

华威焊割

OPERATING INSTRUCTIONS




For every person who will be engaged in operation and maintenance supervision, it is recommended to read through this manual before any operations, so as to permit optimum operation of this machine. Hold this manual carefully so that you can use it next time.

HK-11WE All-position automatic welding machine for pipelines

Instruction

Thank you very much for purchasing this product. Read this instruction manual thoroughly to insure correct, safe and effective use of the machine. Read the manual first to understand how to operate and maintain the machine. Make sure you read, understand and take all the necessary safety precautions.

Safety Precautions

This product is designed to be safe, but it can cause serious accidents if not operated correctly. Those who operate and repair this machine must read this manual thoroughly before operating, inspecting and maintaining the machine. Keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.

- ★Do not use the machine carelessly without following the instructions in manual.
- ★Use the machine only after you completely understood the contents of the manual.
- ★For safety, it needs a qualified people to equip, check and repair the machine. The operation should be done by people, who understand the manual completely or has abundant experience.
- ★In order to do safety education, you should join a forum, which is organized by welding association and welding union or related association. You should take a welding engineer qualified exam.
- ★After reading the specification sheets, you should keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.
- ★If an explanation in the manual is difficult to understand, contact our company of sales service office. The address and telephone number is on the back of the manual.
- ★If the manual become lost or damaged, place an order with our company or sales service office for a new one.
- ★When transferring the machine to a new owner, be sure to hand over this instruction manual as well.

Symbol	Title	Meaning
	General	General caution, warning and danger
	Be careful not to get your fingers caught.	Possible injury to fingers if caught in the insertion part.
	Caution: Electric shock!	Possible electric shock under special conditions.
	Ground this equipment.	Operators must ground the equipment using the safety grounding terminal.
	Pull out the power plug from the outlet.	Operators must unplug the power plug from the outlet when a failure occurs or when there is a danger of lightning.
	Caution against bursting	Possible bursting under certain conditions.
	General	General warning.
	Caution: Hot!	Possible injury due to high temperature under certain conditions.
	Caution: Ignition!	Possible ignition under certain conditions.
	Notice: magnet!	Magnet may generate magnetic field and magnetic wave.
	Please wear eye protector against light!	Must wear eye protector when observing welding arc.
	Please wear protective mask against dust.	Must wear protective mask when there is dust and fume in the production process.
	Don't elevate!	Don't elevate the machine in case of falling!

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1 Safety Instruction

Operation, inspection, and maintenance that disregard the basic safety rules cause many accidents. Carefully read, understand, and master the safety measures and precautions described in this instruction manual and on the machine before operating, inspecting, and maintaining the machine. The safety messages are classified as indicated on the machine safety labels:

- ★ Read this instruction manual before operating the machine.
- ★ When you equip the firing power, choose fixing position, store high-voltage gas, store productions and dispose abatement, you should do them according to laws and rules.
- ★ There are some precautions in the manual, which can prevent you and other people from damages.
- ★ If you operate the machine wrongly, it may lead to some damages. The damages can be divided into three types, which have individual signs and meanings. The signs and words are pasted on machine for warning.

sign	meaning	illustration
	Danger	It may lead to die or terrible damage.
	Caution	It may lead to die or terrible damage.
	Notice	It may lead to damage. In generally, it is dangerous operations.
	Precaution signs	Precaution signs are show to operator and maintenance person that it may lead the machine or external equipments to be damaged.

- Terrible damages are loss of sight, electric shock, burn, fracture, poisoning and so on, which may lead to sequelae or need be specially cured for a long time. The damage such as burn or electric shock need not be hospitalized cured. The actual damages are losses of assesses.

2 Safety precautions before operation



Precaution

Please obey the following precautions in case of some terrible damages.

- ◆ The welding machine is designed considering the safety factors. But, you must operate it according the precautions in case of the terrible accidents.
- ◆ Must make other people leave away the operating space and work area.
- ◆ The melting machine can create magnetic field, which may influent some sensing devices and clocks. Based on the same factor, people, who has electrical pacemaker in heart, can't be near of the operating machine.
- ◆ For safety, the equipment, maintenance, check, and repair should be done by people, who have been trained.
- ◆ Before operating the machine, you must understand the manual well.
- ◆ The machine must not be use to finish other works besides electric arc welding, which be illustrated in the manual.
- ◆ Don't modify the machine.
- ◆ Before operation, you should check whether it is safe in case of accidents.
- ◆ When you carry the machine, you must catch the handle and carry it smoothly.

- ◆ If you want to touch the machine in the process of welding or after welding, you must wear protective gloves. Don't touch it before the face cools.



Precaution

Please obey the following precautions in case of electric shock.

