

# ***LOTOS TIG200ACDCP***



[www.uwelding.com](http://www.uwelding.com)




# PREFACE

---

This manual includes hardware description and operation introduction of the 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

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.

The images shown here are indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.

# CONTENTS

---









1	SAFETY WARNING.....	1
2	PRODUCTS. ....	6
3	INSTALLATION . ....	8
4	OPERATIOIN.....	10
5	INSTRUCTION NOTES.....	24
6	MAINTENANCE AND CHECK TROUBLE. ....	26
7	Appendix Circuit Diagram.....	30

# SAFETY WARNING

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

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

Different damage would be caused by improper 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 bodily harm.</li> <li>✧ Wrong use of the gas cylinder will lead to high-pressure gas eruption and cause serious bodily harm.</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 may shoot of the end of the torch and penetrate the eyes, mouth, or any other unclothed areas.</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>

**DANGER**

**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 should not get close to the welding machine or area without doctor's permission. The magnetism created by energizing the welding machine can have a negative effect to the pacemaker.
- Installation, operation, and maintenance of the equipment should be handled by professional or experienced users.
- Understanding the contents of the user manual for safety.

**DANGER**

**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 a fire net when working in an elevated position.
- Check and maintain the machine regularly, do not use until the damage parts are fixed or replaced properly.
- 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.**

- Keep combustibles out of the 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.

## California Proposition 65 Warnings



Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California

Health & Safety Code Section 25249.5 et seq.)



Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive

harm. Wash hands after handling.



### **For Gasoline Engines:**

Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.



### **For Diesel Engines:**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other

reproductive harm.

---

**PLEASE READ THIS OPERATION MANUAL CAREFULLY AND THOROUGHLY BEFORE ATTEMPTING TO OPERATE THIS MACHINE. KEEP THIS MANUAL HANDY FOR QUICK REFERENCE. PAY CLOSE ATTENTION TO THE SAFETY INSTRUCTIONS PROVIDED FOR YOUR OWN PROTECTION.**

---



## 2.1 Introduction

**Congratulations on your purchase. Please take a few moments to completely read through this manual. Doing so will make your welding experience much more pleasant and understandable. And remember, should you need, seek or desire further understanding of welding principals and practices, the internet is your friend! Take advantage of today's information highway. The internet holds a wealth of information and knowledge. Enjoy!**

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

The development of inverter gas-shielded welding equipment profits from the development of the inverter power supply theory and components. Inverter gas-shielded welding power source utilizes high-power component IGBT to transfer 50/60HZ frequency up to 50KHZ, 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.

AC/DC series welding machine are the AC/DC two-way machines, which are developed by our company newly. Its biggest characteristics is that DC function can be used to weld stainless steel, alloyed steel, carbon steel, copper and other color metals and AC function can be used to weld aluminum and aluminum alloy materials, such as welding of scooters, bicycles.

AC/DC series machine adopts our company's exclusive HF inverter technology. Compared with traditional machine, it is compact in volume, light in weight, effective in transfer, power-saving; compared with imported machine, it is low in price, strong in power net adaptability. What's more, it adopts twice inverter technology, has characteristics of pure square wave output, good arc force, wide cleaning range and continuous arc with small current, which guarantee excellent welding result.

AC/DC series are also with pedal current adjustment device . With that welder can free their hands to adjust current by foot; And at the beginning of welding and at the moment of adding wire, it can increase current to heat quickly; At the end of welding it can decrease current that is good for welding lines shape. With the help of pedal it can improve welding efficiency, reduce welding difficulty and guarantee welding quality.

Thanks for purchasing our company product and hope for your precious advice. We will dedicate to produce the best products and offer the best service.

## 2.2 Technical data

model parameters	TIG200ACDCP		
Power voltage (V)	AC240V $\pm 15\%$		AC120V $\pm 15\%$
Frequency (HZ)	50/60		
Rated input current (A)	TIG 25.7	TIG 25.3	
	MMA 34.9	MMA 42.5	
Rated output voltage (V)	TIG (DC)	10.2-18	10.2-14.8
	TIG (AC)	10.4-18	10.4-14.8
	MMA	20.8-27.2	20.8-24.8
Rated output current (A)	TIG (DC)	5-200	5-120
	TIG (AC)	10-200	10-120
	MMA	20-180	20-120
No-load voltage (V)	67		
Arcing way	HF		
Pre-flow (S)	0.1-1		
Current descending time (S)	0-25		
Post flow time (S)	0-15		
Duty cycle (%)	40		
No-load loss (W)	40		
Efficiency (%)	80		
Power factor	0.73		
Insulation grade	F		
Housing protection grade	IP21		
weight (lb)	30.9		
Dimensions (inch)	17.1 $\times$ 7.9 $\times$ 15.9		

