

User's Manual

SUBMERGED ARC WELDING MACHINE (TANDEM)

MODEL – AUTOWELD 1200 IADC



WARPP ENGINEERS PVT.LTD.

Survey No. 36, House No. 15/3, Unique Industrial Estate
Dhumal Nagar Vasai (East) Dist. Palghar (Maharashtra) INDIA - 401208
Tel: 8551817744 / 8551819944 / 8551817868 - 69 / 8551812002
Customer Care Tel: 8080808734
Email: service@warpp.co.in . Website: www.warpp.co.in

Safety Depends on You

The arc welding and cutting equipments are designed and built with ample safety consideration. However, proper installing and operating the machine can increase your safety.

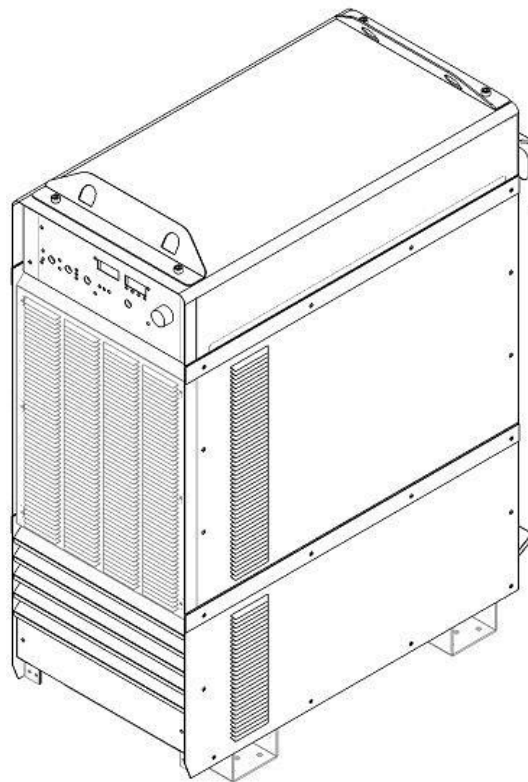
DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT CASUALLY WITHOUT READING THIS MANUAL THROUGHOUT.

Special Attention (Very Important) :

BE SURE TO AVOID THE WELDING MACHINE FALLING DOWN WHEN IT IS PLACED ON THE GRADIENT GROUND. IT'S FORBIDDEN UNFREEZING THE PIPELINE BY THE WELDING MACHINE.

THE SHIELD RANK OF THIS SERIES OF WELDING MACHINES IS IP21S, SO WORKING IN RAIN IS NOT SUITABLE.




This machine EMC is A.










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1 Safety warnings

 <p>Cautions</p>	<p>Arc and arc rays can hurt.</p>
<p>All performing welding workers ought to have health qualification from the authority organization to prevent you and others from arc radiation and burn. It should be prevented for children to enter into dangerous area as well.</p> <p>Be careful reading the following important items and the welder safety byelaw from the authority organization. Be sure that qualified professionals perform all installation, maintenances and repair procedures.</p>	
<p>1 Electric shock: The welding circuits are not insulated when welding. If you touch the two output electrodes of the machine with your bare skin at the same time, it will lead to electric shock, sometimes even fatal dangers. Users need to follow the items below to avoid electric shocks:</p> <ul style="list-style-type: none"> ■ If possible, lay some insulating materials, which are dry and large enough, in your working field. Otherwise, use the automatic or semiautomatic welding machine, DC welding machine as possible as you can. ■ Components in the automatic and semiautomatic welding machine such as the welding wire reel, feed wheel, contact tip and welding head are all electriferous. ■ Always be sure the machine has been connected perfectly to the work piece with the work cables and should be as close as possible to the working area. ■ The work piece should be grounded perfectly. ■ Make sure that the insulating material of the electrode holder, the grounding clamp, the welding cable and the welding head are not affected by damp, mildewed or spoilt, and be replaced momentarily. ■ Never dip the electrode in water for cooling. ■ Never touch electriferous parts of two welding machines at the same time, because this voltage is supposed to be two times of welding voltage while the grounding mode is not clear. ■ While working high above the ground or other places having the risk of falling, please be sure to wear safety belt to avoid losing balance caused by electric shock. 	
	<p>2 Arc: Use an arc welding mask to protect your eyes and skin from sparks and the rays of the arc, pay special attention to the filter glass, which must be conformable to the national standard.</p> <ul style="list-style-type: none"> ■ Use clothing made from durable flame-resistant material or sailcloth to protect your skin from heating by the arc rays. <p>■ Remind other nearby personnel before working lest arc rays hurt them by accident.</p>
	<p>3 Fumes and Gases: Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. While working in limited room, use enough ventilation and/or exhaust to keep fumes and gases away from the breathing zone, or use the respirator. Do not weld at the same time when using of degreasing, cleaning or spraying operations. The heat and rays of the arc can react with these gases to form phosgene, a highly toxic gas,</p> <ul style="list-style-type: none"> ■ Some protective gases used in welding might displace the oxygen in the air, and can lead to hurt or even death. ■ Read and understand the manufacturer's instructions for this equipment, and validate the health certification of consumptive materials, make sure they are asepsis and innocuity.
<p>4 Spatter: Spatter can cause fire or explosion.</p> <ul style="list-style-type: none"> ■ Remove fire hazards from the welding area. Remember that spatter from welding can easily go through small cracks and touch fire hazards. Keep the safety of all kinds of lines going though 	

	<p>welding area, including hydraulic lines in the wild.</p> <ul style="list-style-type: none"> Where compressed gases are to be used in the field, special precautions should be used to prevent explosion. When not welding, make certain that no electriferous part is touching the work piece or the work stage. Accidental contact can create a fire hazard. Do not weld containers or lines, which are not proved to be innocuous. It is very dangerous to heat, cut or weld tanks or containers at entry holes. Does not start work until the proper steps have been taken to insure that there is no flammable or toxic gas. Spatter might cause burn. Wear leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair to prevent from burning by spatter. Wear the ear shield when performing sideways or face up welding. Always wear safety glasses with side shields when being in a welding area. The welding cables should be as close to the welding area as possible, and the short, the better. Avoid welding cables going through the building framework, lifting chains, AC or DC cables of other welding machines and appliances. The welding current is strong enough to damage them while having short circuit with them.
	<p>5 Cylinder: Damage of it might cause explosion.</p> <ul style="list-style-type: none"> Make sure that the gas in the storage cylinder is qualified for welding, and the decompression flow-meter, the adapter and the pipe are all in good condition. Make sure that the installation of cylinder is by the wall and bundled tightly by a chain. Be sure to put the cylinder in the working space with no crash or shake, and far from welding area. It is forbidden to touch cylinder with the welding clamp or the work cables. Avoid facing the cylinder while installing the decompression flow-meter or the gasometer. When not working, please tighten the valve.
	<p>6 Power: (For electrically powered welding and cutting equipment) Turn off input power before installation, maintenances and repair, so that avoid accident.</p> <ul style="list-style-type: none"> The welding equipment is I class safeguard equipment; please install the equipment in accordance with the manufacturer's recommendations by specific persons. Ground the equipment perfectly in accordance with the manufacturer's recommendations.
	<p>7 Power:(For engine driven welding and cutting equipment)</p> <ul style="list-style-type: none"> Work in ventilated place or outdoors.
	<ul style="list-style-type: none"> Do not add fuel near to fire or during engine starting or welding. When not working, add fuel after engine is cooling down; otherwise, the evaporation of hot fuel would result in dangers. Do not splash fuel out of the fuel tank, and do not start the engine until complete evaporation of the outside fuel.
	<ul style="list-style-type: none"> Make sure that all the safeguard equipments, machine cover and devices are all in a good condition. Be sure that arms, clothes and all the tools do not touch all the moving and rotating components including V belt, gear and fan etc. Sometimes having to dismantle some parts of the device during maintenance, but must keep safety awareness strongly every time. Do not put your hand close to fans and do not move the brake handle while operating. Please remove the connection between the engine and the welding equipment to avoid sudden starting bn
	<ul style="list-style-type: none"> When engine is hot, it is forbidden to open the airtight cover of the radiator water tank to avoid hurt by the hot vapor.
	<p>8 Electromagnetic: Welding current going though any area can generate electromagnetic, as well as the welding equipment itself.</p> <ul style="list-style-type: none"> Electromagnetic would affect cardiac pacemaker, the cardiac pacemaker users should consult

one's doctor first.