- ◆ Don't touch charged parts, else it can lead to terrible electric shock or burn. When the power is on, the circuit and inner has charge. The capacity is charged even the power is off. When the welding power put out, the electric pole, metal base and the connected parts are charged.
- ◆ Don't touch charged parts.
- ◆ According to rules to connect distribution box, metal base and other relate connection. All of this should be done by a qualified engineer.
- ◆ Before equipment, maintenance and check, you should cut off the power of carry-in terminal. When you cut off the power, capacity can't be uncharged immediately, so you must make sure there is no residual voltage, then you can do maintenance and check.
- ◆ Do maintenance and check periodically. Repair the broken parts before operating the machine.
- ◆ Don't use broken wire or underpower wire.
- ◆ The connection of the wire should be firmed and insulated
- ◆ You should firm the welding wire on the position of metal base.
- ◆ Don't operate the welding machine under the condition of taking apart the frame or cover.
- ◆ Before you use the machine, you must cover the connector of power.
- ◆ Don't use broken or damp protective gloves and wear damp clothes.
- ◆ Don't operate the machine in outdoor after rain. Don't operate it on the damp floor.
- ◆ Must use life buoy if you operate it on eminence.
- ◆ Cut off all the power if you don't use it.
- ◆ Must equip fuse on the carry-in terminal of the power.
- ◆ Before use it, check the input voltage. The input voltage should be in the range of $\pm 10\%$ of the rated voltage. Don't use it if the voltage is beyond of the scope.
- ◆ There are screw chasers on the metal plug of the hard rubber jacket. You should screw them and make sure no external force pull the plug in the process of welding.
- ◆ Ground the hard rubber jacket wire!
- ◆ You should stop operating, cut off the power and invite professional engineer to repair it if the following cases occur.
 - ▼ The wire is broken.
 - ▼ It is damaged because of the leakage.
 - ▼ Although operating it correctly, some failures occur.
 - ▼ The machine occur failures.
 - ▼ The machine can't operate normally.



Precaution

Use some shields to protect you and other people from aureole, spatter, dross and noise.

- ◆ The aureole contents harmful ultraviolet ray and infrared ray, which may damage you eyes or burn them.
- ◆ The spatter and dross can damage you eyes.
- ◆ The noise can damage your aural comprehension.
- ◆ In the welding process, you should wear effective eye protector and protective gloves to protect you eyes.
- ◆ Set shields to protect others from damaging eyes.
- ◆ In the operating process, you should wear a complete set of shields. Such as leather protective gloves, leg encasing, leather protective skirt, helmet and safe shoes.
- ◆ You should wear safeguard to prevent noise when the noise is too high.



Precaution

Use shield to protect you and others from being damaged by fume in the welding process.

- ◆ There is fume in the process. These fumes can damage your health.
- ◆ If you operate in a small space, it may lead to apnea because of lack of oxygen.
- ◆ You should use antigas-helmet and waste disposal equipment according to the rules to prevent from intoxication and apnea.
- ◆ When the space is small, you should make the air draft well or wear antigas-helmet and ask an empirical person to monitor the welding process.
- ◆ If you weld on steel plate with zinc bed, it can lead to toxic gas. So, you should clear the zinc or wear antigas-helmet.



Precaution

- ◆ Please obey the following precautions in case of the gas bottle leaning or bursting.
- ◆ If the gas bottle leans, it may lead to some terrible accidents.
- ◆ There is high-voltage gas in the bottle. If you don't operate it in right way, the bottle may burst to lead to damages.
- ◆ Dispose the gas bottle according to the rules.
- ◆ Don't make the gas bottle in high temperature.
- ◆ Put the gas bottle on a special base in case of leaning.
- ◆ Don't create electric arc on the gas bottle. Don't put the torch on the bottle and make electric pole connect it.
- ◆ Don't make your head be near of the escape hole when open the bottle.
- ◆ Cover the bottle with shield when the bottle doesn't be used.
- ◆ Use the airmeter made by the same firm or recommended by the firm.
- ◆ Before use the airmeter, you should read the direction for use and operate it according to the rules.
- ◆ Don't use leaking or broken gas bottle
- ◆ The gas bottle only is used to special purpose.
- ◆ Don't smear oil or grease on the bottle.
- ◆ You should contact the distributor when gas bottle is difficult to open.



Precaution

Please obey the following precautions in case of damages by rotary parts.

- ◆ Don't make your hands, hair or clothes near of cooling fan of power or roller wheel of feeder, else you will be seized.
- ◆ Don't make your head near of the end of the torch when the welding wire is going, else the welding wire will damage your eyes.
- ◆ When the welding-wire reel releases, the welding wire may damage you.
- ◆ Don't take apart the frame or cover to use the machine.
- ◆ Let a professional people to take apart frame to do maintenance and check or repair. Set guard rail around the machine in case of other people being near of it.
- ◆ When you move or store welding-wire reel, you should make the welding wire stick to reel.
- ◆ When the welding wire goes into feeder, you should firm it in case of loose.



Precaution

Please obey the following precautions in case of firing, burst or explode.

