Welding Positioner

Operation Manual

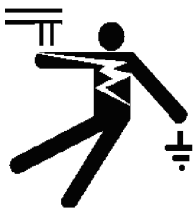
HWP30

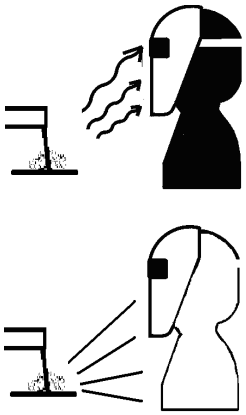
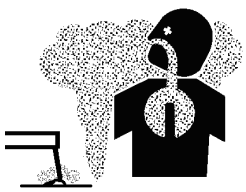
- Thank you very much for buying our product.
- Before use, refer these operating manual to ensure proper use. Keep these safety instructions and read when necessary.
- Make sure to forward these instructions for safety to the final user.

TABLE OF CONTENTS

1 Safety stipulations

	**Warning**
	Before installation and operation, please read this manual carefully for your safety

Take care! Electric shock can be fatal !	
	The operator should wear proper gloves, shoes, clothes and so on.
	When the equipment is powered, contact the welding rod(or welding wire), workpiece and equipment with wet clothes on may cause electric shock.
	Please cut off the outer main power when nonuse or maintenance.
	Don’t operate the machine in high humidity environment.
	Don’t operate the machine without covers on. Great danger exists in exposed terminals of power supply.
	Frequently check power cable. If there is damage, the machine can not be used before a new cable is installed.
	Install the ground connection correctly.
	Install appointed capacity fuse and breaker at power input site.

<table>
<tr><td colspan="2">When welding, the glare may hurt eyes and skin, so please put on proper protection gears.</td></tr>
<tr><td rowspan="4">  </td><td>Please put on appropriate welding protection appliance in order to protect eyes and face(such as glasses, safety helmet)</td></tr>
<tr><td>In order to prevent scald, please cover the naked body by gauntlet, safety helmet or fire-resistant clothes.</td></tr>
<tr><td>Other operator near the working area must sue safety appliance (such as glasses, safety helmet).</td></tr>
<tr><td>Don’t touch the front of the welding torch when welding, don’t touch the work piece just welded to prevent scald.</td></tr>
<tr><td colspan="2">Protection against toxic fume , welding may produce hazardous fumes and gases</td></tr>
<tr><td rowspan="4">  </td><td>Avoid breathing these fumes and gases. When welding, keep your head out of the fume.</td></tr>
<tr><td>Keep good ventilation in working area.</td></tr>
<tr><td>Toxic gas is produced when welding galvanizing metals with zinc, lead, cadmium and so on, ventilation and exhaust devices must be installed.</td></tr>
<tr><td>The welding shielding gas mixed with air is hazardous especially in narrow range.</td></tr>
</table>

Explosion-proof	
	Don’t weld the vessel with flammable substance. it may cause explosion.
	Please make sure whether welding would produce flammable and toxic steam before operate for canned vessel.
	Do not weld in the environment with explosive dust and gases.
	Gas container should be vertically placed with support. Keep the gas container a safe distance away from welding and cutting areas and otheroperating areas with heat, spark or flame.
	Don’t touch the gas container with welding rod, electrode holder or other electric heating components.
Fireproof: welding produced spark and splash.	
	Prepare fire extinguisher at welding site.
	Remove the inflammable from the welding site.
	Keep just welded metal away from flammable materials.
	Keep ventilation when welding in the environment with inflammable gas, flammability liquid and high concentrations of dust.
	Avoid contact among welding rod (wire), welded workpiece, equipment, grounding and so on when out of operation to prevent energy and sparkle.

Electromagnetism: current flows through any conductor may produce electromagnetic field. Welding power source may produce electromagnetic field around welding cable and machine.

Electromagnetic field may disturb pacemakers. Operator withpacemakers should consult the doctor before operation.

Exposed to invisible electromagnetic field may cause damage to people's health

Don't operate close to the power supply, don't wind the welding torch's cable round human body.

Don't place your body between the positive and negative cable. The positive and negative cables should be placed on the same side ofoperators' body. positive and negative cables should be tied together.

Mechanical injury proof

Make sure of machine's safety protections.

When running, operating or maintaining the machine, keep your hands, hair, clothes and tools away from V belt, gear, fan and other running parts.

In some circumstances, operators have to remove safety device when maintaining the machine, take extra caution when operating close to running parts.

Don't put your hands on running fan, don't operate the machine if the panel is open or without safeguard.

Using instructions

Put on protective appliance such as safety helmet, protective glasses and protective boots during installation, operation and maintenance.
Connect grounding with workpiece firmly and correctly.
Pay more attention when operating the machine with rotation motion to prevent clothes entangled in and cause accident.
Don’t hit against floor or machine when workpiece turning(such as extended reinforcing plate onto workpiece)
Don’t use the machine if the safety protection device is not in place or damaged.
The machine must be maintained periodically. repair in time if damaged

Note: qualification is required for following operations:

Arc welding
Gas flame welding
Electrical operation
Travelling crane
High pressure gas operation

Electricity safety instruction

BE CAREFUL

All parts of control system are electrical. Don't misplace any PC panel or plug connection. pay attention to all labels and codes please refer to operating manual or consult professionals.