# INSTALLATION

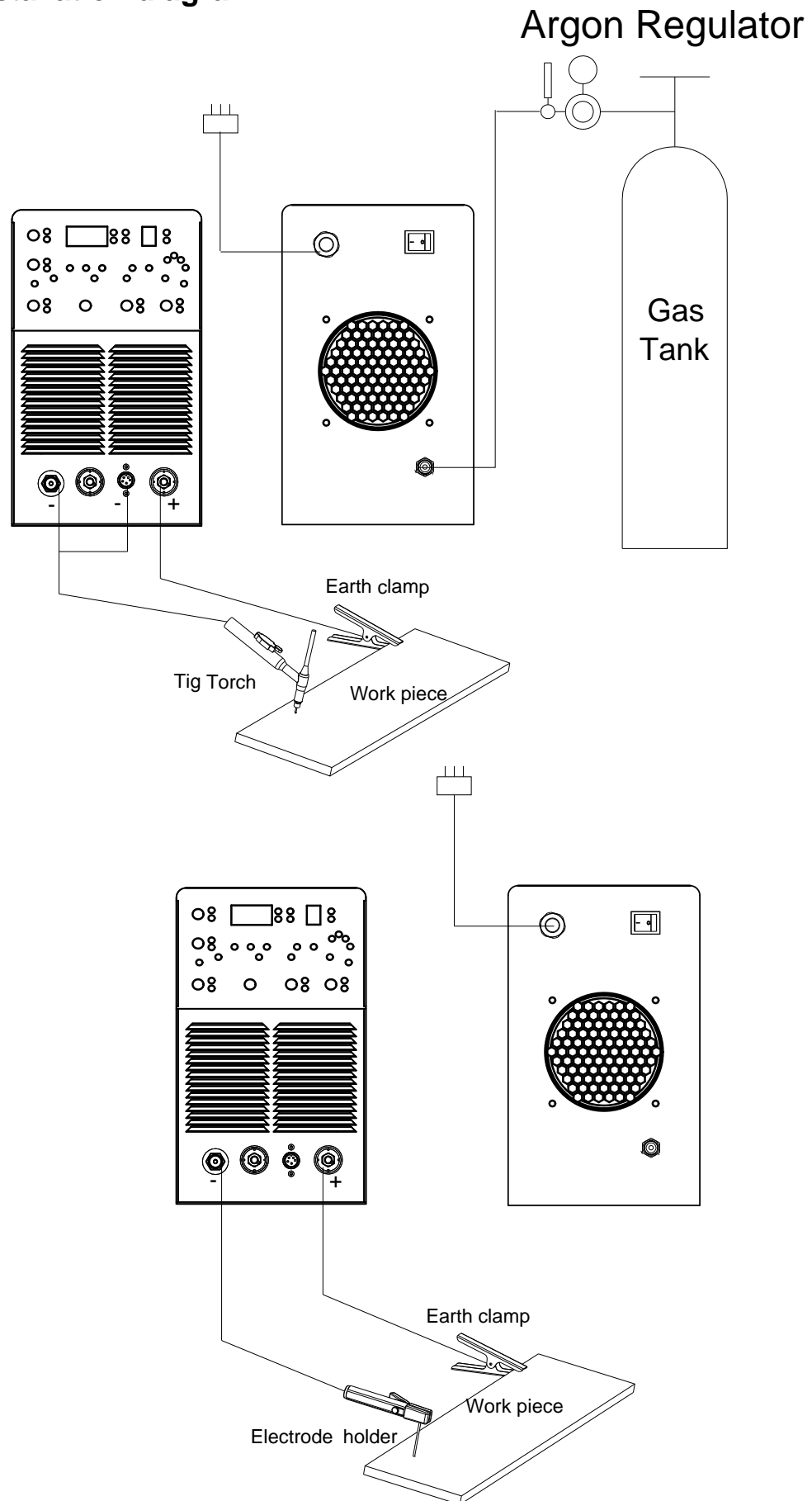
---

The welder is fitted with power voltage compensation device. When power voltage changes with in a range of  $\pm 15\%$  of rated voltage, it can go on with the operation.

If a longer cable wire is used, , we suggest using cable with greater cross section in order to reduce line loss voltage; if a connecting cable is too long, it may exert a great effect upon the arc starting of the welder and other performance of the system, such as weakened high-frequency arc starting or failure of the system to work regularly. So we suggest that you use recommended configuration length.

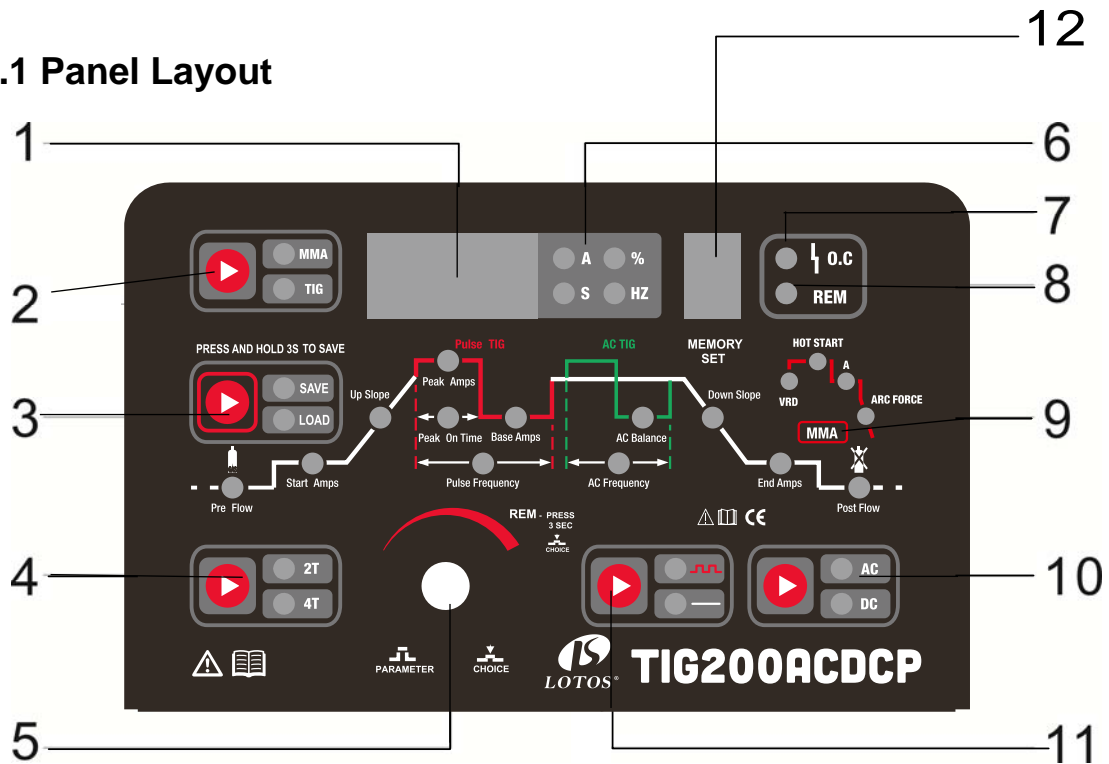
- 1、 Make sure that the vent of the welder is not covered or plugged to avoid failure of the cooling system.
- 2、 Protective gas source should be connected well. Gas supply passage should include gas cylinder, argon decompression flow-meter and gas pipe. The connecting portion of the gas pipe should be tied up with a hose clamp or other objects to prevent leakage and air intake.
- 3、 The shell should be grounded reliably with a conducting wire with a sectional area not less than  $6\text{mm}^2$ .
- 4、 The quick plug of the loop cable is inserted into the quick socket of welder surface plate with the polarity of “+” and tightened clockwise. The ground wire pliers at the other end hold up the work piece.
- 5、 When the pedal switch is used to contro l, Connect the 2-core aviation plug and 3-core aviation plug of the pedal switch with the 2-core aviation socket and 3-core aviation socket.
- 6、 Based on the input voltage class of the welder, the power line should be connected to the distribution box of corresponding voltage class and non-corresponding connection should never occur . Make sure that error in power voltage is within a permissible range.
- 7、 Manual welding correctly as shown in the figure. Connect the copper nut from the other end of the welder with the gas electric integration from the front panel, and tightened clockwise firmly.

- **Installation diagram**



# OPERATION

## 4.1 Panel Layout



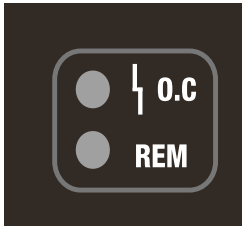
1	Digital Display Meter	7	Abnormal Indicator Light
2	STICK/TIG Selector Button	8	Remote Control Indicator Light
3	SAVE/LOAD Selector Button	9	MMA Parameter Setting
4	2T/4T Selector Button	10	AC/DC Selector Button
5	Parameter Adjustment and Selection Knob	11	Pulse /No pulse Button
6	Unit of Parameter Indicator Light	12	Store Display

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

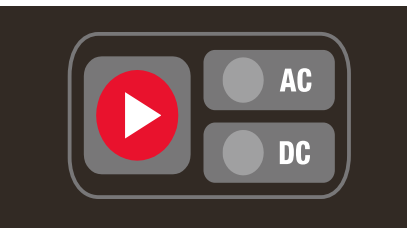
## 4.2 Operation interface specification



This is Display and Unit of Parameter Indicator Light. When the temperature is too high or abnormal the digital display will show "Err", and the abnormal light (O.C) lights up, there will be no output under this situation, will have to wait until the temperature reducing or restart the machine to return to normal.



