

<b>Product</b>	Cobra <sup>®</sup> Tig360
<b>Manual</b>	091-0780
<b>Serial</b>	25110001
<b>Voltage Rating</b>	24 VDC
<b>Revision</b>	A - January 2026
<b>Model Number</b>	255-360



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# Thank you

***Congratulations on choosing Tec Welding Products®!*** This operating manual contains important information on the use and maintenance of this product, as well as safe handling of the product. Please refer to the technical parameters of the equipment in Technical Parameter section of this manual, and read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, please pay particular attention to the safety instructions in the manual and operate the equipment according to the instructions. For more information on Tec Welding Products®, please visit our website at [www.tecweldingprod.com](http://www.tecweldingprod.com).

## **Please examine carton and equipment for damage immediately**

All Tec Welding Products® merchandise is sold FOB Tec Welding Products®, Inc., Escondido, CA or Kansas City, MO or MK Products®, Inc., Irvine, CA. Title to the merchandise transfers to the receiving party at the time carrier accepts shipment. In the event of loss or damage, it is the receiving party's responsibility to file a claim.

***For assistance in reporting and filing a claim, contact MK Products® Customer Service Department within 15 calendar days from date of shipment.***

***For your safety, please read this manual carefully before installing and operating this Tec Welding equipment. Pay extra attention to all content marked with "Warning" and "Description" labels to avoid losses and personal injuries.***

### **For Your Records**


Date Purchased











Serial Number

Distributor & Location

## A. Safety Precautions


### A.1 General Safety


 **Warning!** During welding, arc and cutting, smoke may cause harm to you and others. Take protective measures during welding. For details, refer to the safety protection guidelines for operators that meet the manufacturer's accident prevention requirements.


	<p><b>Only qualified personnel should operate this machine!</b></p> <ul style="list-style-type: none"> <li>•Use welding labor protection equipment recognized by the national safety supervision department!</li> <li>•The operator must be a special equipment operator with a valid Metal Welding (Gas Cutting) Operation certificate!</li> <li>•When maintaining and repairing welder, do not work with electricity.</li> </ul>
	<p><b>Electric Shock — May cause serious injury or even death!</b></p> <ul style="list-style-type: none"> <li>•Install grounding devices according to application standards.</li> <li>•Do not touch any live parts with your exposed skin, wet gloves, or wet clothes.</li> <li>•Make sure that you are insulated from the ground and the workpiece.</li> <li>•Make sure that the workstation is safe.</li> </ul>
	<p><b>Fumes — May be harmful to health!</b></p> <ul style="list-style-type: none"> <li>•Locate the equipment in a well-ventilated position and keep your head out of the fume.</li> <li>•Do not breathe the fume.</li> <li>•When welding, use ventilation or extraction devices to maintain a well-ventilated working environment.</li> <li>•Do not weld any closed containers. •It is prohibited to use the machine for pipeline thawing.</li> </ul>
	<p><b>Arc Radiation — May injure the eyes and burn the skin!</b></p> <ul style="list-style-type: none"> <li>•Use a suitable welding mask and wear protective clothing to protect your eyes and body.</li> <li>•Protect bystanders from hazards with suitable masks or shading curtains.</li> </ul>
	<p><b>Improper use and operation may lead to fire or explosion!</b></p> <ul style="list-style-type: none"> <li>•Welding sparks may cause a fire. Please confirm that there are no flammable materials near the welding station and pay attention to safety and fire prevention.</li> <li>•The fire extinguishing devices shall be set up nearby and the trained personnel proficient in using them shall be available.</li> </ul>
	<p><b>Hot workpieces may cause serious burns!</b></p> <ul style="list-style-type: none"> <li>•Do not touch hot workpieces with bare hands.</li> <li>•There should be a cooling time when using the welding torch continuously.</li> </ul>
	<p><b>Noise — Excessive noise may be harmful to hearing!</b></p> <ul style="list-style-type: none"> <li>•Protect your ears with ear shields or other hearing protectors.</li> <li>•Remind nearby personnel that noise may be potentially hazardous to hearing.</li> </ul>
	<p><b>Magnetic field affects cardiac pacemaker!</b></p> <ul style="list-style-type: none"> <li>•Before consulting a doctor, pacemaker users should stay away from the welding site.</li> </ul>
	<p><b>Moving parts may cause personal injury!</b></p> <ul style="list-style-type: none"> <li>•Keep away from moving parts such as fans.</li> <li>•Various protective devices such as doors, panels, covers, and baffles, etc. should be tightly closed and put in place.</li> </ul>
	<p><b>Fault — When encountering difficulties, seek help from professionals!</b></p> <ul style="list-style-type: none"> <li>•For difficulties during installation and operation, please follow the relevant content of this manual for troubleshooting.</li> <li>•If you still cannot fully understand the content contained in this manual after reading, or cannot solve the problem as per the instructions in this manual, immediately contact your supplier or the service center of Tec Welding Products to seek professional assistance.</li> </ul>

## A. Safety Precautions

### A.2 Precautions













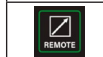











 **Warning!** If the equipment tips over or falls, it may be damaged, or personal injury may result. Therefore, refer to the handling and placement methods indicated on the outer package and use a trolley or similar handling equipment with a sufficient load-carrying capacity to handle the equipment.

 **Warning!** The handle or strap on the welder is only suitable for carrying the welder by hand. When lifting the welder using a crane or other machines, put the welder in a container with a sufficient load-carrying capacity and then lift the welder together with the container.

 **Warning!** The welder has over-voltage, over-current, and over-heating protection circuits. Thus, the welder will stop working when the mains voltage, output current, or internal temperature exceeds the set value. However, if the cutter is still in use in conditions exceeding the set value (such as over-voltage), the welder may be damaged. Therefore, you need to pay attention to the following conditions:

- 1) When the operator's movement is limited by the surroundings (for example, the operator can only bend his knees, barefoot, or lie down during operation), the operator shall practice proper insulation and avoid direct contact with conductive parts on the equipment.
- 2) Do not use the welder in closed containers in narrow spaces where conductive components cannot be removed.
- 3) Do not use the welder in humid environments where the operator is prone to the risk of electric shock.
- 4) Do not weld in sunlight or rain, and no water or rainwater shall seep into the welder.
- 5) Do not perform gas shielded welding in an environment with strong air flow.
- 6) Avoid using the welder in dusty area or environment with corrosive chemical gas.
- 7) The ambient temperature should be -10°C to 40°C during operation and -25°C to 50°C during storage.
- 8) The welding should be performed in a relatively dry environment with a humidity of not more than 90%.
- 9) The inclination of the welder should not exceed 10°.
- 10) Ensure that the input power voltage does not exceed  $\pm 15\%$  of the voltage rating of the machine.
- 11) Be cautious that the welder may fall from a high place during welding.

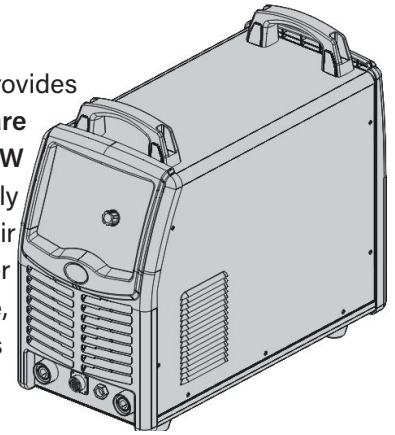
## B. Description of Symbols

 Warning! Read the Explanation	<b>A</b> Current Unit "A"
 WEEE Label	<b>S</b> Time Unit
 VRD Indicator	<b>%</b> Percentage
 Warning Tag	<b>Hz</b> Frequency Unit "Hz"
 Parameter Adjustment & Confirmation Key	<b>V</b> Voltage Unit
 TIG Mode	<b>JOB</b> Light Up When the Saving Channel Selected
 MMA Mode	<b>PRG</b> Light Up When Parameters are Saved or Saved Parameters are Available for the Channel
 Waveform Key	<b>GAS</b> Light Up When the Gas is Supplied
 2T/4T? Reposition/Spot Welding Key	 Tungsten Needle Selection
 Start Mode	 Parameter Setting Warning
 Pulse Mode	 Channel +
 Local/Remote Control Key	 Gas Check/Channel -
 Water Cooler Function	 Storage
 VRD Mode	 Call
 Pulse Duty Cycle, Mixed Duty TIG Cycle, or Spot Welding Crater Time	 Pulse Frequency, Mixed TIG Frequency, Or Spot Welding Arc Duration
 AC Balance	<b>ON</b> Power Switch in the "ON" State
 Grounding Sign	<b>OFF</b> Power Switch in the "OFF" State

## C. Product Overview

This is a digital inverter AC/DC welder featuring advanced technology which provides complete functions and excellent performance. It supports **AC TIG (optional square wave, triangular wave, and sine wave), AC pulse TIG, DC TIG, DC pulse TIG, SMAW (AC/DC), TIG spot welding (DC/AC), and other welding functions.** It can be widely used for fine welding of various metal materials. The unique electrical structure and air passage design inside the machine increases the dissipation of heat generated by power devices, thus improving the duty cycle of the machine. Due to the unique air passage, the equipment can effectively prevent damage to power devices and control circuits from dust drawn in by the fan, thus greatly improving the reliability of the equipment.

**Note: The functions described below are only an overview of the series. The specific functions may depend on the model.**



The main functions are:

- Multiple welding modes and optional analog torch control mode.
- Real-time output current and voltage display: Easily displays the output state of the welder.
- Dynamic LED display of operating state: Displays the current operating state in real time.
- Anti-sticking function: Prevents excessive output current from damaging the electrode and base metal during welding.
- VRD Function: Protects the operator from high-voltage electric shock when the machine is not working.
- MMA Hot Start Function: Makes MMA start easier and more reliable.
- Smart Fan Control: Prolongs the lifespan of the fan, reduces accumulation of dust inside the machine, saves energy and reduces noise.
- TIG welding supports both contact and non-contact start. For the non-contact start, there is a built-in high-voltage start circuit, which achieves a start success rate of 99%.
- Parameters are automatically saved before shutdown, and the parameters and state saved are restored after starting again.
- Remote control mode: Supports analog torch control.

## D. Technical Parameters

Descriptions	Unit	Parameters
Product Model	/	CobraTIG360
Power Supply Voltage	VAC	230V/460V ±15%
Input Frequency	Hz	50/60
Rated Input Power (AC400V)	KVA	15.8@TIG 15.7@MMA
Output Current Range (TIG)	A	1. 230VAC: DC: 5~275; AC: 5~260 2. 460VAC: DC: 5~375; AC: 5~360
Output Current Adjustment Range (MMA)	A	1. 230VAC: AC/DC: 10~200 2. 460VAC: AC/DC: 10~300
Rated Working Voltage	V	1. 230VAC: 21@TIG 28@MMA 2. 460VAC: 25@TIG 32@MMA
Arc Force Current Range	A	0~100
Hot Start Current Range	A	0~80
No-load Voltage	V	84
VRD Voltage	V	9.5
AC Output Frequency	Hz	20~200
AC Balance	%	2 0~60
Base Current	A	1. 230VAC: DC: 5~275; AC: 5~260 2. 460VAC: DC: 5~375; AC: 5~360
Pulse Frequency (DC)	Hz	0.5~200
Pulse Frequency (AC)	Hz	AC Frequency: 50Hz - Pulse Frequency: 0.5-5Hz AC Frequency: 200Hz - Pulse Frequency: 0.5-20Hz
Pulse Duty Cycle	%	5~95
Mixed Frequency (Mix Mode)	Hz	AC Frequency: 50Hz - Mixed Frequency: 1~5Hz AC Frequency: 200Hz - Mixed Frequency: 1~20Hz
Mixed Duty Cycle	%	5~95
Pre-Flow Time	S	0.5~10

## D. Technical Parameters

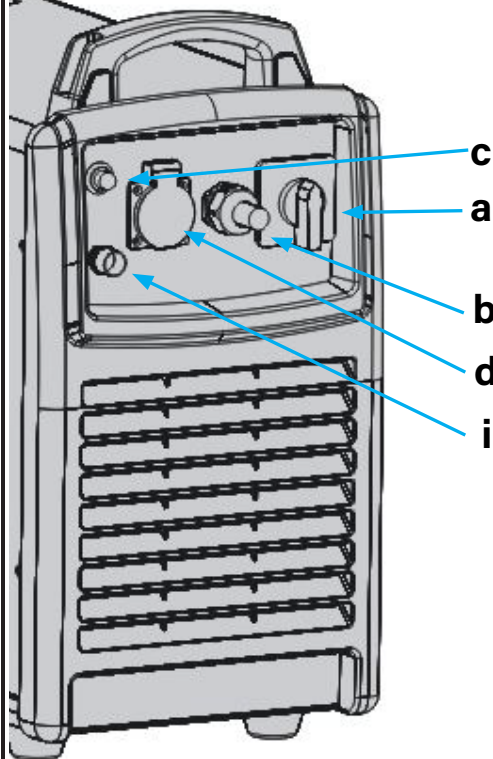
Descriptions	Unit	Parameters
Post Flow Time	S	0.5~20
Up-Slope Time	S	0.5~15
Down-Slope Time	S	0.5~15
Spot Welding Time	S	Arcing Time: 0.01~1 - Crater Time: 0.5~5
Remote Controller	S	Analog Remote Torch with a Wired Foot Remote Control
Start Mode	/	HF Start & Lift Start
Duty Cycle	%	450V: TIG 375@35% - MMA 300@40% 230V: TIG 275@35% - MMA 200@40%
Efficiency	%	≥80
Power Consumption in Standby Mode	W	≤10
Insulation Class	/	B
Enclosure Class	/	IP215
Dimensions LxWxH	mm	647x300x555
Dimensions of Package LxWxH	mm	780x380x610
Bare Machine Weight	Kg	45.8
Gross Weight	Kg	53
Static & External Characteristics	/	CC
Pollution Level	/	Level 3

## E. Installation

- Warning!** All connections shall be made with the power supply turned off.
- Warning!** Electric shock may cause death; after power failure, there is still a high voltage on the equipment, do not touch the live parts on the equipment.
- Warning!** Incorrect voltage may damage the equipment.
- Warning!** This product meets the requirements of Class A equipment in EMC requirements and is not to be connected to a residential low-voltage power supply grid.

