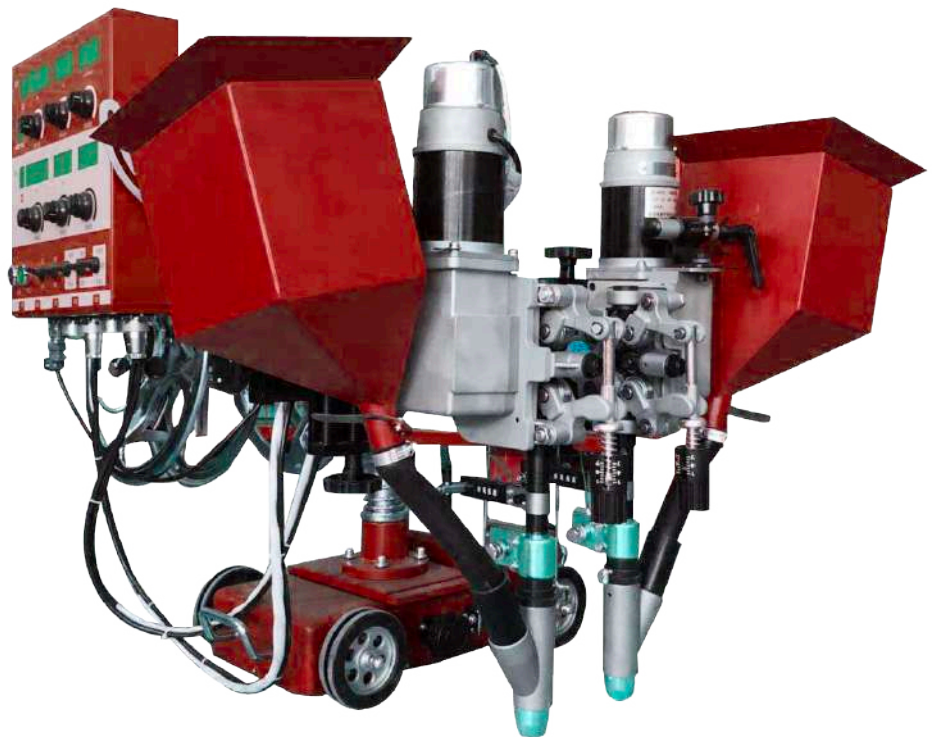


SAW TANDDEM TRACTOR



GeKaMac[®]



SAW TANDDEM TRACTOR

Users Manual

Please Read and Understand This Manual
Before Operating The Welding Machine

www.gedikwelding.com

Dear Customer

This instruction manual will help you get to know your new machine. Read the manual carefully and you will soon be familiar with all the many great features of your new product. Meanwhile, please remember well safety rules and operate as instruction.

If you treat your product carefully, this definitely helps to prolong its enduring quality and reliability—things which are both essential prerequisites for getting outstanding results.

Production specification may change without advance notice.

The model you purchase is:

SAW TANDEM TRACTOR

Please find corresponding models from the "Contents".

Important:

Please take special note of safety rules and operate as instruction in case of damage and serious injury.

Safety Rules



“**Danger**” indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



“**Warning!**” indicates a possible hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are explained in the text.



“**Caution**” indicates a possible hazardous situation which, if not avoided, may result in slight or moderate injury.



“**Note!**” indicates a situation which implies a risk of impaired welding result and damage to the equipment.



Utilization for intended purpose only

- The machine may only be used for jobs as defined by the “Intended purpose”.
- Utilization for any other purpose, or in any other manner, shall be deemed to be “not in accordance with the intended purpose”. The manufacturer shall not be liable for any damage resulting from such improper use.



Safety signs

- All the safety instructions and danger warnings on the machine must be kept in legible condition, not removed, not be covered, pasted or painted cover.



Safety inspection

- The owner/operator is obliged to perform safety inspection at regular intervals.
- The manufacturer also recommends every 3-6 months for regular maintenance of power sources.



Electric shock can kill

- Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In MIG/MAG welding, the wire, drive rollers, wire feed housing and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.
- Do not touch live electrical parts of the welding circuit, electrodes and wires with your bare skin or wet clothing.
- The operator must wear dry hole-free insulating welding gloves and body protection while performs the welding.
- Insulate yourself from work and ground using dry insulating protection which is large enough to prevent you full area of physical contact with the work or ground.
- Connect the primary input cable according to rules. Disconnect input power or stop machine before installing or maintenance.
- If welding must be performed under electrically hazardous conditions as follow: in damp locations or wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or in occasion when there is a high risk of unavoidable or accidental contact with the work piece or ground. Must use additional safety precautions: semiautomatic DC constant voltage (wire) welder, DC manual (Stick) welder and AC welder with reduced open-load voltage.
- Maintain the electrode holder, ground clamp, welding cable and welding machine in good, safe operating condition. Replace damaged part immediately.



Electric and magnetic fields (EMF) may be dangerous

- If electromagnetic interference is found to be occurring, the operator is obliged to examine any possible electromagnetic problems that may occur on equipment as follow:
 - mains, signal and data-transmission leads
 - IT and telecoms equipment
 - measurement and calibration devices
 - Wearers of pacemakers
- Measures for minimizing or preventing EMC problems:
 - Mains supply

If electromagnetic interference still occurs, despite the fact that the mains connection in accordance with the regulations, take additional measures

- Welding cables

Keep these as short as possible

Connect the work cable to the work piece as close as possible to the area being welded.

Lay term well away from other cables.

Do not place your body between your electrode and work cables.

- Equipotential bonding
- Workpiece grounding (earthing)
- Shielding

Shield the entire welding equipment and other equipment nearby.

ARC rays can burn



- Visible and invisible rays can burn eyes and skin.
- Wear an approved welding helmet or suitable clothing made from durable flame-resistant material (leather, heavy cotton, or wool) to protect your eyes and skin from arc rays and sparks when welding or watching.
- Use protective screens or barriers to protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or material.

Fumes and gases can be dangerous



- Welding may produce fumes and gases, breathing these fumes and gases can be hazardous to your health.
- When welding, keep your head out of the fume. If inside, ventilate the area at the arc to keep fumes and gases away from the breathing zone. If ventilation is not good, wear an approved air-supplied respirator.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator.
- Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

Welding and cutting sparks can cause fire or explosion



- When not welding, make sure the electrode circuit is not touching the work or ground. Accidental contact can cause sparks, explosion, overheating, or fire. Make sure the area is safe before doing any welding.
- Welding and cutting on closed containers, such as tanks, drums, or containers, can cause them to blow up. Make sure proper steps have been taken.
- When pressure gas is used at the work site, special precautions are required to prevent hazardous situations.
- Connect work cable to the work as close to the welding zone as practical to prevent welding current from passing too long and creating fire hazards or overheat.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Be attention that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas and start a fire. Remove fire hazardous from the welding area, if not possible, cover them thoroughly. Do not weld where flying sparks can strike flammable material and where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Protect yourself and others from flying sparks and hot metal. Remove any combustibles from operator before perform any welding.
- Keep a fire extinguisher readily available.
- Empty containers, tanks, drums, or pipes which have combustibles before perform welding.
- Remove stick electrode from electrode holder or cut off welding wire at contact tip when not in use.
- Apply correct fuses or circuit breakers. Do not oversize or bypass them.

Cylinder can explode if damaged



- Pressure gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.
- Cylinders should be located away from areas where they may be struck or subjected to physical damage. Use proper equipment, procedures, and sufficient number of persons to lift and move cylinders.
- Always install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling over or tipping.
- Keep a safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- No touching cylinder by welding electrode, electrode holder or any other electrically "hot" parts. Do not drape welding cables or welding torches over a gas cylinder.
- Use only correct compressed gas cylinders, regulators, hoses, and fittings designed for the process used; maintain them and associated parts in good condition.
- Use only compressed gas cylinders containing the correct shielding gas for the and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Open the cylinder valve slowly and keep your head and face away from the cylinder valve outlet.
- Valve protection caps should be kept in place over valve expect when the cylinder is in use or connected for use.

**Hot parts can burn**

- Do not touch hot parts with bare hand or skin.
- Ensure equipment is cooled down before perform any work.
- If touching hot parts is needed, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

**Flying metal or dirt can injure eyes**

- When welding, chipping, wire brushing, and grinding can cause sparks and flying metal. It can hurt your eyes.
- Remember wear appropriate safety glasses with side shields when in welding zone, even under your welding helmet.

**Noise can damage hearing**

- Noise from some processes or equipment can damage hearing.
- Remember wear approved ear protection to protect ears if noise level is high.

**Moving parts can injure**

- Stay away from moving parts such as fans.
- Stay away from pinch points such as drive rolls.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for servicing and maintenance.
- Reinstall doors, panels, covers, or guards when servicing and maintenance is finished and before reconnecting input power.

**Overuse can cause overheating**

- Use machine follow duty cycle. Reduce current or reduce duty cycle before starting to weld again.
- Allow cooling period.
- Do not block or filter airflow to unit.

**Static can damage PCB**

- Always wear wrist straps before touching PCB or parts.
- Use proper static-proof bags and package to store or move PCB.

**Safety markings**

- Equipment with CE-markings meets the basic requirements of the Low-Voltage and Electromagnetic Compatibility Guideline (e.g. relevant product standards according to EN 60 974).

**Safety markings**

- The equipment with the CCC mark meets the basic requirements stipulated in the Chinese standards GB / T15579.1-2013 and GB / T8118.

**Safety markings**

- This marking means that the product is certified for both the U.S. and Canadian markets, to the applicable U.S. and Canadian standards. The preferred location of the indicators is as shown.

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1-GENERAL REMARKS

Saw Tandem Tractor can form a Tandem system with AC and DC welding machines to complete the double-wire submerged arc welding process, which is used to weld various butt welds, lap welds, fillet welds, etc. Materials that can be welded include carbon structural steel, low alloy steel, heat-resistant steel, etc.