Press the knob keep 3s, "REM" light is on, it means it has entered "Remote Control Mode". In this mode, the current can be adjusted by the foot pedal.



This is the AC/DC mode select button.

AC--The output ac, AC mode can be used when welding aluminium and aluminium alloys. DC--The output dc, DC mode can be used when welding iron and carbon steel.



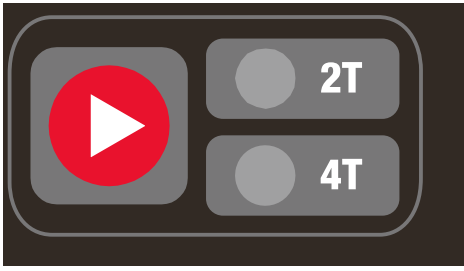
This is the Pulse /No pulse mode select button,



--It means pulse mode



--It means no pulse mode

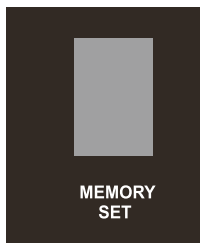


This is the 2T/4T mode select button.

2T is a normal state. When welding, you need to hold down the switch. When not welding, you can directly loosen it. 4T is a semi-automatic state, the operation form is to press the gun switch once, loosen, belongs to the open working state, can always welding, do not need to hold down the switch. After welding, click the gun switch again, stop working. 2T is generally used for short seam welding and spot welding, 4T is suitable for long seam welding, do not have to hold down the welding gun switch, reduce finger fatigue.

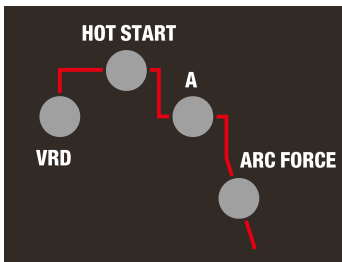


This is SAVE/LOAD mode select button. Save button will save the parameter; and load button will load the recent saved parameter.



This is a digital display table that displays stored Numbers.

Press the button keep 3s, "Save" lamp is shine, the digital display shows "0". To turn the knob5 can make the digital display to show from "0" to "9". It means that can store 10 sets parameters memory. Again press the button, "Save" lamp is off, it means that the parameters are stored successfully. Press the button, (SAVE/LOAD mode select button). "Load" lamp is shine, the digital display shows "0". To turn the knob can make the digital display to show from "0" to "9". It means that can load 10 sets parameters memory. Again press the right Menu button, "Load" lamp is off, it means that the parameters are loaded successfully



This is MMA parameter light

MMA current range is 20-180A.

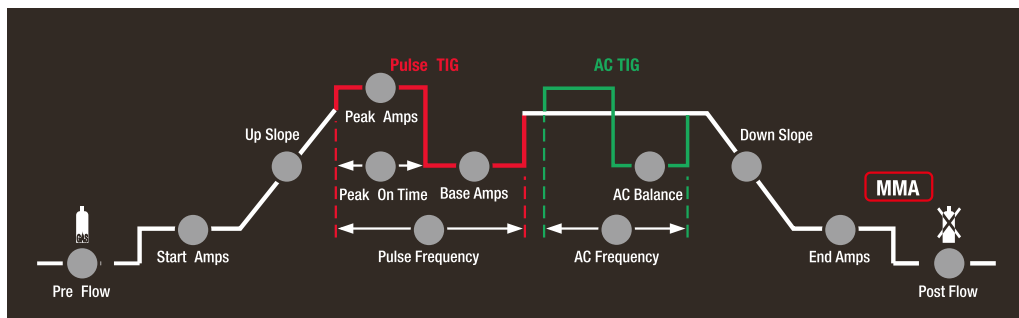
HOT START display shows from OFF-10, the actual corresponding current is 0-50A.

ARC FORCE display shows from OFF-10, the actual corresponding current is 0-100A.

VRD voltage is 13-23V. to turn VRD on and off, adjust the MMA current to 108, then press and hold the 2T/4T button for 5s.



This is MMA/TIG mode select button



This is TIG parameter light pre flow

0.1-1s

start amps 5-200A

up slope 0-15s

Peak amps 5-200A

peak on time 10-90%

pulse frequency 0.5-200HZ

base amps 5-95%

AC frequency 40-200HZ

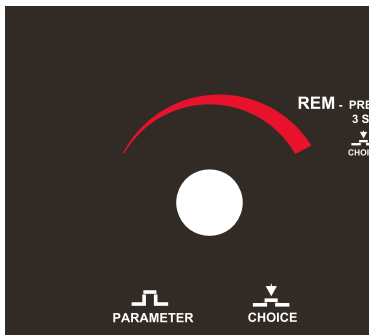
AC balance 30-70%

down slope 0-25S

end amps 5-200A

post flow 0-15S



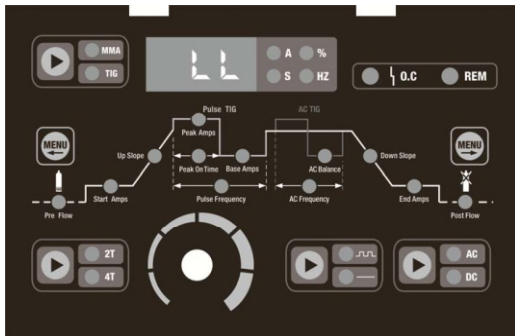


This is parameter regulating and selection knob.

Rotate the knob to adjust the parameter.

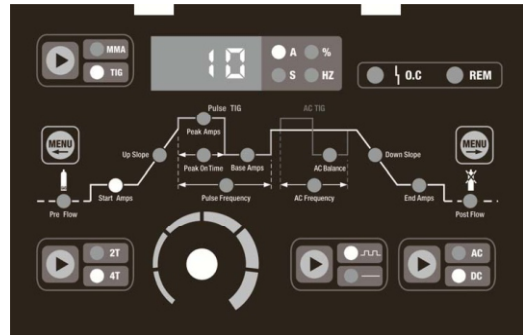
Press the knob to select the parameter.

## Operation interface specification



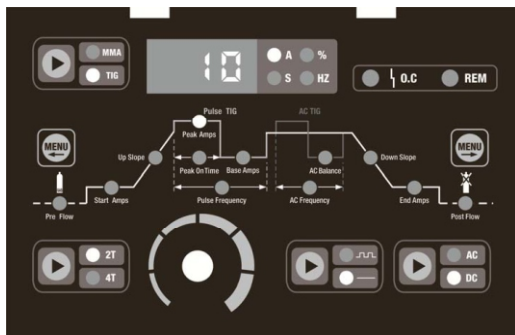
Picture 2

The picture 2 shows the digital display meter reads “LL” when the machine starts working.