WARNING

High voltages are dangerous to people's life. the machine only can be maintained by qualified technician.

Must ensure the system's main switch is OFF before pull out any PC panel or plug connection.

Main power must be OFF after operation.

Safety stipulations

1. Safety stipulations must be handed to every operator.
2. To operate the system safely, relevant operators must understand the content of operating manual and the manuals provided along with the machine.
3. All operators must comply with the accident precaution stipulations and rules.
4. All operators must comply with the accident precaution stipulations and rules relate to welding.
5. Must be with face shield when welding to prevent radiation.

Start on

1. The electric system's assembly，start-on，maintenance and overhaul must be handled by trained electrician.
2. All operators must comply with the accident precaution stipulations and rules.
3. When the system is failure，all possible electriferous conductive parts must be connected to each other and must be connected to protective conductor.

Operation

1. During operation, close the door of control box all the time to prevent the operator from contacting the electric device by accident, and avoid dust accumulation in the unit.
2. Protect idle socket with cover or nominal plug, avoid getting it dirty.
3. The system may not separate with power completely when system's main switch is OFF.

Overhaul

1. Forbid changing the safety device, forbid bridge connection fuse, forbid using fuses that are different from capacitance mentioned in this manual.

2. If any cable, plugs, switches or other electronic operation device is damaged, please cut off the system's power immediately (put the main switch to OFF). Only trained electrician can change the damaged parts. Only use original spare parts.

3. When operating grounding measuring instruments (such as oscilloscope), must ensure the measuring instruments' grounding is connected with the control units' grounding all the time.

4. When operating grounding tools (Such as iron or a portable drill), must ensure the system's main switch is OFF.

5. The system may not separate with power completely when system's main switch is OFF.

6. Only qualified person can open the machine.

Electrostatic discharge precautions

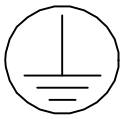
Must comply with correct electrostatic discharge (ESD) procedure all the time when maintaining the products. Must wear correct grounding wrist strap when disassemble ,assemble and transport any circuit plugs. All circuit plugs and electronic component must be put in electrostatic protection container during transportation.

The measures taken under accident conditions

1. Put the main switch to OFF
   1) If can't cut off the main power switch immediately or the above method is invlid, must separate the personnel in shock from charged parts by non-conducting objects or drag the electric shocked people from conductive parts by his clothes. The rescue workers must be insulated from the device and electric shock people. The rescue worker can't touch any other objects.
   2) Seek help to qualified medical personnel immediately.
2. Once the control system or device is on fire, can only use dry powder or other suitable powder to put out the fire.

Graphic symbols

	EARTH (grounding) TERMINAL: is mainly used for functional earth terminal related to test and measure circuit. These terminals are not used for the purpose of safe grounding, but to provide an earth datum mark.

	**PROTECTIVE CONDUCTOR TERMINAL**: the symbol is dedicated to protective conductor terminal, it can't be used for other purpose. this symbol placed in the machine grounding point, it is compulsory to all earth device.
	**WARNING:** Electric shock can be fatal.
	**CAUTION:** Overheat surface.
	**CAUTION (refer to accompanying documents)**: It is used to inform the userthat they need to refer to and must comply with special safety statement in the operation manual.

2 Working condition and surrounding

Working condition

a) Height above sea level：≤1000m

b) Environment temperature

Working：5℃～40℃

Storage and transport：－20℃～55℃

c) Humidity

35℃：≤50%

20℃：≤90%

d) The content of dust, acid, aggressive gas etc are normal at most.