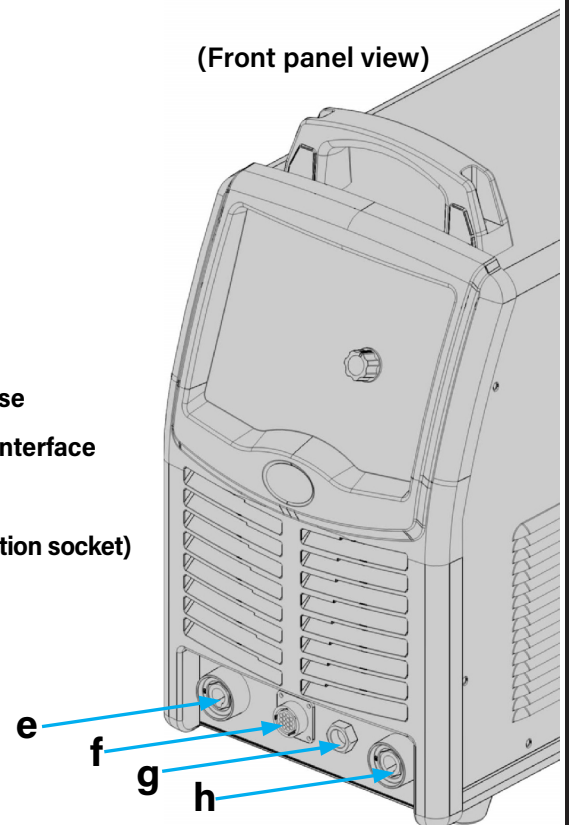
### E.1 External Interface Description

(Rear panel view)



- a. Power switch
- b. Input power cable
- c. Water cooler power supply fuse
- d. External water cooler power interface
- e. Negative polarity
- f. Torch trigger (fourteen-pin aviation socket)
- g. Output gas coupling
- h. Output positive polarity
- i. Input gas coupling

(Front panel view)



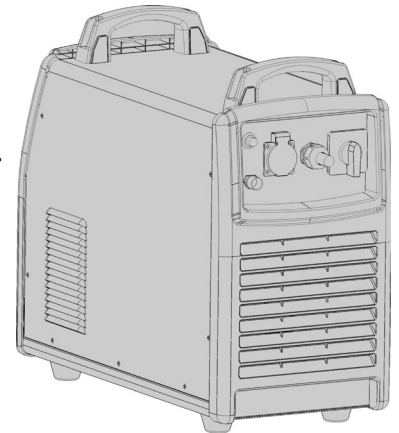
## E. Installation

### E.2 Power Supply Installation

- Warning!** The electrical connection of the machine must be completed by electricians with qualification certificates.  
**Warning!** All connections shall be made with the power supply turned off.  
**Warning!** Incorrect voltage may damage the equipment.

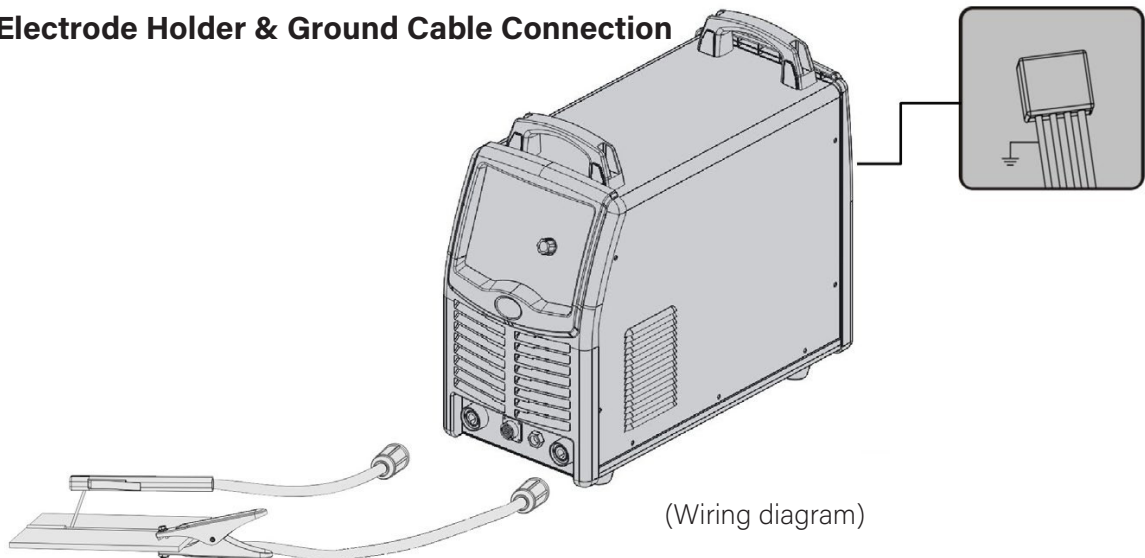
- 1) Connect the welder with voltage grade corresponding to its input voltage. Do not connect it to the wrong grade.
- 2) Ensure that the input power cable is in good contact with the power terminal or socket.
- 3) Ensure the input voltage value is within the specified input voltage range.
- 4) Ground the power supply well.
- 5) Ensure that the welder power switch is turned off.

(Wiring diagram)



**Note!** When extending the input cable is required, use a cable with a bigger cross-sectional area to reduce the voltage. The recommended cable cross-section is 3x5.26 mm<sup>2</sup> or above.

### E.3 MMA Electrode Holder & Ground Cable Connection



(Wiring diagram)

Pay attention to the polarity of wiring before performing MMA welding. Generally, there are two connection methods of DC welder: DCEP and DCEN.

DCEP: The electrode holder cable is connected to the negative polarity, and the workpiece to the positive polarity;

DCEN: The workpiece is connected to the negative polarity, and the electrode holder cable is connected to the positive polarity.

The operator can also choose the polarity of the connection based on the base metal and electrode. Generally speaking, DCEP is recommended for basic electrodes (i.e., electrode holder connected to the positive polarity), while no special provisions are made for acid electrodes.

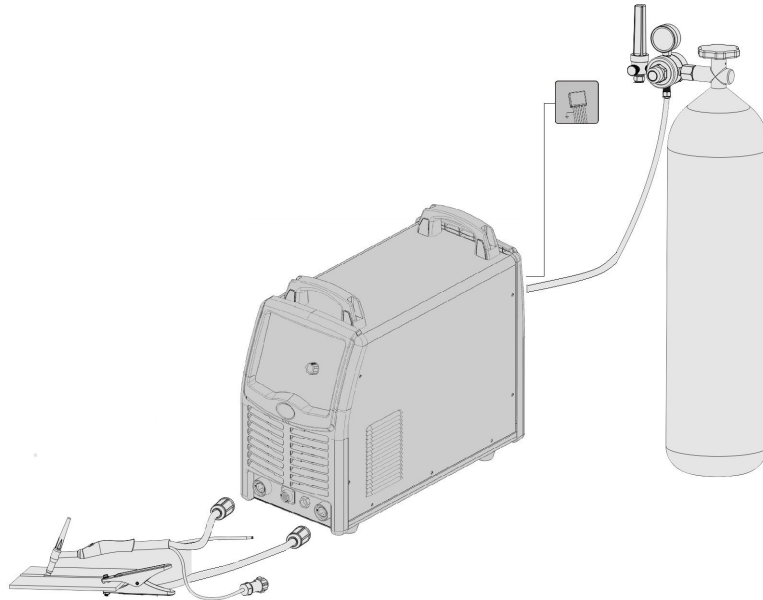
1. Ensure that the power switch of the welder is open.
2. Insert the cable plug with the electrode holder into the corresponding socket on the front panel of the welder and tighten it clockwise.
3. Insert the cable plug with an earth clamp into the corresponding socket on the front panel of the welder and tighten it firmly in a clockwise direction.

**Note!** If you want to use long secondary cables (electrode holder and earth cable), you must ensure that the cross-sectional area of the output cable is increased appropriately to reduce the voltage drop due to the cable length.

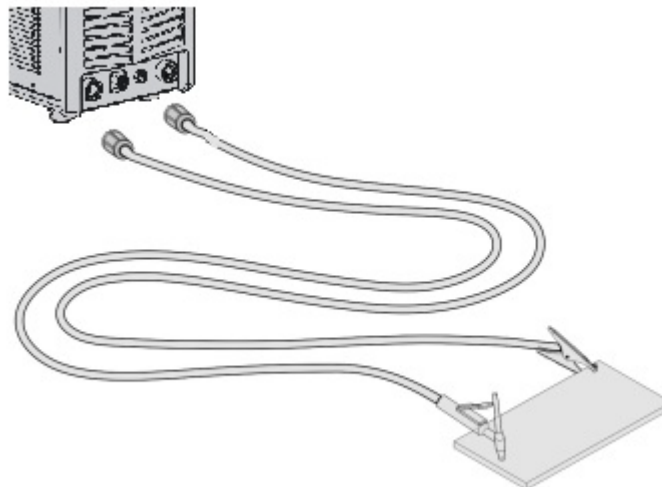
## E. Installation

### E.4 TIG Welding Torch & Earth Cable Connection

1. Ensure that the power switch of the welder is open.
2. Insert the cable plug with the electrode holder into the positive jack at the lower part of the welder's front panel and tighten it clockwise.
3. Insert the cable plug of the welding torch into the negative jack at the lower part of the welder's front panel and tighten it clockwise. **Note! The positive and negative polarities should not be reversed as this will prevent normal welding operation.**
4. Insert the gas coupling of the welding torch into the gas outlet on the front panel.
5. Connect the gas hose of the argon cylinder to the inlet nozzle on the rear panel of the machine. (Wiring diagram)  
**Note! If you want to use long secondary cables (electrode holder cable and earth cable), you must ensure that the cross-sectional area of the cable is increased appropriately in order to reduce the voltage drop due to the cable length.**



6. In AC TIG welding mode, shorten the power cable as much as possible. If the cable must be extended, pay attention to the following:
  - Bind the cables for the base metal and the welding torch together before placement.
  - Straighten the cable as much as possible.
  - If the cable cannot be straightened, place the welding torch cable across the cable connected to the base metal.



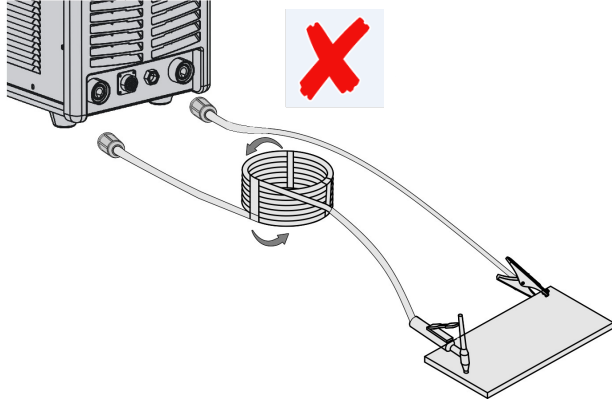
## E. Installation

### E.4 TIG Welding Torch & Earth Cable Connection . . . *continued*

•The excessive cable must be wound up. For details, refer to the following good practice.

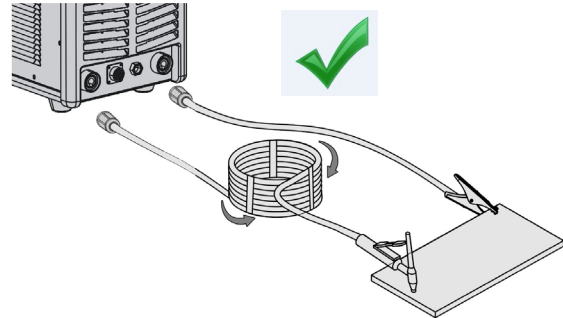
#### Bad Practice:

Do not wind up the excessive cable along the same direction.



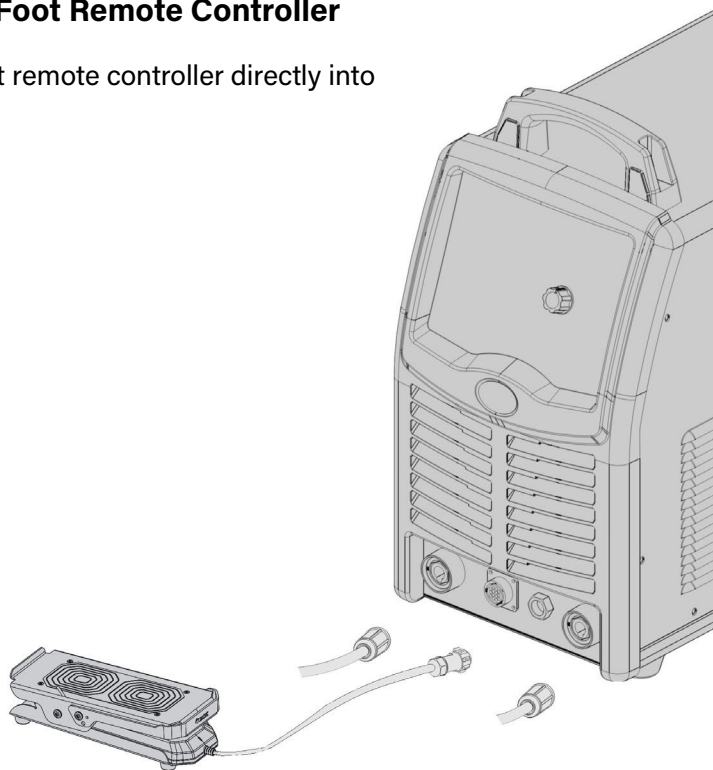
#### Good Practice:

Wind up the same number of turns in the cable winding direction and the opposite direction (the wiring harnesses in the two directions should keep a similar number of cable turns), and stack them together.