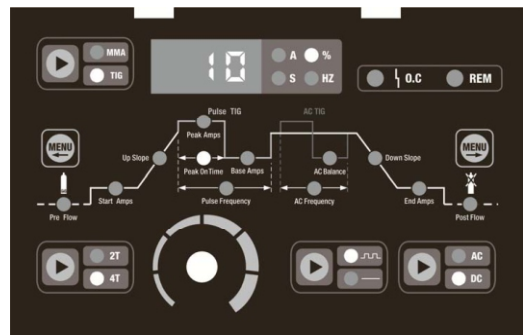
Picture 5

The picture 5 shows press knob the Start Amps indicator light on, rotate the parameter knob, the meter reads 5-200A adjustable.



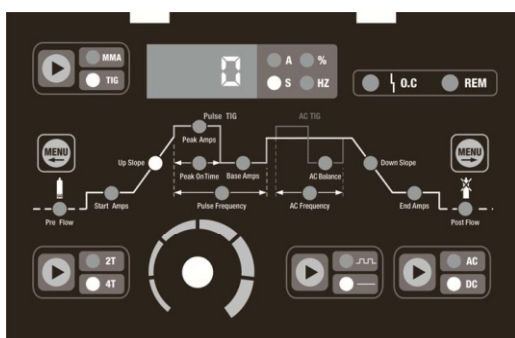
Picture 3

The picture 3 shows when under TIG mode, the Peak Amps indicator light on, adjust the parameter knob, meter reads 5-200A adjustable, press knob to choose other parameter settings.



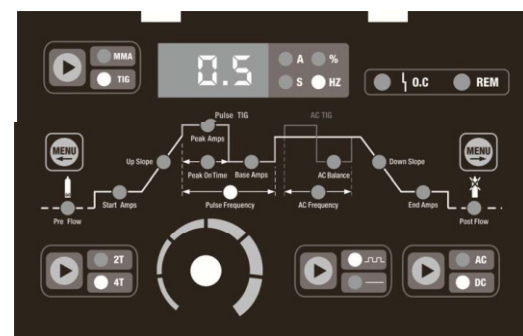
Picture 6

The picture 6 shows when under pulse mode, press the knob to Peak On Time indicator light on, rotate the parameter knob, the meter reads 10-90% adjustable.



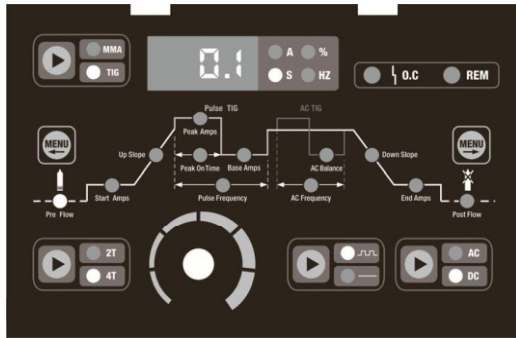
Picture 4

The picture 4 shows when under 4T mode, press the knob to Up Slope indicator light on, rotate the parameter knob, the meter reads 0-15s adjustable.



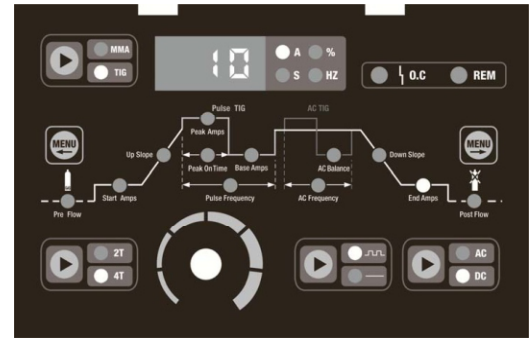
Picture 7

The picture 7 shows press the knob to Pulse Frequency indicator light on, rotate the parameter knob, the meter reads 0.5-200 HZ adjustable.



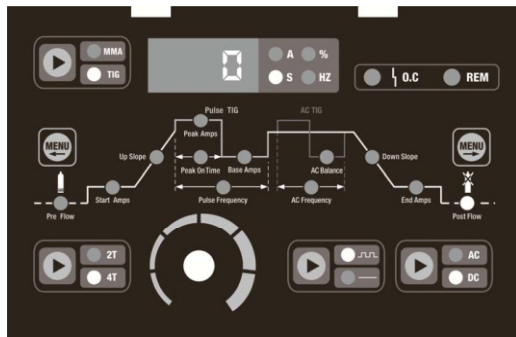
**Picture 8**

The picture 8 shows press the knob to Pre flow indicator light on, rotate the parameter knob, the meter reads 0.1-1S adjustable.



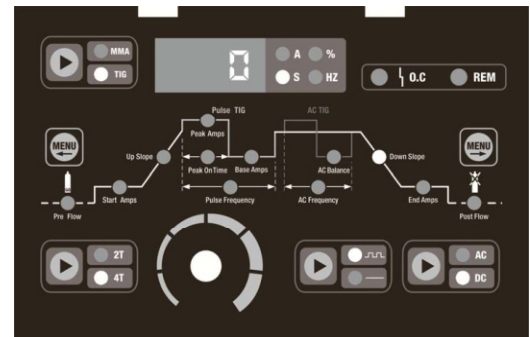
**Picture 11**

The picture 11 shows press the knob to End Amps indicator light on, rotate the parameter knob, the meter reads 5-200A adjustable.



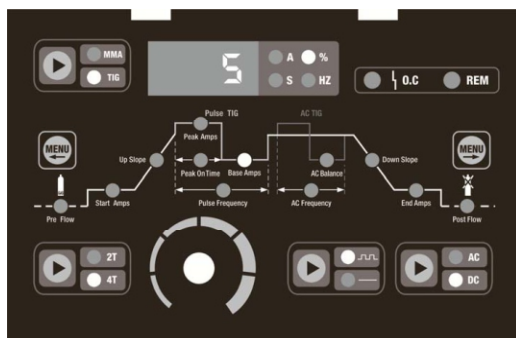
**Picture 9**

The picture 9 shows press the knob to Post flow indicator light on, rotate the parameter knob, the meter reads 0-15S adjustable.



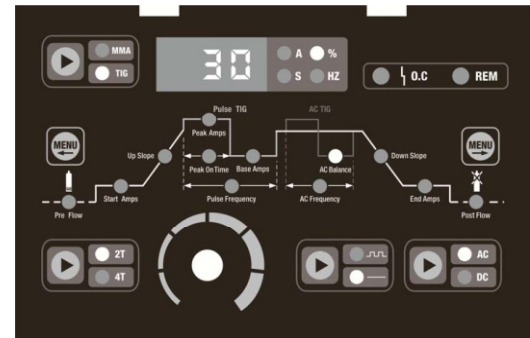
**Picture 12**

The picture 12 shows press the knob to Down Slope indicator light on, rotate the parameter knob, the meter reads 0-25S adjustable.