1-1 Features

Highlights as follows:

- Stable walking and wide welding range.
- Adopt cross carriage to make vertical and horizontal movements, cooperate with multi-angle displacement wire feed head, easy and flexible to adjust, adapt to multi-position welding.
- A 4-wheel drive wire feeding device with straightening mechanism is adopted, which has low mechanical loss, strong wire feeding force and good welding stability.
- DC and AC are independently adjustable, and can be used in three submerged arc welding methods: single front wire (single DC), single rear wire (single AC), and double wire double arc (DC + AC);
- Fault self-diagnosis function.

1-2 Duty cycle

Duty cycle is percentage of 10 minutes that a machine can weld at rated load without overheating. If overheats, thermostat(s) will open, output stops. Wait for fifteen minutes for the machine to cool down. Reduce amperage or duty cycle before welding.



Note! Exceeding duty cycle can damage the machine and greatly reduce its lifespan

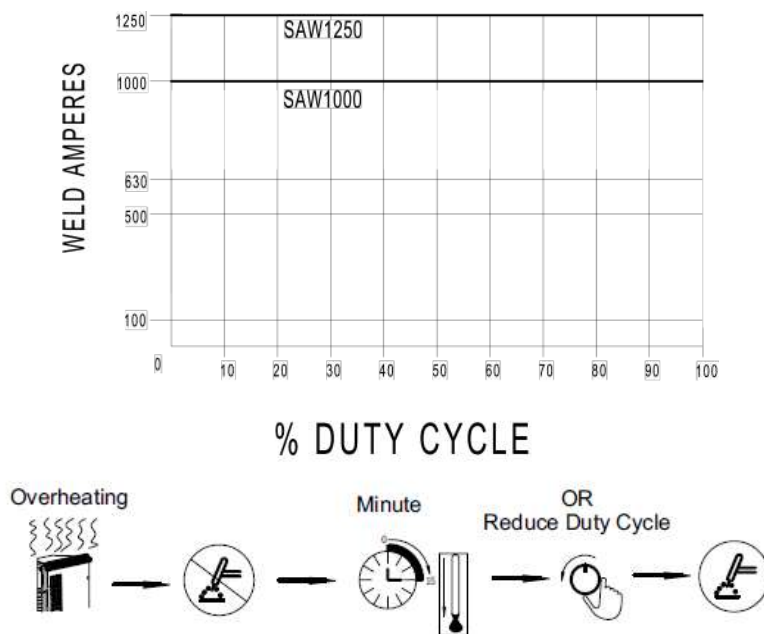


Fig.1-2-1: Duty cycle

1-3 Applications

Recommended areas of use as follows:

- Chemical structure and engineering
- Boiler pressure vessel manufacture
- Shipbuilding and offshore engineering
- Vehicle manufacturing
- Mechanical industry
- Other industries

2-SAW TANDEM TRACTOR

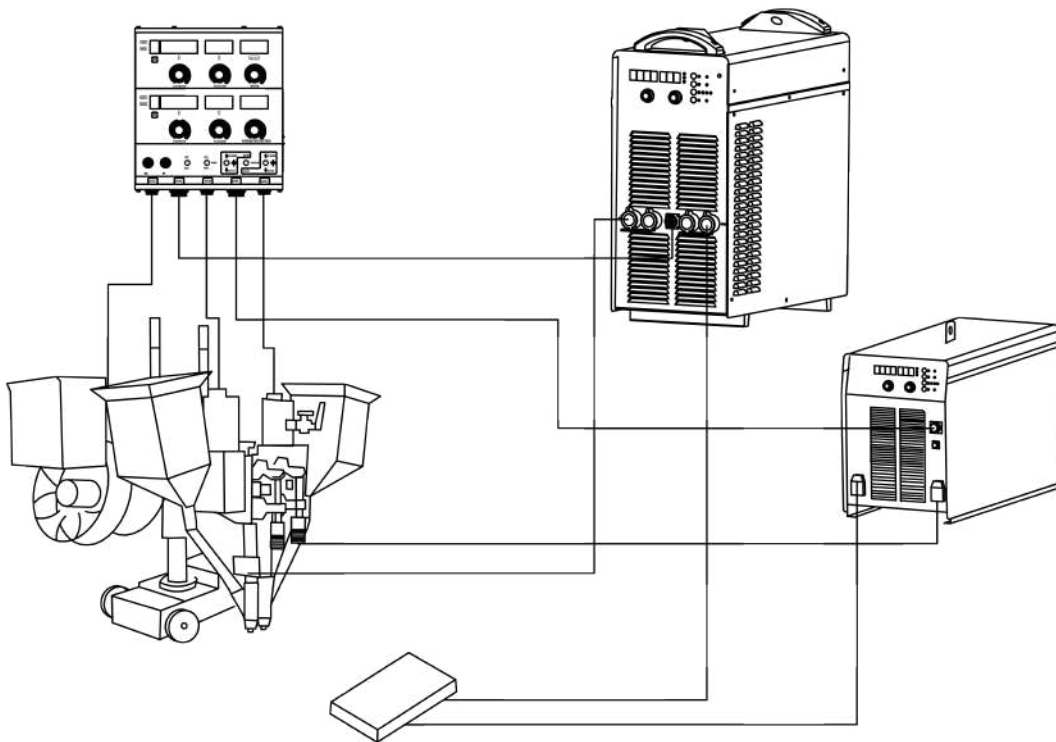


Fig. 2-1:SYSTEM

2-1 Trolley structure

The trolley has two sets of wire feeder heads, namely head A and head B. In order to facilitate operation, the installation position of the control box is generally the same side as the trolley clutch. Generally, the position of the trolley clutch is also used as the travel direction of the car during welding. At this time, head A is called front wire head (DC) and head B is called back wire head (AC).



Fig. 2-1-1: Saw Tandem Tractor

The trolley is mainly composed of the following parts:

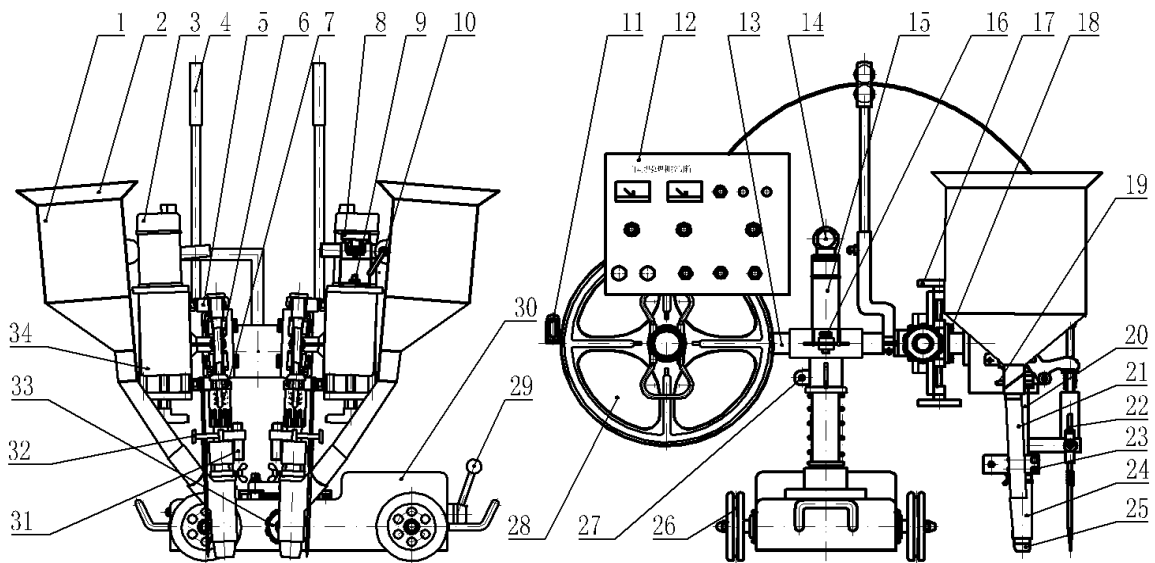


Fig. 2-1-2: System components

- 1.flux container 2. flux filter mesh 3. wire feeding motor 4. wire guide frame 5. wire feed bracket assembly 6. straightening wheel 7. Pressure regulating handle 8. M8 star handwheel 9.M8 hexagonal nut 10. M8 × 25 adjustable tightening handle 11. Lead bracket 12. control box 13. cross beam 14. M16 eyebolt 15. vertical column 16. M10 × 30 hexagon bolt I 17. cross carriage 18. cross carriage connection assembly 19. flux shutter 20. welding gun rod 21.rubber hose 22. pointer 23. conducting plate 24. flux hose 25. discharge sleeve 26. traveling wheel 27.M10 × 30 hexagon bolt II 28. welding wire reel 29. travelling clutch handle 30. tractor base 31. laser lamp 32. pointer locking screw 33. base carriage wave hand wheel 34. wire feed reducer

2-1-1 Engine base

The tractor base (30) is equipped with a travel motor reducer and a transmission clutch. Pull travelling clutch handle (29) to "automatic" to close the clutch, and the wire feeding trolley can automatically travel; pull the travelling clutch handle (29) to "manual" to release the clutch, and the wire feeding trolley's automatically function stop, and can be pushed and moved by hand.

A carriage is arranged in the tractor base (30), and the vertical column (15) can be moved by turning the base carriage wave hand wheel (33) of the carriage, with a distance of 70 mm

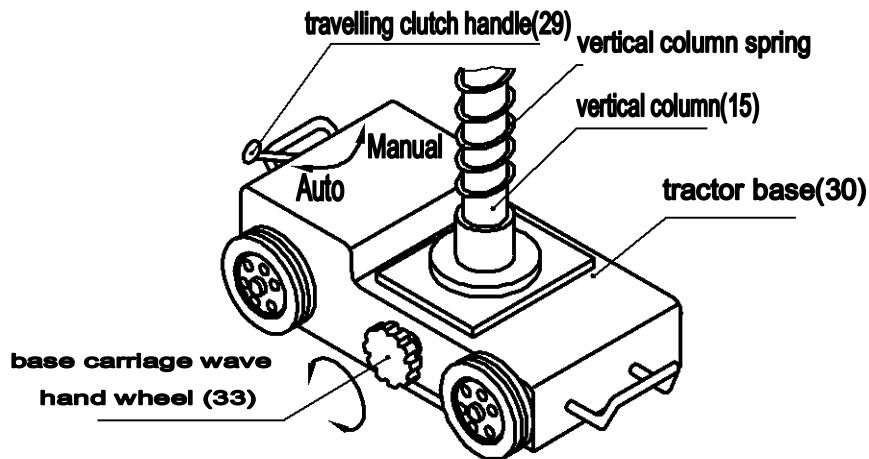


Fig. 2-1-3: Engine base

2-1-2 Crossbeam

Loosen the M10 × 30 hexagon bolt II (27), the cross beam (13) can rely on the spring force of the column to upward or compress the column spring downward, and the lifting distance is 70mm.