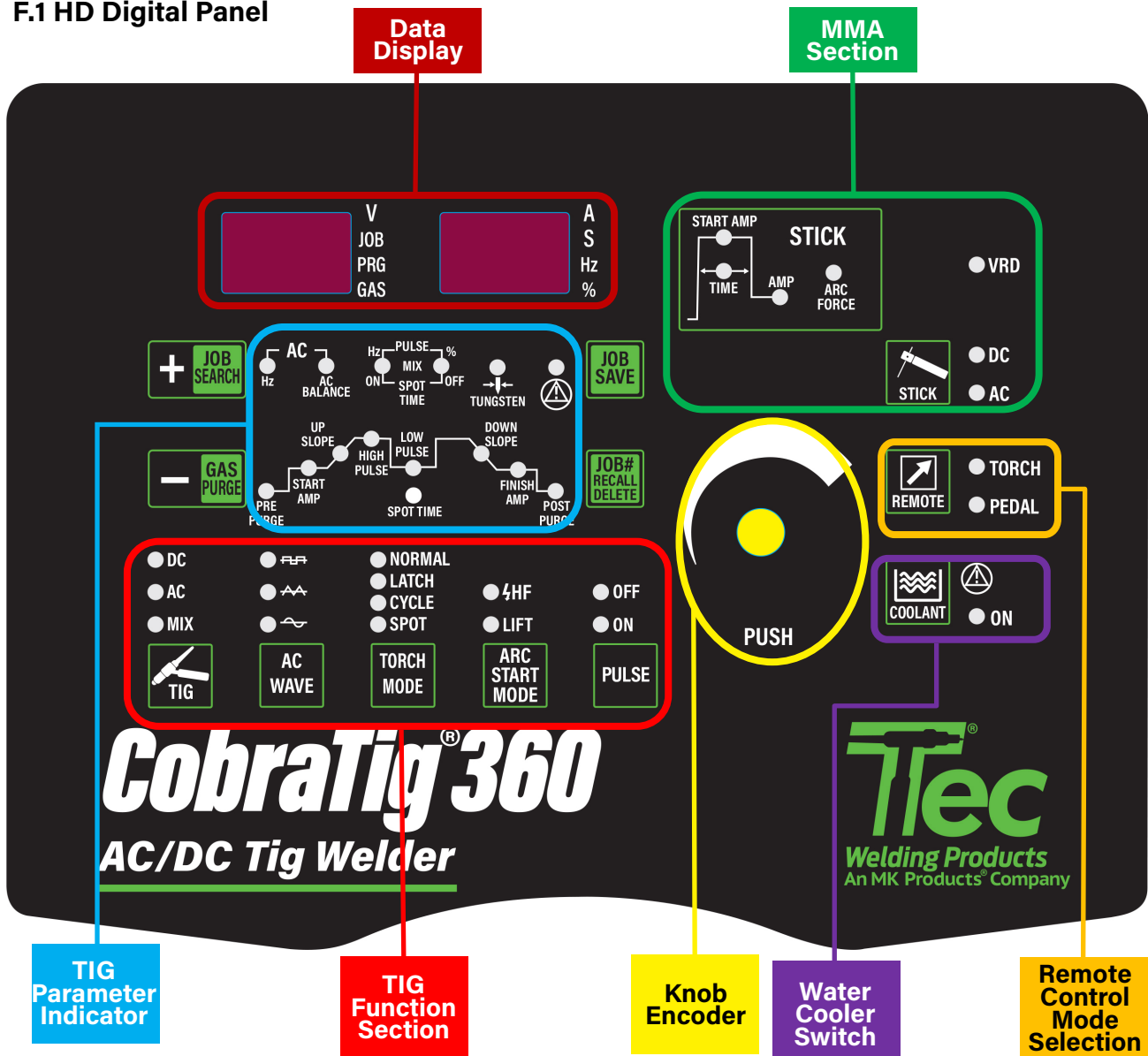
### E.5 Connection of the Wired Foot Remote Controller

▪ Insert the aviation plug of the foot remote controller directly into the aviation socket of the machine.



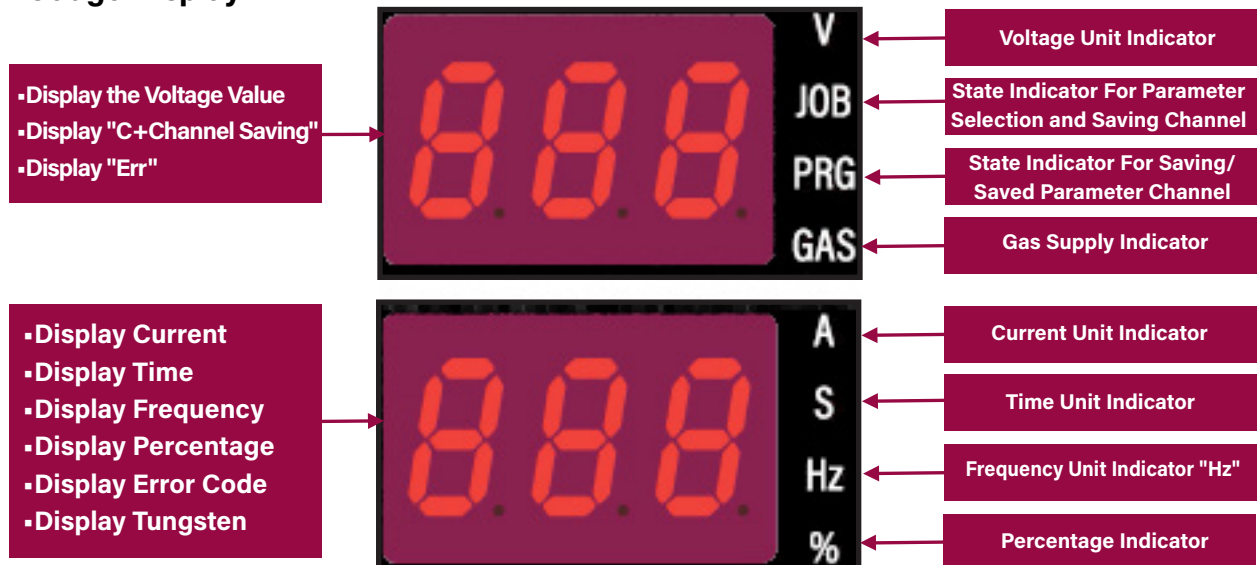
## F. Control Panel & Function

### F.1 HD Digital Panel



### F.2 Description of Control Panel Functions

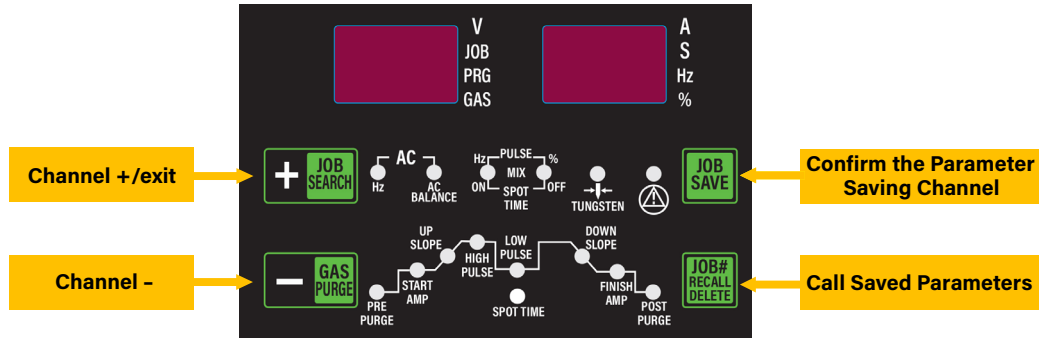
#### F.2.1 Gauge Display



## F.2.1 Gauge Display . . . *continued*

1. The "V" indicator comes on during voltage display.
2. The "JOB" indicator comes on when the parameter saving channel is selected.
3. The "PRG" indicator comes on when parameters are saved into the channel or there are previously saved data in the saving channel.
4. The "GAS" indicator comes on when gas is supplied with the solenoid valve open for gas delivery.
5. The "A" indicator flashes when a current exists.
6. The "S" indicator comes on during time display.
7. The "Hz" indicator comes on during frequency display.
8. The "%" indicator comes on during percentage display.


## F.2.2 Save Parameters & Set Call Parameters





1. Press the channel key  to enter the saved parameter channel mode.



2. After entering the channel mode, select an appropriate channel by pressing the channel key 



and  paging up or down. There are 50 saving channels in total.

3. The parameter should be set as required. When they are saved in the selected channel, press the "OK" button  to save the parameters.

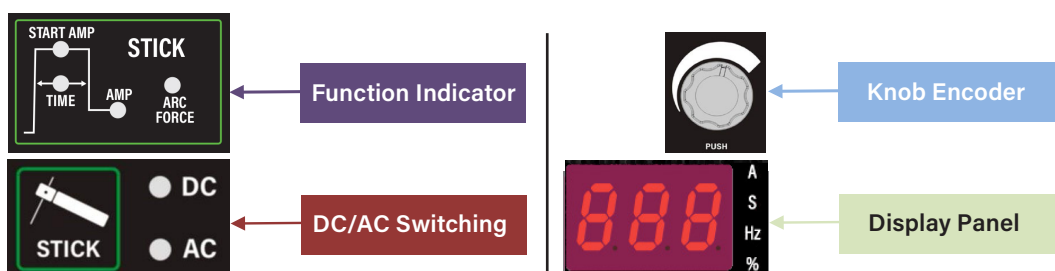
4. If you are required to exit the channel and return to the normal interface, press and hold the channel  key for 2 seconds to exit the channel saving mode; press any key other than the channel mode key to exit the channel mode; or, the channel mode will exit automatically if no operation is performed within 5 seconds after entering the channel mode.

5. When parameters saved in a channel are called, press the channel key  to enter the saved parameter channel






mode. Press the channel key  or  to select the parameter channel you want to call. Then, press the call



key  to call the saved parameters. The current channel data can be deleted by pressing the call key .





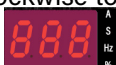
## F.2.3 MMA Mode & Parameter Setting




## F.2.3 MMA Mode & Parameter Setting . . . continued


1.  Means the hot start current in the MMA mode.
2.  Means the hot start time.
3.  Means the welding current in the MMA mode
4.  Means the arc force in the MMA mode
5. Press the MMA  to select the required DC or AC mode.


With the DC mode selected, the  indicator comes on; with the AC mode selected, the  indicator comes on.

6. Turn the knob encoder  clockwise or counterclockwise to select the required function. Then, press the knob encoder  to set the desired parameter. After setting the parameter, press the knob encoder  again to exit parameter setting.
7. When the function is selected, the corresponding indicator lights up. When you edit the function, the corresponding indicator flashes.
8. During parameter setting, turn the knob encoder  clockwise to increase the parameter value or counterclockwise to decrease it. The parameter value is displayed on the panel .

## F.2.4 Safe VRD Mode

 **Warning!** The electrical connection of the machine must be completed by electricians with qualification certificates. **Warning!** Electric shock may cause death; after power failure, there is still a high voltage on the equipment, do not touch the live parts on the equipment. **The MMA VRD mode is disabled by default in factory settings.** The user can choose to enable or disable it as required via the toggle switch on the control panel.

1. Enable VRD: Toggle the switch to the ON position  from the "2" position, indicating that the VRD is enabled, the welder is switched to MMA mode, and the VRD is enabled, the welder is switched to MMA mode, and the

VRD indicator on the panel comes on . In this case, the no-load voltage of the welder is within the range of 9V to 15V. In TIG mode, the VRD voltage exists only during the lift start. The VRD indicator is on only in MMA mode. 2) Disable VRD: Toggle the toggle switch to the position ON from the "2" position to turn off the VRD. In the MMA mode, the no-load voltage is approx. 84 V (In the TIG mode, the VRD voltage exists only during lift arc striking). The VRD indicator remains off throughout the entire process.



**Note:** As shown in the left figure, the VRD is turned on. **The toggle switch at position "1" is used as a back-end commissioning function and must not be toggled by any personnel other than the commissioning personnel.**


● DC

● AC

● MIX



## F.2.5 Classification of TIG Modes

1. Press the TIG key  to switch among DC, AC, and MIX modes. The user can select the desired mode as required.
2. With the DC mode selected, the DC indicator comes on; with the AC mode selected, the AC indicator comes on; with the Mix mode selected, the MIX indicator comes on.





● 

● 

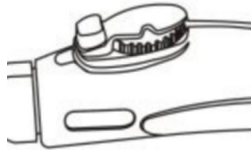
● 









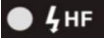
## F.2.6 Classification of AC Waveforms

1. Press the waveform selection key  to switch among the square wave, triangular wave, and sine wave. The user can select the desired mode as required.
2. With the square wave selected, the  indicator comes on; with the triangular wave selected, the  indicator comes on; with the sine wave selected, the  indicator comes on.