- The effect of electromagnetic to one's health is not confirmed, so it might have some negative effect to one's health.
- Welders may use following method to reduce the hazardous of electromagnetic:
 - a. Bundle the cable connected to the work piece and the welding cable together.
 - b. Do not enwind partially or entirely your body with the cable.
 - c. Do not place yourself between the welding cable and the ground (work piece) cable, if the welding cable is by your left side, then the ground cable should be by your left side too.
 - d. The Welding cable and the ground cable are as short as possible.
 - e. Do not work near to the welding power source.



9 Lift Equipment: carton or wooden boxes package the welding machines supplied by our company. There is no lifting equipment in its wrapper. Users can move it to the prospective area by a fork-lift truck, and then open the box.



- If having rings, the machine can be transited using rings. While D&H SÉCHERON Welding Machine Manufacture reminds users, there is possible risk to damage the welding machine. It is better to push the welding machine moving in use of its rollers unless special situations.



- Be sure that the appurtenances are all removed off when lifting.
- When lifting, make sure that there is no person below the welding machine, and remind people passing by at any moment.
- Do not move the hoist too fast.

10 Noise: The Welding Machine Manufacturer reminds users: Noise beyond the limit (over 80 db) can cause injury to vision, heart and audition depending on oneself. Please consult local medical institution. Use the equipment with doctor's permission would help to keeping healthy.

Machine used for pipe unfreezing purpose is prohibited.

2 Product summary

2.1 Main features

1. Adopting digital control technology, easy to operate with beautiful outlook.
2. With arc voltage inspection and sensor react technology, welding cable can lengthen to 70m
3. 100% duty cycle, suitable for heavy industry
4. Software technology, with small volume, light weight and low consumption
5. With AC square wave control technology, adjustable AC frequency, DC deviation and wave balance parameter to improve the arc voltage stability, control the welding seam depth and deposition speed to get good performance
6. With AC/DC revert connection and DCEN connection exchange function, can get exchange without change the cable connection
7. Power source can parallel to work to enlarge the output current, which suitable for huge current welding situation and increase the efficiency

2.2 Application

- This AC/DC square wave arc welding rectifier is a power source with multi-functions for submerged arc welding. Except for good functions with AC/ DC single wire welding and surfacing with band-electrode, it can do twin or multi wire welding with DC arc welding power source.
- Power source can parallel to work to enlarge the output current, which suitable for huge current welding situation.
- Widely used for steel structure, bridge, automotive, oven and water electricity filed.

2.3 Working circumstance

The machine protection grade is IP21S, can't work or stock under the rain

Working in living quarters is not recommended

Ambient temperature range: When welding: $-10 \sim +40^{\circ}\text{C}$; transport and store $-25 \sim +55^{\circ}\text{C}$

Relative humidity: $40^{\circ}\text{C} \leq 50\%$; $20^{\circ}\text{C} \leq 90\%$




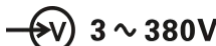




















The dust, corrosive and acid air or material should be within normal range, except the air come from the welding process.

The tilting should be no more than 10° , if machine work on the tilting place, anti-tilting measurements should be taken.

Distance from machine to machine, from machine to wall should be more than 50cm.

Working situation should fit standard of GB/T8118-2010.

2.4 Symbol instruction

	Read instruction manual		Danger
	overheat		Input 3-380V
	Input abnormal		Power indicator
	Input control		Output control
	Remote control		Panel control
	CC		CV
	AC		DC
	AC frequency	DC +	DCEP
	Wave balance	DC -	DCEN
	DC deposition		Parameter value adjust
	Welding head		SAW
	Work piece		Work piece arc voltage input
	Control transformer fuse		Ground connect

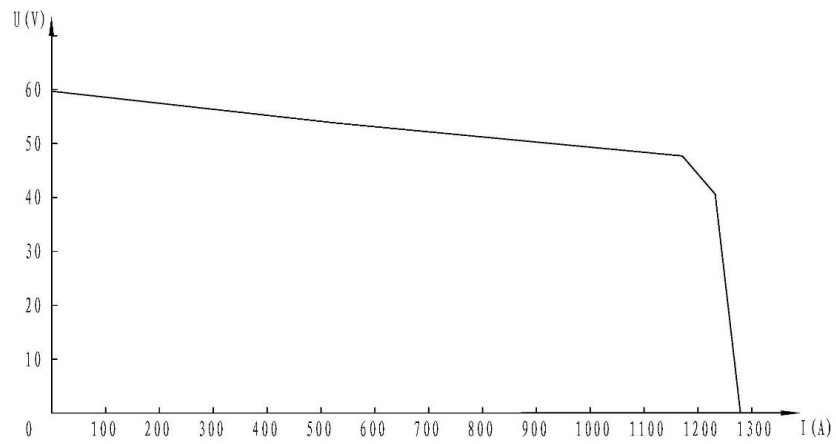
3 Technical parameters

3.1 Technical parameter

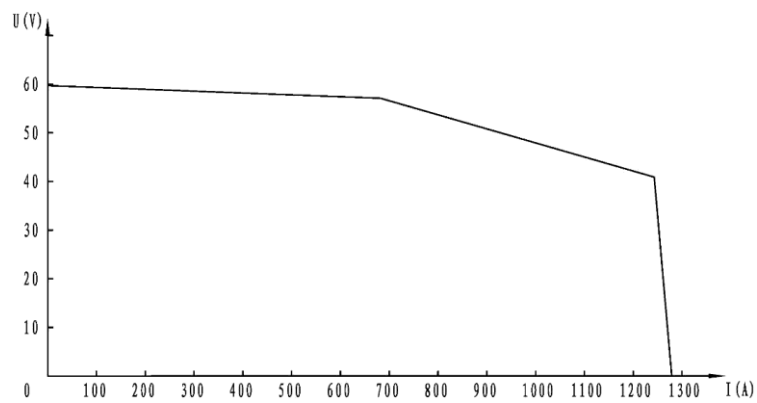
Item	Unit	Model
		AUTOWELD 1200 IADC
Input Power	V/Hz	3~380/415 ±10% 50
Rated Input Capacity	KVA	63.8
Rated Input Current	A	104
Rated Output Current	A	1200
Rated Output Voltage	V	44
Rated AC Output Current/Voltage Range	-	100A/20V ~ 1200A/44V
Rated Open Circuit Voltage	V	92
Rated Duty Cycle	-	100% (40 °C)
Efficiency	-	78%
Power Factor	-	0.91
Wave Shape Balance	%	25 ~ 75
DC Bias	%	25 ~ 75
Cooling Mode	-	Air Cooling
Insulation Grade	-	F
Ingress Protection	-	IP21S
Dimension (L*W*H)	mm	930x470x1250
Net Weight	kg	180