Loosen one (16) M10 × 30 outer hexagon bolt, the cross beam (13) can move left and right, and the moving distance is 50mm.

2-1-3 Head

The trolley is equipped with two sets of heads, which are composed of wire feeding motor (3), wire feeding reducer (34), wire feed bracket assembly (5), welding gun rod (20), etc. Its function is to pull out the welding wire from the welding wire reel (28), lead it into the wire feed bracket assembly (5) through the wire guide frame (4), and send the input welding gun rod (20) to the welding area for welding after being straightened. The machine head is equipped with a turning mechanism of cross carriage (17) and cross carriage connection assembly (18). When the wave hand wheel I in figure 2-1-3-1 is rotated, the carriage drives the machine head to rise and fall with a distance of 100 mm, and the wave hand wheel II is rotated. The carriage drives the machine head to move laterally with a distance of 200 mm between two welding guns. Loosen the m8x25 hexagon head bolts I and II, and the machine head can turn $\pm 45^\circ$; use the special sleeve plate head to loosen Open the 2-M8 hex nut to make the welding gun deflect $\pm 45^\circ$.

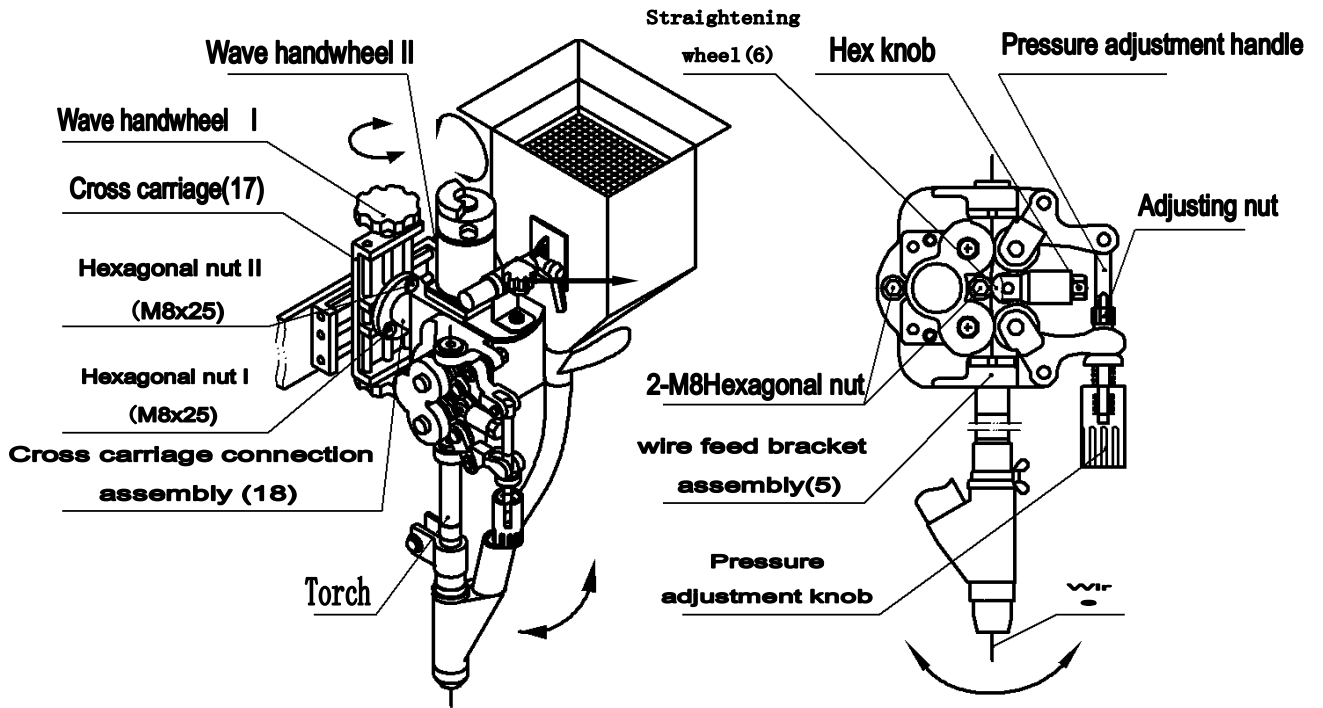


Fig. 2-1-4:Head

2-1-4 Wire reel

The welding wire reel (28) is equipped with a damping wire reel shaft (Fig. 2-1-5). The size of the damping force of the wire reel shaft can be adjusted. When adjustment is needed, pull out the wire reel shaft baffle, remove the parallel cap, tighten the M8 × 30 hexagon socket screw if the damping is increased, loosen the screw if the damping is reduced, install the parallel cap after adjustment, and reset the baffle.

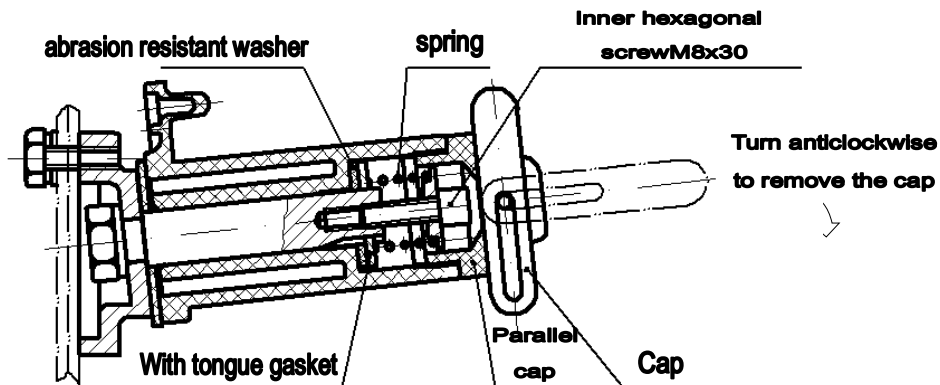


Fig. 2-1-5: Wire reel

2-1-5 Flux hopper

The flux container (1) is fixed on the head wire feeding reducer (34) through the hopper bracket and the hopper flat shaft, which is fixed by the M8 star hand wheel (8) and can be moved in a retractable manner; the M8 × 25 adjustable tightening handle(10) is used to adjust the swing angle of the flux container (1), so that the added reagent can enter the flux hose (24) smoothly after being filtered by the flux filter mesh (2) to the welding area, and the disc is loosened the screw is M6 × 15 and the flux hose (24) can rotate around the gun head. When it is turned to fit the rubber hose (21), the screw can be locked.

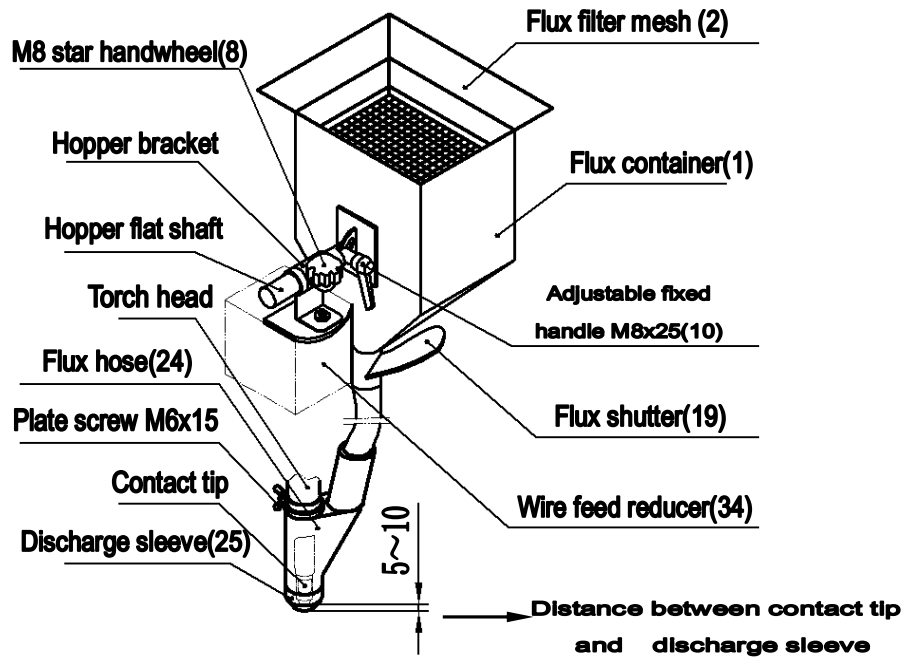


Fig. 2-1-6: Flux hopper

2-2 Control box

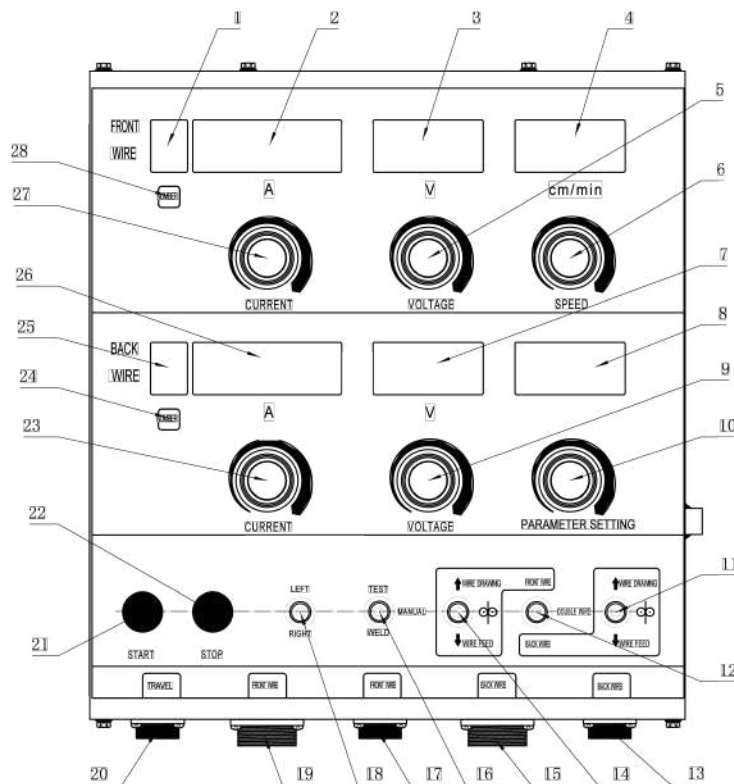


Fig. 2-2-1: control box



Note! Some described parameters in this manual may be slightly different from the wire feeder, some identification may be slightly different from power source identification, but the manner of working is the same.