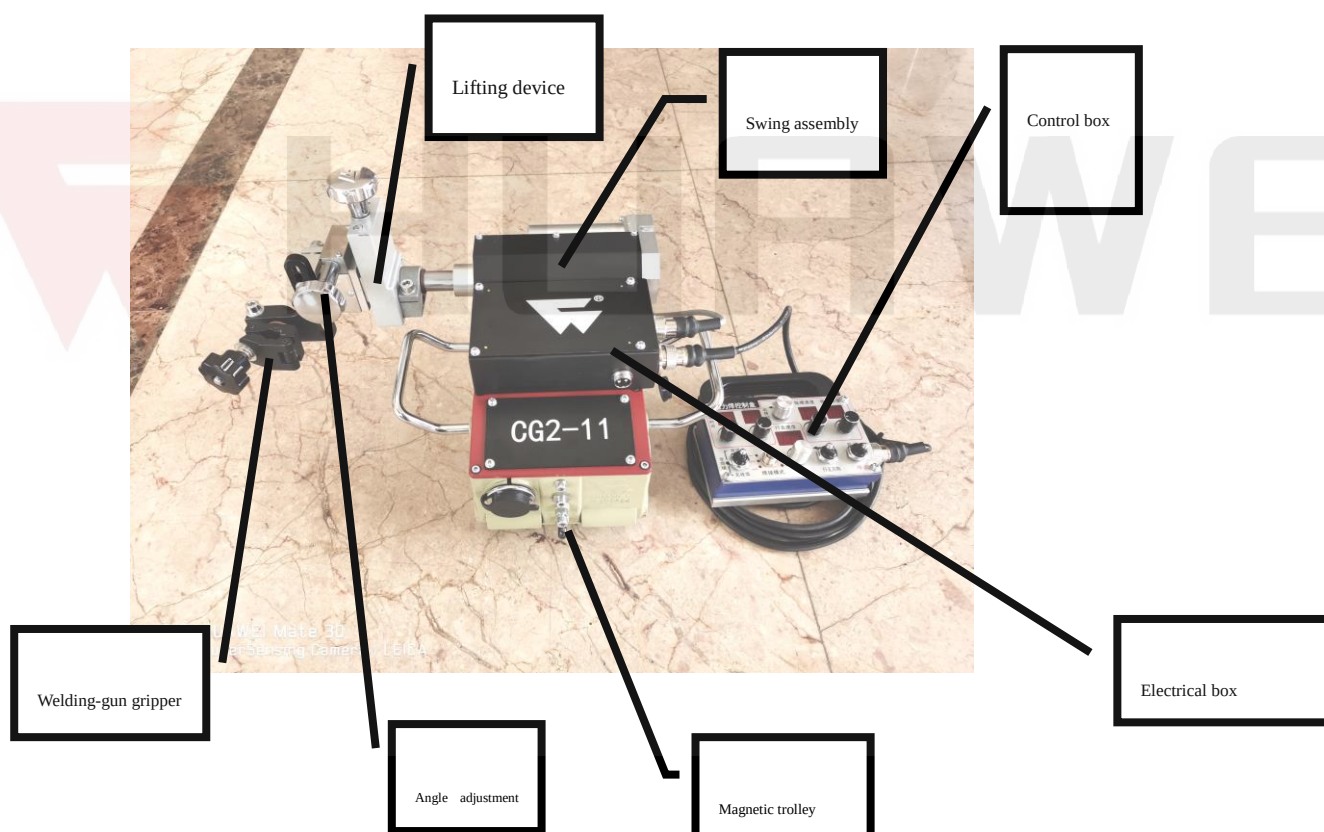
- ◆ The spatter and hot metal base may lead to fire.
- ◆ If the steel bar isn't connected to other parts well, it may lead to fire because the resistance is too hot.
- ◆ If you create electric on oil container, it may lead to explode.

- ◆ Welding on encapsulate container may lead to burst.
- ◆ Don't weld on the space on which the spatter can contact combustibles and don't weld near inflammable gas.
- ◆ Don't put the overheated metal base after welding near combustibles.
- ◆ Welding on floor, wall may lead to fire in room. Before welding, you should take away the combustibles form room.
- ◆ Firm the connector of wire and connect welding conducting wire on the position of metal base.
- ◆ Don't weld bottle full of gas and encapsulated container.
- ◆ In the welding space, there must be annihilator in case of fire.
- ◆ In the welding process, you can't carry cigarette lighter, match and other combustibles.

3 Summary

- **HK-11WE** The all-position automatic welding machine for pipelines adopts the way of pipe fixation and welding trolley walking to realize all-position automatic welding of pipelines. The welding technique adopts high efficiency and low cost gas mental arc welding.
- **HK-11WE** The all-position automatic welding machine for pipelines is characterized by light design and portable carriage, which is especially suitable for the automatic welding of pipeline in construction site and has simple operation, fast welding speed, high production efficiency, low labor intensity, stable welding performance and other characteristics.
- **HK-11WE** The equipment is widely applicable, where the pipes with a diameter of $\phi 150\text{mm}$ or more can be applied. Theoretically, there is no limit on welding wall thickness, and for pipes with thick walls, multi-layer multi-channel welding can be adopted.