3.2 Characteristics

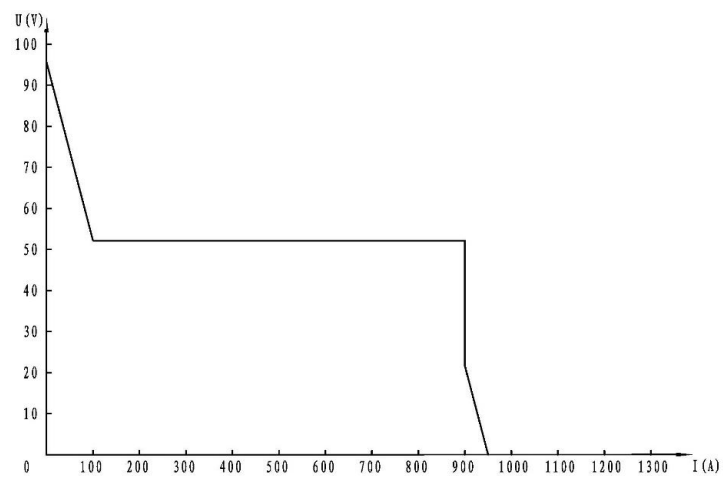
(1) Slowly CC mode



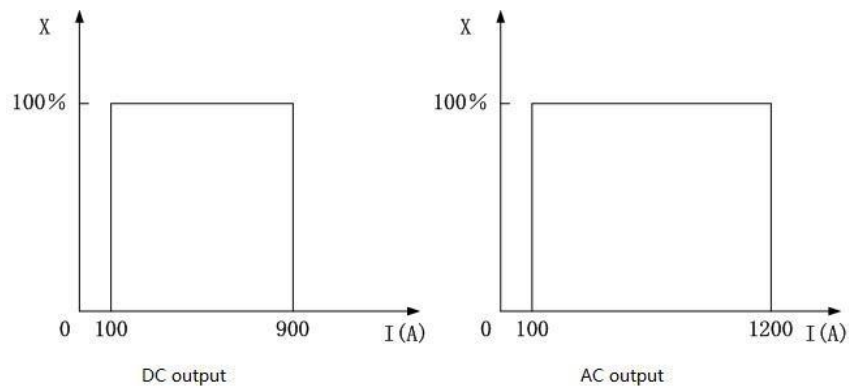
(2) CV model



(3) Sharply CC mode



3.3 Rated duty cycle



Rated duty cycle $X=100\%$ means take 10min as a circle, machine can work 10min, that means machine can 24 hours work without stop. The machine working is under temperature $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$, if ambient temperature over 40°C or too much dust inside the machine will cause the duty cycle reduce, maybe the machine will be burnt.

3.4 Overheat protection

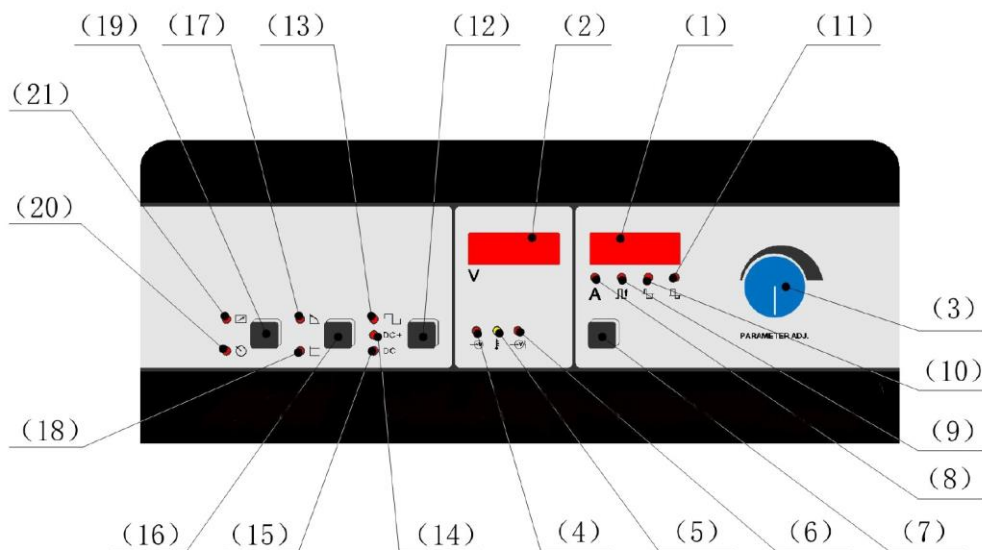
This machine adopt temperature relay for heat protection, if machine work over the rated duty cycle or ambient temperature over 40°C cause machine over heat, the temperature relay will stop the machine to avoid burnt.

Machine can continue to work when the inside temperature turn to normal and the overheat indicator off.

4 Panel function

4.1 Front top panel instruction

1. Ammeter: Indicate the actual welding current;
2. Voltmeter: Indicate the actual welding voltage;
3. PARAMETER ADJ.) :adjust the welding current under panel control, adjust AC frequency, wave balance and DC deposition parameter under remote control
4. Power supply indicator: to indicate if the power is energized;
5. Over-load indicator: when machine is under over-load, the indicator lamp is on;
6. Voltage abnormal indicator: when the voltage is abnormal, the indicator lamp is on;
7. Parameter selection: select AC frequency, wave balance and DC deposition under AC mode;



8. Current indicator: it will be on when ammeter show current value.
9. AC frequency (f) indicator: it will be on when ammeter show AC frequency(Hz), can adjust the AC frequency parameter by turn the knob.
10. Wave balance (H) indicator: it will be on when ammeter show the wave balance(%), can adjust the wave balance parameter by turn the knob.
11. DC deposition (D) indicator: it will be on when ammeter show the DC deposition (%), can adjust the DC deposition parameter by turn the knob.

AC frequency, wave balance and DC deposition indicator select by the parameter adjust knob, 3s after adjustment finish, the indicator will automatically turn to current indicator on.

12. Polarity select knob: AC/DCEP/DCEN exchange knob
13. AC (A) indicator: it will be on when under AC function
14. DCEP (DC+) indicator: it will be on when under DCEP function(welding head terminal is +,work piece terminal is -)
15. DCEN (DC-) indicator: it will be on when under DCEN function(welding head terminal is -,work piece terminal is +)
16. Characteristic select knob: CC and CV mode exchange knob
17. CC mode (C) indicator: it will be on when under CC mode(it is slow CC under remote control, sharp CC under panel control)
18. CV mode (V) indicator: it will be on when under CV mode(no such function under panel control)
19. Control selection knob: remote control and panel control exchange knob.

- 20. Panel control (☺) indicator: machine under panel control when indicator on
- 21. Remote control (☑) indicator: machine under remote control when indicator on

4.2 Front bottom panel instruction

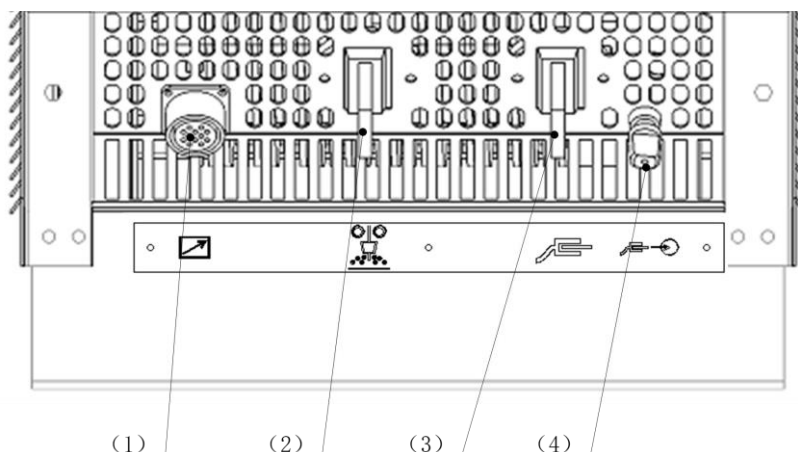
1. Remote control plug: power source remote control communication plug, the pin function of the plug as following table:

Pin	Name	Function	Note
1	Remote control A	Start signal	Remote control and panel control affected by this signal
2	H	Power given signal	Together with pin 4 output 15V signal, inside power have 150Ω resistor
3	D	Power given signal	Input , resistor > 10MΩ, 0~15V
4	L	Power given signal	Short connect with pin 12 (GND) inside the machine
5	Remote control B	Start signal	Input together with pin 1(A) , back circuit current < 50mA
6	Arc volt.(work piece)	Arc volt. inspection signal	Output
7	~110VA	AC 110V	Output, isolate from the three phase input power, frequency (50Hz/60Hz) , power 250W
8	~110VB	AC 110V	Output
9	Arc volt.(welding head)	Arc volt. inspection signal	Input
10	PE	Connect shell	Not connect
11	I	Current feedback signal	Output ,welding current/current feedback signal = (1000A/4V)
12	GND	Ground connect	Reference terminal for pin 3 and pin 11

2. Welding head (☑) output terminal: connect with cable from welding head side


3. Work piece (☑) output terminal: connect with cable from work piece side


4. Arc voltage inspection signal: work piece side arc voltage inspection signal input (☑) terminal, connect with arc voltage inspection cable from work piece side





4.3 Back panel instruction


(1) Power switch: over current protection switch, when machine abnormal, this switch will power off to protect the machine. Please separately connect power switch when install the machine

(2) Communication plug X1: power source parallel control connector or synchronize control communication plug, input plug  . Pin 1 is for whole communication signal A, pin 2 is for whole communication signal B, other 5 pin is for reservation.