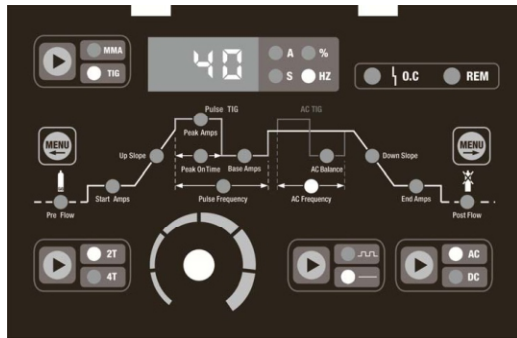
**Picture 10**

The picture 10 press the knob to Base Amps indicator light on, rotate the parameter knob, the meter reads 5-95% adjustable.



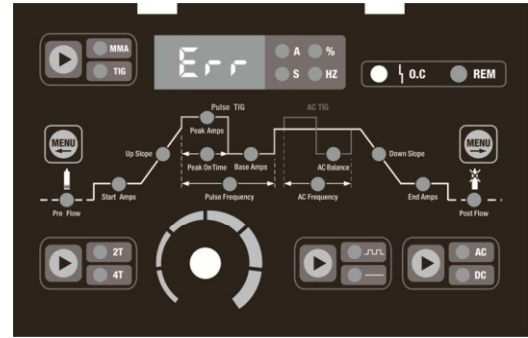
**Picture 13**

The picture 13 shows when choose under AC mode, press the knob to AC balance indicator light on, rotate the parameter knob, the meter reads 30-70% adjustable.



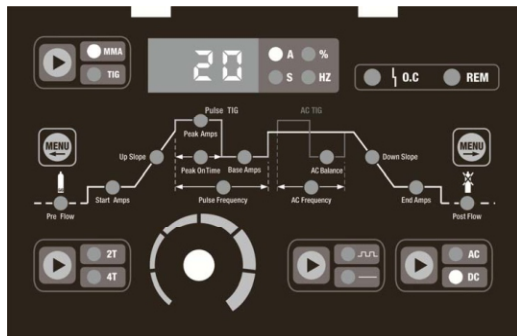
**Picture 14**

The picture 14 shows when under AC mode, press the knob to AC Frequency indicator light on, rotate the parameter knob, the meter reads 40-200HZ adjustable.



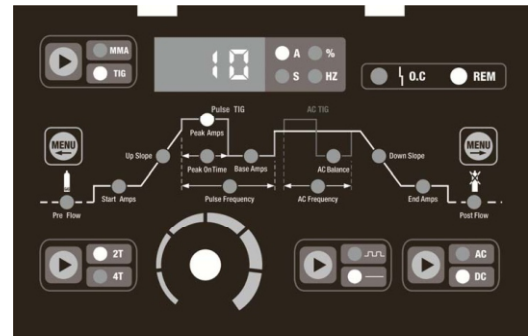
**Picture 16**

The picture 16 shows when the temperature is too high or abnormal the digital display show "Err", abnormal light O.C lights up, this time no output, you will have to wait until the temperature reduce or restart the machine to return to normal.



**Picture 15**

The picture 15 shows when choose under MMA mode, adjust the parameter knob, the meter reads 20-180A adjustable, only AC/DC mode can be selected, other buttons can't be used.



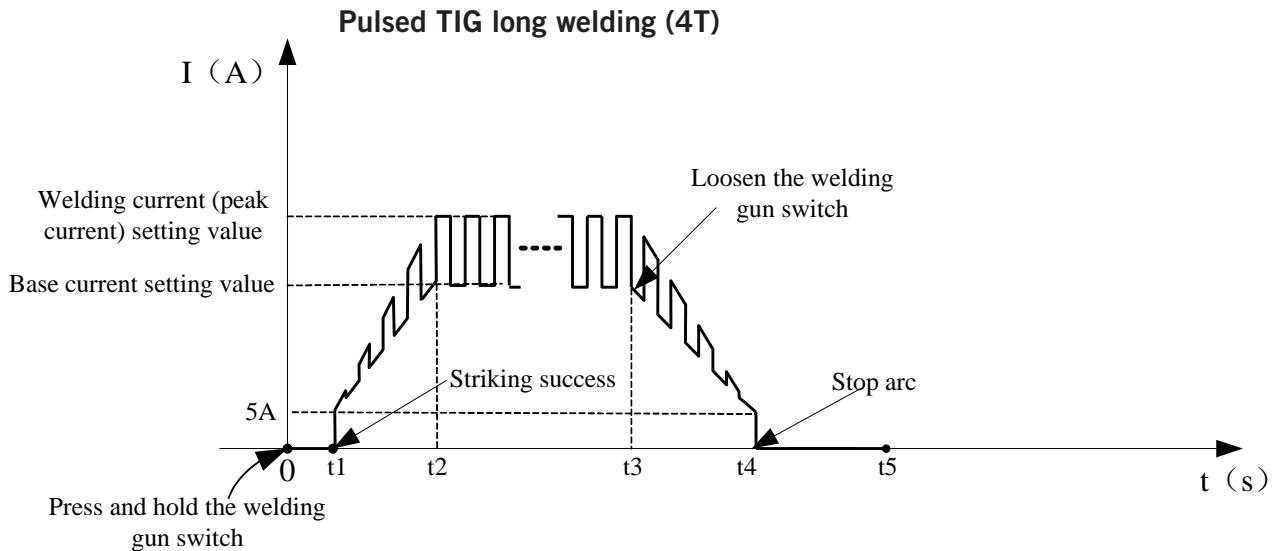
**Picture 17**

The picture 17 shows In TIG mode, when connecting the foot pedal to the machine, the REM indicator is on, the machine is converted to REM mode automatically. At this time: Start Amps, Peak Amps, End Amps these three current parameters are controlled by the foot pedal, other parameters are controlled by the knob on the front panel.

## 4.3 Argon Arc Welding Operation

### 4.3.1 TIG welding (4T operation)

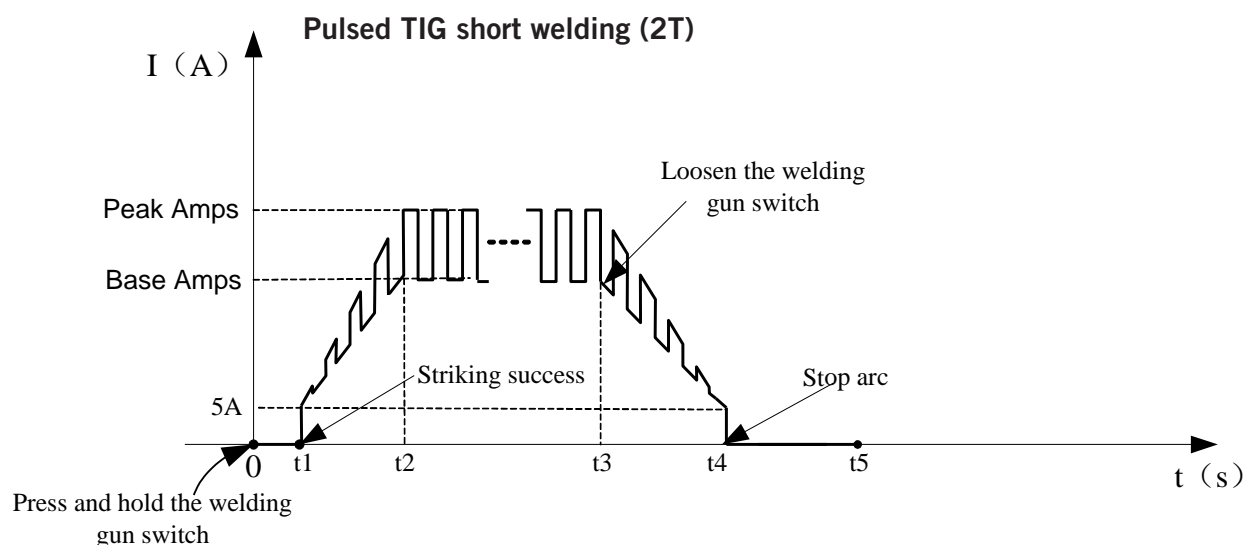
The start current and crater current can be pre-set. This function can compensate the possible crater that appears at the beginning and end of welding. Thus, 4T is suitable for the welding of medium thickness plates.