Warning! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described here until you have read and completely understood all content of this manual.

2-2-1 Control panel

- (1) Front wire channel display table: display the channel number of welding specification.
- (2) Front wire current display meter: display the preset welding current of front wire when it is in standby mode; display the actual welding current of front wire after successful arc starting, and display the fault code of front wire welding machine in case of fault.
- (3) Front wire voltage display meter: display the preset welding voltage of front wire in standby mode; display the actual welding voltage of front wire after successful arc starting.
- (4) Welding speed display meter: display preset welding speed in standby mode; display actual welding speed after successful arc starting.
- (5) Front wire voltage adjusting knob: adjust the front wire welding voltage.
- (6) Welding speed adjustment knob: adjust the welding speed.
- (7) Rear wire voltage display meter: display the preset welding voltage of rear wire in standby mode; display the actual welding voltage of rear wire after successful arc starting.
- (8) Spare display.
- (9) Rear wire voltage adjusting knob: adjust the rear wire welding voltage.
- (10) Parameter setting knob: used as the setting of some parameters.
- (11) Rear wire feeding / rewiring switch: controls the up drawing and down feeding of back wire.
- (12) Single and double wire switch: used to switch single front wire, single rear wire and double wire welding mode.
- (13) Rear wire control socket (10 cores): connect the rear wire head.

- (14) Front wire feeding / rewiring switch: controls the up drawing and down feeding of front wire.
- (15) Rear wire control socket (14 cores): connect MZE-1000 AC welding machine.
- (16) Mode selection switch: control the traveling and stopping of SAW trolley. When the clutch handle of the trolley is set to "manual", the trolley can be pushed by hand. When the clutch handle of the trolley is set to "automatic", the mode selection switch selects "test run", and the trolley starts to walk; the mode selection switch selects "welding", and the trolley starts to walk after pressing the start button; the mode selection switch selects "manual", and the trolley does not move.
- (17) Front wire control socket (10 cores): connect the front wire head.
- (18) Travel direction switch: control the travel direction of submerged arc welding trolley.
- (19) Front wire control socket (14 cores): connect DC welding machine MZ-1000 IV.
- (20) Trolley control socket (4-core): connect the trolley traveling motor.
- (21) Start button: after power on, press this button to start the welding machine, and the green start indicator light is on.
- (22) Stop button: press this button to stop the welding machine, and the red stop indicator light is on.
- (23) Rear wire current adjusting knob: adjust the welding current of rear wire.
- (24) Rear wire channel switch button: switch rear wire welding specification channel.
- (25) Rear wire channel display meter: display rear wire welding specification channel number.
- (26) Rear wire current display meter: display the preset welding current of rear wire in standby mode; display the actual welding current of rear wire in case of successful arc starting, and display the fault code of rear wire welding machine in case of fault.
- (27) Front wire channel switch button: switch the front wire welding specification channel.
- (28) Front wire current adjusting knob: adjust the welding current of front wire.



Note: In the normal welding process, only the stop button, current adjustment knob, voltage adjustment knob and welding speed adjustment knob are effective.

2-2-2 Special function description

Description of jackscrew protection function:

When pressing the wire feed / rewind switch, if the welding wire contacts with the workpiece when it is sent downward, there will be jackscrew protection (the welding wire can not continue to send downward). At this time, if the welding wire needs to continue to send downward, continue to press and hold the wire feed / rewind switch for more than 3 seconds.

Automatic stop function description:

After pressing the start button, if the arc is not started successfully within about 15 seconds, the welding machine will automatically stop working. After entering the welding state, if there is no welding current for about 15 seconds, the welding machine will stop working automatically.

Welding parameter storage function:

The upper and lower control panels can store 10 sets of user welding parameters (welding current, welding voltage, driving speed). After the user finishes adjusting the parameters, the parameters will be automatically stored in the corresponding channel. The parameters can be switched by pressing the channel key.

2-2-3 Control interface of trolley motor

The traveling motor of the trolley is driven by the control box, and the wiring of its control cable is shown in Figure 2-2-2.

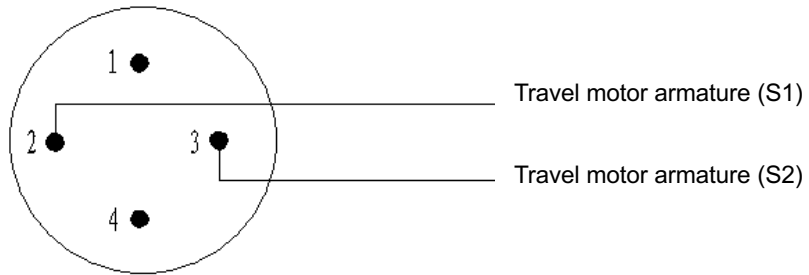


Fig. 2-2-2: Control socket

2-2-4 Control interface of wire feeding motor

The control of two wire feeder heads is also realized by the control box. The wire feeding control cable wiring of each machine head is shown in Fig. 2-2-3.

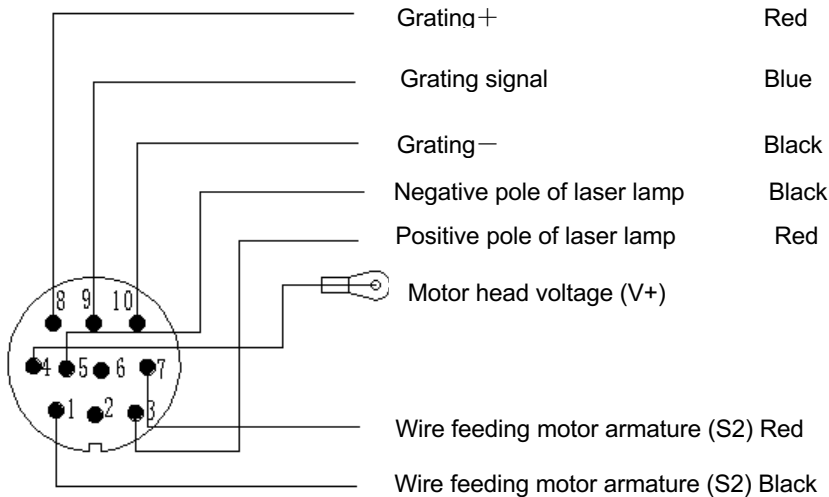


Fig. 2-2-3: Control socket

2-3 Installation



Warning! An electric shock can be fatal. If the machine is plugged into the mains electricity supply during installation, there is high risk of very serious injury and damage. Do not use the functions described here until you have read and completely understood “safety rules” in the beginning. Only carry out work on the machine when

- the mains switch is on turn-off position,
- the machine is unplugged from the mains.

2-3-1 System connection

Twin wire and twin arc system welding adopts "front DC back AC" mode. When the position of each part of the trolley and the welding travel direction meet the requirements of Fig 2-1-1, the system wiring is shown in Figure 2-3-1 Head A is connected to DC welding machine as front wire head and head B is connected to AC welding machine as rear wire head.

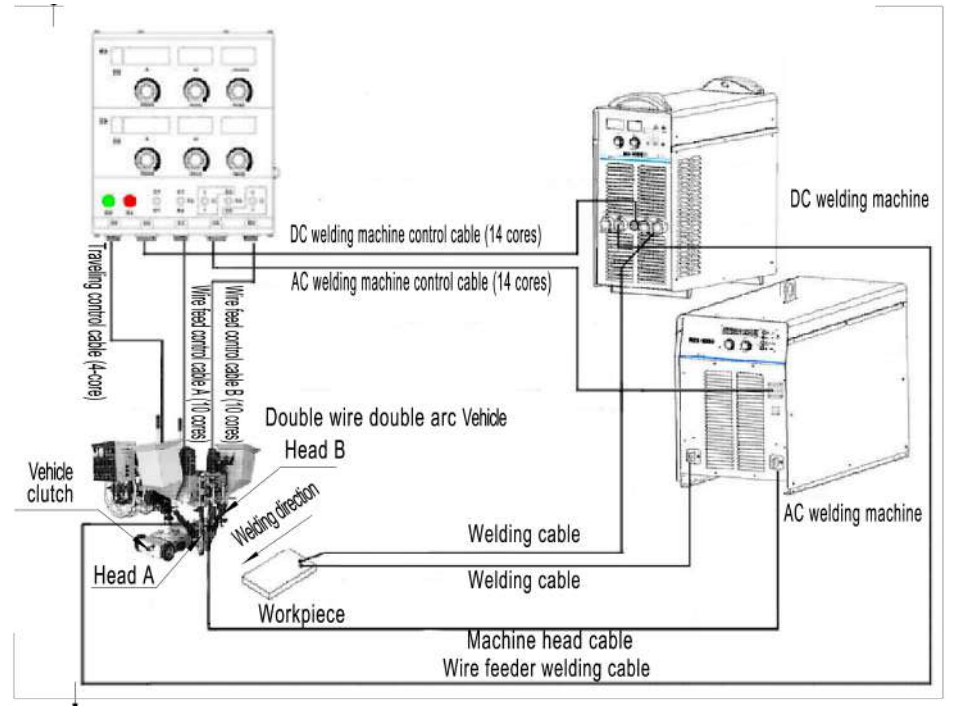


Fig. 2-3-1 schematic diagram of double wire double arc submerged arc welding system