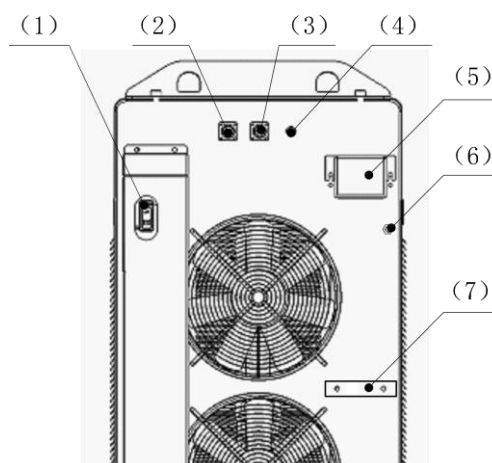
(3) Communication plug X2: power source parallel control connector or synchronize control communication plug, input plug  . Pin 1 is for whole communication signal A, pin 2 is for whole communication signal B, other 5 pin is for reservation.

(4) Fuse FU1 (5A) : used for control transformer over current protection(control circuit, fan, remote control output)  .Make sure the power source is no electricity when turn on the fuse.

(5) Power cable connector: three phase power input  3 ~ 380V;

(6) Ground connect  screw (M8) : must be stable and fit the state standard

(7) Cable fix block: to fix the three phase input cable



5 Insert function

No.	Item	Factory set	Instruction	
1.	Penetration set on DCEP	1 (on) 1 gear	<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "2", press "characteristic select", come into DCEP penetration setting Step 3: voltmeter show "0", turn "parameter adjust", press "pole selection" when ammeter show "0", to turn off the penetration adjust t and exit from the insert function set. Press "pole selection" when ammeter show "1", to start the penetration set Step 4: voltmeter show "1", turn "parameter adjust", penetration have 4 gear select(1st gear the penetration is lightest, the 4th gear penetration is deepest), press "pole select" to storage then exit. 	
2.	Up/down slope adjust for AC current exchange	0 (off)	<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "3", press "characteristic select", come into AC current up/down slope adjust setting Step 3: voltmeter show "0", turn "parameter adjust", press "pole selection" when ammeter show "0", to turn off the slope adjust and exit from the insert function set. Press "pole selection" when ammeter show "1", to start the slope control Step 4: voltmeter show "1", turn "parameter adjust", adjust AC up/down slope (1~100 (A/100μs))press "pole select" storage ,the value is 10 Step 5: voltmeter show "2", up slope and down slope value set same, press "pole select" to storage, then exit. 	
3.	System reboot		<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "7", press "characteristic select", come into factory set, storage and exit. 	
4.	Parallel function	0 (off)	<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "5", press "characteristic select", come into parallel and multi arc control 	<ul style="list-style-type: none"> Step 4: voltmeter show "0", set the master and deputy source, turn "parameter adjust", press "pole selection" when ammeter show "0", to set the deputy power source, Press "pole selection" when ammeter show "1", to set the master power source

No.	Item	Factory set	Instruction	
	Multi-function	0 (off)	setting <ul style="list-style-type: none"> Step 3: voltmeter show "0", turn "parameter adjust", press "pole selection" when ammeter show "0", to off the parallel and multi arc mode, then exit from insert function. Press "pole selection" when ammeter show "1", to open the parallel function, when ammeter show "2" to open the multi arc function 	<ul style="list-style-type: none"> Step 5: voltmeter show "2", to set the arc order, turn "parameter adjust", press "pole selection" when ammeter show "1", to set the first arc, Press "pole selection" when ammeter show "2-6", to set the 2nd to 6th arc.
5.	Lack voltage and phase inspection	280	<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "7", press "characteristic select", come into "input abnormal inspection" Step 3: voltmeter show "0", turn "parameter adjust", ammeter show 230~330(this value bigger, the voltage inspection sensitive higher), press "pole selection" to storage the parameter, then exit. 	
6.	Remote control start set	0 (on remote control when start)	<ul style="list-style-type: none"> Step 1: press "parameter selection" for 5s, come into insert function set mode, voltmeter show "00." Step 2: adjust "parameter adjust" make ammeter show "7", press "characteristic select", come into panel control start setting Step 3: voltmeter show "0", turn "parameter adjust", press "pole selection" when ammeter show "0", set the power source start on remote control terminal. Press "pole selection" when ammeter show "1", set the power source start automatically, storage and exit. 	

*Insert function: can set on the front up panel as the above table 4 shows.

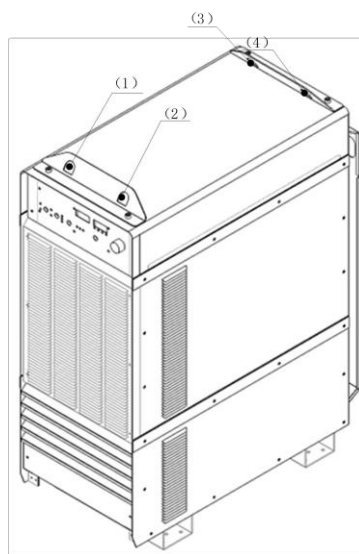
*Power source protection function: 6s after power on, the machine can have output.

*Intelligent fan function: fan work 2s after machine power source. It continue work on remote control mode. It start to work when machine power on under remote control mode, and stop work 8min after machine stop work. Each time the fan start/stop time need no less than 5s. it continue work under overheat situation.

6 Machine Installation

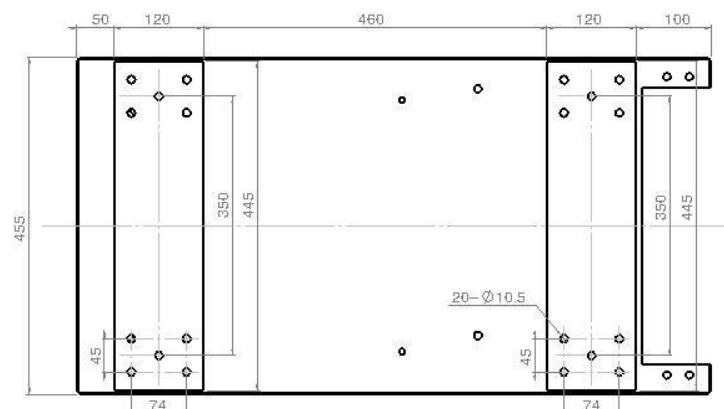
6.1 Hoisting

As following drawing show, (1)、(2)、(3) (4) hoisting hole, can choose (1) and (4) or (2) and (3) or (1)、(2)、(3) (4) together



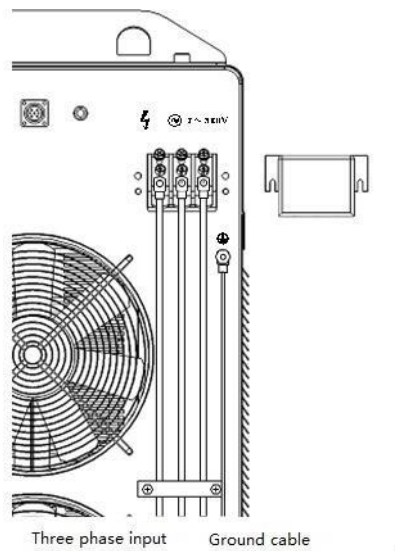
6.2 6Foot install dimension

As following drawing show:



6.3 Machine connection

6.3.1 Input power cable connection



This machine requires 3 phase 380v/50Hz power input, so the related power cable and distribution box is needed, as well as the circuit breaker and ground lead. Reliably connect the protective ground and the yellow-green wire which on the back of the machine. The wire CSA should no less than the following table:

Model	CSA for input copper wire (mm ²)	Breaker capacity (A)	Fuse protector (A)	CSA for ground lead cable(mm ²)
AUTOWELD 1200 IADC	≥25	≥16	150	≥150

6.3.2 Output terminal cable connection

(1) Take away the protection pad of the output terminal, connect the welding head and work piece stably with the power source output terminal, make sure the protection pad ≥10mm away from the cables after the pad installed. Welding cable shall be no less than 140mm².