## F.2.7 Classification of Torch Control Modes


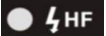
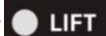


Torch Controller (Trigger)

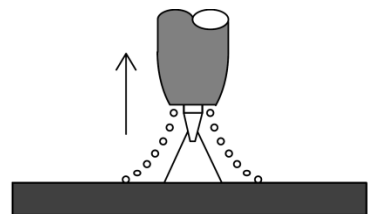
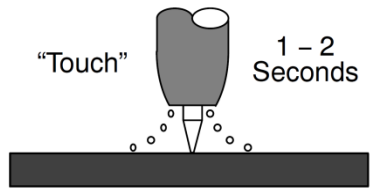
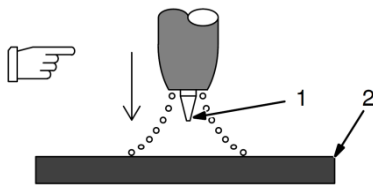
1. Press the mode key  to switch among 2T, 4T, cyclic, and spot welding modes. The user can select the desired mode as required.
2. With the 2T mode selected, the  indicator comes on; with the 4T selected, the  indicator comes on; with the cyclic mode selected, the  indicator comes on; with the spot welding selected, the  indicator comes on.
3. In the 2T mode, press the **torch trigger** so that the welder goes through the pre-flow time and the time required to increase the start current to the pre-set current, reaching the pre-set current; release the **torch trigger** so that the welder goes through a process of gradually decreasing the pre-set current to the stop current, followed by a delay time for gas supply after arc extinction.
4. In 4T mode, press the **torch trigger** so that the welder goes through the pre-flow time and stops in the start stage; release the **torch trigger** so that the welder goes through the time required to increase the start current to the pre-set current and reaches the pre-set current. After that, press the **torch trigger** again so that the welder experiences a gradual decrease in the pre-set current to the stop current, and stops at the stop current stage; release the **torch trigger** so that the welder undergoes a process from the stop current to the arc blowout, followed by a delay time for gas supply after arc extinction.
5. In cyclic mode, press the **torch trigger** for the first time so that the welder undergoes the pre-flow time and stops in the start stage; release the **torch trigger** so that the welder undergoes the period of increasing the start current to the pre-set current and reaches the pre-set current. After that, press the **torch trigger** again so that the welder undergoes a period during which the pre-set current slowly decreases to the stop current, and stops at the stop current stage; release the **torch trigger** so that the welder undergoes a period during which the stop current increases back to the pre-set current, and then reaches the pre-set current. Eventually, press the **torch trigger** and then release it, forming a cyclic process of pre-set current → stop current → up-slope time → pre-set current. Continuously press the **torch trigger** within 500 ms to stop the welder output and exit the cyclic mode.
6. In spot welding mode, press the **torch trigger** so that the welder initiates a pre-flow time and reaches the pre-set current. In the lift arc mode , the welder stops the output after the pre-set operation time during spot welding. In the high-frequency start mode , the welder reaches the pre-set operating time, then enters the pre-set stop time, and then returns to the operation state. Without releasing the **torch trigger**, the welder should be operated cyclically in this manner.

## F.2.8 Start Modes



1. There are two start modes, including high-frequency start and lift start.
2. Press the start control key  to switch between the HF start and lift start modes.
3. When the indicator  comes on, it indicates that the welder is in the HF start mode; when the indicator  comes on, it indicates that the welder is in the lift start mode.

## F.2.8 Start Modes... continued



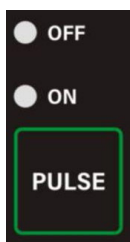
Lift Start


4. In the HF start mode, keep the tungsten electrode at a distance of less than 1 cm from the workpiece. Then, press the **torch trigger** to start arcing successfully

5. In the lift start mode, arcing can be initiated in two methods. The first method is to press the **torch trigger** first, allowing the tungsten electrode to contact the workpiece for 1-2 seconds; then lift the tungsten electrode to successfully initiate the arc. The other method is to enable the tungsten to contact the workpiece for 1-2 seconds, then press the **torch trigger**, after that, lift the tungsten electrode to start arcing successfully.

6. The number "1" in the figure indicates the tungsten electrode, and the number "2" indicates the workpiece.

## F.2.9 Selection of Pulse Presence or Absence



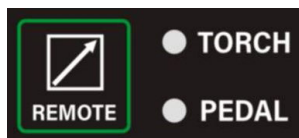
1. Press the pulse selection key  to switch between pulse and no-pulse.

2. When the indicator  is on, it indicates that the machine is in the no pulse mode.


When the indicator is on,  it indicates that the machine is in the pulse mode.


## F.3 Use of Remote Controller


### F.3.1 Remote Control Mode



1. Press the remote control key  to enter, change, or exit the remote control mode.

2. When the indicator  comes on, the machine is in the torch control mode. In the case of an analog torch, the output current can be controlled. In the case of a digital torch, the parameter can be adjusted to control the output current. The aviation socket can automatically identify the analog and digital torch.

3. When the indicator  comes on, the machine is in the foot remote control mode. In remote foot mode, arc starting is under control so that the output current can be controlled.


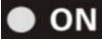
4. When the machine is powered on, the welder is in the default  panel control mode.

### F.3.2 Remote Controller Mode Selection

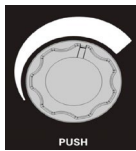
Type	Remote Controller Name	Remote Controller Model	Welder Transceiver Module	Welding Mode	Remote Controller Picture
Torch Control	Analog Torch Trigger	10K Potentiometer Analog Welding Torch	No	TIG	/
	Digital torch trigger	Digital Welding Torch	No	TIG	/
Wired	Wired Foot Remote Controller	Foot Remote Controller (P087)	No	TIG	/









### F.3.3 Water Cooler Controller



1. Press the water cooler control key  to turn on or off the water cooler.
  2. When the indicator  comes on, the water cooler is turned on while the water cooling mode is enabled.
    - (2.1) When no welding current is detected after the water cooling mode is enabled, the welder will power off the water cooler after 2 minutes.
    - (2.2) If a current is outputted during welding, the water circulates in the water cooler; if there is no current output, the welder automatically stops powering off the water cooler after 5 minutes, and the water cooler enters the energy-saving mode.
- Note:** The water cooling mode is recommended when the water-cooled torch is in use; otherwise, the welding torch is prone to damage.

### F.3.4 Selection of Tungsten Electrode







1. Turn the knob encoder  clockwise or counterclockwise so that the indicator  comes on. Press the knob encoder  so that the indicator flashes. Then, set the actual tungsten electrode size. After the parameter setting, press the knob encoder  again to exit the parameter setting interface.
2. During parameter setting, turn the knob encoder  clockwise to increase the parameter value or counterclockwise to decrease it . The parameter value is displayed on the panel .
3. When the tungsten electrode setting does not match the output current, the indicator  comes on.
4. The relationship between the tungsten size and the output current is as follows.

(Note: The DC TIG does not have this function)

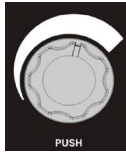
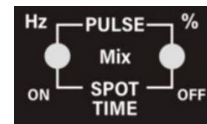
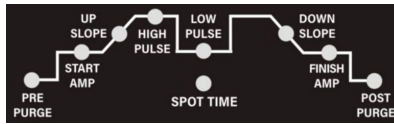
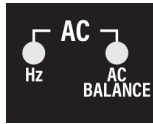
Tungsten electrode size (mm)	Recommended current range (A)	Tungsten electrode size (mm)	Recommended current range (A)
0.5	5--15	2.4	141--190
1.0	16--55	3.2	191--240
1.6	56--90	4.0	241--375
2.0	91--140		

### F.3.5 Gas Check Function





1. Press the key  so that the  indicator on the panel comes on and the gas check function is enabled.
2. When the indicator comes on, gas is supplied from the gas pipe. If no gas is supplied, check the gas supply equipment.
3. Press the  key again to exit the gas check function;
4. If you do not press the  key to exit, the welder will automatically shut off the gas after the welder remains in the no-load condition for 30 seconds.


### F.3.6 TIG Parameter Setting





Meaning of symbols


Pre-purge time  means the pre-flow protection time.


Start current  means the current when the arc is started.

Up-slope time  means the time when the start current reaches the peak current.


Peak current  means the welding current during working.

Low pulse current  means the low pulse current when there is pulse.


Down-slope time  means the time when the peak current drops to the stop current.

Stop current  means the current when the arc stops.


Post-flow time  means the post-flow time.


AC frequency  means the frequency at which the welder works in the AC mode.


### F.3.6 TIG Parameter Setting. . . continued


AC balance  means the ratio of the time when the tungsten electrode serves as the positive pole to the AC cycle.



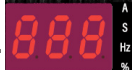
Pulse frequency  means the pulse working frequency or the operation time during the spot welding.







Pulse duty  means the ratio of peak current time to the pulse cycle or the spot welding arc extinguishing time.

Turn the knob  clockwise or counterclockwise to select the parameter that need to adjust.

Then, press the knob encoder  to set the required parameter. After that, press the knob encoder again to exit the parameter setting. If the encoder is not operated for more than 5 seconds, the welder automatically returns to the "Peak current" parameter and the parameter selection state.

With  selected, the corresponding indicator lights up. When you adjust the parameters, the corresponding indicator flashes.

During parameter setting, turn the knob encoder  clockwise to increase the parameter value or counterclockwise to decrease the parameter value. The parameter value  is displayed on the panel. 

When setting parameters in the spot welding mode, turn the knob encoder  to select and set the spot welding time.  In this case, the indicator  comes on. Press the knob encoder  to set parameters, select  to set the arcing time, and select  to set the crater time.

The factory settings are shown in Table 6-8.

Welding Mode	Pre-flow Time (s)	Initial Current (A)	Up-slope Time (s)	Peak Current (A)	Low Pulse Current (A)	Down-Slope Time (s)	Stop Current (A)	Post-flow Time (s)	Spot Welding Arcing Time (s)	Spot Welding Crater Time (s)	Pulse Frequency (Hz)	Duty Cycle (%)	Welding Current (A)	Hot Start Current (A)	Arc-force Current (A)
DC TIG	0.5	10	0.0	50	---	0.0	10	1	0.01	0.5	---	---	---	---	---
DC Pulse TIG	0.5	10	0.0	50	00	0.0	10	1	---	---	5	50	---	---	---
MMA	---	---	---	---	---	---	---	---	---	---	---	---	10	80	0

Welding Mode	Pre-flow Time (s)	Initial Current (A)	Up-slope Time (s)	Peak Current (A)	Low Pulse Current (A)	Down-slope Time (s)	Stop Current (A)	Post-flow Time (s)	Spot Welding Arcing Time (s)	Spot Welding Crater Time (s)	Pulse Frequency (Hz)	Duty Cycle (%)	AC Frequency (Hz)	AC Balance (%)	---
AC TIG	0.5	10	0.0	50	---	0.0	10	1	0.01	0.5	---	---	50	20	---
AC Pulse TIG	0.5	10	0.0	50	20	0.0	10	1	---	---	10	50	50	20	---

Welding Mode	Pre-flow Time (s)	Initial Current (A)	Up-slope Time (s)	Peak Current (A)	Low Pulse Current (A)	Down-slope Time (s)	Stop Current (A)	Post-flow Time (s)	Mixed Frequency (Hz)	Mixed Duty Cycle (%)	AC Frequency (Hz)	AC Balance (%)	---	---
Mix TIG	0.5	10	0.0	50	---	0.0	10	1	1	50	50	20	---	---

## G. Welding Function Operation



**Warning!** Before turning on the power supply, make sure that the equipment is disconnected to the output. Otherwise, an unexpected arc may be started when the power is turned on. This can cause damage to the work piece and to personnel.



**Warning!** Be sure to wear appropriate protective equipment during welding or cutting operation. Arcs, spatter, smoke, and high temperatures produced in the welding process may cause injury to personnel.



**Warning!** After the power supply is turned off, the output voltage of the welder may continue for a period and then drop slowly. Please do not touch the conductive part of the output before the panel is extinguished.

### G.1 Function Table

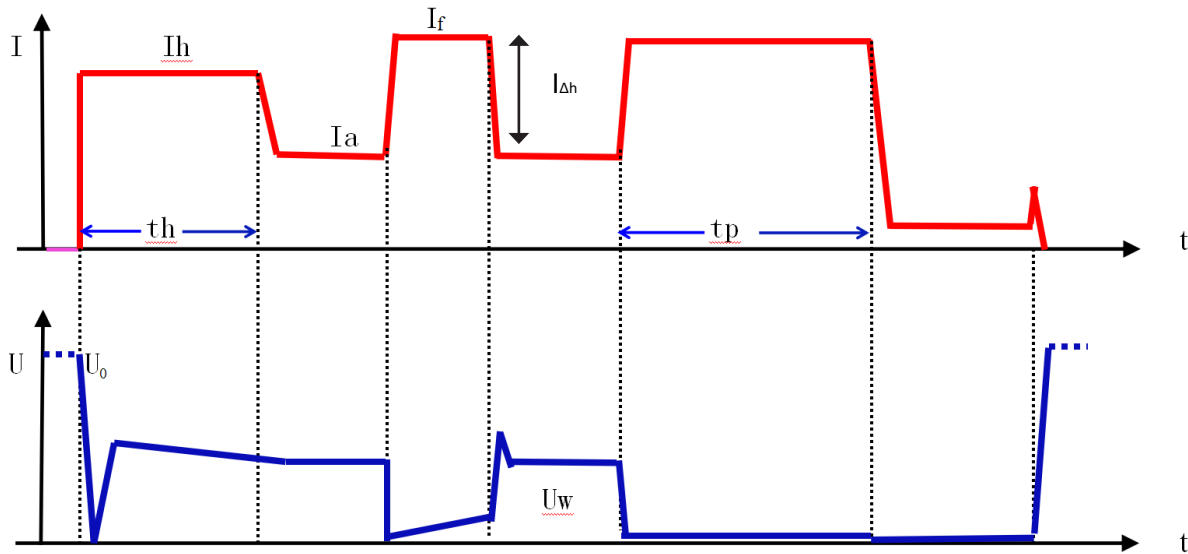
Rotate the Parameter Adjustment Knob to select different welding parameters as required. Regardless of no-load or welding mode, parameter selection and adjustment can be carried out without affecting the welding. Switch the mode by rolling. "•" indicates that the parameter is optional, and "×" means not optional.

