Cool Fan	20087V6.2-20V	1	
39	RP1	Down-slope line VR of regulator	WX1-4.3K2	1	Knob DFR02003
40	RP2	Up-slope time VR of regulator	WX1-4.3K2	1	
41	RP3	Base current VR of regulator	WX1-4.3K2	1	Knob DFR02003
42	RP4	Pulse current VR of regulator	WX1-4.3K2	1	
43	RP5	ANC force VR of regulator	WX1-4.22K	1	
44	RP6	Pulse frequency VR of regulator	WH5-50K	1	
45	RP7	Pulse width VR of regulator	WH5-50K	1	
46	RP8	Power supply VR of regulator	WH5-100K	1	
47	RP9	Current current VR of regulator	WX1-4.3K2	1	
48	RP10	Initial current VR of regulator	WX1-4.3K2	1	
49	RP11	AC frequency VR of regulator	WH5-33K	1	
50	RP12	AC SP VR of regulator	WH5-33K	1	
51	1BD1	POWER LED (green)	BT203-1	1	POWER LED
52	1BD2	Warning LED (Double color)	BT203-2	1	WARNING LED
53	PCB	Control board	WS8100-AC	1	
54	PCB1	Driver board	WS8100-DC	1	
55	HF PCB	HF rectifier board	GP-1PH	1	
56	PCB1	second invert (AC) driver board	WSB-160	1	
57	PCB2	driver pcb	NZ-630UD	1	

WARNING	<ul style="list-style-type: none"> Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground. 	<ul style="list-style-type: none"> Keep flammable materials away. 	<ul style="list-style-type: none"> Wear eye, ear and body protection.
Spanish AVISO DE PRECAUCION	<ul style="list-style-type: none"> No toque las partes o los electrodos bajo carga con la piel o ropa mojada. Aíslese del trabajo y de la tierra. 	<ul style="list-style-type: none"> Mantenga el material combustible fuera del área de trabajo. 	<ul style="list-style-type: none"> Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	<ul style="list-style-type: none"> Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. Isolez-vous du travail et de la terre. 	<ul style="list-style-type: none"> Gardez à l'écart de tout matériel inflammable. 	<ul style="list-style-type: none"> Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	<ul style="list-style-type: none"> Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! Isolieren Sie sich von den Elektroden und dem Erdboden! 	<ul style="list-style-type: none"> Entfernen Sie brennbares Material! 	<ul style="list-style-type: none"> Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATENÇÃO	<ul style="list-style-type: none"> Não toque partes elétricas e electrodos com a pele ou roupa molhada. Isolo-se da peça e terra. 	<ul style="list-style-type: none"> Mantenha inflamáveis bem guardados. 	<ul style="list-style-type: none"> Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	<ul style="list-style-type: none"> 通電中の電気部品、又は溶接にヒツやぬれた衣で触れないこと。 施工物やアースから身体が絶縁されている様にして下さい。 	<ul style="list-style-type: none"> 燃えやすいものの側での溶接作業は絶対にしてはなりません。 	<ul style="list-style-type: none"> 目、耳及び身体に保護具をして下さい。
Chinese 警告	<ul style="list-style-type: none"> 带电或通衣物切勿接触带电部件及焊缝。 使你自己接地和工作绝缘。 	<ul style="list-style-type: none"> 把一切易燃物品移离工作场所。 	<ul style="list-style-type: none"> 佩戴眼、耳及身体防护用具。
Korean 위험	<ul style="list-style-type: none"> 전도체나 용접봉을 빙은 환경 또는 피부로 절대 접촉하지 마십시오. 모재와 접지를 접촉하지 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근시키지 마십시오. 	<ul style="list-style-type: none"> 눈, 귀의 등에 보호장구를 착용하십시오.
Arabic تحذير	<ul style="list-style-type: none"> لا تلمس الأجزاء التي يسري فيها التيار الكهربائي أو الإلكترود بجلد الجسم أو بالملابس المبللة بالماء. ضع عزلاً على جسمك خلال العمل. 	<ul style="list-style-type: none"> ضع المواد القابلة للاشتعال في مكان بعيد. 	<ul style="list-style-type: none"> ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
<ul style="list-style-type: none"> ● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone. 	<ul style="list-style-type: none"> ● Turn power off before servicing. 	<ul style="list-style-type: none"> ● Do not operate with panel open or guards off. 	WARNING
<ul style="list-style-type: none"> ● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases. 	<ul style="list-style-type: none"> ● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio. 	<ul style="list-style-type: none"> ● No operar con panel abierto o guardas quitadas. 	Spanish AVISO DE PRECAUCION
<ul style="list-style-type: none"> ● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail. 	<ul style="list-style-type: none"> ● Débranchez le courant avant l'entretien. 	<ul style="list-style-type: none"> ● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés. 	French ATTENTION
<ul style="list-style-type: none"> ● Vermeiden Sie das Einatmen von Schweißrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes! 	<ul style="list-style-type: none"> ● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!) 	<ul style="list-style-type: none"> ● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen! 	German WARNUNG
<ul style="list-style-type: none"> ● Mantenha seu rosto da fumaça. ● Use ventilação e exaustão para remover fumaça da zona respiratória. 	<ul style="list-style-type: none"> ● Não opere com as lampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas. 	<ul style="list-style-type: none"> ● Mantenha-se afastado das partes móveis. ● Não opere com os painéis abertos ou guardas removidas. 	Portuguese ATENÇÃO
<ul style="list-style-type: none"> ● ヒュームから顔を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。 	<ul style="list-style-type: none"> ● メンテナンス・サービスに取リかかる際には、まず電源スイッチを必ず切つて下さい。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外したままで機械操作をしないで下さい。 	Japanese 注意事項
<ul style="list-style-type: none"> ● 呼吸器を使用し換気或排煙設備。 ● 在呼吸器使用通風或排風設備。 	<ul style="list-style-type: none"> ● 維修前切斷電源。 	<ul style="list-style-type: none"> ● 儀表板打開或沒有安全罩時不操作。 	Chinese 警告
<ul style="list-style-type: none"> ● 얼굴로부터 증접가스를 멀리하십시오. ● 호흡지역으로부터 증접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오. 	<ul style="list-style-type: none"> ● 보수전에 전원을 차단하십시오. 	<ul style="list-style-type: none"> ● 패널이 열린 상태로 작동하지 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● أبعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان الخارج لكي تبعد الدخان عن المنطقة التي تنفّس فيها. 	<ul style="list-style-type: none"> ● قطع التيار الكهربائي قبل القيام بأية صيانة. 	<ul style="list-style-type: none"> ● لا تشغيل هذا الجهاز إذا كانت الأغطية الحديدية الواقية ليست عليه. 	Arabic تحذير

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使用機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀擇材料，並請遵守貴方的有關勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بفهم تعليمات المصنع للمنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

PACKING LIST

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

★ ★

WT - 315 D Welding machine	1	
500A Ground pliers	1	
TIG welding torch	1	
gas inlet pipe	1	
Operation instructions	1	
Certificate of quality	1	

Name of product: PULSE TIG WELDING

Type of product: WT - 315 D

Packing No: _____

Test results of this welder fulfils _____

technical requirements and its release

from the works is granted.

Inspector _____ Date _____