#### Introduction

- 0 Press and hold the gun switch – Electromagnetic gas valve is turned on. The shielding gas starts to flow
- 0~ $t_1$  Pre flow time – adjustment range of pre flow time: 0~2S
- $t_1$  Striking success – adjustment range of start current: 5~100% of main current
- $t_2$  Loosen the gun switch – the output current slopes up from start current. If the output pulse function is turned on, the output current is pulsed
- $t_2$ ~ $t_3$  Output current slopes up to the setting current value – adjustment range of up slope time 0~10S
- $t_3$ ~ $t_4$  Welding process – during this period the gun switch is loosened  
Note: If the output pulse function is turned on, the output current is pulsed.  
If the output pulse function is turned off, the output current is the welding current ( $I_w$ )
- $t_4$  Repress the gun switch – the output current slopes down to crater current. If the output pulse function is turned on, the slope down current is pulsed
- $t_4$ ~ $t_5$  Down slope time – adjustment range of down slope time: 0~10S
- $t_5$ ~ $t_6$  Crater current holds time – adjustment range of crater current: 5~100% of main current
- $t_6$  Loosen the gun switch – stop arc and keep the argon flowing
- $t_6$ ~ $t_7$  Post flow time – adjustment range of post flow time: 0~10S
- $t_7$  Electromagnetic valve is closed and stop argon flowing – welding is complete

### 4.3.2 TIG welding (2T operation)

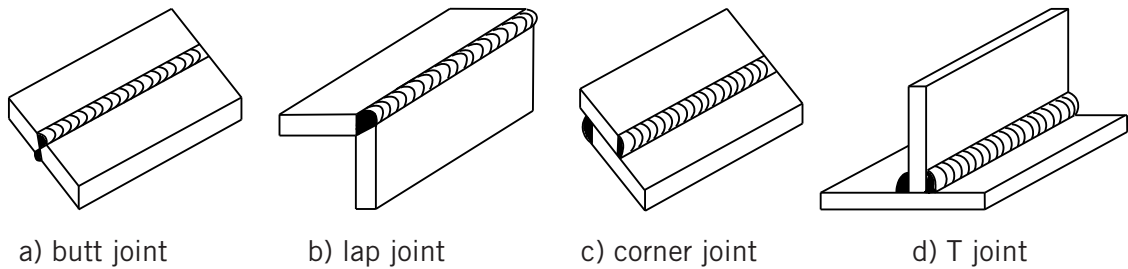


#### Introduction

- 0 Press and hold the gun switch – electromagnetic gas valve is turned on. The shielding gas starts to flow
- 0~t1 Pre flow time – adjustment range of pre flow time: 0.1~1S
- t1~t2 Striking success – the output current slopes up to the setting current from minimum current (5A). If the output pulse function is turned on, the slope up current is pulsed
- t2~t3 During the whole welding process, the gun switch is pressed and held without releasing  
Note: If the output pulse function is turned on, the output current is pulsed.  
If the output pulse function is turned off, the output current is DC
- t3 Loosen the gun switch – the output current slopes down. If the output pulse function is turned on, the slope down current is pulsed
- t3~t4 The output current slopes down to minimum current (5A) – stop arc.  
Adjustment range of down slope time: 0~25S
- t4~t5 Post flow time – adjustment range of post flow time: 0~15S
- t5 Electromagnetic valve is closed – argon stops flowing and welding is complete

## 4.4 Welding Parameters

### 4.4.1 Joint forms in TIG/MMA



a) butt joint

b) lap joint

c) corner joint

d) T joint

### 4.4.2 Explanation of welding quality

The relation of welding area color & protect effect of stainless steel

Welding area color	argent , golden	blue	red-grey	grey	black
Protect effect	best	better	good	bad	worst

## 4.5 Parameters Matching

The corresponding relationship between gas nozzle diameter and electrode diameter

Gas nozzle diameter/mm	Electrode diameter/mm
6.4	0.5
8	1.0
9.5	1.6 or 2.4
11.1	3.2
Notice: the above parameters originate from 《Welding Dictionary》 P142, Volume 1 of Edition 2.	

Welding current range/A	DC positive connection	
	Gas nozzle diameter/mm	Gas flow rate/L • min <sup>-1</sup>
10~100	4~9.5	4~5
101~150	4~9.5	4~7
151~200	6~13	6~8
201~300	8~13	8~9

tungsten electrode diameter /mm	sharpened of the electrode diameter/mm	angle of cone ( ° )	background current/A
1.0	0.125	12	2~15
1.0	0.25	20	5~30
1.6	0.5	25	8~50
1.6	0.8	30	10~70
2.4	0.8	35	12~90
2.4	1.1	45	15~150
3.2	1.1	60	20~200

TIG of stainless steel (single run welding)

Workpiece thickness /mm	Joint form	tungsten electrode diameter/mm	welding wire diameter/mm	Argon gas flow rate/ L • min <sup>-1</sup>	welding current (DCEP)	Welding speed/ cm • min <sup>-1</sup>
0.8	Butt joint	1.0	1.6	5	20~50	66
1.0	Butt joint	1.6	1.6	5	50~80	56
1.5	Butt joint	1.6	1.6	7	65~105	30
1.5	Corner joint	1.6	1.6	7	75~125	25
2.4	Butt joint	1.6	2.4	7	85~125	30
2.4	Corner joint	1.6	2.4	7	95~135	25
3.2	Butt joint	1.6	2.4	7	100~135	30
3.2	Corner joint	1.6	2.4	7	115~145	25
4.8	Butt joint	2.4	3.2	8	150~225	25
4.8	Corner joint	3.2	3.2	9	175~250	20

Notice: the above parameters originate from 《Welding Dictionary》 P150, Volume 1 of Edition 2.