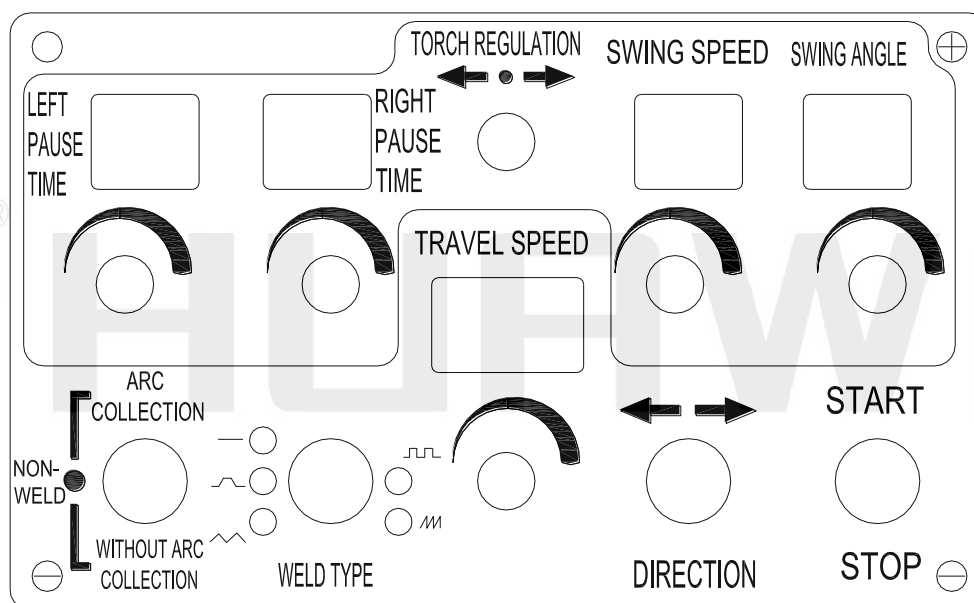
4 Component Descriptions



5 Technical Specifications

Item	Content		Note	Item	Content		Note
Outline dimensions	250X400X210		mm	Machine weight	12Kg (including swinger)		
Packaging dimensions	600X375X405		mm	Package weight	20.5Kg		
Input voltage	220V AC 50/60Hz			Swing motor	Brush motor		
Drive mode	Magnetic wheel drive			Welding speed	50~700mm/min		
Welding-gun adjustment range	Top and bottom	25mm		Swing parameters	Dwell time between left and right	0~2.5S	
	Front and back	360°			Swing speed	0~100	
					Swing distance	±20mm	

6 Descriptions of the Control Panel

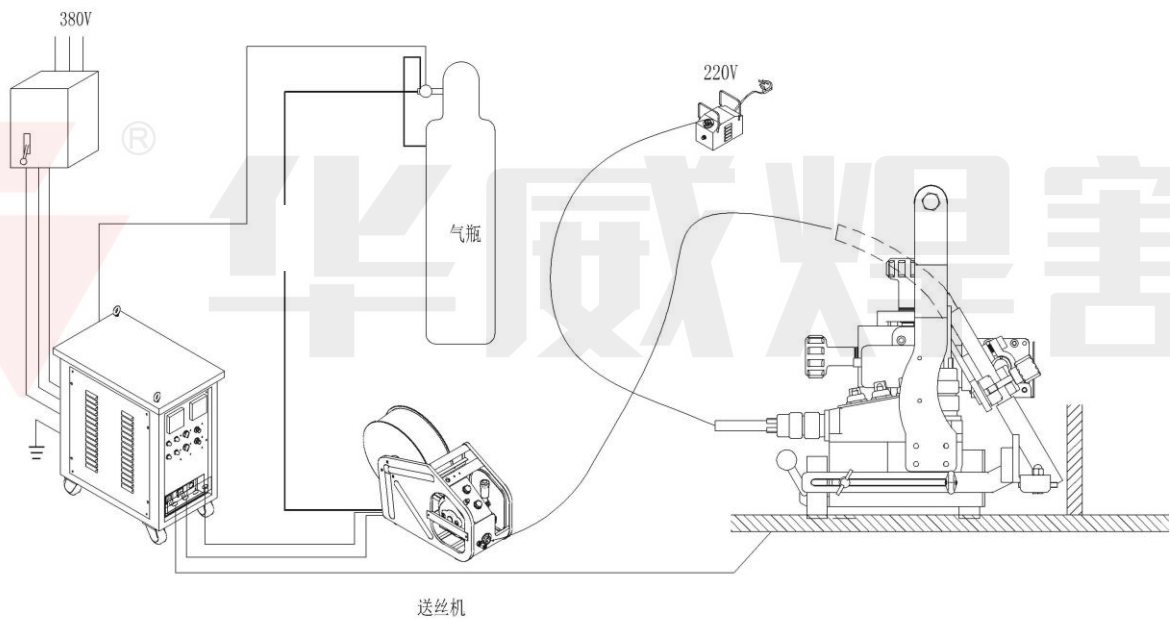


Control system functions of all-position automatic welding machine for pipelines:

- (1) Swing angle: Adjust the angle of reciprocating swing of the swinger when it is moving (note: the adjustment range is from 0 degree to 10 degrees).
- (2) Swing speed: When adjusting, the value can be adjusted by directly rotating the side turn-knob without pressing the button.

- (3) Left dwell time: Rotate the side turn-knob to adjust parameters and set the left dwell time.
- (4) Right dwell time: Rotate the side turn-knob to adjust parameters and set the right dwell time.
- (5) Walking speed: Adjust the walking speed of the equipment during welding (note: the speed range is from 0 to 1200cm/min, and the adjustment range of the electronic screen is from 0 to 100).
- (6) Welding mode: Welding mode button: Press this button once to switch a welding mode. Only the indicator of a certain welding mode is on, indicating that this mode is the current welding mode.
- (7) Arc closing/ Non-welding/Non-arc closing: Selective switch: It is the selective switch of welding and non-welding. If selecting non-welding, press walking switch, the trolley will only simulate welding walking without welding; If selecting arc closing, when the welding is end, the arc will be automatically closed, and the welding appearance effect will be more pretty and comprehensive; If selecting non-arc closing, when the welding is end, the arc will not be automatically closed, and there will be arc pits at the point of welding end.
- (8) Adjusting: It is used to adjust the welding gun to the center of the weld. When the welding gun deviates from the welding line during the welding process, this button can be used to adjust the welding gun without stopping the machine.
- (9) Walking direction: It is to select whether the trolley walks towards left or right.
- (10) Start/stop: When the trolley is walking, if pressing the stop button, the trolley will stop all actions.