e) Voltage wave： 400VAC ±10%

f) Frequency wave：50HZ ±1%

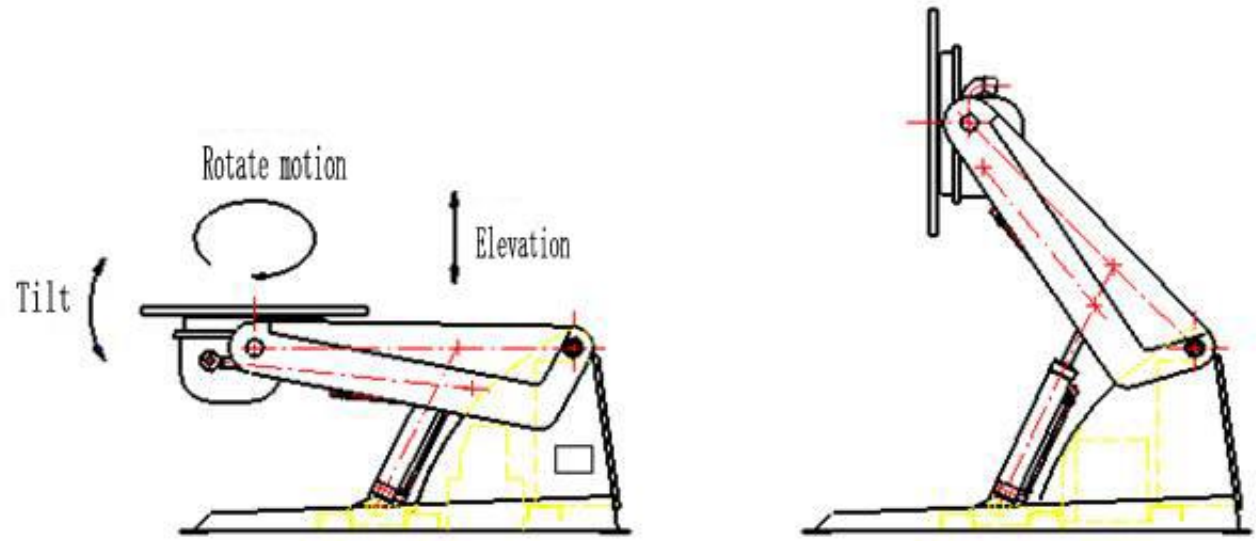
Working environment

The machine should be installed in environment: avoid direct sunlight, outside in the rain, aeration-drying, no dust pollution.

Avoid steam, chemical substances, explosive substance, corrosive material, Keep the machine away from shake and jolty area.

3 Summarize

The welding machine is special equipment designed by the customer's requirement, and combined our company's years of welding positioner design experience. The machine can rotate and tilt, enable the work piece's welding seam at the best welding and handle position, operating conveniently and improve productivity effect.



Equipment structure

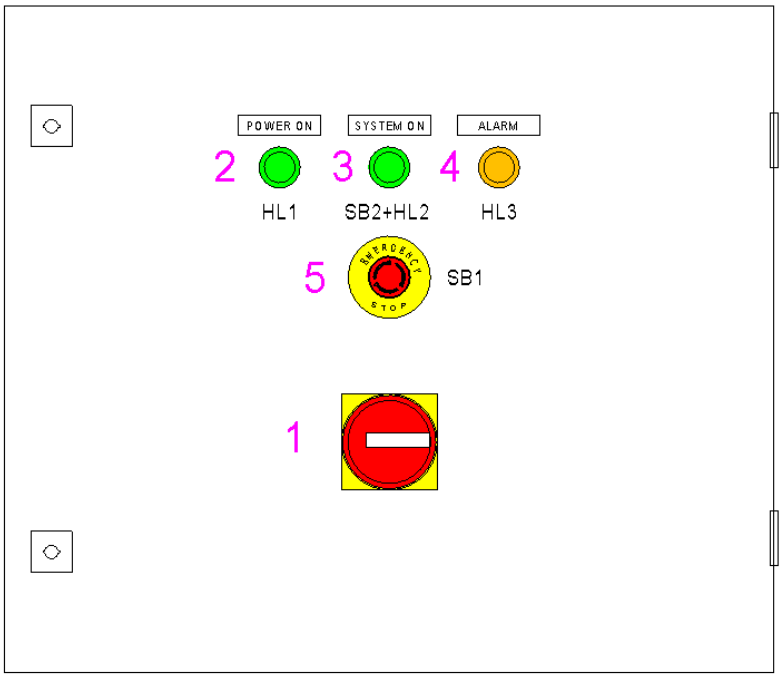
4 Technical parameter

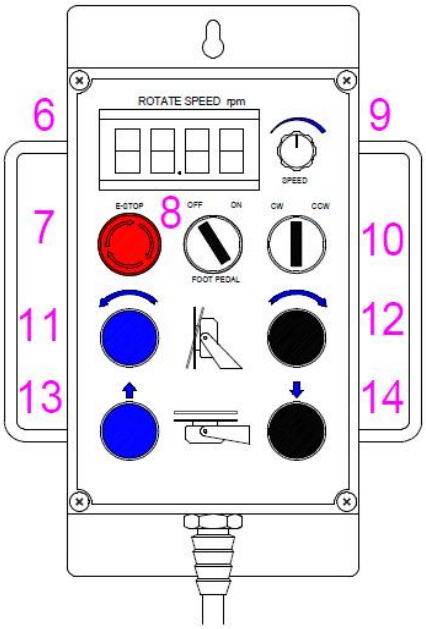
Model	HWP30
Max.load capacity	3000 Kg
ECCENTRICITY (ECC)	150 mm
CENTRE OF GRAVITY	300 mm
Rotation motor	2*0.55KW AC motor c/w brake
Oil pump motor	3.0KW AC motor
Rotation speed	0.07-0.7 rpm @ 5-50HZ
Rotation torque	4500 Nm
Table Dia.	φ1450 mm
Tilt time(0-130°)	30 sec
Tilt torque	9000 Nm
Overall table height	980-1750 mm
Welding current	500 A
Power	AC400V±10%, 50Hz±1,4.3 KW
Size(L*W*H)	2325 × 1450 × 980 mm
Weight	1770 kg

* Max rotational torque in rotational speed range 100% - 10% of max speed

5 Operation and function

Understand the following before operate.