Welding Mode	Torch Trigger Mode	MMA Current	Hot Start Current	Arc Force Current	Hot Start Time
DC MMA	No	•	•	•	•
AC MMA	No	•	•	×	•

Welding Mode	Torch Trigger Mode	Pre-flow Time	Initial Current	Up-slope Time	Peak Current	Base Current	Down-slope Time	Stop Current	Post-flow Time	Spot Welding Arcing Time	Spot Welding Crater Welding Time	AC Frequency	AC Balance	Pulse Frequency	Pulse Duty Cycle
DC TIG	Two-step	•	•	•	•	×	•	•	•	×	×	×	×	×	×
	Four-step	•	•	•	•	×	•	•	•	×	×	×	×	×	×
	Repeat	•	•	•	•	×	•	•	•	×	×	×	×	×	×
	Spot Welding	•	×	×	•	×	×	×	•	•	•	×	×	×	×
DC Pulse TIG	Two-step	•	•	•	•	•	•	•	•	×	×	×	×	•	•
	Four-step	•	•	•	•	•	•	•	•	×	×	×	×	•	•
	Repeat	•	•	•	•	•	•	•	•	×	×	×	×	•	•
AC TIG	Two-step	•	•	•	•	×	•	•	•	×	×	•	•	×	×
	Four-step	•	•	•	•	×	•	•	•	×	×	•	•	×	×
	Repeat	•	•	•	•	×	•	•	•	×	×	•	•	×	×
	Spot welding	•	×	×	•	×	×	×	•	•	•	•	•	×	×
AC Pulse TIG	Two-step	•	•	•	•	•	•	•	•	×	×	•	•	•	•
	Four-step	•	•	•	•	•	•	•	•	×	×	•	•	•	•
	Repeat	•	•	•	•	•	•	•	•	×	×	•	•	•	•

Welding Mode	Torch Trigger Mode	Pre-flow Time	Initial Current	Up-slope Time	Peak Current	Base Current	Down-slope Time	Stop Current	Post-flow Time	Spot Welding Arcing Time	Spot Welding Crater Welding Time	AC Frequency	AC Balance	Mixed Frequency	Mixed Duty Cycle
Mix TIG	Two-step	•	•	•	•	×	•	•	•	×	×	•	•	•	•
	Four-step	•	•	•	•	×	•	•	•	×	×	•	•	•	•
	Repeat	•	•	•	•	×	•	•	•	×	×	•	•	•	•

## G.2 MMA Operation

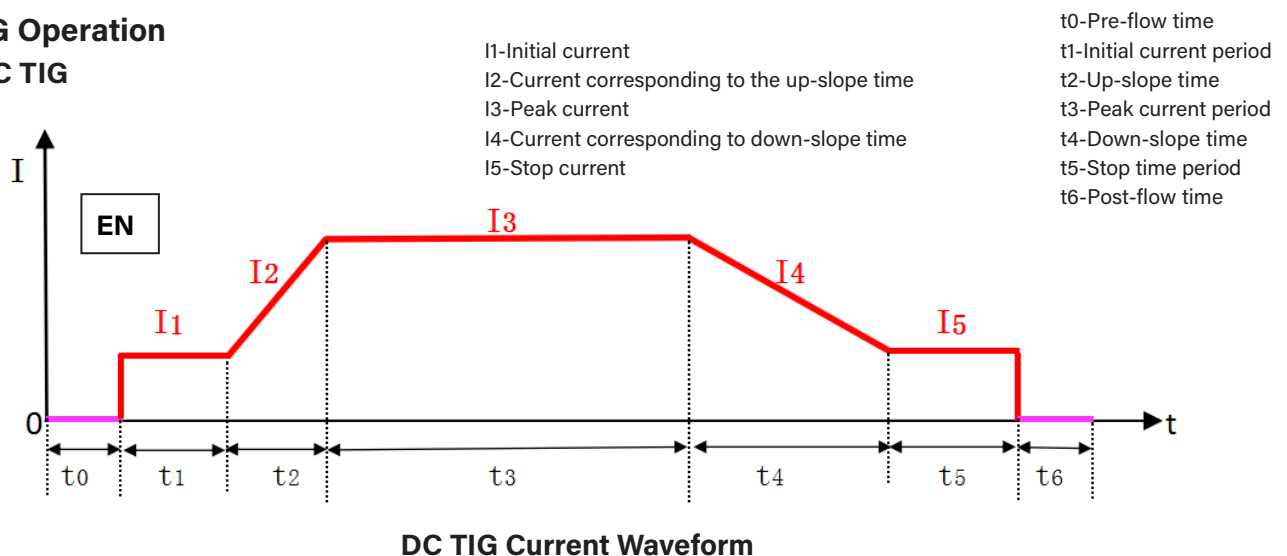


### MMA Electrode Welding Process

1.  $I_h$  (hot start current) =  $I_{\Delta h}$  (start current) +  $I_a$  (welding current), which helps the arc start, and reduces the sticking tendency of the welding electrode and workpiece during start. The hot start current usually depends on the welding electrode type and specification and welding current. For welding electrodes with sound arc start performance and small diameter, generally select a small hot start current; a large welding current also has little requirement for a hot start current. The hot start time  $t_h$  is correlated with the start current – the greater the current, the shorter the arc start time.
2.  $I_f$  (plus arc force current) =  $I_{\Delta f}$  (arc force current) +  $I_a$  (welding current), use the electrode diameter, set current, and process requirements to determine the arc force current. High arc force current settings lead to faster metal transfer and non-sticking electrodes but with some spatter. Lower arc force current settings provide a smooth arc with less spatter and good weld seam formation, but sometimes the arc is soft or the welding electrode can stick. The arc force should be increased especially when welding thick electrodes at a small current. Generally, the arc force is 20–40A during the welding.
3. After the short-circuit time exceeds  $T_p$ , it enters anti-sticking electrode current, which is smaller, until the electrode is separated from the workpiece.
4.  $U_0$  is the no-load voltage and  $U_w$  is the working voltage. When not performing MMA welding, the welder outputs the open circuit voltage  $U_0$  or the VRD voltage.

## G.3 TIG Operation

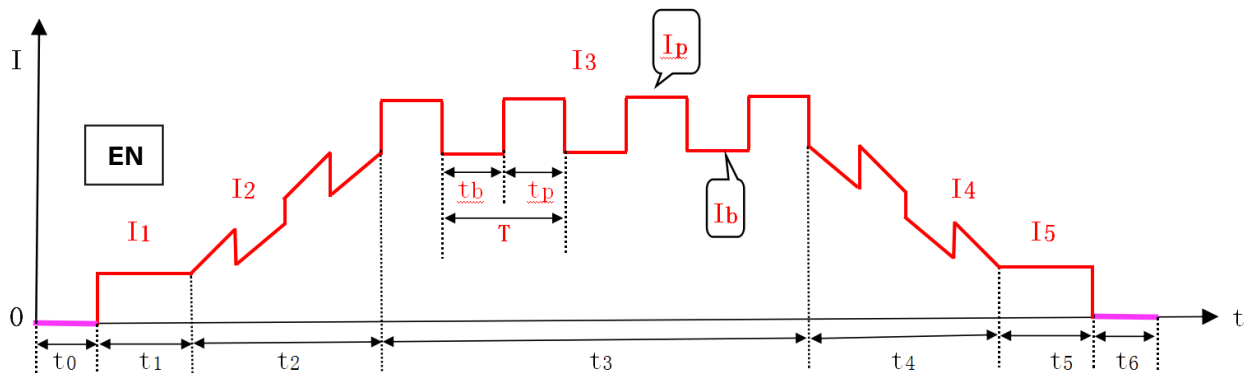
### G.3.1 DC TIG



### DC TIG Current Waveform

- Initial current (I1): The initial current is the current after the torch trigger is pressed to start the arc, which should be determined according to the process requirements. A large initial current facilitates start. However, the initial current should not be too big during the welding of a thin sheet; otherwise, the workpiece may be burned through during start. After the arc is started in some operation modes, the current remains at the initial current to achieve the purpose of preheating the workpiece or lighting.
- Up-slope time (t2): Refers to the time as the current slowly rises from the initial current to the peak current, which can be determined according to the usage and process requirements.
- Peak current (I3): Set by the user according to the actual process requirements.
- Down-slope time (t4): Down-slope time refers to the time when the current drops from the peak to the stop current, which can be determined according to the usage and process requirements.
- Stop current (I5): In some operation modes, the arc is not extinguished after the current down-slope and remains in a state of continuous arcing, which can avoid weld defects or large craters caused by immediately cutting off the output. This current should be determined according to the process requirements.
- Pre-flow time (t0): Refers to the time from pressing the torch trigger to sending argon gas to start. Generally, it should be greater than or equal to 0.5s to ensure that the gas has been sent to the welding torch at normal flow when discharging arc initiation. It should be increased when the gas pipe is long.
- Post-flow time t6: Refers to the time from welding current shut-off to the gas valve closing in the welder. If this time is too long, argon gas waste may result; if this time is too short, the weld seam and electrode may be oxidized because the gas is stopped too early. The post-flow time may be longer for AC TIG or special material welding.

### G.3.2 DC Pulse TIG



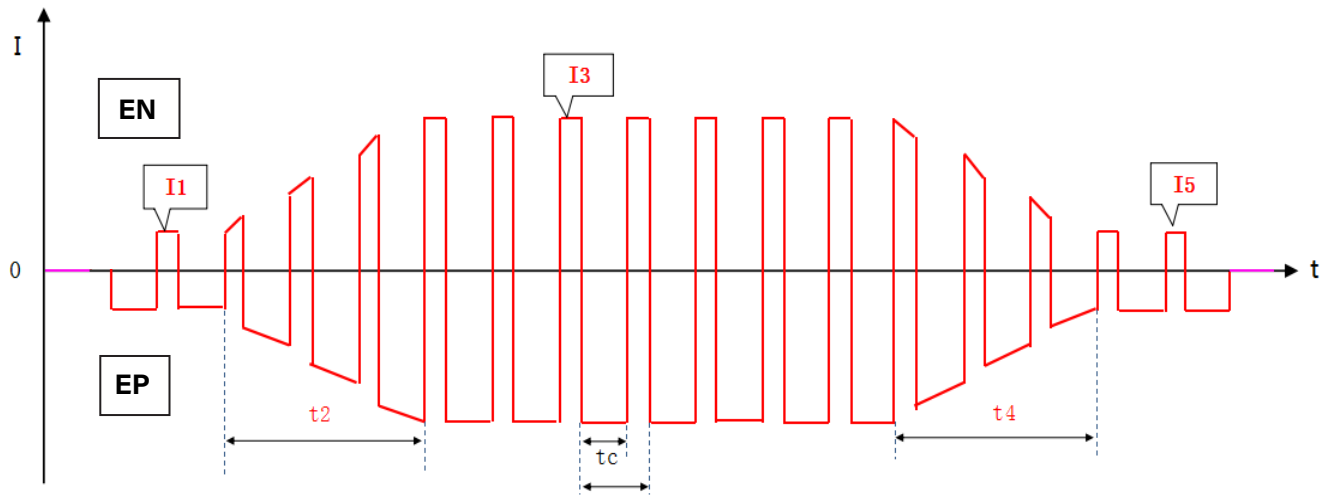
**DC pulse TIG Welding Current Waveform**

- |   |                                      |
|---|--------------------------------------|
| I1-Initial current                            | t0-Pre-flow time                     |
| I2-Current corresponding to the up-slope time | t1-Initial current period            |
| I3-Peak current                               | t2-Up-slope time                     |
| I4-Current corresponding to down-slope time   | t3-Peak current period               |
| I5-Stop current                               | t4-Down-slope time                   |
| IP-Pulse Peak Current                         | t5-Stop Time Period                  |
| Ib-Pulse Low Current                          | t6-Post-flow time tb-Pulse base time |
|   | tp-Pulse peak time                   |
|   | T-Pulse period                       |

Pulse TIG includes all DC TIG parameters, except that the parameters are set differently. The parameters will not be explained again here. In addition, there are 4 adjustable parameters, which are explained separately in conjunction with the figure:

- Peak current (Ip): Maximum pulse current, adjusted according to the process requirements.
- Low pulse current (Ib): Minimum pulse current, adjusted according to the process requirements.
- Pulse frequency (1/T): Pulse period  $T = t_p + t_b$ , adjusted according to the process requirements.
- Pulse duty cycle ( $100\% * t_p / T$ ): the ratio of the peak current duration to the pulse period, adjusted according to the process requirements.