7 Installations and Connections



7.1. The installation of the swinger

After installing the moving seat and other components, remove the swinger, loosen the butterfly screw of the gripper, and install the swinger on the connector. Then select the welding mode as required (except for straight line welding, the welding mode can also be reasonably selected according to the actual situation).

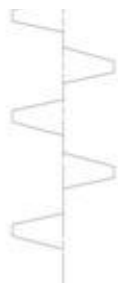
The following are several swing modes for reference:

Modes

4. Only dwell in the middle position



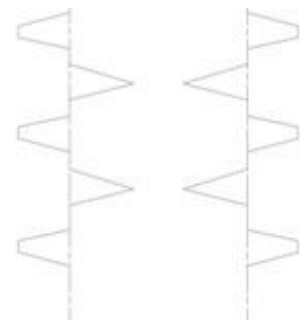
1. Dwell in the left, middle and right positions



3. Dwell at both ends



2. Dwell in the middle and one-end position

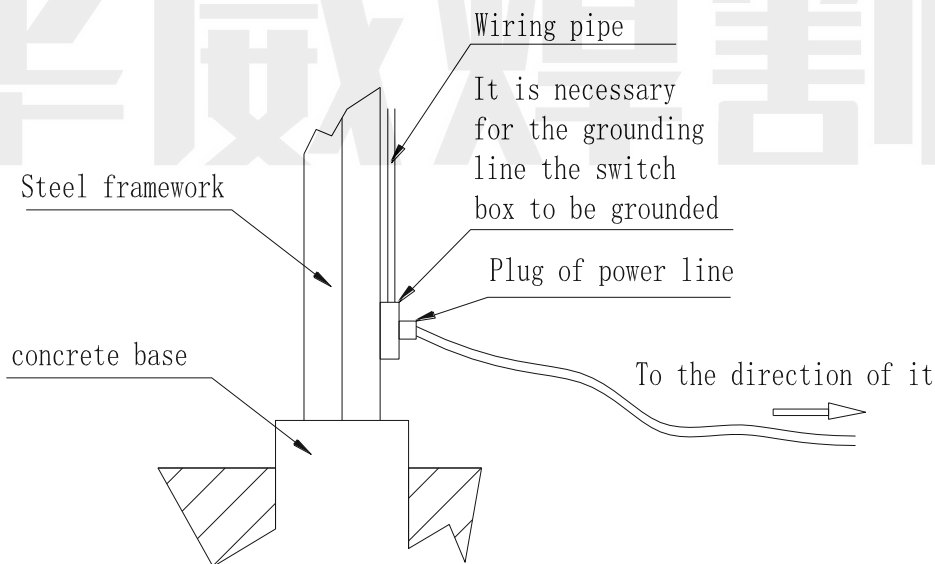


7.2 Precautions for power connection



Note: Before the machine is powered on, please make sure that the input voltage limit is consistent with the requirements specified on the label. If not clear, the machine must not be connected to electricity, and an engineer equipped with electrical professional knowledge must be invited to operate.

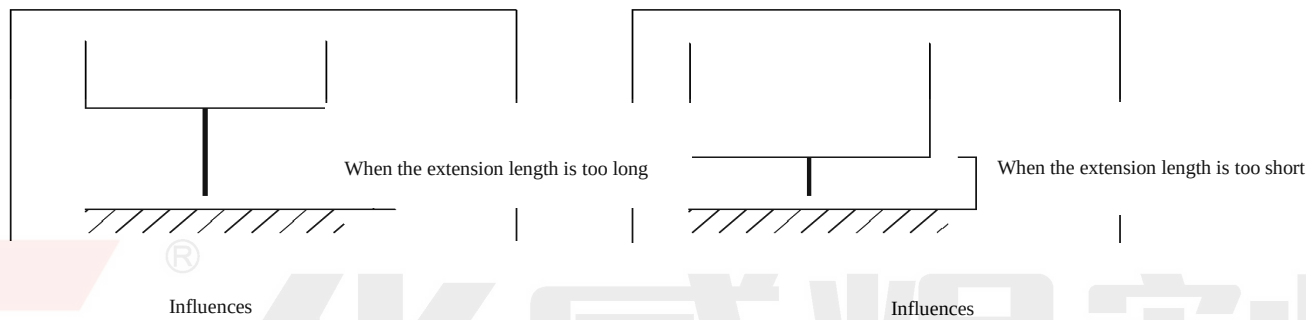
Note: Before connecting the power supply, please make sure proper current grounding.