Function Table

Button No.	Button type	Button option	Function	Display contrast	The essential of button start
1	Rotation handle	On	Cabinet power on	<2> light on	400VAC/3P/50Hz incoming Voltage supplied to console
		Off	Cabinet power off	<2> light off	
2	Light	On	<1>at ON position		
		Off	<1>at OFF position		
3	Pushbutton	On	Turns on system		1) <1> in ON position. 2) <5/7> is released
		Off			
4	Light	On	Machine alarm		1) <1> in ON position. 2) <3> in ON position
		Off	Machine normal		
5	Emergency Stop	Depress	All functions STOP	<3> light off <4> light on	<1> in ON position.
		Turn-Release			
6	Digit display		Display rotate travel		<3> light on

			speed		
7	Emergency Stop	Depress	All functions STOP	<3> light off <4> light on	<1> in ON position.
		Turn-Release			
8	Selector	On	The rotation is controlled by pedal		<3> light on <4> light off
		Off	The rotation is controlled by pendant		
9	Speed adjust button	TURN LEFT	Reduce speed		<3> light on <4> light off
		TURN RIGHT	Increase speed		
10	Selector	TURN LEFT	Work-table CW		<8> in Off position
		MIDDLE	Stop rotate		
		TURN RIGHT	Work-table CCW		
11	Pushbutton	On	Tilt up		<3> light on
		Off	Tilt up stop		<4> light off
12	Pushbutton	On	Tilt down		<3> light on
		Off	Tilt down stop		<4> light off
13	Pushbutton	On	Table elevate up		<3> light on
		Off	Elevate up stop		<4> light off
14	Pushbutton	On	Table elevate down		<3> light on
		Off	Elevate down stop		<4> light off

Note:

1) Don’t operate the machine continuous for a long time, otherwise it will damage the machine.

2) To prevent accident, tilt the workpiece to horizontal place before power off or don’t operate for a long time.

6 Operating order

Note	
	Connect the power supply and operate the machine after make sure no potential safety hazard around.
	Don’t put heavy object or step on cables, to prevent damaged cables cause accidents such as electric shock and leakage.
	Free running 5-10 minutes to preheating the machine when using the machine in Winter under **0**℃.

Operating as following order

1	Switch on outer power supply, put the power switch to ON, press POWER ON button of control box power.
2	Put the workpiece on horizontal position, and fix firmly.
3	To prevent the workpiece dropping, only can loose the belt after the workpiece fixed, then remove the hoisting tool.
4	Press the tilt button and tilt the workpiece to appropriate position to welding.
5	Repeat step 4 when tilting after present welding seam finished.
6	Tilt to appropriate position to welding.
7	Make sure the workpiece don’t hit ground during longtime working.
8	Tilt the workpiece to horizontal position after welding finished.
9	Fasten the workpiece by hoisting tool to prevent accident of workpiece dropping if

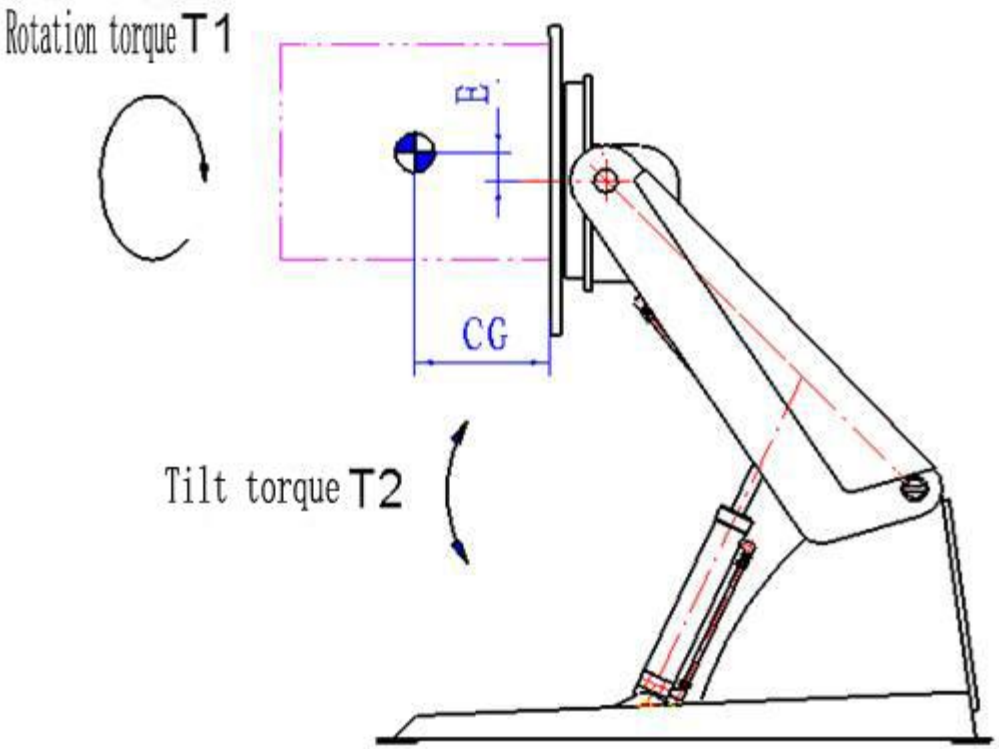
	set screws loosen.
10	Unload the workpiece after make sure the screws loosen completely.
11	Press the (Red) E-stop button on control box after welding finished, turn off the machine power.
12	After finish the whole day's work, turn off the main power.