(2) When power source integrated, the control cable one side connect power source output terminal stably, the other side connect controller, make sure the 12 pin control cable no less than 0.75mm²

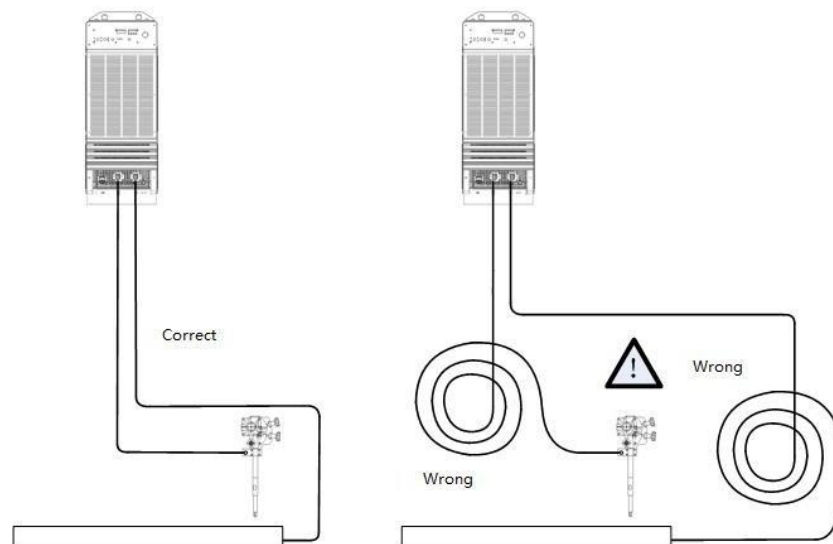
(3) Connect one side of the arc voltage inspection cable stably with the power source bottom panel arc voltage inspection signal terminal, the other side connect with work piece, the cable should be no less than 1.0mm²

6.3.3 Notes for output terminal cable connection

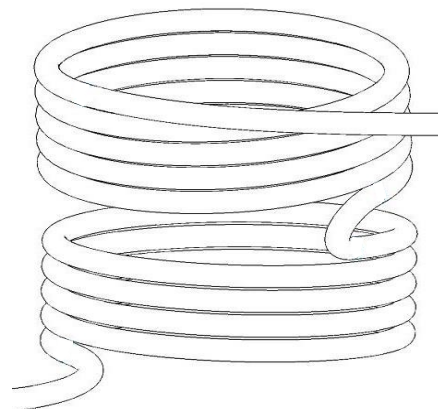
(1) Welding cable square meter small or connect not stable will cause welding performance. Make sure the cable square meter is big enough and connection is stable. The overheat of the cable shall be caused by small cable or connect

unstable.

(2) Make the cable roll up, like the following drawing 12 (a) show is prohibited. If roll up is unavoidable, it better use the way like 12 (b) show, make the welding head cable and work cable nearby to reduce circuit inductance.



(a)



(b)

Drawing 12

(3) When work piece too long, it better use slipper mode for ground connect to reduce the cable length, welding cable length shall be no more than 70m.

(4) Too much inductance for the welding circuit will cause SC welding current and voltage unstable, cause the power source stability and burn the parts inside.

(5) Arc voltage inspection cable connect with welding cable is prohibited to avoid inductance.

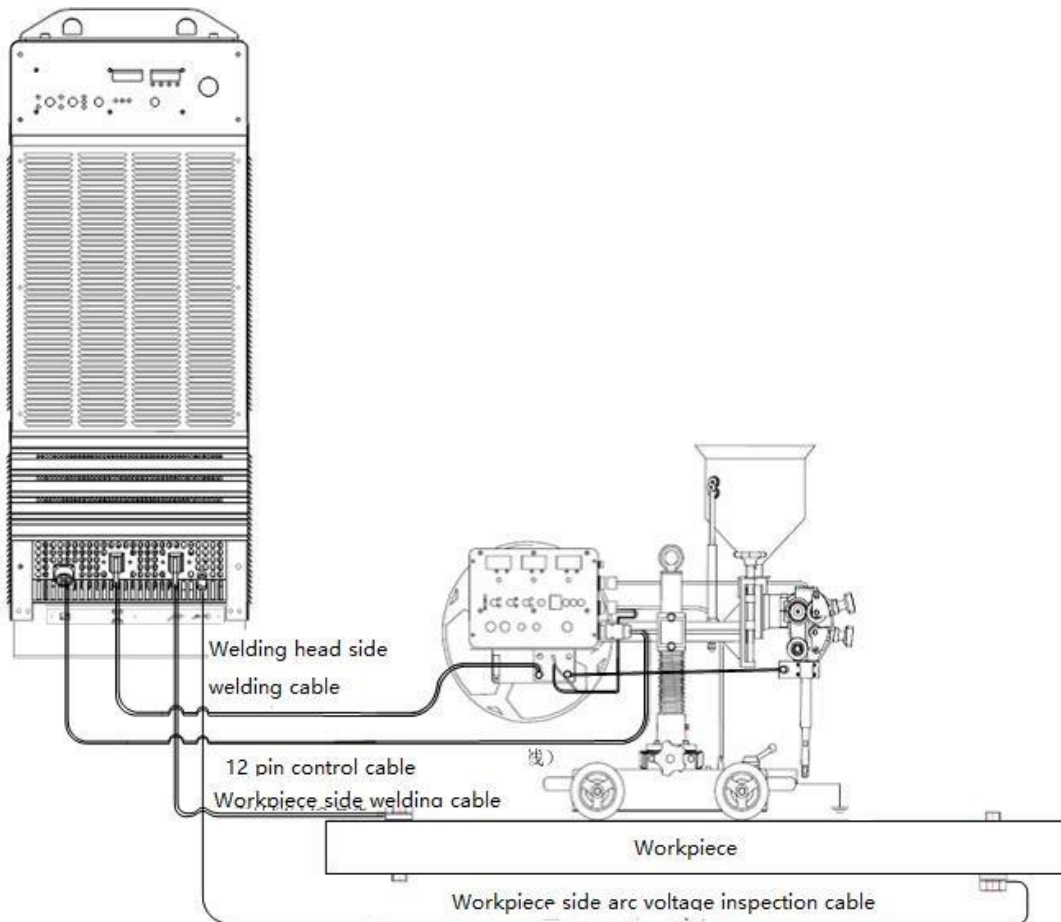
(6) Arc voltage inspection cable shall be as short as possible to reduce the inductance

(7) Taking the position opposite from the work piece during the welding can get better welding performance

(8) When the power used for multi arc and parallel function, after ensure the min. distance for each power source, the communication cable shall be the shorter the better , communication cable shall be less than 1200m