In order to operate the machine safely, it is necessary to connect the machine with the grounding line as shown in the diagram, and also check the connection condition of the power line, which is as shown on the right:

8 Operations

- (1) Select welding wire diameter switch.
- (2) Select the type of welding wire, which can be solid cored welding wire or flux cored welding wire.
- (3) Turn on the switch of power distribution board -----ON
- (4) Turn on the welding power switch ----ON
- (5) Open the valve of the CO₂ gas cylinder, adjust the pressure to 2~3Kg/cm², and regulate the flow in the "Check" section of the gas switch.
- (6) Send the welding wire to the front end of the welding gun with manual wire feeding, and install the conductive mouth corresponding to the diameter of the welding wire.
- (7) Confirm the extension length of the welding wire.



(8) Place the trolley at the starting point of welding, adjust the extension lengths of the left and right guide rods to be consistent, and lock the two sets of guide wheels when they are tightly against the steel belt.

(9) Clamp the welding gun on the welding gun gripper, and use special spanner to adjust the operation angle and advancing angle of the welding gun.

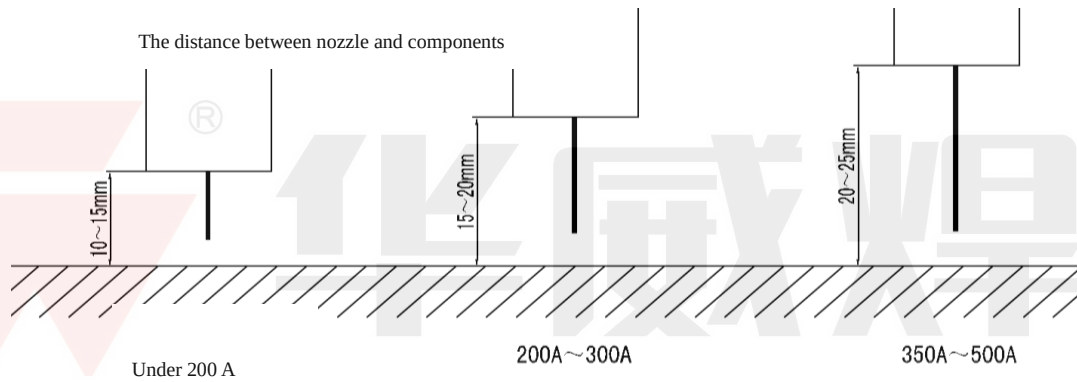
(For CO₂ welding, it is general to adopt left welding method (push welding). In this way, it is easy to observe welding seam shape and gas protection effect.)

The advancing direction and angle of the welding gun.		
The cross-section shape of the welding		

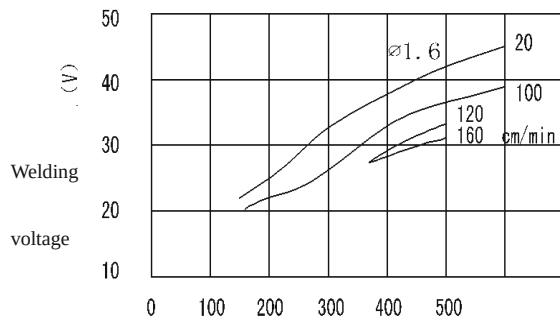
(10) Adjust the position of welding gun and the distance between nozzle and components by adjusting seat.

When the distance between nozzle and components is too large, it is easy to produce defects (such as pores, pits, etc.). Please adjust it

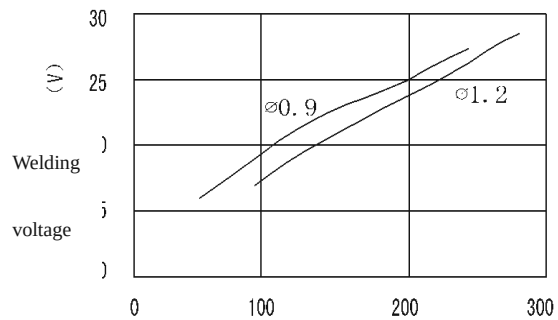
according according to the following figure when using the machine.



(11) Preliminary adjust the process parameters (current and voltage)



Welding current and its corresponding voltage



Welding current and its corresponding voltage

(12) Set the arc closing time of continuous welding or welding seam spacing and arc closing time of intermittent welding.

(13) Confirm the flow of CO₂ gas and the protection effect of molten pool.

(14) Start welding, observe the arc, and adjust the welding speed and other welding process parameters to be appropriate.

9 Welding Process Parameters

Welding parameters	Welding wire diameter	Φ1.2mm	Φ1.4mm	Φ1.6mm
Current (A)	Flat welding	120-300	150-380	180-430
	Flat fillet welding	120-280	150-320	180-380
	Girth welding	120-280	150-300	180-330
Voltage (U)	① $U=14+0.05I$ ② When under 300A, $U=0.041+16\pm1.50$ When above 300A, $U=0.041+20\pm2.0$			
The distance between nozzle and components (H)	When under 200A, $H=10\sim15\text{mm}$ When ranging from 200 to 350A, $H=15\sim20\text{mm}$ When ranging from 350 to 500A, $H=20\sim25\text{mm}$			
The extension length of welding wire (L)	Generally, 10 times of the diameter of welding wire is taken, that is, $L=10d$			