7 Notice of loading and unloading workpiece

Warning: workpiece move or slide may cause heavy safety accident and damage the workpiece.	
	Put on protection clothes, protection glasses or safety cap when install.
	Use qualified nut and bolt when installation.
	Adopt secure manner to fix up workpiece in order to prevent slide.
	Calculate load weight, eccentricity and tilt angle correctly. Do not exceed the range.
	Loosen the hoist tool only after make sure the workpiece pressed tightly when loading; tight the workpiece, then loosen the compaction when unloading to prevent droping.

Attention	
	Avoid workpiece bump into worktable while loading, especially when using crane.
	Overload may damage motor and control system.
	When worktable with workpiece tilting, pay attention to workpiece can’t bump into ground.

8 Machine capacity



W: Capacity----------Weight of workpiece

E: Rotate eccentricity----------the distance from workpiece's center of gravity to rotation center.

T1: Rotation torque--------the weight of workpiece × E

CG: Tilt eccentricity----------the distance from workpiece's center of gravity to tilt positioner table

T2: Tilt torque----------the weight of workpiece× CG

1. Tolerable Capacity

Max. load of workpiece	Rotation moment of force T1	Tolerable eccentric vector E	Tilt moment of force T2	Tolerable center of gravity height CG
3000 kg	4500 N.m	150 mm	9000 N.m	300 mm

2. Calculate of load weight and eccentricity,

If W (kg) × 10× E (m) ≤ T1 (Nm), that's in the permissible range.

Ex: 3000×10×0.1 = 3000Nm, OK; 2000×10×0.25 = 5000Nm, overload

3. Tilt angle is 0°< θ< 135°

W (kg) × 10 × CG (m) ≤ T2, that's in the permissible range.

9 Installation

1. Condition request

Well-ventilated

Fix up the machine on solid ground, otherwise may raise eccentricity and cause the machine turn over.

Do not put the machine in the following condition:

- Rain
- Wet ground
- Dangerous place where may cause fire.
- Somewhere that weld spatter may cause fire.

Warning: Avoiding electric shock on steel plate.	
	Put on insulated protective clothing while the machine on the steel plate, and separate you from work pieces, welding positioner, earthing cable.

2. Installation

1）Hoist

Don’t let the machine out of sight when hoisting.

Note: don’t stand at the hoist aero when hoisting. Dismount the hoist tools only after the machine laid down stably.

2）Installation of the machine body

Put the machine on flat ground, and fixed by anchor bolt to prevent machine tilting or move. The two ends of anchor bolt must be tightened and can’t loose. It is dangerous when operating if the anchor bolts loosen.

3）Cable connection of control box

Open the door of control box, connection according to line No. on the drawing, connect power line, motor line and limit switch, close the door of control box after tighten the screw.

4）Checking

Check if all connection correct and reliable carefully, special attention to lack of motor phase, it will damage the motor, check carefully after connection.

The motor with independent fan, make sure the motor rotate direction is same as the cover marked after electricity.

5）Machine electricity

1. Close outer air switch, input power.

2. Place the main power switch on electric control box to “ON”, reset pendant and E-stop.

3. Press power ON, power indicate light on and machine electricity; please make sure the power connected correctly If abnormal. Meanwhile check phase sequence protector, turn off power if phase sequence false and turn on again after change input power wire phase sequence.

4. Press the tilt and rotate button on the pendant, check the machine motion if normal.

5. Please make sure hydraulic oil position within normal range when check tilt and height motion.

6. The machine is allowed to use.

Note: Stop immediately if the machine running with obvious shake or abnormal noisy, test it after identify causes. The machine can’t be put into use until all above work finished.

Power wire phase sequence fault may cause the motor CCW; the machine has phase sequence test function after power line is reconnected. If phase sequence fault, the machine can’t power on normally unless change phase sequence.