6.3.4 、 Single wire connection

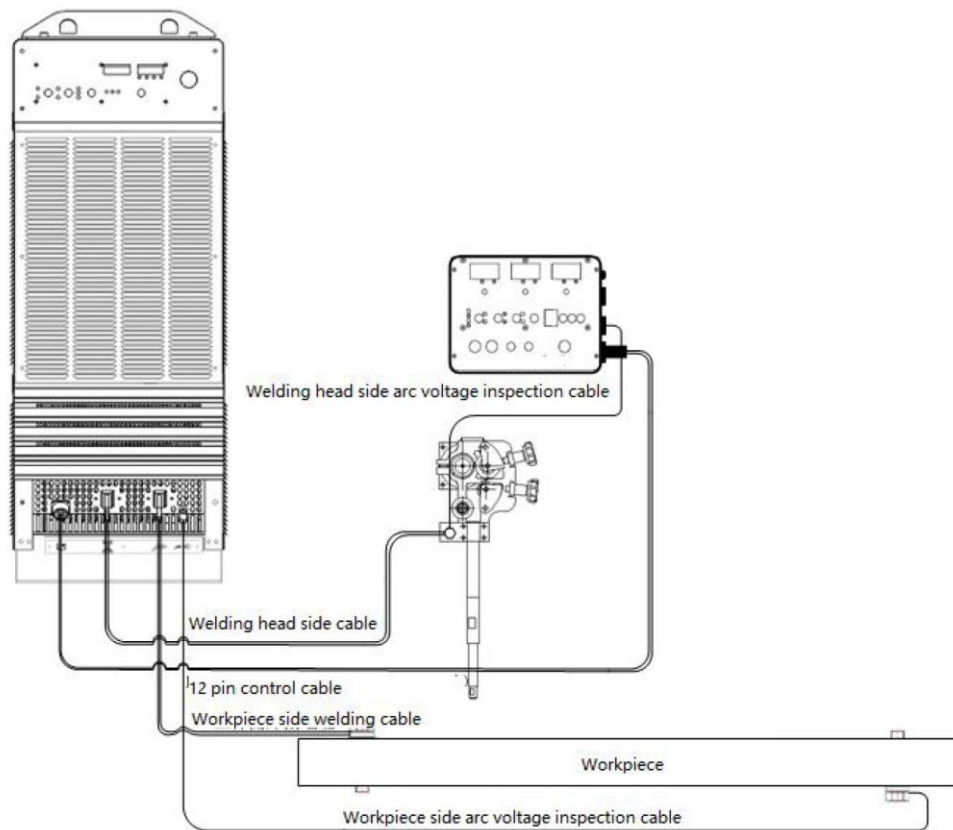
(1) Work with single wire tractor



Drawing 13

Turn off the three phase input breaker, connect two power source as drawing 13 shows, connect three phase power source, earth cable, welding head side cable, work piece side cable, 12 pin control cable and arc voltage inspection cable accordingly.

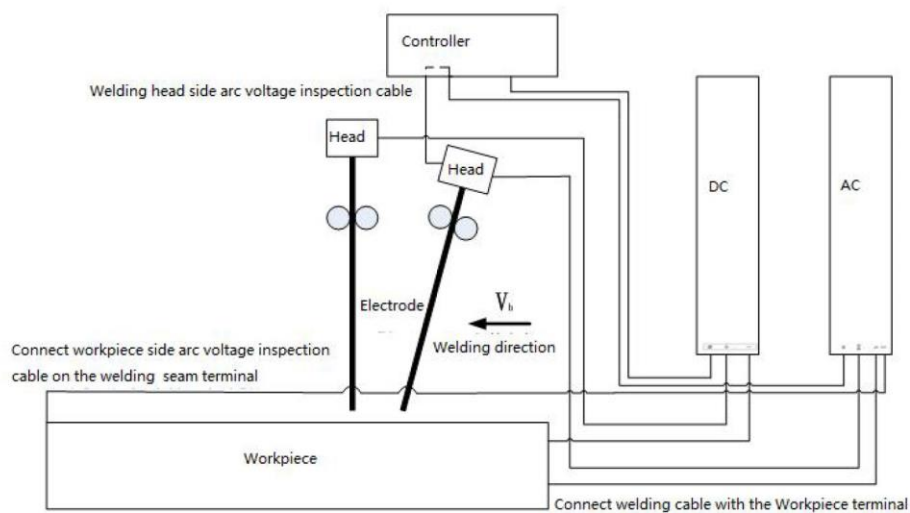
(2) Work with gantry machine



Drawing 14

Turn off the three phase input breaker, connect two power source as drawing 13 shows, connect three phase power source, earth cable, welding head side cable, work piece side cable, 12 pin control cable and arc voltage inspection cable accordingly.

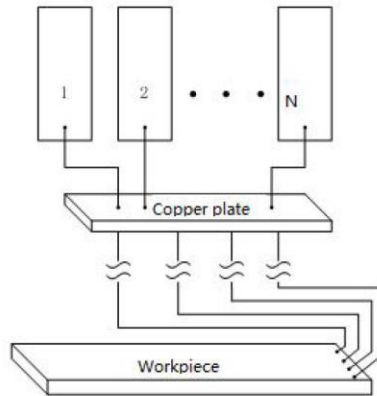
6.3.5. Tandem connection



Drawing 15

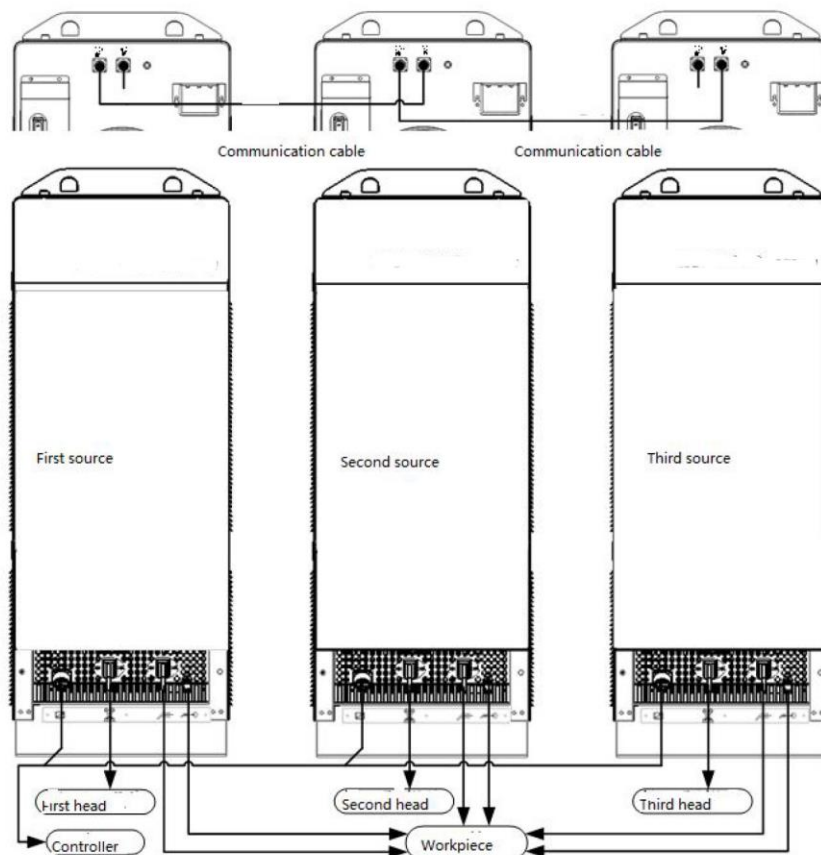
AC/DC tandem welding connection as above drawing show. Fix two power source in suitable position, Turn off the three phase input breaker, connect two power source as drawing 14 shows(when ZDE7-1200HD work ad DC power source, work piece arc voltage inspection cable connect with work piece terminal can connect with power source work piece terminal directly)

6.3.6、 Multi power source connection (Drawing 16)



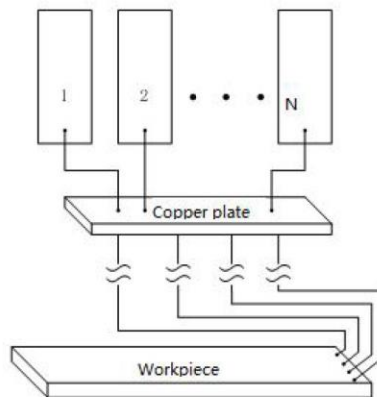
When use multi wire welding, many source connect with one work piece only, when the distance is far, need use one integrated cable, which can reduce the resist consumption to improve the efficiency, like drawing 16 show.