The specified welding direction (as shown in the figure), and connection of the system:

1. Insert the train control cable (4 cores), wire feeding control cable a (10 cores) and wire feeding control cable B (10 cores) into the "train operation", "front wire" and "rear wire" control sockets respectively.
2. Insert the control cable (14 cores) of DC welding machine into the control socket of DC welding machine and the "front wire" control socket of control box respectively.
3. Insert the control cable (14 cores) of the AC welding machine into the control socket of the AC welding machine and the "rear wire" control socket of the control box.
4. Two 15m wire feeder welding cables are connected in parallel, and the two ends are respectively connected with the positive terminal of DC welding machine and the conductive plate of head A; two 2m welding cables are connected in parallel, and the two ends are respectively connected with the negative terminal of DC welding machine and workpiece.
5. Connect two 15m wire feeder welding cables in parallel, and connect MZE-1000 AC welding machine "head" terminal and head B conductive plate at both ends respectively; connect two 2m welding cables in parallel, and connect MZE-1000 AC welding machine "workpiece" terminal and workpiece at both ends respectively.



Note: ① aviation plug, connection between workpiece and cable and all bolts shall be tightened to ensure reliable connection.

② The two welding wires, and the two welding wires and the trolley body must be insulated from each other. It is strictly prohibited to cross or short circuit between the welding wires.

Connection of welding machine, SAW trolley and control box during reverse traveling welding

Sometimes, the welder needs to work in the opposite direction of welding as specified in Fig. 2-3-1. At this time, head A becomes the back wire head connected with AC welding machine, and head B becomes the front wire head connected with DC welding machine.

The connection needs to be adjusted as follows:

1. Wire feeding control cable a (10 cores) and wire feeding control cable B (10 cores) are respectively inserted into the "rear wire" and "front wire" control sockets.
2. Connect two welding cables of 15m wire feeder in parallel, and connect the positive terminal of DC welding machine and B conducting plate of machine head respectively at both ends;
3. Two welding cables of 15m wire feeder are connected in parallel, and the two ends are respectively connected with the "head" terminal of AC welding machine and the head a conductive plate.
4. Adjust the motor armature wiring in the control box; open the control box and cross adjust the two single end plugs of the connecting line between the two front wire sockets; cross adjust the two single end plugs of the connecting line between the two rear wire sockets

The rest of the wiring is the same as usual.



Note: if the connection is not adjusted or adjusted incorrectly, the back drawing of welding wire will occur after starting.

2-3-2 Installation of wire feeding roller:



Note: Welding inspection after the trolley is connected with the welding power supply, confirm that all parts are connected correctly and reliably. Confirm the specification of wire feeding wheel and conducting nozzle to match with the selected welding wire.

- Unscrew M6 knurled screw (9) → Wire feed axle support (8) Self ejection → Remove the wire feeder wheel (7) and oil gasket (10) → Confirm to install 4 wire feeding wheels (7) with the same specification as the welding wire → Install the oil gasket (10) of the wire feede → Cover the wire feed shaft bracket (8) → Tighten the M6 knurled screw (9).

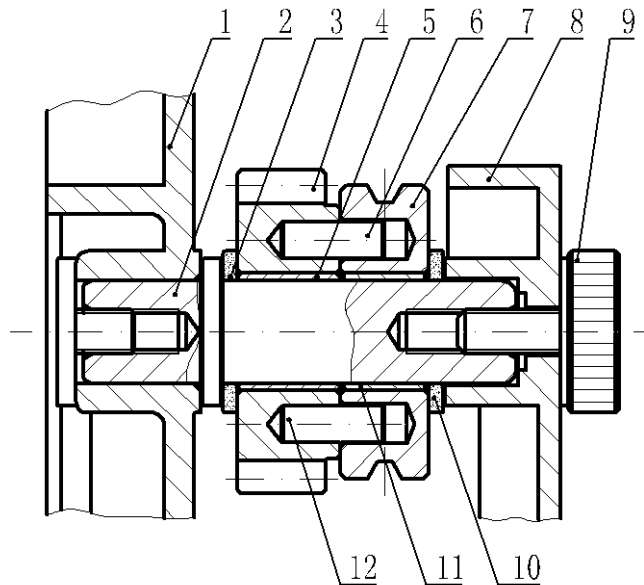
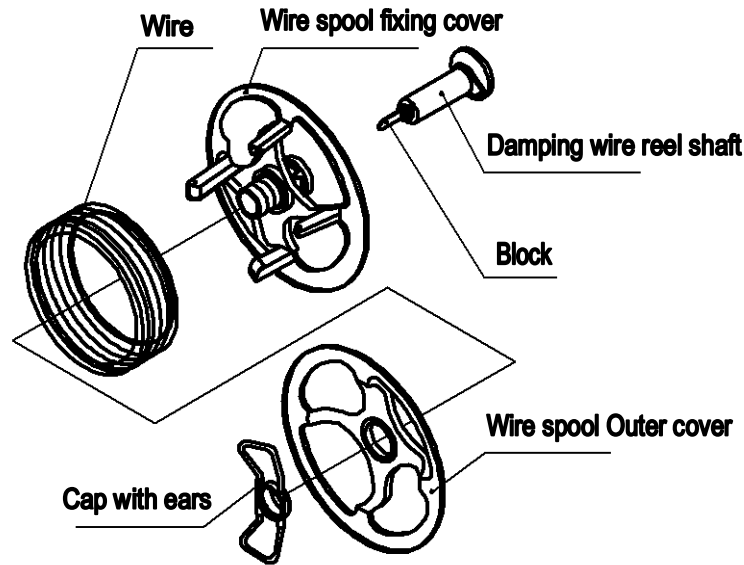


Fig. 2-3-2 wire feeding roller

1. Double drive bracket
2. Wire feed shaft
3. Oil bearing gasket of gear
4. Driving gear of wire feed wheel
5. High wear-resistant oil bearing of gear
6. Cylindrical pin $\Phi 5 \times 14$ (1)
7. Wire feed wheel
8. wire feed shaft bracket
9. M6 knurled screw
10. Oil gasket
11. High wear-resistant oil bearing of wire feed wheel
12. Cylindrical pin $\Phi 5 \times 14$ (2)

2-3-3 Installation of welding wire



Pull out the stop of the damping screw shaft and turn it → Remove the welding wire reel (28) → Screw out the screw nut → Pull off the cover of wire reel → Install the welding wire into the fixing cover of the wire tray → Press on the cover → Screw in screw nut → Install the welding wire reel (28) → Return the blank to its original position.

2-3-4 Rough adjustment of head position

Rotate the base carriage wave hand wheel (33) of carriage base and the waveform hand wheel I and II of cross carriage (17)(as shown in Figure 2-1-2) , and move the two heads to the weld joint. When the head needs to rotate or the welding gun needs to deflect, see page P4.



Note: the machine head needs to rotate. When loosening the two M8 × 25 hexagon head bolts (Figure 2-1-4), please hold the machine head to prevent the release of locking force. The machine head tilts due to its own weight and damages the discharge sleeve; When the welding gun needs to deflect, it is necessary to remove the debris on the surface of bracket and reducer, so as to prevent the debris from being brought into the wire feed reducer (34) from the screw hole when loosening the 2-m8 hex nut, causing damage to the internal gear and other parts.

2-3-5 Adjust the position of wire guide frame:

Take out the welding wire head from the two welding wire reels (28), pass through the lead bracket (11) and the respective wire guide frame (4) and lead them into the wire guide nozzle and the wire feed wheel. Fix the wire guide frame after the position of the wire guide frame (4) is adjusted properly.

2-3-6 Compress welding wire:

The pressure regulating handle is marked with 3, 4 and 5 marks, which are respectively the pressure marks corresponding to $\Phi 3$, $\Phi 4$ and $\Phi 5$ welding wires. According to the actual welding wire specifications, adjust the adjusting nut on the pressure regulating handle to the corresponding marks, so that the pressure regulating handle can be pushed in smoothly.

Turn the pressure regulating handle clockwise to tighten, that is, increase the compression force of the welding wire, and turn it counterclockwise to reduce the compression force. The ideal compression force is that the welding wire is normally sent out, and it is better not to slip on the wire feeding wheel.

2-3-7 Straightening welding wire

Pull out the pressure regulating handle, rotate the hex knob, push the straightening wheel (6), press the "wire feeding" button of the control box (as shown in Fig. 5), start wire feeding, make the straightening wheel compress the welding wire, close the pressure regulating handle, and continue to rotate the hex knob until the straightness of the welding wire sent by visual inspection meets the requirements, i.e. the sending wire is within 100mm, the straightness is not more than 2.5mm, and weld After wire straightening, release the "wire feeding" button and wait for welding.

The parameter table of straightening degree is attached for reference during straightening:

Straightening degree parameter	
Specifications	Reference value H (Figure 11)
Φ6	1.3
Φ5	1.0
Φ4	0.6
Φ3	0.4

Table:2-3-1

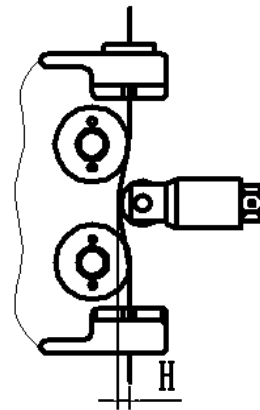


Fig: 2-3-4

2-3-8 Adjust the position and angle of the hopper

Adjust the position and angle of the flux container (1) and the flux hose (24) to make the flux discharge smooth; adjust the flux shutter (19) to cover the conductive nozzle and weld of the welding gun with flux, and adjust the flux flow according to the process requirements and the visual inspection during the welding speed operation.