Warning: must install earthing to prevent electric shock in case of electric leakage.	
	It’s special operation for earthing and its relevant electric leakage breaker (electricity operation). When install earthing and electric leakage breaker, must obey electrical device technical standard and line code. Please make sure the earthing have been installed at the point of earthing terminal.

Check the phase sequence switch when first time electrify to the machine, look over the KX1 status after connect outer power supply, then press SYSTEM ON to electrify after normal.

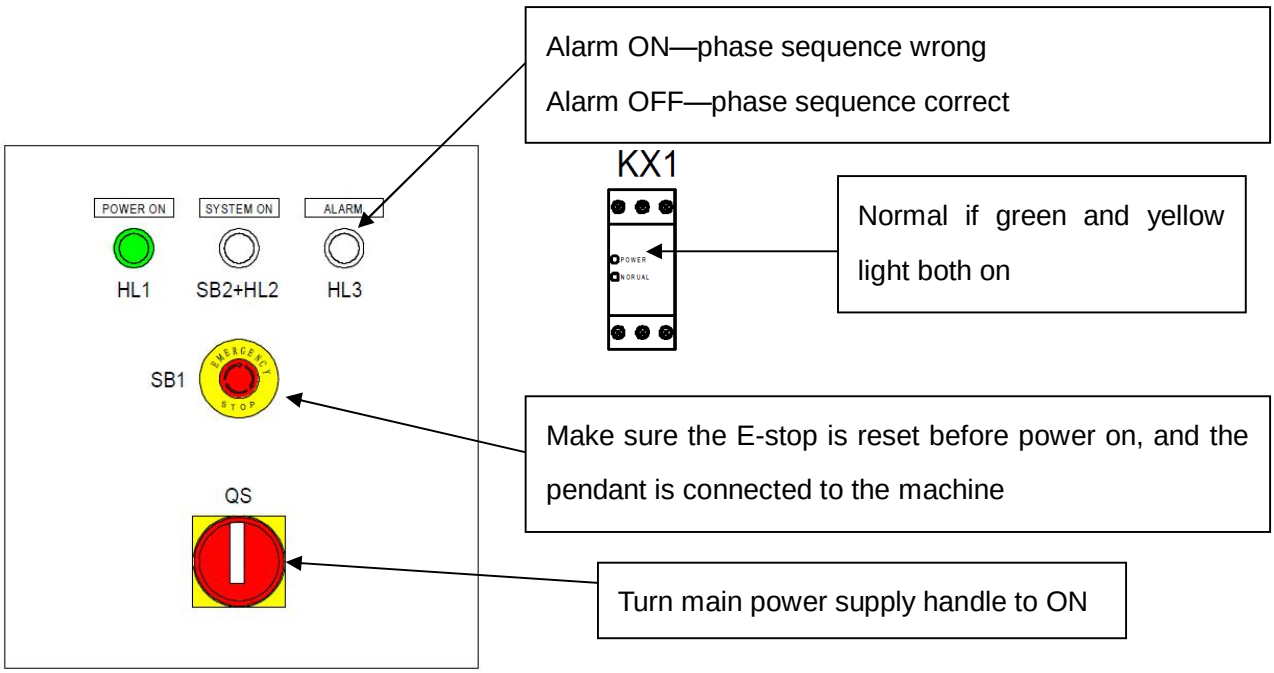
The phase sequence reply electrify normal is green light and yellow light on meantime, power supply is green light on, phase sequence normal is yellow light on

1） Phase sequence wrong: please power off and exchange the phase sequence (exchange any

two wires of L1/L2/L3 and connect), then power on.

2） Phase short: Test whether the 3 phase power supply is connected in deed by universal meter.

3） 3 phase non balance: released when any wire's voltage is lower than 85% of others.



POWER INPUT

Power cables should be prepared by customers, standard is 4×1.5mm^2， rated current of air switch is beyond 12A.