6.3.7、 Triple wire connection(Drawing 17)



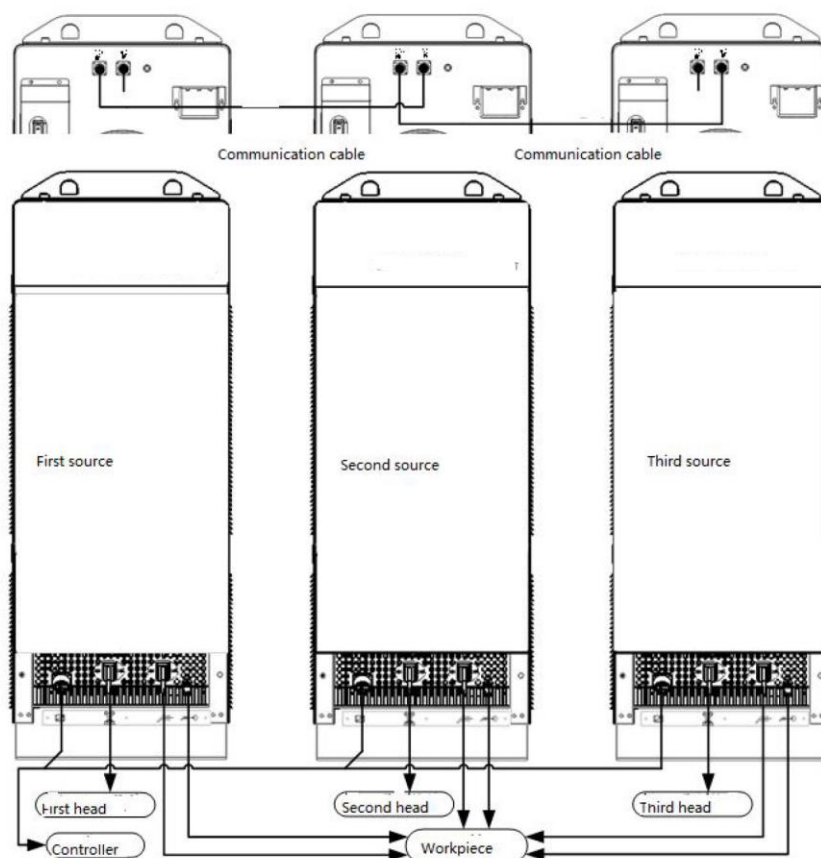
AC/DC tandem welding connection as above drawing show. Fix two power source in suitable position, Turn off the three phase input breaker, connect two power source as drawing 14 shows(when ZDE7-1200HD work ad DC power source, work piece arc voltage inspection cable connect with work piece terminal can connect with power source work piece terminal directly)

6.3.6、 Multi power source connection (Drawing 16)



When use multi wire welding, many source connect with one work piece only, when the distance is far, need use one integrated cable, which can reduce the resist consumption to improve the efficiency, like drawing 16 show.

6.3.7、 Triple wire connection(Drawing 17)

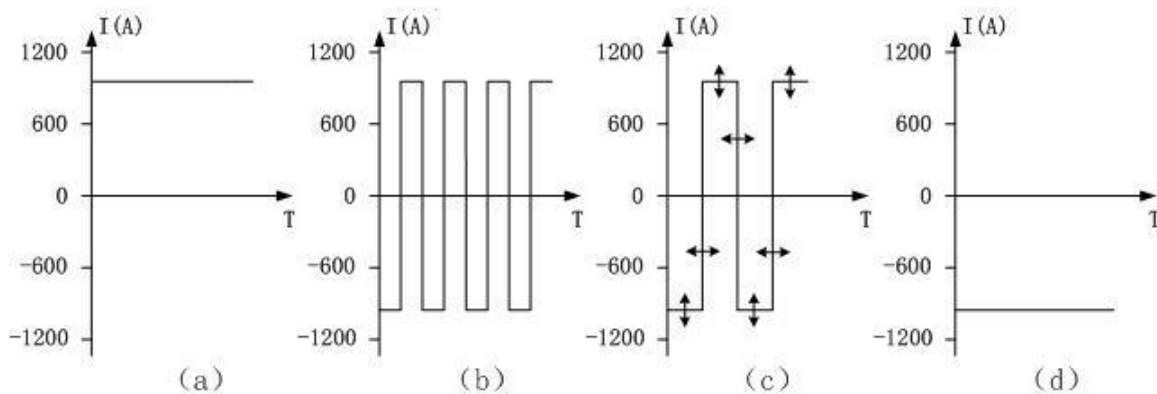


7 Operation

7.1 Procedure

This power source can be used for submerged arc welding and stick welding. It adopts module design, which can be used for single wire welding, also can be used for multi wire welding, max. 6 arc welding, it can also be parallel for other applications.

Through adjust the AC wave frequency, wave balance and DC deposition data, operation can reduce the arc deposition and control the current + half wave to affect the weld penetration, as well as the – half wave to affect the welding speed.



(1) DCEP: Work piece voltage higher than the welding head voltage during the welding process, weld penetration high, weld speed slow, normally used for the forward welding for tandem to ensure the penetration. Refer to above drawing (a)

(2) AC balance procedure: frequency 10Hz~60Hz, wave balance 50%, DC deposition 50%, weld penetration low, weld speed fast, arc stability high. Normally used for the backward welding for tandem to ensure the weld speed and performance. Welding efficiency is times higher than single wire welding. Refer to above drawing (b)

(3) Changeable AC procedure: frequency 10Hz~60Hz, wave 25%~75%, DC deposition 25%~75%, cab set AC parameter, penetration depth can adjust, weld speed can adjust, arc voltage stability can adjust. Refer to above drawing (c)

(4) DCEN: Work piece voltage lower than the welding head voltage during the welding process, weld penetration low, weld speed fast. Refer to above drawing (d)

7.2 For stick welding machine

- (1) Power off, refer to 6.3 connect the machine. The arc voltage inspection wire must connect well(work piece side connect with work piece, welding head side connect with welding electrode holder)
- (2) Connect electrode holder and welding head output terminal stably
- (3) Connect welding cable with work piece output terminal stably

- (4) Power on the machine, set the function of the power source, select panel control, according to the electrode procedure require, choose AC, DCEP or DCEN.
- (5) Adjust the parameter refer to following table
- (6) Start the machine

Work piece thickness (mm)	≤3	4~5	6~12	≥13
Electrode dia. (mm)	φ3.2	φ3.2~φ4	φ4~φ5	φ5~φ6
Welding current (A)	60~120	90~120	120~250	250~400

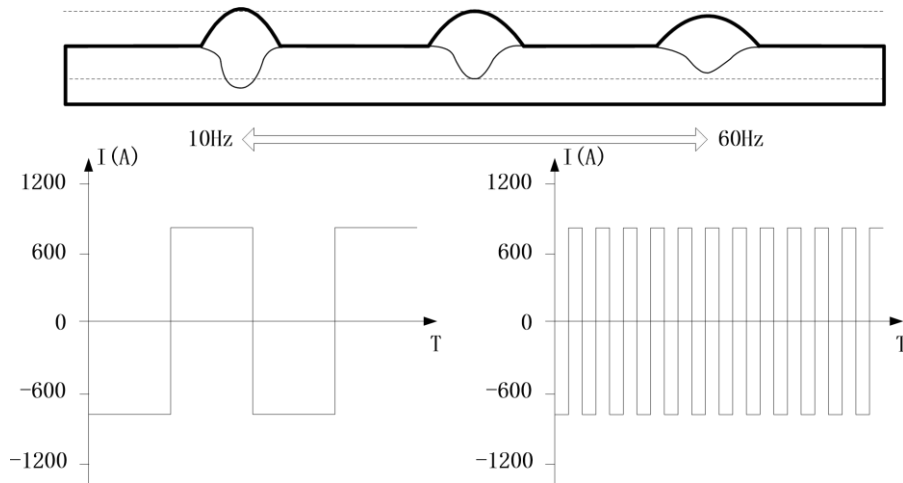
7.3 For DC submerged arc welding machine

Wire dia. (mm)	φ3.2	φ4.0	φ5.0
Welding current (A)	400~800	450~900	500~900
Welding voltage (V)	28~38	31~40	33~43

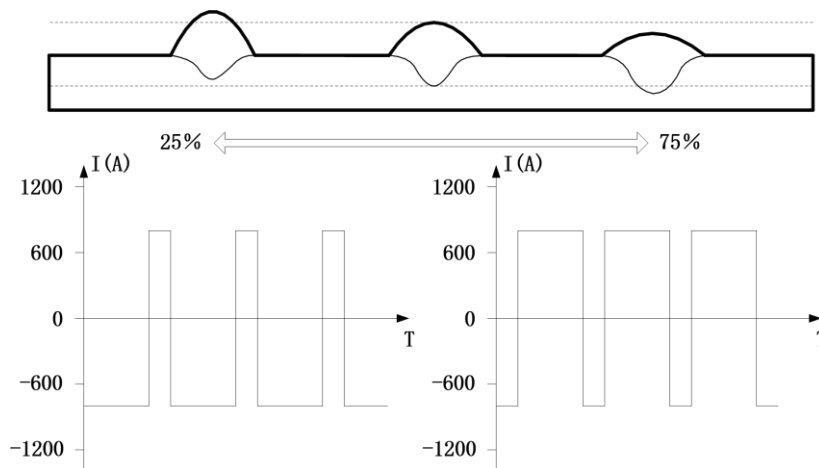
- (1) Power off, refer to 6.3 connect the machine
- (2) Power on the machine, set the function of the power source, select the function and set parameter on the panel, choose the power source characteristics. Then according to the welding procedure choose the DCEP or DCEN, Finally set the welding current, welding voltage, wire feed speed, wire dia. And characteristic at the remote control terminal.
- (3) Start the machine