Note: The medicament flux filter mesh (2) is used to filter the iron block, welding slag and other sundries in the flux, so as to ensure the smooth blanking, and shall not be abandoned.

2-3-9 Set welding parameters

According to the thickness of welding materials, welding requirements or welding process, set welding current, welding voltage and welding speed in advance.

2-3-10 Fine tune the head position

Observe the centering condition of the lead out two welding wire heads and the weld. If there is any deviation, turn the waveform base carriage wave hand wheel (33) on the carriage base and the waveform hand wheel on the cross carriage (17) until the alignment is good through visual inspection.

Loosen the pointer locking screw (32), adjust the pointer (22) on the welding gun rod (20), make the pointer align with the weld, and the distance from the workpiece is about 10-15mm, and then tighten the pointer locking screw (32).

2-3-11 Start welding

Press the "start" button (Figure 2-2-1) to start welding according to the process requirements after arc starting.



Note: during welding, observe the alignment between the pointer and the weld at any time. If any deviation is found, rotate the waveform hand wheel (33) of the carriage of the machine base to make fine adjustment, so as to keep the welding wire in alignment.

2-3-12 Shutdown

When welding to the end of the weld, press the "stop button" (Figure2-2-1), stop the welding, turn off the reagent switch (19), turn off the "power supply", push the clutch handle (29) to the manual (Figure 2-1-3), and pull the trolley out of the welding area.

2-4 Technical data

Project	Parameter value
Rated input voltage of traveling mechanism	DC110V
Rated input voltage of wire feeder	DC110V
Welding speed range	20~120cm/min
Wire feeding speed range	25~250cm/min
Applicable welding current rating	630A, 1000A, 1250A
Suitable Wire Diameter	Φ3.0~Φ6.0mm
Lifting height of crossbeam	70mm
Horizontal adjustable distance of two heads	200mm
Rotation angle of cross beam around column	±90°
Head rotation angle	±45°
Deflection angle of welding gun	±45°
Flux capacity	6L×2
Wire coil capacity	25Kg×2
Boundary dimension (L × w × h)	1100×900×770mm
weight	75Kg(Without welding wire)

Table 2-4-1: Technical data

2-5 Disassembly and reassembly

Head parts distribution (Part No. 12-03)

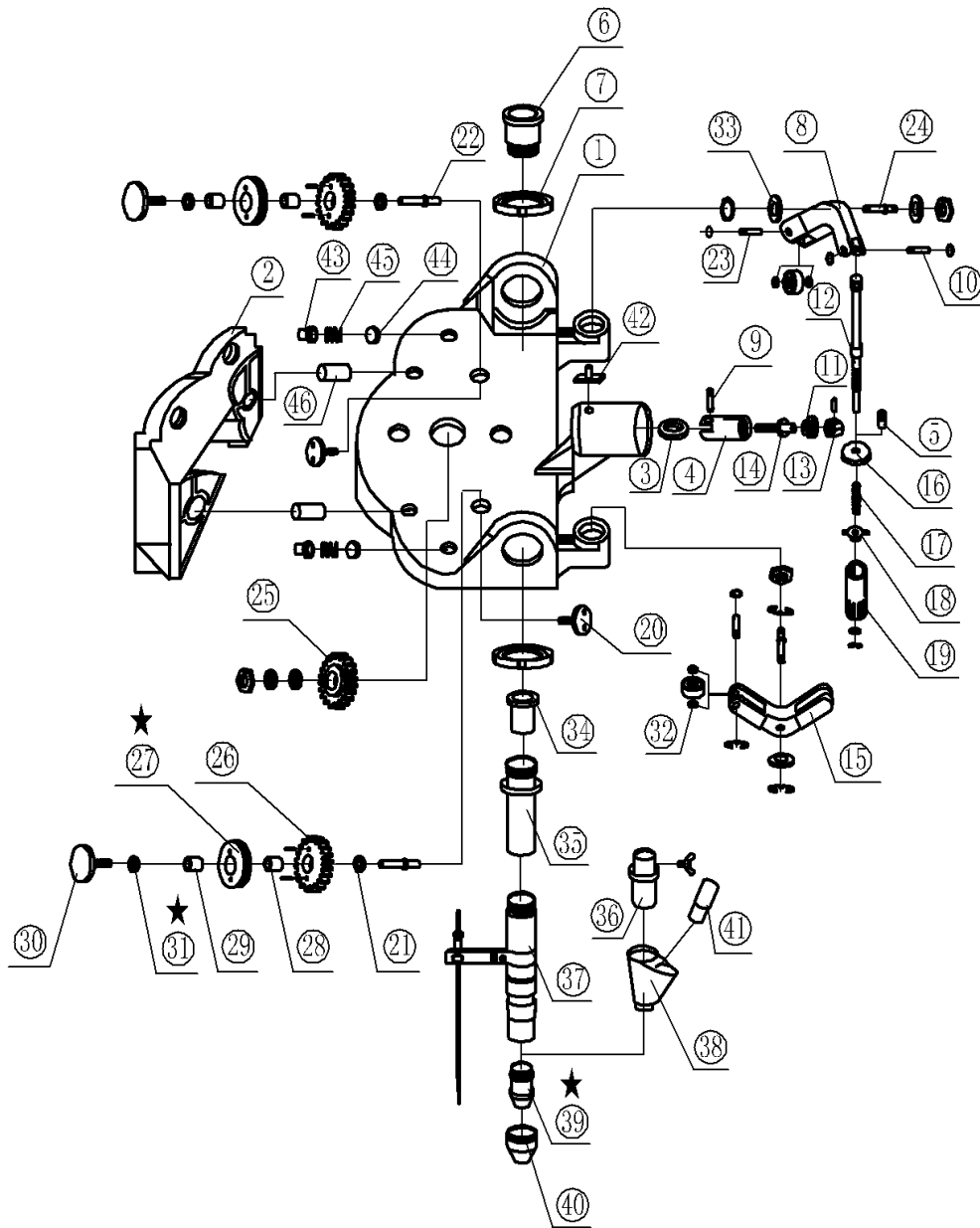


Fig. 2-5-1: Disassemble and reassembly

NO	Code	Drawing NO.	Item	Qty	Stock NO.	Remarks
1	12-03-001	MZZK-1000A-03-001	Double drive bracket	2		
2	12-03-002	MZZK-1000A-03-002	Wire feed axle support	2		
3	12-03-003	MZZK-1000A-03-003	Straightening wheel	2	331143-00007	
4	12-03-004	MZZK-1000A-03-004	Straightening axle	2	331143-00020	
5	12-03-005	MZZK-1000A-03-005	Handle shaft adjusting nut	2		
6	12-03-006	MZZK-1000A-03-006	Lead in nozzle	2	324005-00006	
7	12-03-007	MZZK-1000A-03-007	Small round nut M20×1.5	4		
8	12-03-008	MZZK-1000A-03-008	Roller frame I	2		
9	12-03-009	MZZK-1000A-03-009	Straightening axle pin	2		
10	12-03-010	MZZK-1000A-03-010	Press axle pin	2		
11	12-03-011	MZZK-1000A-03-011	Support sleeve	2		
12	12-03-012	MZZK-1000A-03-012	Handle shaft	2	331143-00015	
13	12-03-013	MZZK-1000A-03-013	Hexagon adjustment knob	2		
14	12-03-014	MZZK-1000A-03-014	Screw rod	2		
15	12-03-015	MZZK-1000A-03-015	Roller frame II	2		
16	12-03-020	ZK-SB-B-01-20	Steel bowl	2		
17	12-03-018	MZZK-1000A-03-018	Handle spring	2		
18	12-03-019	ZK-SB-B-01-18	Special hexagon nut	2		
19	12-03-017	MZZK-1000A-03-017	Adjusting handle	2		
20	12-03-024	MZZK-1000A-03-024	forcing screw	4		
21	12-03-025	MZZK-1000A-03-025	Drive gear oil gasket	4		
22	12-03-026	MZZK-1000A-03-026	Wire feed axle	4	331119-00026	
23	12-03-027	MZZK-1000A-03-027	Press axle pin	4	328005-00122	
24	12-03-028	MZZK-1000A-03-028	Pressure bar locating pin	4		
25	12-03-030	MZZK-1000A-03-030	Gear as-driving	2	331113-00021	
26	12-03-031	MZZK-1000A-03-031	Transmission gear of wire feeder	4	331113-00001	
27	12-03-046	MZZK-1000A-03-032	Wire feed roller Φ1.6	2	331101-00008	★ Φ 1.6
	12-03-037		Wire feed rollerΦ2~Φ2.8	2	331101-00004	★ Φ2~Φ2.8
	12-03-034		Wire feed rollerΦ3~Φ4	2	331101-00005	★ Φ3~Φ4 wire
	12-03-035		Wire feed rollerΦ4.2~	2	331101-00020	★ Φ4.2~Φ5

			Φ5			wire
	12-03-036		Wire feed rollerΦ6	2	331101-00010	★ Φ6 wire
28	12-03-038	MZZK-1000A-03-033	Gear wear-resistant oil bearing	4		
29	12-03-039	MZZK-1000A-03-034	Wear resistant oil bearing of wire feeder	4		
30	12-03-040	MZZK-1000A-03-035	Knurled screw	4		
31	12-03-041	MZZK-1000A-03-036	Oil bearing gasket	4	327047-00010	
32	12-03-042	MZZK-1000A-03-037	Copper gasket	8		
33	12-03-043	MZZK-1000A-03-038	Gasket of locating pin of pressurizing rod	4		
34	12-03-044	MZZK-1000A-03-039	Lead out nozzle	2	324005-00019	
35	12-03-045	MZZK-1000A-03-040	Welding gun rod	2	331005-00016	
36	12-03-049	MZZK-1000A-03-044	Insulating sleeve assembly	2		
37	12-03-051	MZZK-1000A-03-046	Torch head	2	331005-00042	
38	12-03-052	MZZK-1000A-03-047	Blanking barrel	2	331035-00003	
39	12-03-053	MZZK-1000A-03-048	Conductive tip Φ1.6	2	331008-00003	★
	12-03-054		Conductive tip Φ2.0	2	331008-00005	★
	12-03-055		Conductive tip Φ2.4	2	331008-00008	★
	12-03-058		Conductive tip Φ3.2	2	331008-00016	★
	12-03-059		Conductive tip Φ4.0	2	331008-00024	★
	12-03-061		Conductive tip Φ5.0	2	331008-00026	★
	12-03-062		Conductive tip Φ6.0	2	311029-00099	★
40	12-03-063	MZZK-1000A-03-049	Discharge sleeve	2	331035-00001	
41	12-03-064	MZZK-1000A-03-050	Feed insulating sleeve	2		
42	12-03-073	MZZK-1000A-03-058	Straightening axle key	2		
43	12-03-075	MZZK-1000A-03-060	Top pin of wire feed wheel bracket	4		
44	12-03-076	MZZK-1000A-03-061	Bracket top pin spring seat	4		
45	12-03-077	MZZK-1000A-03-062	Support pin spring	4		
46	12-03-078	MZZK-1000A-03-063	Locating guide pin of gear cover	4		

Table 2-4-1: Main components list



Note: the belt "★" is a vulnerable part.