Thickness of the plate(mm)	Width of the welding wire (mm)	Diameter of welding wire D (mm)	Current I (A)	Voltage U (V)	Velocity V (cm/min)	Distance between conductive mouth and components (mm)	Gas flow (L/min)
6	4~4.5	1.2	300-330	30-35	60-70	15-20	20
	6~7	1.2	300-350	30-36	40-45	15-20	20
	6~7	1.6	380-400	37-38	45-50	15-20	20
8	6	1.2	300-350	30-36	40-45	15-20	20
	8~9	1.6	430-480	38-42	40-45	15-20	20
12	10	1.6	430-480	38-42	30-40	15-25	20
	12-13	1.6	450-480	39-42	25-30	15-25	20

The following is swing parameter table for reference:

Thickness of the plate δ (mm)	Swing mode	Swing speed	Swing angle	Dwell time of the left, middle and right (S)
6	Zigzag wave	4~5	1~2	0.1~0.2
8	Zigzag wave	5~6	1~2	0.2~0.4
12	Zigzag wave	7~8	1~2	0.3~0.6

10 Maintenance and Storage of the Welding Trolley

Please repair and maintain the equipment periodically according to the actual use.

1. The dust and splash on the surface of the machine shall be cleaned frequently, especially the driving gear and the machine roller need to be cleaned and lubricated regularly. The deposits of welding -gun head, guiding wheel, driving wheel and slider should be removed to avoid affecting the safe operation of the trolley.
2. The machine shall be cleaned completely at least once a month, where the grease of gearbox shall be replaced and all old and damaged places shall be checked. All damaged components must be inspected, replaced and ensured for safety, including damaged and worn cables.
3. The rotational speed feedback encoder device shall be placed on the back of the motor of the machine swing device, and dust around which should be checked and cleaned. The old swing motor can cause excessive axial movement, which can cause the rotational speed feedback sensor wheel to rub against the sensor housing and results in operation malfunction. Constant careful inspections can prolong the service life of the machine.
4. It is necessary to check frequently whether there is abnormal sound or fever, whether the fuse is blown, whether joints are loose, whether connecting wires, hoses, and welding guns are broken and damaged, whether the bearing is flexible in transport, and whether the moving rod slides easily and freely?
5. Equipment not used for a long time should be stored in a dry environment, and do not put heavy objects on the machine to prevent unnecessary damage.

11 Faults and Countermeasures of the Trolley during Welding

Faults and countermeasures of the CO₂ trolley are shown as follows:

- 1) The power light in the control box is not on.

Causes	Repair measures
The connection of the control line is not in good contact	Replace the control line
The fuse of the control box is blown	Replace the fuse
The AC220V power supply is abnormal	Confirm the power supply

- 2) The welding start switch does not work

Causes	Repair measures
The welding wire is not in good contact	Remove the welding slag
The driving motor burns out	Replace or repair thing drive motor
The selective switch of welding/non-welding is damaged	Check the circuit or replace the switch

- 3) The welding point of the welding gun is inconsistent with the target position

Cause	Repair measure
The fixed mount of welding gun is not tightened	Tighten the fixed mount

- 4) The adjusting rod is not flexible

Cause	Repair measure
There are deposits in the slide block section	Remove deposits or add lubricating oil

- 5) The trolley shakes during automatic welding.

Causes	Repair measures
There are barriers in the advancing direction of the trolley	Remove the barriers
There are deposits on the guiding wheel	Clean deposits

- 6) When the welding stops, the switch is pressed, while the welding arc is not eliminated.

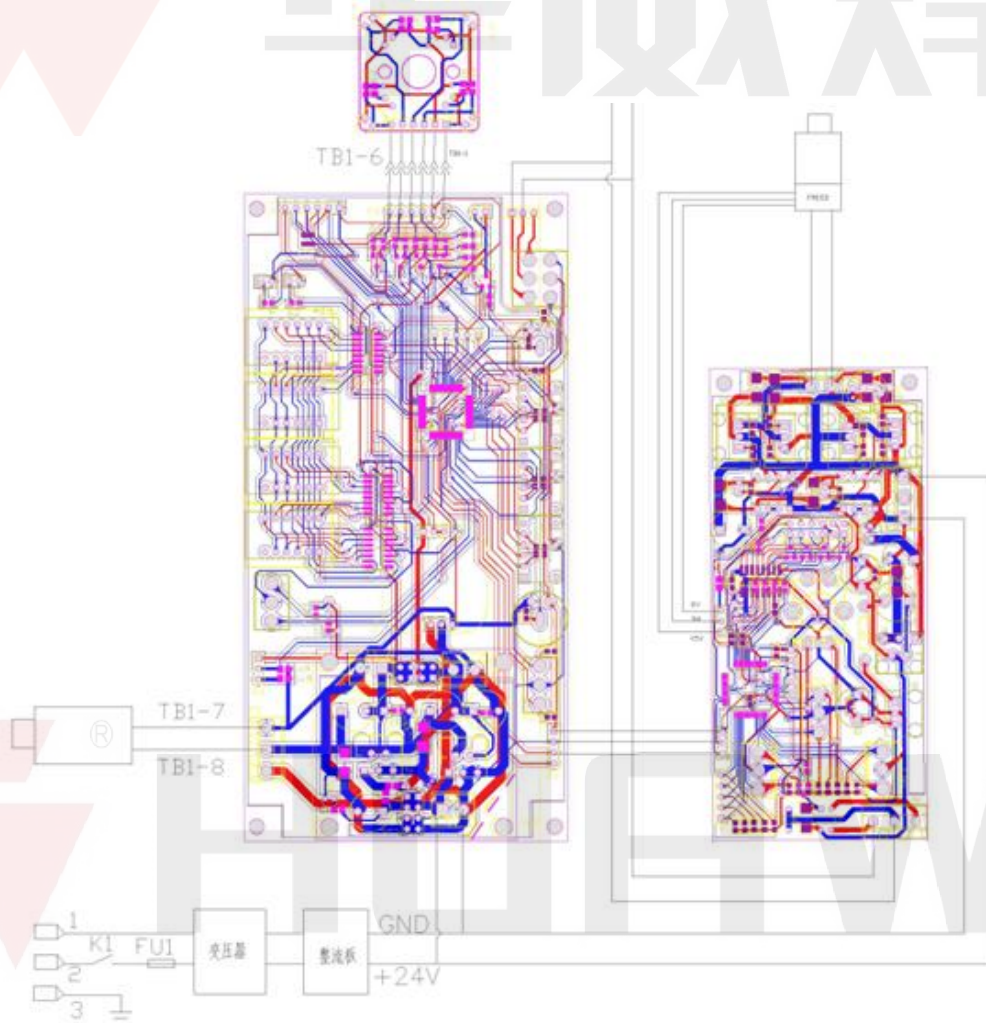
Causes	Repair measures
Welding stop switch is in fault	Check and replace the switch
Self-protection circuit switch is placed in the "On"	Place the self-protection circuit switch in the "No"