Parameters of piping back sealing welding for mild steel (DCEP)

Piping diameter $\Phi$ /mm	Tungsten electrode diameter/mm	Gas nozzle diameter/mm	Welding wire diameter/mm	Welding current/A	Arc voltage/V	Argon flow rate / $L \cdot \min^{-1}$	Welding rate / $cm \cdot \min^{-1}$
38	2.0	8	2	75~90	11~13	6~8	4~5
42	2.0	8	2	75~95	11~13	6~8	4~5
60	2.0	8	2	75~100	11~13	7~9	4~5
76	2.5	8~10	2.5	80~105	14~16	8~10	4~5
108	2.5	8~10	2.5	90~110	14~16	9~11	5~6
133	2.5	8~10	2.5	90~115	14~16	10~12	5~6
159	2.5	8~10	2.5	95~120	14~16	11~13	5~6
219	2.5	8~10	2.5	100~120	14~16	12~14	5~6
273	2.5	8~10	2.5	110~125	14~16	12~14	5~6
325	2.5	8~10	2.5	120~140	14~16	12~14	5~6
Notice: the above parameters originate from 《Welding Dictionary》 P167, Volume 1 of Edition 2.							

## STICK (SMAW) OPERATION GUIDE

METAL THICKNESS	ELECTRODE SIZE	WELDING AMPS
$< 1 \text{ mm}/.040''$	$1.5 \text{ mm}/1/16''$	20-40
$2 \text{ mm}/.080''$	$2 \text{ mm}/3/32''$	40-50
$3 \text{ mm}/1/8''$	$3.2 \text{ mm}/1/8''$	90-110
$4-5 \text{ mm}/3/16''$	$3.2-4 \text{ mm}/1/8''$	90-130
$6-10 \text{ mm}/1/4''-3/8''$	$4-5 \text{ mm}/1/8''-5/32''$	130-200

## TUNGSTEN SELECTION GUIDE FOR AN INVERTER

TYPE	PERCENT	COLOR	PROCESS	RECOMMENDATION
Pure	100% Tungsten	Green	AC	NOT RECOMMENDED! Do not use in an inverter.
Thoriated (slightly radioactive)	2% Thorium	Red	AC/DC	YES. Great for all purpose welding. Most economical.
Ceriated	2% Ceria	Orange	AC/DC	YES. Good for low amp use.
Lanthanated	1.5% Lanthanum	Gold	AC/DC	YES. Best alternative to 2% Thoriated. Tough performer.
Lanthanated	2% Lanthanum	Blue	AC/DC	YES. Slight advantage over 1.5% Lanthanated.
Zirconiated	1% Zirconia	Brown	AC	NOT RECOMMENDED! Do not use in an inverter.

Parameters of AC TIG (MMA) for Aluminum and its alloy

Sheet thickness /mm	Welding wire diameter /mm	Tungsten electrode diameter /mm	Pre-heat Temperature /°C	Welding current /A	Argon flow rate / L • min <sup>-1</sup>	Gas nozzle diameter /mm	Remark
1	1.6	2	—	45~60	7~9	8	Flange welding
1.5	1.6~2.0	2	—	50~80	7~9	8	Flange or butt welding by one side
2	2~2.5	2~3	—	90~120	8~12	8~12	Butt welding
3	2~3	3	—	150~180	8~12	8~12	V-groove butt welding
4	3	4	—	180~200	10~15	8~12	
5	3~4	4	—	180~240	10~15	10~12	
6	4	5	—	240~280	16~20	14~16	
8	4~5	5	100	260~320	16~20	14~16	
10	4~5	5	100~150	280~340	16~20	14~16	
12	4~5	5~6	150~200	300~360	18~22	16~20	
14	5~6	5~6	180~200	340~380	20~24	16~20	
16	5~6	6	200~220	340~380	20~24	16~20	
18	5~6	6	200~240	360~400	25~30	16~20	
20	5~6	6	200~260	360~400	25~30	20~22	
16~20	5~6	6	200~260	300~380	25~30	16~20	X-groove butt welding
22~25	5~6	6~7	200~260	360~400	30~35	20~22	

《Welding Dictionary》 P538, Volume 2 of Edition 2.

# INSTRUCTION NOTES

---

## 5.1 Operation environment

- 1) Welding operation should be carried out in a relatively dry environment with air humidity usually less than 90%.
- 2) Ambient temperature should be kept between -10°C ~40°C.
- 3) Welding in the sun or rain should be avoided and water or rainwater should never be seeped into the welder interior.
- 4) Welding in the dusty area or under a corrosive gas environment should be avoided.
- 5) Gas protection welding operation in an environment with strong air flow should be avoided.

## 5.2 Safety

In this welder over-voltage, over-current and overheat protection circuits have been installed beforehand. When the grid voltage, output current and machine temperature surpass the set standards, the machine will stop automatically. But excessive use (for example, when the voltage is too high) can still lead to the breakdown of the welder. So you have to pay attention to the following items:

### 1) **Good ventilation !**

This machine is a small type welder. In operation a high working current flows in and natural ventilation is unable to meet the welder's requirement for cooling. So a fan is fitted to effectively cool the welder to keep it work smoothly.

Operators should make sure that the vent is not covered or plugged, the distance of the welder from its surrounding objects is not less than 0.3 m and good ventilation is kept all the time. All these are very important for better operation of the welder and longer service life of the welder.

### 2) **No overload !**

Operators should bear in mind that maximum permissible load current (relative to the selected load duration factor) be observed at any time and welding current should never surpass the maximum permissible load current.

Over-current will shorten the service life of the welder remarkably and even burn it down.

### 3) **No over-voltage !**

Power voltage is shown in the main performance parameter table. In general, the voltage auto-compensation circuit in the welder will ensure the welding current remain within the permissible range. If power voltage surpasses the permissible value, the welder will be broken down.

Operators should fully know this and adopt corresponding preventive measures.

- 4) Behind each welder there is a grounding screw with the grounding mark. Before

operation the shell of the welder should be grounded reliably by a cable wire with a sectional area bigger than  $6\text{mm}^2$  so as to release static electricity or prevent any accident due to leakage.

- 5) If the welding machine exceeds the standard load duration factor in operation, it may probably go into a protective state suddenly and stop work, which indicates it has exceeded the standard load duration factor. Excessive heating triggers the temperature control switch and makes the welding machine stop operation. Under such circumstances you needn't turn off the power so that the cooling fan may work continuously for cooling. When the temperature drops to the standard range, welding may be restarted.

# MAINTENANCE AND TROUBLESHOOTING GUIDE

---

## 6.1 Maintenance

- 1 Dust should be removed with dry and clean compressed air regularly. If the welder is used in a heavily polluted environment with dense smoke and polluted air, dust must be removed from the welder each month.
- 2 The pressure of compressed air should be reasonable so that damage is not done to small elements in the welder.
- 3 Regularly check the connection of electric circuit in the welder and make sure circuit be connected properly and joint is secured (especially inserted joint or element). If the cases of rusting or loosening are found, the rust layer or oxidized film should be removed with abrasive paper and then the joint should be connected again and tightened firmly.
- 4 Entry of water or steam into the interior of the welder should be avoided. If this condition occurs, the welder should undergo drying treatment. Then the welder is measured for insulation by a megohm-meter (including the area between connecting points and the areas between the connecting points and shell). Welding can go on only when evidence shows no abnormality.
- 5 If the welder is not to be used for a long time, it should be replaced in the original package and kept in a dry environment.