### G.3.3 AC TIG



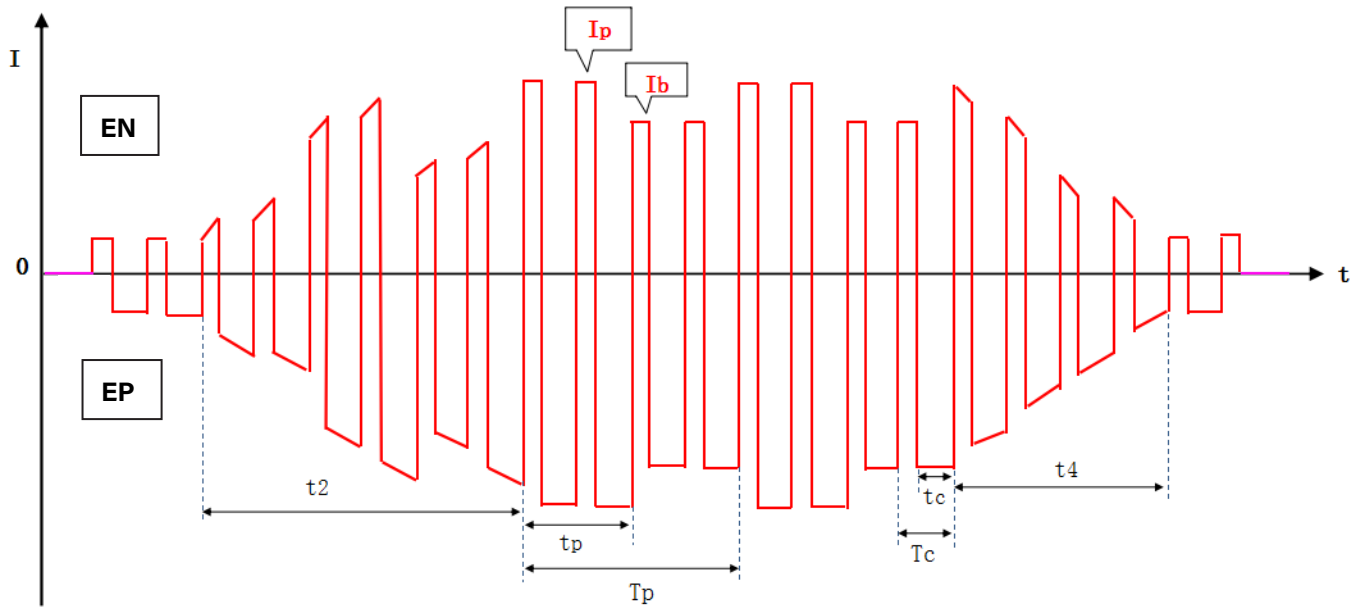
**AC TIG Welding Current Waveform**

- I1-Initial current
- t2-Up-slope time
- I3-Set AC peak current
- t4-Down-slope time
- I5-Stop current
- tc-Cleaning current time
- T-AC period

The AC TIG has three working modes, each with a different output wave, i.e., square wave, triangular wave, and sine wave. The AC TIG pre-flow and post-flow times are the same as the DC TIG mode. Other parameters are described in terms of figures, respectively:

- Initial current (I1), peak current (I3) and stop current (I5): These three parameters are set approximately equal to the effective values of the actual welding current, and can be adjusted as required.
- AC frequency (1/T): Can be adjusted as required.
- AC balance (100%\*tc/T): Generally, the current of the positive tungsten electrode in AC welding is called the cleaning current. Its main function is to break the dense oxide layer of the workpiece, and the AC balance represents a portion of the cleaning current. This parameter is usually 10-40%. When the value is small, the arc is concentrated, the fusion depth is large, and the fusion width is small, and vice versa.

### G.3.4 AC Pulse TIG Welding

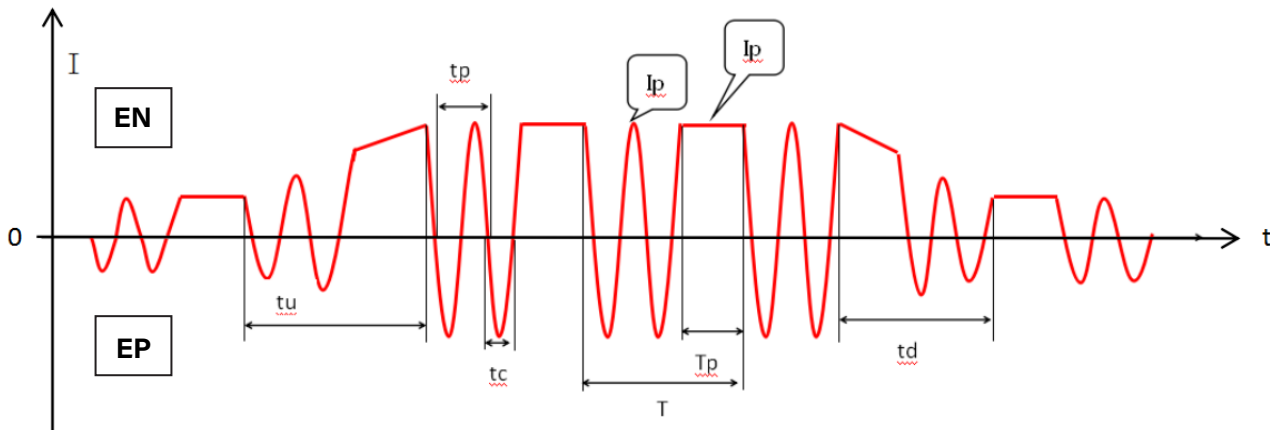


**Current waveform of AC pulse TIG Welding**

tc-Cleaning current time  
Tc-AC period  
tp-Pulse peak time  
Tp-Pulse period  
t2-Up-slope time  
t4-Down-slope time  
Ip-Peak current  
Ib-Base current

- AC frequency ( $1/Tc$ ): Can be adjusted according to process requirements.
- Pulse frequency ( $1/Tp$ ): Can be adjusted according to process requirements.
- Pulse duty cycle ( $100\% \cdot tp/Tp$ ): Can be adjusted according to process requirements.
- AC balance ( $100\% \cdot tc/Tc$ ): Can be adjusted according to process requirements.
- AC pulse TIG welding supports square, triangular and sine output waveforms. AC pulse TIG welding is basically the same as AC square wave TIG welding, but its welding current is controlled by a low-frequency pulse, and therefore changes with the pulse value to form peak and base current, which are the (average) peak and (average) base values of the low-frequency pulse.
- In AC pulse mode, the pulse frequency range is affected by AC frequency and frequency division factor. The minimum frequency division factor is 10, and the maximum is 2 times the AC frequency. Therefore, the pulse frequency range is 0.5Hz to AC frequency/10Hz; the user can select any frequency within that range. When the AC frequency changes, the AC frequency/actual frequency of the current pulse is equal to the frequency division factor, and is updated. After the frequency division factor is determined, the current AC frequency/division factor is set equal to the actual frequency of the current pulse and is saved, so the pulse frequency does not change. After setting the AC frequency and pulse frequency, the frequency division factor is determined, which is equal to the AC frequency/pulse frequency. Example: if the AC frequency is set to 100Hz, the pulse frequency range is 0.5-10Hz. Set AC frequency to 100Hz at the first time, then the pulse frequency is set to 5Hz for the first time, the current frequency division factor is  $100/5=20$ . If the AC frequency is updated to 70Hz, the pulse frequency is 3.5Hz. In other words, when the pulse frequency remains unchanged, the frequency division factor keeps constant. In this case, changing the AC frequency may influence the pulse frequency range.

### G.3.5 Mix TIG Welding



**Current waveform of mixed TIG welding**

tc-Cleaning current time  
tp-AC period  
tp-DC running time  
T-Mixed cycle  
tu-Upslope time  
td-Downslope time  
Ip-Peak set current

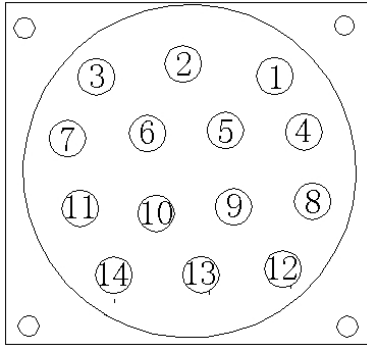
- AC frequency ( $1/tp$ ): Can be adjusted according to process requirements.
- Mixed frequency ( $1/T$ ): Can be adjusted according to process requirements.
- Mixed duty cycle ( $100\% \cdot Tp/T$ ): Can be adjusted according to process requirements.
- AC balance ( $100\% \cdot tc/tp$ ): Can be adjusted according to process requirements.
- Mix TIG welding supports the combination of square, triangular, and sine waveforms with DC.
- In mixed TIG mode, the frequency range of the welding is affected by the AC frequency and frequency division factor. The minimum frequency division factor is 10, and the maximum AC balance is equal to the AC frequency. Therefore, the frequency range of mixed TIG welding is 1Hz to the AC frequency/10Hz, and the user can select any frequency within the range. When the AC frequency changes, the AC frequency/actual frequency of the current mixed TIG welding is equal to the frequency division factor, and is updated. After the frequency division factor is determined, the current AC frequency/frequency division factor is equal to the actual frequency of the current mixed TIG welding and is saved, so it does not change. After setting the AC frequency and mixed TIG frequency, the frequency division factor is determined as the current AC frequency/mixed TIG frequency. Example: If the AC frequency is set to 100Hz, the mixed TIG frequency range is 1-10Hz. Set the AC frequency to 100Hz at the first time and then the mixed TIG frequency is set to 5Hz for the first time, the current frequency division factor is  $100/5=20$ . If the AC frequency is changed to 70Hz, the mixed TIG frequency is changed to 3.5 Hz. In other words, when the mixed TIG frequency remains unchanged, the frequency division factor keeps constant. In this case, changing the AC frequency may influence the mixed TIG frequency range.

### G.3.6 Welding Mode Description of TIG Welding Torch

TIG operation mode has a special convention, which specifies the mode or method of controlling the welding current change by different operations of torch trigger during TIG (DC, pulse, AC TIG, or mixed TIG) welding. The introduction of TIG operation strengthens the application of the torch trigger remote control function, so the user can obtain a practical welder remote controller without additional investment. The TIG mode should be determined according to the process requirements and operator preference. It is described in terms of the following figure:

Legend for commonly-used torch trigger operations			
↓	Press the torch trigger	↑	Release the torch trigger
Mode No.	Operation Schedule	Torch trigger operation and typical DC TIG current curve	
1	Spot welding mode: 1. After the torch trigger is pressed, the start current reaches the peak current value. If the torch trigger is pressed continuously, the spot welding is performed at the output current periodically from the start time $T_{spot}$ to the crater welding time $T_{takt}$ ; 2. Release the torch trigger to extinguish the arc in the spot welding process.		
2	2T mode: 1. Press the torch trigger to increase the arc up to the peak current; 2. Release the trigger to slowly extinguish the arc 3. If the trigger is pressed again before the arc is extinguished, it will slowly increase to the peak current		
3	4T mode: 1. Press the torch trigger to start the arc to the initial current; 2. With the torch switch released, make the striking arc ramp up to the peak current; 3. With the torch trigger pressed, make the striking arc ramp down to the Stop current; 4. Release the trigger to extinguish the arc		
4	Repeat mode: 1. Press the torch trigger to start the arc to the initial current; 2. Release the torch trigger to slowly increase the initial current to the peak current; 3. Press the torch trigger to slowly drop the initial current to the stop current; 4. Release the torch trigger to slowly increase the initial current to the peak current; 5. Repeat steps 3 and 4 until the arc is extinguished by pressing the torch twice within 300ms.		

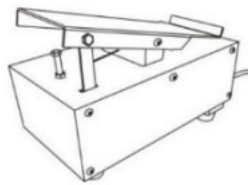
### G.3.7 Aviation socket of the torch trigger



1. Pin1 (power supply VCC), Pin2 (analog signal), and Pin3 (analog ground) are for the analog torch current adjustment.
2. Pin4 (Decrease key), Pin5 (Increase key), and Pin6 (Parameter selection key) are for digital torch adjustment.
3. Pin 7 is the digital torch/analog torch identification terminal. The high level is for the digital torch and the low level is for the analog torch.
4. Pin8 (torch trigger) and Pin9 (power supply ground) are the torch trigger.
5. The aviation socket of the torch trigger can be connected with the digital torch, analog torch, wired pedal controller, and wired handheld controller.
6. With Pin 2 as the common terminal of the potentiometer, when the torch control roller value is 0 and the current value is at the minimum, the resistance of pins 1 and 2 is 10k $\Omega$ , and the resistance of pins 2 and 3 is 0 $\Omega$ ; when the roller value is at the maximum and the current value is at the maximum, the resistance of pins 1 and 2 is 0 $\Omega$ , and the resistance of pins 2 and 3 is 10k $\Omega$ .

Note: Pins 10-14 are spare pins.

### G.3.8 Use of foot pedal controller

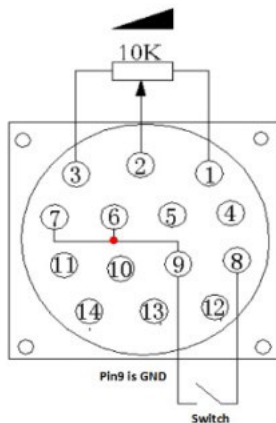


1. The foot remote controller consists internally of a switch and potentiometer, as shown in the figure.
2. Use a dedicated cable to connect the pedal controller to Pins 1, 2, 3, 8, and 9 of the torch trigger's aviation socket on the front panel of the welder.



3. In the no-load state, press **REMOTE** to turn on the **PEDAL** indicator. At this time, the welder is in the foot remote control mode.

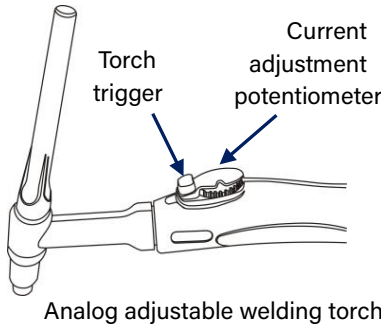
4. Adjust the maximum welding current on the panel to start welding.
5. Step on the foot remote controller to start the arc, generally using the non-contact start mode. After it is started, the welding current will be controlled by the foot remote controller, using the maximum output of the current setting.



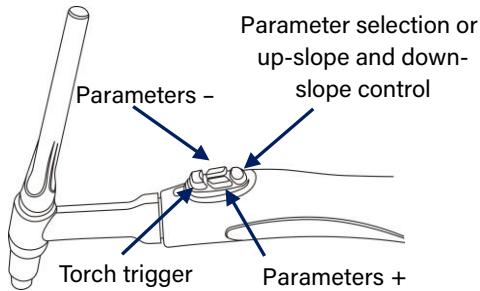
6. Pin 2 is the common potentiometer port. When the foot remote controller current is at the minimum, the resistance of pins 1 and 2 is 10k $\Omega$ , and of pins 2 and 3 is 0 $\Omega$ ; when the current is at the maximum, the resistance of pins 1 and 2 is 0 $\Omega$ , and of pins 2 and 3 is 10k $\Omega$ .