10 Welding current

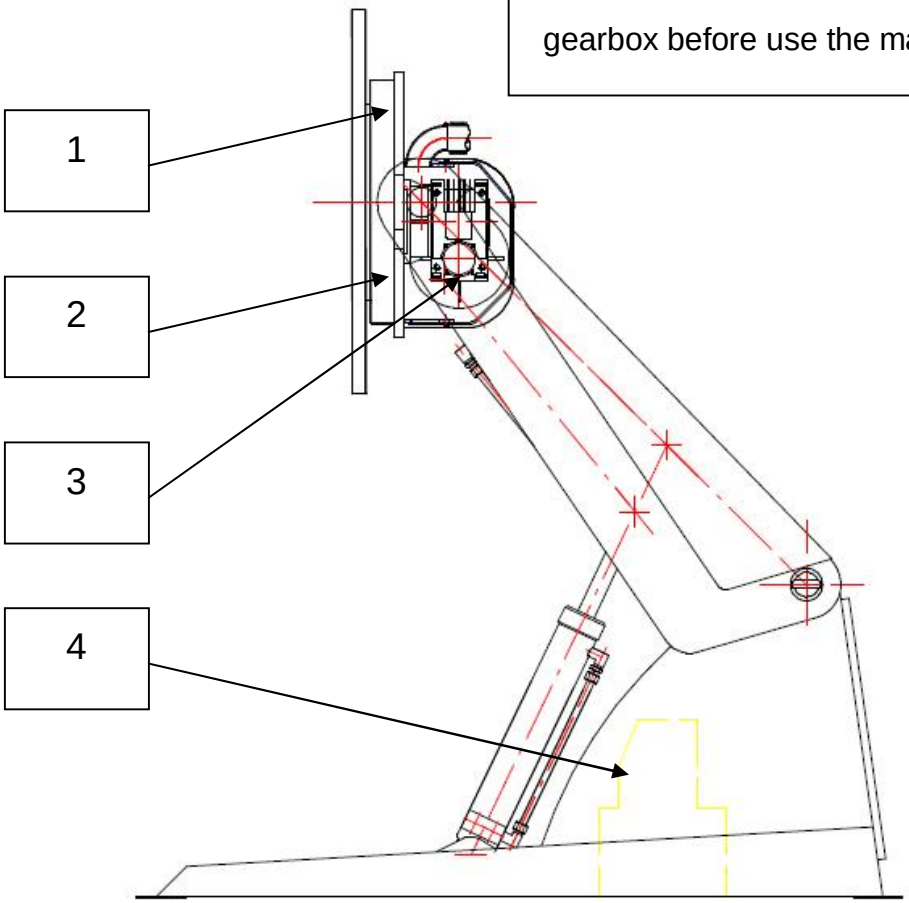
Please connect the equipment grounding to the welding connector in the front of base. Welding ground must be reliable, It is not allowed to use overlap joint which might lead to grounding failure while workpiece rotating and cause damage to the equipment.

welding grounding 500A

Welding earth contact bad lead to machine ground cable burn

11 Machine lubrication

Please confirm if there is oil in the gearbox before use the machine



NO.	Lubricating point	Lubricating oil	Period
1	Slewing bearing	Lithium-based grease NLGI 2	500h
2	Rotation gear	Lithium-based grease NLGI 3	500h
3	Worm speed reducer	Gear oil，2.7 L * 2 ISO VG220 (or similar oil)	First：300h Others：3000h
4	Hydraulic power unit	winter ISO VG32，25.0L summer ISO VG46，25.0L	First：10h Others：1500h

Note：

- When refueling the lubricating oil, please note the oil level sight glass indication in the reducer.
- Above table is for normal temperature. Shorten the period of changing oil when the environment temperature is higher than 40℃.
- When the temperature is lower than 5℃, gearbox oil should be change to ISO VG150.

Elevating Hydraulic power unit

The power unit can use all types of the mineral oil，when is chosen, according to the environment and temperature to consider the viscosity and humidity.

Working condition：mineral substance hydraulic oil according to ISO6743/4, is HM-HR-HV model. The viscosity level is standard ISO3448.Lowest viscosity：12cST；Highest viscosity：80cST；Best viscosity range：20cST～50cST；Lowest temperature of hydraulic oil：-15℃；Highest temperature of hydraulic oil：+80℃；Best working temperature：30～60℃；Lowest environment temperature：-15℃；Highest environment temperature 40℃

Fuel- injection quantity is 25.0L（approximate value）

hydraulic oil recommendation：

Winter	Outside temperature -10 - 25℃	ISO VG32
Summer	Outside temperature 0 - 35℃	ISO VG46

Before the maintenance of the hydraulic power unit, should cut off the motor power and other power of the electrical apparatus elements. And all the above things should operated by a professional person.

When installation ,assembling ,maintenance and disassembling the hydraulic power unit or other electrical apparatus element，must obey the related items strictly，the internal part of the system has no pressure (the pressure is 0)，should not have capacity on the equipment.

When change any kinds of valves or control elements, the oil can splash out，it may burn skin. Please operation after the oil is cooled.

The power unit is mainly consisted of aluminium alloy, alloy steel, plastic, etc. it can do some cleaning accordingly. When cleaning，should dropt hydraulic oil；to clean the oil pump , fuel tank，pipeline，strainer and valves etc.

Hydraulic power unit maintenance ：

Before add hydraulic oil, should clean the fuel tank totally. Add the oil to the highest oil level which is marked. When add the hydraulic oil, note to avoid oil leakage，should use clean hydraulic oil and use clean filter screen.

The safety and normal use of the hydraulic power unit is up to the right periodic maintenance. When used in a high pressure condition in a very short period，should check the bolts ,connectors, pipelines. Shake and swing will make the above elements less crowded, so may cause accident. Check the oil level and condition of oil. We suggest after the initial 10 working hours，change the hydraulic oil. Then you can change the oil once a year, at least change the oil one time a year, and clean the fuel tank before changing oil every time. Before changing, should dropt all the left hydraulic oil.