3-TROUBLE SHOOTING



Warning! An electric shock can be fatal. Before doing any work on the machine:

- Switch it off and unplug it from the mains
- Put up a clearly legible and easy-to-understand warning sign to stop anybody inadvertently switching it on again
- Check to make sure the electrically charged components (e.g., Capacitors) have been discharged.
- Bolts in machine case also work for ground connection. Never use other bolt that cannot work for ground connection.

Under the condition of normal welding parameters, if no wire feeding or unstable wire feeding occurs, check:

- Whether the connection plugs are loose.
- Wire feed motor (3) Whether it is damaged.



Note: the wire feeding motor (3) and its wire feeding reducer (34), including the traveling motor assembly, do not need to be disassembled for maintenance at ordinary times. Do not open it without permission in case of any fault. You can contact the sales department or our company for professional service.

- Whether the wire feed wheel is worn.
- Whether the welding wire is tightly pressed or slipping.
- Whether the hole diameter of the conducting tip has been roughened or worn.

After confirming the cause of the fault, replace the parts or adjust according to the specification until the wire feeding is stable and normal.

3-1 Key tips

- 1.1 The trolley is equipped with a lifting device - M16 eye bolt (14) should pay attention to the balance of the center of gravity when lifting.
- 1.2 The trolley shall be placed in a place that is free from direct sunlight, rain, low humidity, little dust and flat ground. The surrounding temperature is - 10 ~ 40°C and the protection grade of the trolley is IP2X.
- 1.3 Avoid the wind when welding in windy places. When using the fan in summer, do not blow the wind directly on the arc part to avoid air holes.
- 1.4 When the trolley works on the inclined plane, attention shall be paid to the adjustment of the balance of the center of gravity of the trolley. The maximum inclination shall not exceed 10 ° and anti-rollover measures shall be taken if it is greater than 10 ° .
- 1.5 When the trolley is working on the workbench, pay attention to the stability of the scaffold to prevent the trolley from sliding due to the shaking of the scaffold.
- 1.6 Check the insulation condition of the cable frequently and stop using if there is any damage.
- 1.7 The control cable joint shall not be loose to avoid poor contact, which may affect the welding action, and shall not be twisted to avoid damaging the internal wire.
- 1.8 Keep the welding wire and flux properly to avoid rust, dirt and moisture.
- 1.9 The car is equipped with a laser lamp (31), with a rated voltage of DC3V. The user can connect the wires according to the needs.
- 1.10 The rated load duration of the trolley is 100%.

3-2 Troubleshooting

№	Fault phenomenon	Causes and troubleshooting
1	Unstable welding voltage	① Burning loss of conductive nozzle ② The wire feeding wheel is not compressed or worn ③ Welding machine main control board failure ④ Poor contact of welding cable of workpiece
2	Moving instability	① Loose traveling wheel ② Clutch failure ③ Welding machine main control board failure
3	Hard to arc	① Burning loss of conductive nozzle ② Welding wire selection is inconsistent with the actual situation ③ Improper specification setting ④ Improper extension length of welding wire
4	The trolley cannot be started	① Control box circuit board failure ② Welder failure ③ Welding machine control cable disconnection ④ Start button is broken
5	After start-up, only slow wire feeding, not normal welding	① Welder failure ② Poor contact of workpiece welding cable ③ Welding machine main control board failure
6	No wire delivery or trolley driving	① Mechanical failure ② Motor failure ③ Welding machine main control board failure ④ Button switch is broken
7	Welding current out of control	① Welding machine control cable damaged ② Welder failure

Table 3-2-1: Troubleshooting

4-CARE AND MAINTENANCE

4-1 Before open the machine



Warning! An electric shock can be fatal. Before doing any work on the machine:

- Switch it off and unplug it from the mains
- Put up a clearly legible and easy-to-understand warning sign to stop anybody inadvertently switching it on again
- Check to make sure the electrically charged components (e.g., Capacitors) have been discharged.
- Bolts in machine case also work for ground connection. Never use other bolt that cannot work for ground connection.

4-2 Maintenance

Please follow the instructions as below to ensure normal lifespan of power source.

- Conduct safety check at regular intervals (see “Safety rules”)
- Dismantle machine side panels and clean machine inside with clean and low-pressure compressed air by professional technician, not less than twice per year. Clean the components at a certain distance only;
- If a lot of dust has accumulated, clean the cooling-air ducts.

4-3 Daily maintenance

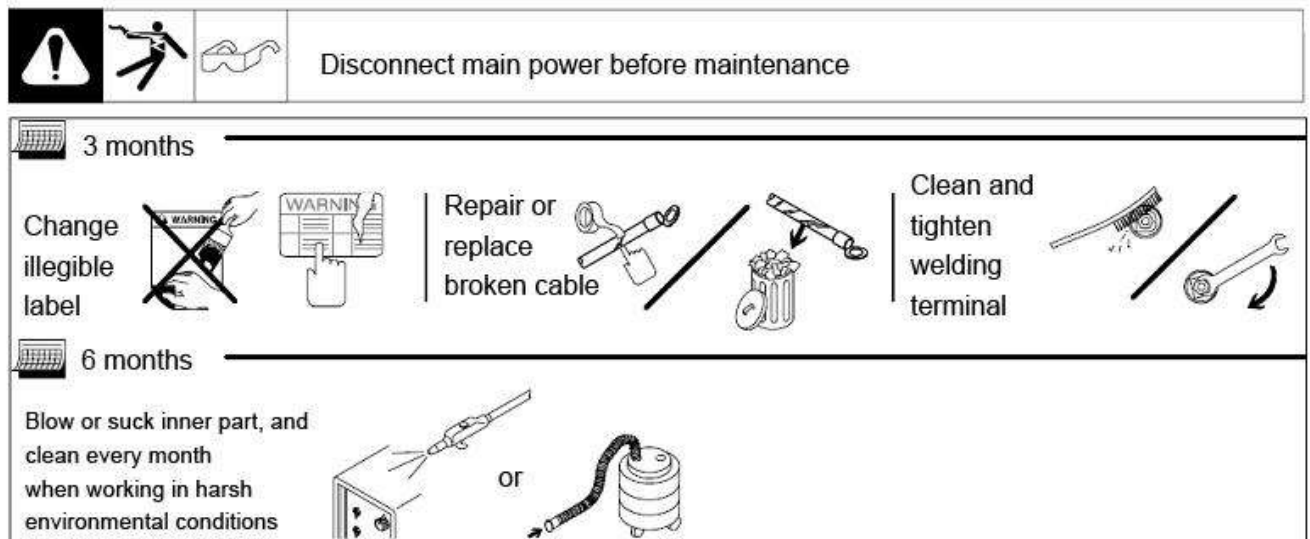


Fig. 4-3-1: Daily maintenance

- 4-3-1 Protect the cable, avoid twisting, prevent the insulation layer from damage, and replace it in time in case of damage.
- 4-3-2 Prevent the control box from moisture, and the cable connection and plug shall not be loose.
- 4-3-3 When using the trolley, keep all parts of the welding wire channel clean, free of oil and sundries, and prevent the welding wire from being brought into the wire feeding wheel and the conductive nozzle after being stained.
- 4-3-4 The inlet guide nozzle, the feed wheel, the outlet guide nozzle and the conductive nozzle shall be cleaned regularly to remove the accumulated dirt, otherwise it is easy to cause unstable wire feeding; when the wear is serious, it shall be replaced in time, and the replacement must be the corresponding specification of the welding wire diameter, and it is not allowed to be installed wrongly.

Note: when the wire groove of the wire feeding wheel is seriously worn, two must be replaced at the same time.



4-3-5 The conductive nozzle (Fig. 13-39) and the gun head (Fig. 13-37) need to be tightened. Looseness will lead to abnormal heating at the joint and deformed thread, which will make it difficult to replace the conductive nozzle and seriously burn the gun head.

4-3-6 The lead screw and guidepost (Figure 12) of cross carriage (17) shall be kept clean and properly oiled.

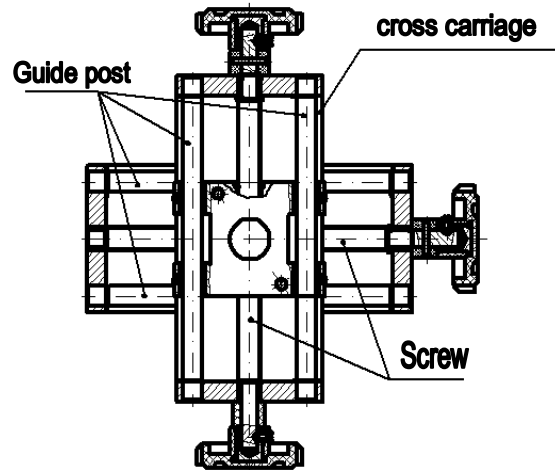


Fig. 4-3-2

4-3-7 Although the outer edge of the walking wheel (26) is designed to be oil resistant and acid and alkali resistant rubber, it is still required to avoid the direct contact of oil, sharp objects and acid and alkali media, so as to prolong the service life of the walking wheel.