Note: Pins 10-Pin14 are reserved.

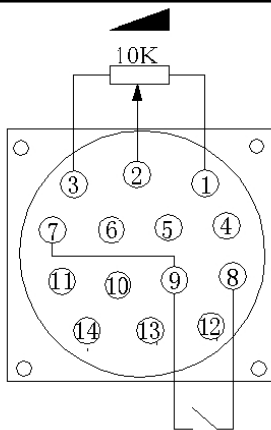
### G.3.9 Use of wired welding torch



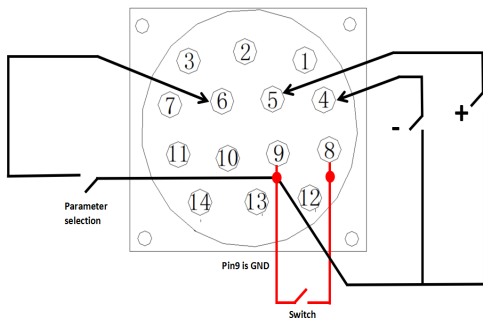
Analog adjustable welding torch



Digital adjustable welding torch



Wiring diagram of the 14-pin analog torch aviation socket



Wiring diagram of the 14-pin digital torch aviation socket

1. The wired welding torch include digital and analog types, as shown in the following figure.

2. Use a dedicated cable to connect the analog welding torch to Pin 1 (power supply VCC), Pin 2 (analog signal), Pin 3 (analog ground), Pin 8 (torch trigger), and Pin 9 (power supply ground) of the torch trigger's aviation socket on the front panel of the welder. Note: Pin 7 (analog torch identification) is connected with Pin 9 when the analog torch is connected. With Pin 2 as the common terminal of the potentiometer, when the torch control roller value is 0 and the current value is at the minimum, the resistance of pins 1 and 2 is 10kΩ, and the resistance of pins 2 and 3 is 0Ω; when the roller value is at the maximum and the current value is at the maximum, the resistance of pins 1 and 2 is 0Ω, and the resistance of pins 2 and 3 is 10kΩ.

3. Use a dedicated cable to connect the digital welding torch to Pin 4 (Decrease key), Pin 5 (Increase key), Pin 6 (Parameter selection key), Pin 8 (Torch trigger), and Pin 9 (Power supply ground) of the torch trigger's aviation socket on the front panel of the welder. Note: Pin 7 of the digital torch is reserved.

4. In the no-load state, press the remote control key to turn on the indicator . At this time, the torch is in the torch control mode.

5. When using the analog welding torch, set the welding parameters on the panel to start welding. During welding, the potentiometer can be used to adjust the welding current from the minimum to the set value.

6. When the digital welding torch is in use, the "Parameter Selection" key on the torch can be used to switch the adjustment parameter; "Parameter Increase" and "Parameter Decrease" keys can be used to adjust the parameter value; and "Torch Trigger" on the welding torch can be used to control the current output.

Wiring of the digital torch:

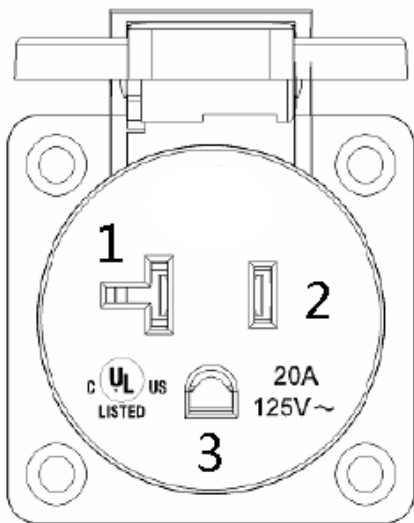
Torch trigger: Pins 8→9; +: Pins 5→9; -: Pins 4→9

Functional parameter selection: Pins 6→9 (Pin 9 is the power supply ground)

**Note: 1. The wired foot remote controller of the analog welding torch is optional. Select it before placing an order if required;**

**Note: 2. The welding parameters cannot be adjusted unless the digital torch is in the torch control mode.**



### G.3.10 Water cooler connector






Water cooler connector

1. The water cooler connector comes with an American aviation socket, which is described as follows:  
Pins 1 and 2 are connected to power supply ports, and the pin 3 is connected to the case ground port.

2. Connect the welder to the water cooler before powering on.


Under no load, press the water cooler control key  to turn on the  ON indicator. The welder will enter water-cooled mode during welding.


3. When the welding is stopped, the water cooler keeps working for 5 minutes. After 5 minutes, the welder will power off the water cooler automatically, and the water cooler enters the energy-saving standby mode. 

4. If the water cooler is not in use, press the water cooler control button  to turn off the  ON indicator and disable the water cooling mode.

Note: The welder can only use the original supporting water cooler. Do not use water coolers purchased from other manufacturers.

## H. Maintenance and Care

 **Warning!** The following operations must be performed by the operator with professional knowledge of electricity and safety. The operator should have valid qualification certificates that prove his/her capability and knowledge background.

 **Warning!** Please make sure that the input cable of the welder is disconnected from the power grid before opening the case.

### H.1 Power Supply Maintenance

1. Regularly check the internal circuit connection of the welder to confirm that the circuit connections are correct, and the connectors are secure (especially for inserted connectors or components). If rust or looseness is found, sandpaper should be used to remove the rust layer or oxide film, then reconnect and tighten it firmly.
- 2) When the welder is energized, do not put hands, hair, or tools near the live devices (such as fan) in the welder to avoid personal injury or damage to the welder.
- 3) Dry and clean compressed air should be used to blow off the dust regularly. If the welder that is used in an environment with heavy smoke and severe air pollution should be dedusted daily. The compressed air pressure should remain at a reasonable level to avoid damage to the small components in the welder.
- 4) Avoid water or moisture entering the interior of the welder. If this condition occurs, the interior of the welder should be dried. Subsequently, use a megohmmeter to measure the insulation condition of the welder (including between the connection nodes and between the connection point and the enclosure). Do not proceed with welding unless confirming that there is no abnormal condition.
- 5) Regularly inspect all cable insulation layers of the welder for damage, wrap them up or replace as necessary.
- 6) Welder not used for a long time should be placed back into the original packaging box and stored in a dry environment.
- 7) Regularly check the power switch, grounding device, welding torch, and coupling output device is required. If such parts are rusted, loosened, or connected improperly, remove the rust, or tighten the loosened and improperly connected parts.

## H.2 Welding torch maintenance


The tungsten electrode argon arc welding torch used in TIG welding serves to hold the electrode, conduct electricity, and deliver the argon gas flow.


Regular maintenance of welding torch is one of the most important measures to ensure its normal operation and improve its life. In order to ensure normal maintenance, the wearing parts of the torch should have spares. Generally, the quick-wear parts of the welder include the collet, nozzle, sealing mesh, insulating washer, etc. Common faults of the welding torch include overheating, gas leakage, water leakage, poor gas protection, power leakage, nozzle burn out, and cracking.

The causes of these faults and troubleshooting methods are as shown in the following table:


Symptom	Causes	Troubleshooting
The welding torch is overheated	The welding torch capacity is too small	Replace with a welding torch with one with large capacity
	The cooling water pipe is blocked, resulting in blockage or low cooling water flow	Blow the cooling pipe with compressed air to clear the blockage
	The collet fails to clamp the tungsten electrode	Replace the collet or electrode cap
Water leakage	The sealing ring is aged	Replace the sealing ring
	The water pipe joint is damaged or not fastened	Reconnect the water pipe and tighten it
	The weld between the welding torch and the water inlet pipe is leaking	Open it to repair the welding
Air leakage	The sealing ring is aged	Replace the sealing ring
	The connecting thread is loose	Tighten it
	The gas inlet pipe joint is damaged or not fastened	Cut off the damaged joint, reconnect and tighten the replaced gas intake pipe or reliably wrap the damaged area
	The gas inlet pipe has been damaged by heat or aging	Replace the gas inlet pipe
Electric leakage	The torch head is wet due to leakage or other reasons	Find the cause of water leakage, and fully dry the electrode holder
	The torch head is damaged or the live metal part is exposed	Replace the torch head or wrap the exposed electrified metal part with adhesive tape
Poor gas protection	The welding torch is leaking	Eliminate the leakage
	The nozzle diameter is too small	Replace with a nozzle of larger diameter
	The nozzle is damaged or cracked	Replace with a new nozzle
	The gas circuit in the welding torch is blocked	Blow the circuit with compressed air to clear the blockage
	The gas screen has been damaged or lost during disassembly and assembly	Replace with a new gas screen
	The argon gas is impure	Replace with qualified argon gas
	The gas flow is too large or small	Adjust the gas flow properly
<i>Arc is started between the electrode holder and tungsten electrode or welding torch</i>	The collet and tungsten electrode have poor contact, or arc is started when the tungsten electrode contacts the base metal	Replace the collet or repair
	The collet and welding torch have poor contact	Connect the collet and welding torch properly

# I. Troubleshooting

 **Warning!** The following operations must be performed by the operator with professional knowledge of electricity and safety. The operator should have valid qualification certificates that prove his/her capability and knowledge background. Please make sure that the input cable of the welder is disconnected from the power grid before opening the case.

 **Warning!** After some models are disconnected from the input power supply, the capacitor in the machine may have a high voltage within a period. Please discharge before testing.

## I.1. Troubleshooting of Common Problems

 **Warning:** The welder may be damaged during use. After you confirm that the welder is damaged, the welder should be repaired promptly. The welder can be repaired only by the personnel who have received professional training. Do not have the welder repaired by non-professional personnel; otherwise, the fault scope may be further extended, or more valuable parts may be damaged.

The faults listed above may be related to the accessories, gas, environmental factors, and power supply you use. Please try to improve the working environment to avoid these faults.

### Troubleshooting of common problems in MMA mode

Symptoms		Causes	Solutions
The fan does not turn or the speed is abnormal after power-on		The temperature is too low or the fan is damaged	When the temperature is too low, allow the machine to work for a period of time until the temperature in the machine increases and the fan rotates normally. If the fan still does not work, replace it with a new one.
MMA	It is hard to start the arc.	Low start current or short arc striking time	Increase the start current or arc striking time as appropriate
	Unsteady arc striking or the arc-striking molten pool is too big	High start current or long arc striking time	Decrease the start current or arc striking time as appropriate
	No normal arc can be initiated.	The power cable is not connected properly.	Connect the power cable properly.
	Electrode sticking.	The arc force is small	Increase the arc force current.
	The electrode holder is hot.	The rated current of the electrode holder is too low.	Use an electrode holder that can handle a higher current.
	The arc is prone to interruption.	The mains voltage is low.	Use it after the grid power supply are back to normal.
Other faults		Please contact Tec Welding Products	

## Elimination of general problems in TIG

Symptoms		Causes	Solutions
The fan does not turn or the speed is abnormal after power-on		The temperature is too low or the fan is damaged	When the temperature is too low, allow the machine to work for a period of time until the temperature in the machine increases and the fan rotates normally. If the fan still does not work, replace it with a new one.
TIG	No current output when the torch trigger is pressed.	Some TIG modes allow welding to end when the torch trigger is pressed	Release the torch trigger and start over
		The welding circuit is open	Check the welding circuit and reconnect it
	No discharge after pressing the torch trigger to start the arc when starting the arc at high frequency	The torch trigger is not inserted properly	Insert the torch trigger
		Excessive spark gap of the discharge plate	Adjust the spark gap of the discharge board (about 1mm)
	Rapid tungsten electrode burnout.	The welding torch and ground cable are connected with polarity reversed	Reverse the two connectors (Note: If the rapid tungsten electrode burnout occurs in the AC TIG mode, please confirm that the AC balance is excessive, it is recommended that the AC balance range is 10%–40%)
	The welding spot is blackened	The welding spots are oxidized due to not being effectively protected	<ol style="list-style-type: none"> <li>1. Ensure that the valve of argon cylinder is open and there is enough pressure. Generally, if the cylinder pressure is lower than 0.5 MPa, it must be refilled.</li> <li>2. Check whether the argon flow rate is normal. You can select the flow rate according to the welding current condition, but too low a flow rate may lead to insufficient shielding gas to cover all weld joints. It is suggested that the argon flow rate be no less than 5L/min, no matter how small the current.</li> <li>3. Check whether the gas path is leaking, or whether the gas purity is too low.</li> <li>4. Check whether there is strong ambient air flow in the environment.</li> </ol>
	Hard to start arc. The arc is prone to interruption	Poor quality or serious oxidation of the tungsten electrode	<ol style="list-style-type: none"> <li>1. The original tungsten electrode is replaced with one with better quality.</li> <li>2. Grind off the tungsten oxide layer.</li> <li>3. Select the setting with a long lagging time for gas shut-off to avoid the oxidization of the tungsten electrode.</li> </ol>
	Unstable current during welding	The mains voltage fluctuates heavily, the mains line is contacted poorly, or other electric consumers cause serious interference.	<ol style="list-style-type: none"> <li>1. Check whether the power grid is normal and connect the power supply properly.</li> <li>2. Connect the welder to the power cable that is not connected with the equipment that may cause serious interference.</li> </ol>
Other faults		Please contact Tec Welding Products	

## 1.2 Error Codes & Solutions

Error Code	Categories	Possible Causes	Countermeasures
Err1	Primary inverter over-heating protection	The welder continuously outputs the maximum current.	Restart the welder. If it is still in over-current protection, contact the after-sales department of the company.
Err2	Secondary inverter over-heating protection	The welder continuously outputs the maximum current.	Restart the welder. If it is still in over-current protection, contact the after-sales department of the company.
Err3	Under-voltage protection	The input mains voltage is too low	Turn off the machine and restart it. If this alarm cannot be eliminated and the mains voltage remains too low, check the power mains voltage and wait for the grid to be normal before welding. If the mains voltage is normal and the alarm persists, contact professional maintenance personnel.
Err4	Over-voltage protection	The input mains voltage is too high	Turn off the machine and restart it. If the alarm cannot be eliminated and the mains voltage remains too high, check the power mains voltage and wait for the grid to be normal before welding. If the mains voltage is normal and the alarm persists, contact professional maintenance personnel.
Err5	Power supply + 15 V under-voltage	Low power supply chip voltage	Turn off the machine and restart it. If the alarm cannot be eliminated, contact professional maintenance personnel.
Err6	Water cooler alarm	The water cooler is not connected, the water cooler has insufficient water, or its overheating protection is triggered.	Check whether the water pipe of the water cooler is connected properly; check whether the water pipeline is bent; check whether the water cooler connector is connected to the welder; if not connected, power off the water cooler and then connect it again. After being connected properly, power on the water cooler. If this problem is not eliminated, contact professional maintenance personnel.
Err10	Abnormal VRD	The output circuit of the welder is short-circuited.	Check whether the output circuit of the welder is short-circuited. After the check, power on the welder. If this problem cannot be eliminated, contact professional maintenance personnel.
Err11	Standby	/	/

**Note: If after applying the above countermeasures, the alarm still persists or reappears after lifting, please contact professional maintenance personnel.**

## K. Packaging, Transportation, Storage, and Waste Disposal

### K.1 Transportation Requirements

In the process of handling the equipment, it should be handled with care, and should not be dropped or severely impacted. Avoid moisture and rain during transportation.