The best working temperature is 30℃ to 60℃，if exceeds, it will short the service life. Note：

check the oil after half a year，when found the color of the oil is different or impurity inside ,please change it.

Use clean hydraulic oil and screening it. It will extend the service time. mustn’t use different kinds of hydraulic oils or other mixed oils，avoid acid sludge and sediment to making the power unit working abnormally.

12 Maintenance

The operator must be trained, unqualified operators are forbidden to operate this machine.

Bolts are usually used to fix the equipment during initial installation.

Check each fastener to make sure they are not loosened after installation.

1. The machine should be grounding reliably when welding.

2. When failure occurs, cut off the power immediately. check and repair before operation.

3. Check the cable insulation condition. stop using if broken.

4. Check and change the oil for the gearbox, gear, rack and other transmission parts regularly

5. Check the lubrication condition of gear ,rack on lift-sliding, guiderail and sliding block before using,

6. If there is abnormal phenomenon at transmission unit, such as vibration, abnormal noise, jam, etc, stop and repair immediately.

7.During tightening and loosening operation, do not put hands inside, if workpiece narrow, tools are required .

8. Gearbox, motor ,guiderail and other joint should be checked once a month

9. Balance weight should be prepared for maintenance of elevation unit,

10. Every part can't be eroded by rain or corrosive gas, also can't be use in high temperature environment to avoid damage on electric components.

Daily check

When machine is powered on and working, don't open electric control cabinet. Operator should check from the outside of equipment running and make sure if there is no abnormal circs.

1、 Performance accords with standard criterion.
2、 Ambient environment is suitable for requirement (no rain water, no corrosive gas, no high temperature condition)
3、 Parts are in good condition.
4、 No abnormal noise, vibration and smell.
5、 No overheat or color change.

Periodically check

For periodically check, stop operation first, power off and open the cover of control box.

1) Power voltage should be within standard range.
2) Clean dust from control box and panel.
3) Check for any insulated cable damages. Repair immediately.
4) All kinds of connecting components: if loose, fasten before use.
5) If any damage of control circuit or each electric elements, please repair or replace it.

13 Trouble shooting

Trouble phenomena	Causes	Solutions
worktable no motion	1) No input power 2) cable broken 3) limit broken 4) motor or control parts burning loss 5) tooth surface damaged 6) tilt bearing cover broken 7) shaft key broken	1) input power 2) replace cable 3) replace 4) screw down 5) replace motor or control parts 6) replace 7) replace 8) replace key
	Attention: find out the cause of 4.7, eliminate potential safety hazard then replace.	
Rotation unsmooth	1) The chain wheel for rotation sticks with impurity such as splash and overlap. 2) Transducer alarm 3) overload 4) Rotation bearing damaged	1) Clean and lubrication. 2) check according to transducer manual 3) use with allowable value 4) Replace
Lubricate oil leakage	1) oil seal damaged 2) oil hole unsealing 3) oil pointer damage	1) Replace 2) Screw up 3) Replace
Workpiece elevation fault	1) button broken or poor connection 2) cable broken 3) limit broken 4) Rail scratch 5) motor or control device damaged.	1) Check and replace 2) Replace cable 3) Check or replace 4) Repair 5) Replace motor and control device
Welding instability	1) earthing cable loose 2) carbon brush abrasion	1) connect stably 2) Replace

14 Attachments

1) Electrical diagram
2) General assembly drawing
3) Certificate of quality
4) Electric list

No.	Model	Element	Q'n	Spec.	Note
1	QS1	Separate switch	1	LW42B-1016	25A
2	QF1-3	Breaker	3	OSMC32N1C10	10A
3	QF4	Motor protect switch	1	GV2-ME-14C	6-10A
4	TC1	Control transformer	1	BK-150	AC400V / 24V
5	U1	Inverter	1	ATV310HU15N4	1.5KW
6	KM0-1	Contactor	2	LC1-D12B7C	Wiring AC24V
7	KX1	Phase sequence protector	1	DPA51CM44	
8	HL1	Light	1	XB2BVB1LC	AC24V
9	SB2+HL2	Button switch	1	XB2-BW31B1C	AC24V
10	HL3	Light	1	XB2BVB5LC	24V
11	SB0-1	E-stop	2	XB2-BS442/XB2-BS542	
12	SA1-2	Select switch	2	XB2-BD33	
13	SB5,7	Button switch	2	XB2-BA21	
14	SB4,6	Button switch	2	XB2-BA11	
15	VC1	Power supply	1	AC220/DC5V	
16	VC2	Rectifying bridge	1	3510	
17	YV1-4	Magnetic valve	4	DC24V	
18	KA1-6	Intermediate relay	6	RXM4LB2B7	AC24V
19	KA7	Intermediate relay	1	RXM4LB2BD	DC24V
20	RP1	potentiometer	1	WH118	2.2K
21	RP2	potentiometer	1	WXD3-13	4.7K
22	P1	Digit display	1	UP5135	
23	XT	Connection terminal	45	UK5N,UK3N	