position	position
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7) The welding is not performed as the welding seam track.

Cause	Repair measure
The position of the guiding wheel is not fixed properly	Reposition the guiding wheel and fix it

12 Electrical Wiring Diagram



13 Warranty Descriptions

Since the date of delivery (invoice date), if the welding machine is properly used in strict compliance with the terms stated in the operation manual, and the whole machine (except the wearing parts) is faulty due to quality reasons, we will provide free maintenance for six months. According to the regulations, the following conditions are not covered by the free warranty:

- 1) Damage caused by improper transportation and storage after purchase.
- 2) Damage caused by failure to use the machine in accordance with the instructions manual and voltage

exceeding the specified range.

- 3) Products without valid warranty cards and invoices.
- 4) Products inconsistent with the warranty cards and equipment contents
- 5) Damage caused by force majeure factors such as natural disaster.
- 6) Any damage caused by dismantling by non-professional personnel.
- 7) Damage caused by failure to use accessories sold by our company.

14 Contact Details

If you have any comments, suggestions or unsolvable faults in the process of using the machine, please go to our homepage for inquiry (www.huawei.sh.cn) or consult our technical department to inform us of the relevant content(Tel: [021-69590305](tel:021-69590305), service time: 8:00 to 16: 30 each Monday to Saturday). Thanks for your cooperation!

Note: Shanghai Huawei Welding and Cutting Machinery Co., LTD reserves the right of final interpretation of this manual.

The specifications and technical content of this product are subject to change without prior notice!

Thanks for choosing our products

Our main product:

CG1-30 Series	Trolley-type flame cutting machine
CG1-30H	High-speed trolley-type cutting machine (Plasma cutting torch is available)
CG1-100	Flame cutting machine(Double cutting torches)
CGD2-100	Multi-head flame cutting machine (Three to five sets of cutting torches)
CG1-2H	H-type steel cutting machine
CG1-75	Steel ingot cutting machine
CG1-13	Multi-direction cutting machine
CG2-150	Series swing-type copying cutting machine
CG2-2700	Movable swing-type copying cutting machine(with a cutting diameter of 2700 mm)
CG2-600 Series	Circle cutting machine
CG2-11 Series	Pipeline cutting machine
HK-PIPE Series	Intersecting pipe end cutting machine
HK-30 Series	Hand-held cutting machine
HK-55	Hand-held automatic cutting machine
HK-600D	Automatic pipe hole cutting machine
HK-66	Hand-pulling walking machine
KMQ Series	Hand-held copying cutting machine
HK Series	Automatic welding trolley
HW-2000	Automatic welding machine
ISY Series	Internal-rising electric pipe beveling machine
ISD Series	Electric pipe end machine
GPK Series	Pneumatic pipe beveling machine
CHP Series	Flat-scope beveling machine
CG Series	Multi-head straight-line flame cutting machine(Five to twenty sets of cutting torches)
HNC Series	Numerical control flame/plasma cutting machine
HNC-1000W Series	Miniature numerical control cutting machine

XG Series	Numerical control intersecting line cutting machine
ZYHC Series	Self-controlled far infrared welding electrode drying furnace
TRB Series	Welding electrode thermostat container
YJJ-A Series	Suction-type flux cutting drying box

Auxiliary materials and accessories for welding and cutting: oxygen, acetylene, propane, argon, CO₂ pressure reducer, manual welding and cutting torch, manual welding and cutting nozzle, isobaric acetylene cutting nozzle, isobaric propane cutting nozzle, nozzle cleaner, pipeline bushing bar and other welding and cutting accessories.

Details

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