### K.2 Storage conditions

Storage temperature:  $-25^{\circ}\text{C}$  -  $+50^{\circ}\text{C}$

Storage humidity: relative humidity  $\leq 90\%$

Storage period: 12 months

Storage site: indoors with no corrosive gas and air circulation

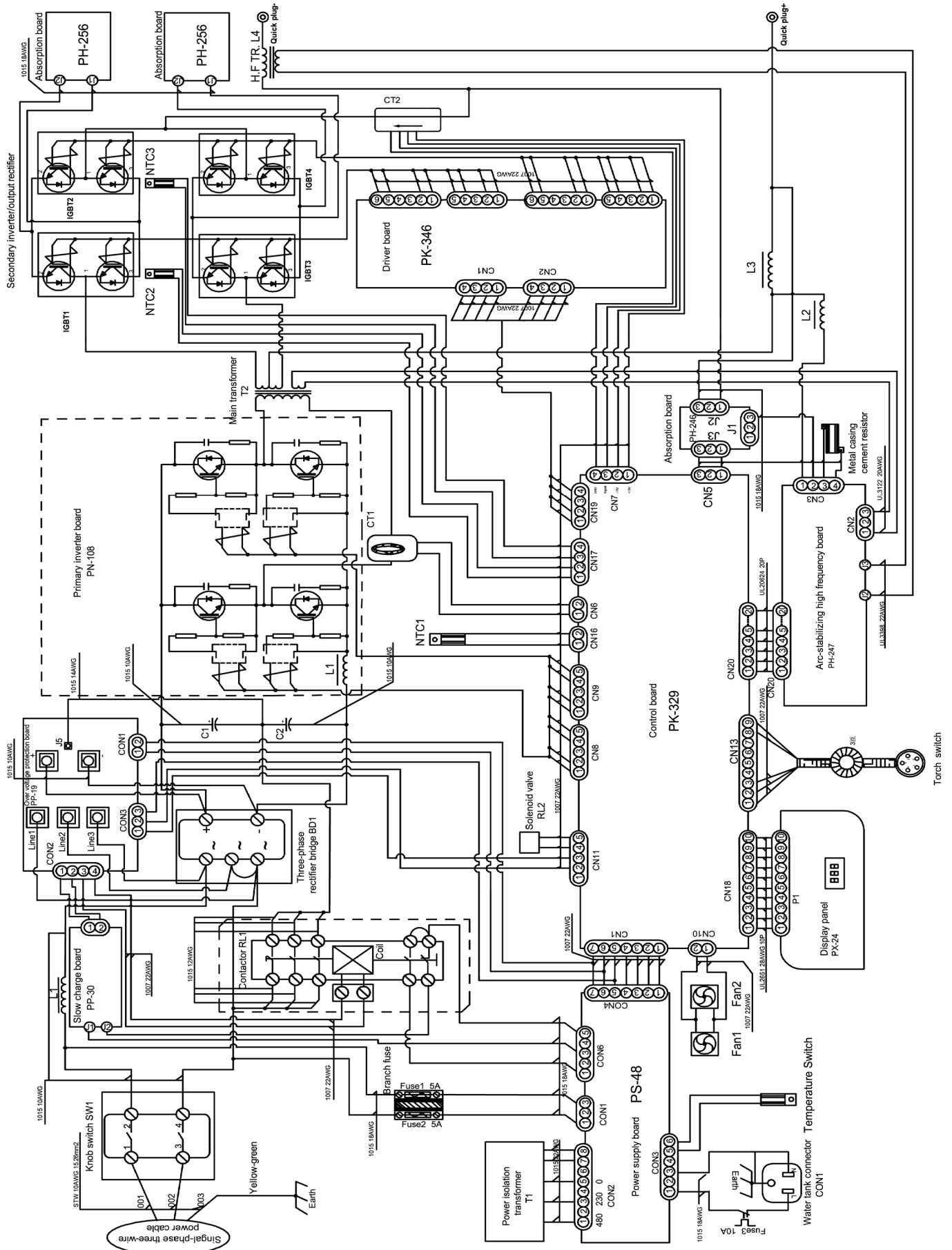
### K.3 Waste disposal



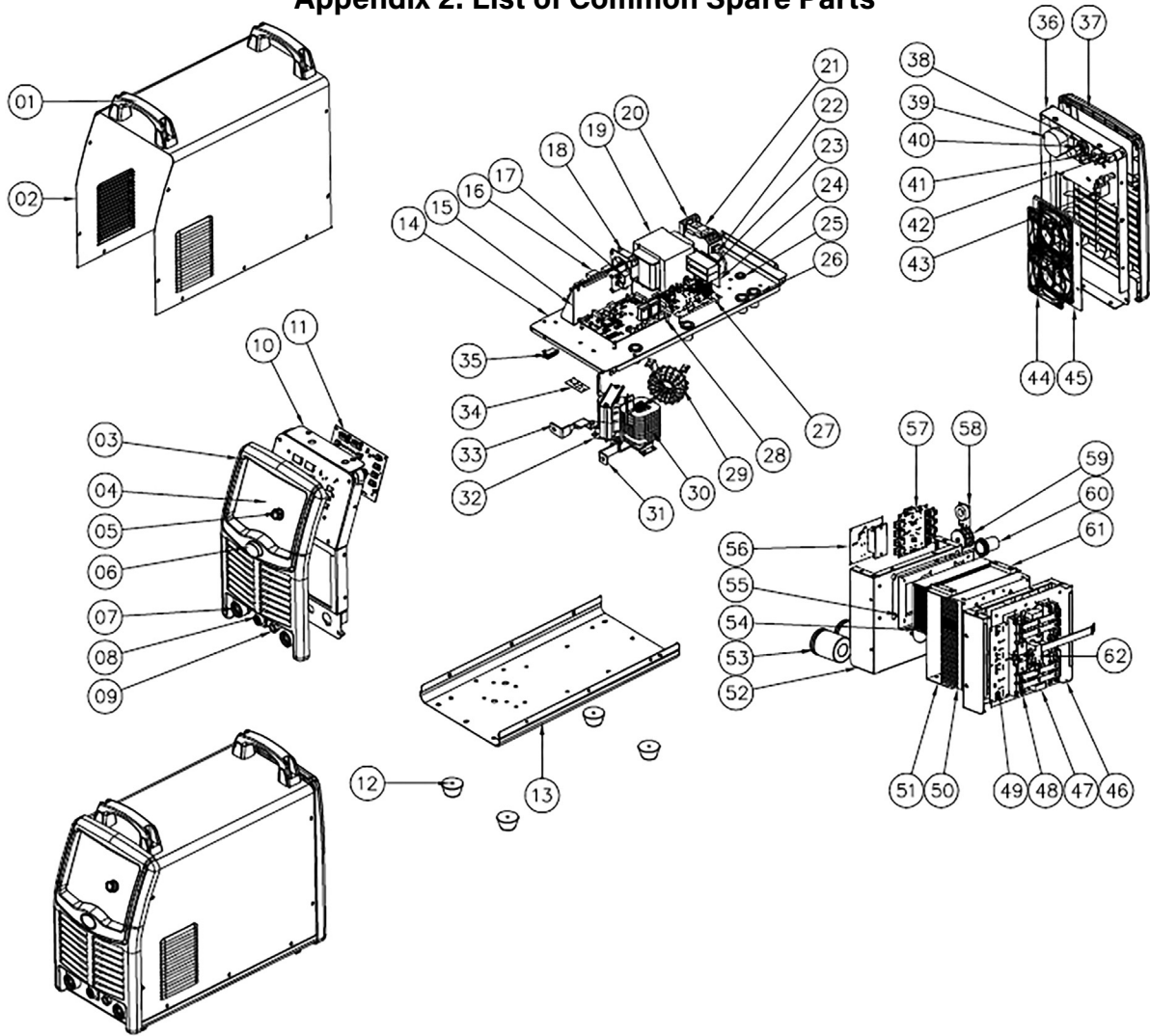
Do not dispose of the equipment with normal waste.

The electric equipment that has reached the end of its service life by referring to the Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), the Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, and national laws must be collected separately and transported to the appropriate environmental protection and recovery agency. The equipment user must be sent to the local recovery center according to the instructions of the local government or representative office. Following these regulations helps protect the environment and human health.

# Appendix 1: Wiring diagram of the machine



## Appendix 2: List of Common Spare Parts



### CobraTig® 360 Parts Assembly

No.	Qty.	Part No.	Description				
1	2	51004820	Handle	32	1		Arc Starter Transformer
2	1		Cover	33	1		Negative Connector
3	1		Front Panel	34	1		
4	1		Front Panel Decal	35	1		
5	1		Knob	36	1		Rear Panel
6	1		Trademark Sticker	37	1		Molded Rear Panel
7	2		Quick Socket	38	1		
8	1		14 Pin	39	1		
9	1		Inlet Nozzle	40	1	51004906	Cable Fastener
10	1		Front Panel	41	1		
11	1		Display PCB Board	42	1		
12	4	10016489	Rubber Feet	43	1		
13	1		Chassis	44	2	51002174	Fan
14	1		Medium Septum	45	1		Fan Mount
15	1		Start Board Support	46	1		Secondary Inverter Support
16	1			47	1		
17	1			48	1	10072719	Secondary Insulation Board
18	1			49	1		
19	1		Power Frequency Transformer	50	1	10072775	Secondary Radiator
20	1		Contact Support	51	1	10072721	Intermediate Insulation Paper
21	1		Contact	52	1		Primary Inverter Support
22	1			53	2	10072246	Electrolytic Capacitor
23	1			54	1	10072748	Primary Radiator
24	1	51002415	PCB Support	55	1	10072720	Primary Insulation Paper
25	1	51000357	Grommet with Skirt	56	1		
26	7	51000358	Grommet with Skirt	57	1		
27	1			58	1		
28	1			59	1	10072135	Energy Storage Induction
29	1		Main Transformer	60	3	51000360	Grommet with Skirt
30	1		Reactor	61	1		
31	1		Positive Connector	62	1		

# LIMITED WARRANTY

USE OF OTHER THAN GENUINE MK PRODUCTS® INC. AND TEC WELDING PRODUCTS® CONSUMABLES, PARTS, AND ACCESSORIES MAY VOID YOUR PRODUCT WARRANTY.

This warranty supersedes all previous MK Products® / Tec Welding Products® warranties and is exclusive, with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - MK Products® Inc. and Tec Welding Products® warrants that all new and unused equipment furnished by MK Products® Inc. and Tec Welding Products® is free from defects in workmanship and material. No warranty is made by MK Products® Inc. and Tec Welding Products® with respect to trade accessories or other items manufactured by others. Such trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any.

MK Products® Inc. and Tec Welding Products® warranty does not apply to components having normal useful life of less than one (1) year, such as and not limited to, tungsten, collets, brushes, and welding gun parts that come in contact with the welding wire, including conduits, gas cups, gas cup insulators, and contact tips where failure does not result from defect in workmanship or material.

MK Products® Inc. and Tec Welding Products® shall, exclusively remedy the limited warranty or any duties with respect to the quality of goods, based upon the following options:

- (1) repair
- (2) replacement
- (3) where authorized in writing by MK Products® Inc. and Tec Welding Products® the reasonable cost of repair or replacement at our Irvine, CA facility.

As a matter of general policy only, MK Products® Inc. and Tec Welding Products® may honor an original user's warranty claims on warranted equipment in the event of failure resulting from a defect within the following periods from the date of delivery of equipment to the original user:

- 1. Power Supplies and Wire Feed Cabinets ..... 3 years
- 2. Weld Heads, Coolers, Positioners, and Push-Pull Guns ..... 1 year
- 3. Spool Guns, and Spool Gun Modules..... 180 days
- 4. Repairs/Exchanges/Parts..... 90 days

Classification of any item into the foregoing categories shall be at the sole discretion of MK Products® Inc. and Tec Welding Products®. Notification of any failure must be made in writing within 30 days of such failure.

A copy of the invoice showing the date of sale must accompany products returned for warranty repair or replacement.

All equipment returned to MK Products® Inc. and Tec Welding Products® for service must be properly packaged to guard against damage from shipping. MK Products® will not be responsible for any damages resulting from shipping.

Normal surface transportation charges (one way) for products returned for warranty repair or replacement will be borne by MK Products® Inc. and Tec Welding Products®, except for products sold to foreign markets.

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