## 6.2 Check Fault

Phenomena enumerated here may have something to do with the parts, gas, environmental factors and power supply you use and efforts should be made in improving the environment to avoid occurrence of such cases.

### A. Black welding spot

This shows the welding spot is oxidized without being protected effectively and you can make the following inspection

1. Make sure that the valve of argon cylinder has been opened with sufficient pressure. As a rule, if the pressure within the cylinder is lower than 0.5MPa, then it is necessary to refill the cylinder.
2. Check if the argon flow-meter is turned on with sufficient flow. You can select different flow rates in light of varying welding current, but too small flow may lead to inadequate gas stiffness and thus failure to cover all the welded spots. We suggest argon flow should never be lower than 3l/min no matter how weak the current will be.
3. The easiest way to check gas delivery is to touch the nozzle of welding torch to see whether the gas passage of the welding torch is blocked.
4. Poor sealing of gas passage or lower gas purity will also give rise to welding quality trouble.
5. Strong air flow in the environment may also lead to deterioration of welding quality.

#### **B. Difficulty in arc starting with easy arc breaking:**

1. Make sure that the tungsten electrode in use is of good quality as discharge ability of inferior tungsten electrode may fail the requirement;
2. Tungsten electrode without sharpening treatment is also unable to start arc and leads to unstable arc.

#### **C. Output current can't reach the rated value:**

Deviation of power voltage from the rated value will lead to unconformity of output current value with the set value. When power voltage is lower than the rated value, maximum output current of the welder may also be lower than the rated value.

#### **D. Unstable current in the operation of the welder**

This may be attributed to the following factors:

1. Change in grid voltage;
2. Interference from the power grid or other power equipments.

#### **E. Severely burn of the tungsten needle**

The duty cycle is adjusted too large, causing emission from the workpiece to the tungsten electron for too long, resulting in severe heat of the tungsten needles.

#### **F. The oxide film can't be torn when welding aluminum**

1. The welding gear is selected wrong.
2. The duty cycle is adjusted too small;
3. The secondary inverter has field pipe damage.

#### **G. The abnormal pilot lamp is on**

1. The light is on when the welder work abnormally, please turn off the power switch and then reboot the machine, it can continue to use if it return to normal,
2. If the light is on repeatedly, please refer to the professional or the manufacturer for repair.

Faults	Resolvable Methods
1. Power indicator is not lit, fan does not work and no welding output	<ol style="list-style-type: none"> <li>1. Power switch is out of work.</li> <li>2. Check if electrify wire net (which is connected to input cable )is in work.</li> <li>3. Check if input cable is out of circuit.</li> </ol>
2. Power indicator is lit, fan does not work or revolve several circles, no welding output	<ol style="list-style-type: none"> <li>1. Maybe connect wrong to 380V power cause machine is in protection circuit ,connect to 120/240V power and operate machine again .</li> <li>2. 120/240V power is not stable, (input cable is too slender) or input cable is connected to electrify wire net cause machine in protection circuit. Add the section of cable and tighten input connector firmly .Close machine 2-3 minutes then open it again</li> <li>3. Open and close power switch constantly in short time cause machine is in protection circuit Close machine 2-3 minutes then open it again .</li> <li>4. Main circuit 24V relay of power panel is not close or has damage. Check 24V power source and relay. If relay has damage, replace it with same model.</li> </ol>
3. Fan is working, indicator is not lit and sound of HF arc-striking can not be heard, wiping welding can not strike arc.	<ol style="list-style-type: none"> <li>1. Positive and negative electrodes of CON1 insert component voltage should be about DC310V from power panel to IGBT board. (1) If circuit is broken and silicon bridge is poor contact. (2) If some of four high electrolytic(about 2200UF/250V) of power panel capacitor is leaking.</li> <li>2. There is a green indicator in auxiliary power of IGBT board, if it is not on, auxiliary power is out of work. Check fault spot and connect with seller.</li> <li>3. Check if connectors are poorly contacted.</li> <li>4. Check control circuit and find out reasons or connect with seller.</li> <li>5. Check if control cable of torch is broken.</li> </ol>
4. Abnormal indicator is not on, sound of HF arc-striking can be heard, but there is non welding output .	<ol style="list-style-type: none"> <li>1. Check if torch cable is broken.</li> <li>2. Check if grounding cable is broken or not connected to welding piece.</li> <li>3. Output terminal of positive electrode or torch electrify is loose from inter-machine.</li> </ol>
5. Abnormal indicator is not lit, sound of HF arc-striking can not be heard, wiping welding can strike arc.	<ol style="list-style-type: none"> <li>1. Primary cable of arc-striking transformer is not connected to power panel firmly, tighten it again.</li> <li>2. Arc-striking tip is oxidized or too far, give a good polish to it or change it is about 1 mm between arc-striking tip.</li> <li>3. Switch(sticking/argon-arc welding) is damaged, replace it.</li> <li>4. Some of HF arc-striking circuit components is damage, find out and replace it.</li> </ol>
6. Abnormal indicator is lit but there is no welding output.	<ol style="list-style-type: none"> <li>1. Maybe it is overheated protection, please close machine first, then open the machine again after abnormal indicator is out.</li> <li>2. Maybe it is overheated protection, wait for 2-3 minutes (argon-arc welding does not has overheated protection function.)</li> <li>3. Maybe inverter circuit is in fault, please pull up the supply power plug of main transformer which is on IGBT board (VH-01 insert which is near the fan)then open the machine again. (1) If abnormal indicator is still lit, close machine and pull up</li> </ol>

	<p>supply power plug of HF arc-striking power source, then open machine:</p> <ol style="list-style-type: none"> <li>If abnormal indicator is still lit, some of fieldistor of IGBT board is damaged, find out and replace it with same model.</li> <li>If abnormal indicator is not lit, rise transformer of HF arc-striking circuit is damaged, replace it .</li> </ol> <p>(2) If abnormal indicator is not lit,</p> <ol style="list-style-type: none"> <li>Maybe transformer of middle board is damage, measure inductance volume and Q volume of main transformer by inductance bridge(<math>L=0.9-1.6mH</math> <math>Q&gt;35</math>). If volume is too low, please replace it.</li> <li>Maybe secondary rectifier tube of transformer is damaged, find out faults and replace rectifier tube with same model.</li> </ol> <p>4. Maybe feedback circuit is broken.</p>
7. When welding aluminum, can not break oxidized film	<ol style="list-style-type: none"> <li>Wrong welding value</li> <li>Pulse duty too low</li> <li>Twice inverter IGBT broken</li> </ol>
8. Stick is burnt out	Pulse duty is too high, reduce it.



# APPENDIX CIRCUIT DIAGRAM