5-Tandem (Twin wire twin arc) submerged arc welding process

5-1 Process introduction

In order to improve the welding efficiency of thick plate, the usual way is to increase the welding current, but too much welding current will affect the welding quality. By adding a welding wire, the double wire and double arc submerged arc welding process can effectively improve the cladding rate and at the same time obtain good weld formation.

In order to meet the requirements of the field process flexibly, the welding specifications of the two welding wires must be adjusted separately, so two independent power sources are used for double wire double arc submerged arc welding. Because DC + DC power supply is prone to magnetic bias blowing, and the arc stability of AC + AC power supply requires high flux, so in order to overcome the above shortcomings, DC + AC power supply is generally used. The main function of front wire DC welding machine is to control the weld penetration while filling the weld; the main function of rear wire AC welding machine is to control the weld penetration while filling the weld.

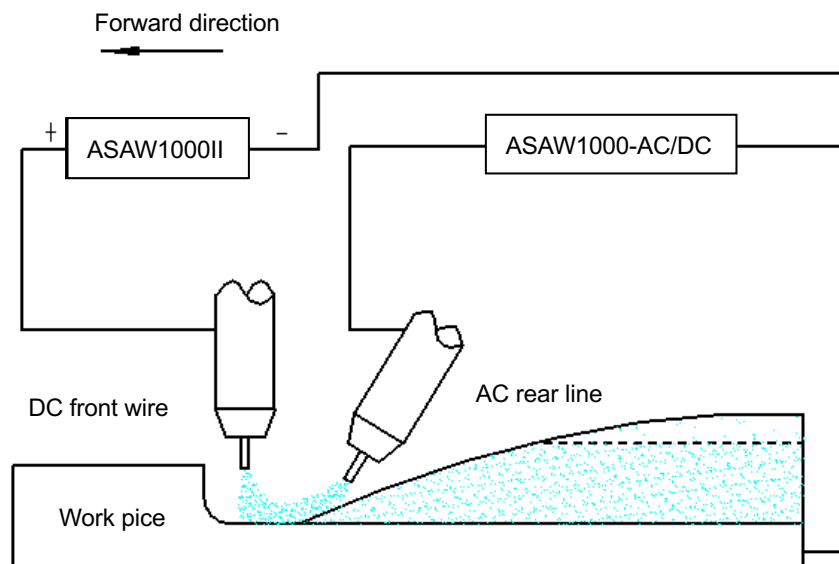


Fig: 5-1-1

5-2 Main factors affecting welding

(1) Head fixing mechanism

The head must be fastened well, and the correct position must be maintained during the welding process.

(2) Polarity

The front wire adopts DC to ensure the maximum penetration. The back wire adopts AC to reduce the magnetic bias between the arcs.

(3) Welding current

Welding current affects welding wire melting speed and penetration. The higher the welding current is, the higher the melting speed and penetration of welding wire are. Too much current will cause wavy edges. The welding current of DC front wire is slightly higher than that of AC rear wire.

(4) Welding voltage

Welding voltage affects weld formation and weld width. The welding voltage of DC front wire is generally slightly lower than that of AC rear wire and increasing the welding voltage will increase the weld width. However, excessive welding voltage will produce wavy edges.

It is suggested that the welding voltage of the AC rear wire should be between 35 and 42V. If the welding voltage is too low, it is easy to cause wire sticking fault, but if the welding voltage is too high, it will bite the edge. If the welding cable of the AC welding machine is too long in actual use, the welding voltage should be increased appropriately according to the voltage drop of the welding cable.

(5) Moving speed

When the welding current and welding voltage are fixed, the traveling speed determines the amount of weld filling and heat input per unit length of weld. Too fast driving speed will result in narrow weld and even undercut. Too slow driving speed will make the molten metal roll under the DC front wire arc, resulting in the instability of the arc and the generation of wavy edges.

(6) welding wire diameter

4.0 or 5.0mm welding wire is generally recommended for DC front wire. Deep penetration can be obtained by using 4.0 welding wire. After AC wire generally use a slightly thinner wire or the same wire as the front wire.

(7) Selection of welding wire and flux

According to the requirements of welding and mechanical properties of the workpiece, the appropriate welding wire material and flux type shall be selected.

(8) Flux thickness

The flux stack must be thick enough to prevent arc light after AC. But too thick flux will form a narrow and rough weld.

(9) Wire arrangement

Generally, two welding wires are arranged in sequence along the welding direction. The front wire is DC and the back wire is AC.

(10) Wire spacing

It is recommended to adopt the method of CO melting pool for double wire and double arc, and the distance between welding wires is 16-30mm. If the distance is too close, it will increase the penetration and decrease the penetration width, which will lead to the instability of wire arc after AC; if the distance is too far, it will decrease the penetration and increase the penetration width, which will lead to the instability of wire arc before DC.

(11) Welding wire angle

The DC front wire is generally perpendicular to the workpiece, while the AC back wire has a certain caster angle.

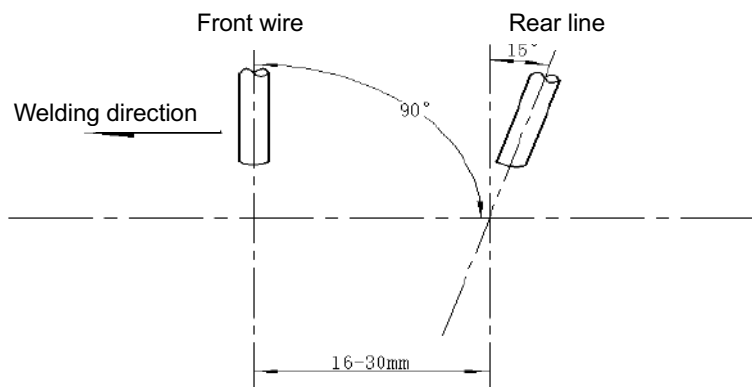


Figure 5-2-1 schematic diagram of welding wire inclination and spacing

(12) wire extension

The wire extension is usually set to about 8 times the diameter of the welding wire. After AC, the wire dry elongation can be appropriately lengthened.

(13) Centering of welding wire

During welding, the two welding wires must be aligned with the center of the weld, and the deviation distance must be controlled within 1mm.

(14) Conductive nozzle

The conductive nozzle and the conductive rod must be fastened well in order to weld stably, and at the same time, it can help the welding wire to be aligned and ensure the spacing. Excessive wear of the conductive nozzle may cause unstable contact between the welding wire and the conductive nozzle, which shall be replaced in time.

(15) Workpiece connection

The welding cables of DC welding machine and AC welding machine shall be fixed at the initial welding position of the workpiece.

5-3 Field case

(1) Tower Industry

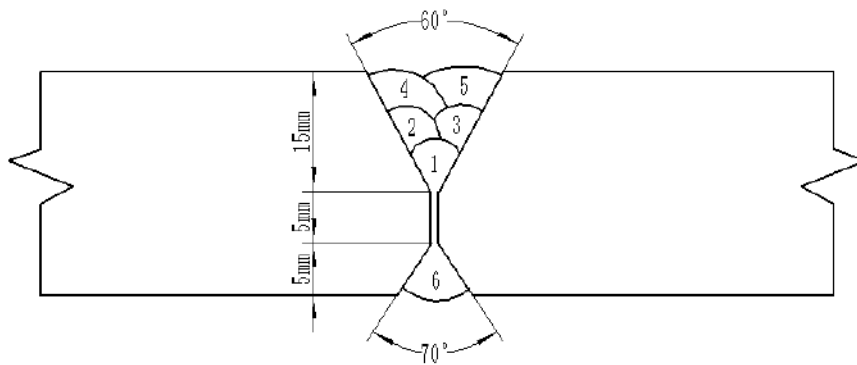


Figure 5-3-1 schematic diagram of a workpiece in the tower industry

Number of passes	1	2~6	
ARC	Front wire	Front wire	Rear wire
Polarity	DC+	DC+	AC
welding current (A)	660	690	500
Welding voltage (V)	30	37	39
welding speed (cm/min)	25	57	
AC frequency (Hz)	-	-	60
AC duty cycle (%)	-	-	50
DC offset (%)	-	-	0
wire extension (mm)	25	25	
wire diameter (mm)	4.0	4.0	4.0
Wire spacing (mm)	-	28	
Welding wire angle (°)	0	0	15

Table 5-3-1 welding procedure specification (Reference)

(2) Steel structure industry

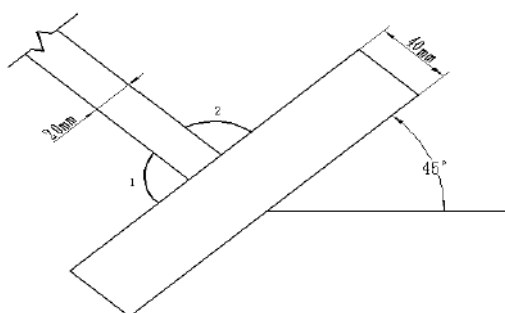


Figure 5-3-2 schematic diagram of a workpiece in steel structure industry

Number of passes	1~2	
ARC	Front wire	Rear wire
Polarity	DC+	AC
welding current (A)	850	700
Welding voltage (V)	32	39
welding speed (cm/min)	60	
AC frequency (Hz)	-	60
AC duty cycle (%)	-	50
DC offset (%)	-	0
wire extension (mm)	25	
wire diameter (mm)	5.0	5.0
Wire spacing (mm)	28	
Welding wire angle (°)	0	15

Table5-3-2 welding procedure specification (Reference)

Ver.20211101

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