7.4 For AC submerged arc welding machine

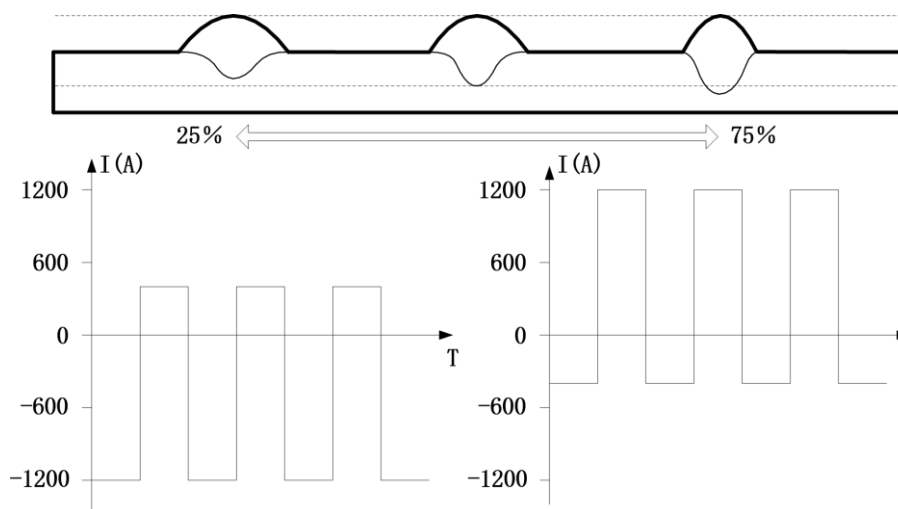
- (1) Power off, refer to 6.3 connect the machine
- (2) Power on the machine, set the function of the power source, select the function and set parameter on the panel, choose the power source characteristics, Choose the AC frequency(50Hz), set the remote control, wave balance50% and DC deposition 50%. The increase of the AC frequency can increase the arc stability, DC deposition and wave balance increase can increase the weld penetration, with same situation, will affection as following (a) (b) (c) shows. Finally set the welding current, welding voltage, wire feed speed, wire dia. And characteristic at the remote control terminal. For tandem welding, the backward AC usage power source need to be less than the forward DC usage power source(100A less for reference)
 - (a) AC frequency set: AC frequency increase, arc stability increase, weld with increase, weld penetration decrease.



(b) Wave balance set: wave balance increase, weld with and penetration increase, melt stirring improve



(c) DC deposition set: DC deposition increase, weld penetration increase, weld width decrease, weld speed decrease



(3) Start the machine

7.5 For multi-arc and multi-wire welding machine

Multi-arc welding system should set the current position to avoid the magnetic interruption for each arc, which mean control the different arc wave shape. the set value as 0°、90°、180°、270°、0°、90°.....which indicate the current wave shape position, each arc position set separately:

	The first arc	Second arc	Third arc	Fourth arc	Fifth arc	Sixth arc
Tandem	0°	90°				
Triple arc	0°	90°	180°			
Four arc	0°	90°	180°	270°		
Five arc	0°	90°	180°	270°	0°	
Six arc	0°	90°	180°	270°	0°	90°

No more than 6 arc, adopt the above table to set the arc position, if more than 6 arc, then repeat the setting as 90° to reduce the interruption.

The procedure for multi-arc welding:

(1) Power off, refer to 6.3 connect the machine

(2) Power on the machine, set the I function of the power source, select the function and set parameter on the panel, choose the power source characteristics, select AC, DCEP, DCEN. Choose the AC frequency, all power source set the remote control, wave balance 50% and DC deposition 50%, finally set the welding current, welding voltage, wire feed speed, wire dia. And characteristic at the remote control terminal.

(3) Start the machine

7.6 For parallel application

This machine AC rated output is 1200A/44V (40°C, 100% duty cycle), if need higher current, then can parallel N sets (2≤N≤32) power source to get N times 1200A; DC rated output is 900A/44V (40°C, 100% duty cycle), if need higher current, then can parallel N sets power source to get N times 900A.

The remote control plug pin 11 and pin 12 output current feedback signal voltage will be change from 1000A/4V to $1000A \cdot \frac{2}{N} \cdot 4V$.

The procedure for power source parallel:

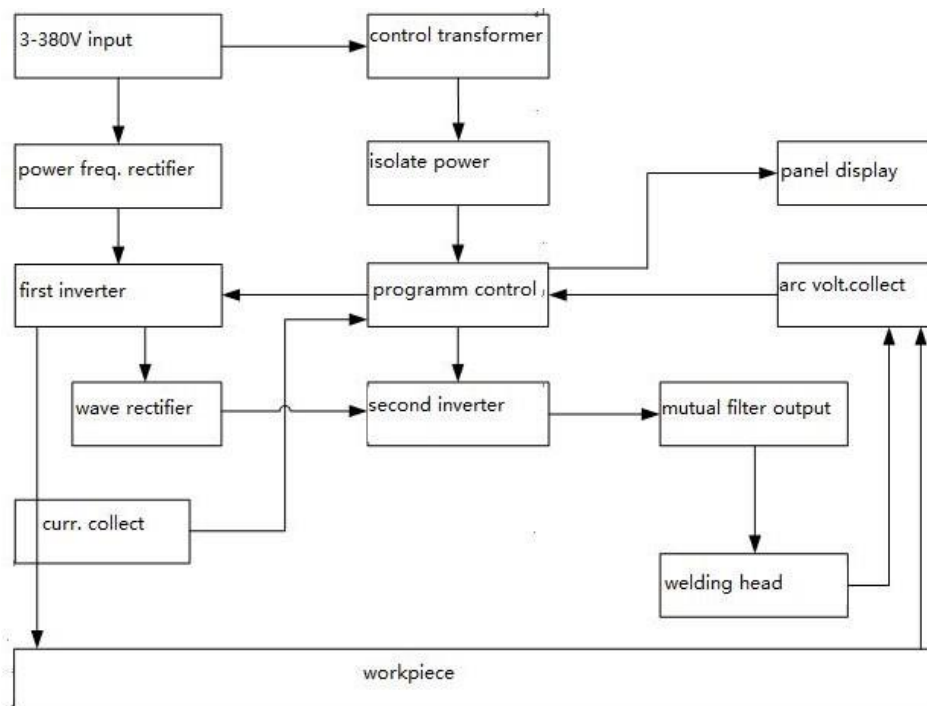
(1) Power off, refer to 6.3 connect the machine

(2) Power on the machine, set the parallel function of the power source, select the function and set parameter on the panel, choose the power source characteristics, select AC, DCEP, DCEN. Choose the AC frequency, all power source set the remote control, wave balance 50% and DC deposition 50%, finally set the welding current, welding voltage, wire feed speed, wire dia. And characteristic at the remote control terminal.

(3) Start the machine

8 Working principle

Electric principle drawing as below



Main electric principle of ZDE7 arc welding rectifier (as attached)

9 Maintenance, repair and discard

Specially note: Please turn off the power before any of maintenance and repairing of this welding power source, and because of the capacitor discharge, any of operation should be done at least 5 minutes after turning off the power.

9.1 Maintenance

1. The welding power should be opened and checked regularly (Once a year at least), clear the dust inside the machine with impressed air to avoid any of fault or short circuit.
2. The welding cables (Input and output) should be checked regularly (Once a week at least) to protect the reliable connection.

9.2 Repair

- Only qualified person can repair the machine
- Check the three phase input cable first before open the machine, then check the breaker at back of the machine,

finally check the welding cable connection.

9.3 Discard

- The capacitor on the PCB burnt may cause explosion
- The rubber cover and pad burnt may cause dangerous gas
- Please deal as industrial waste

10 Trouble shooting

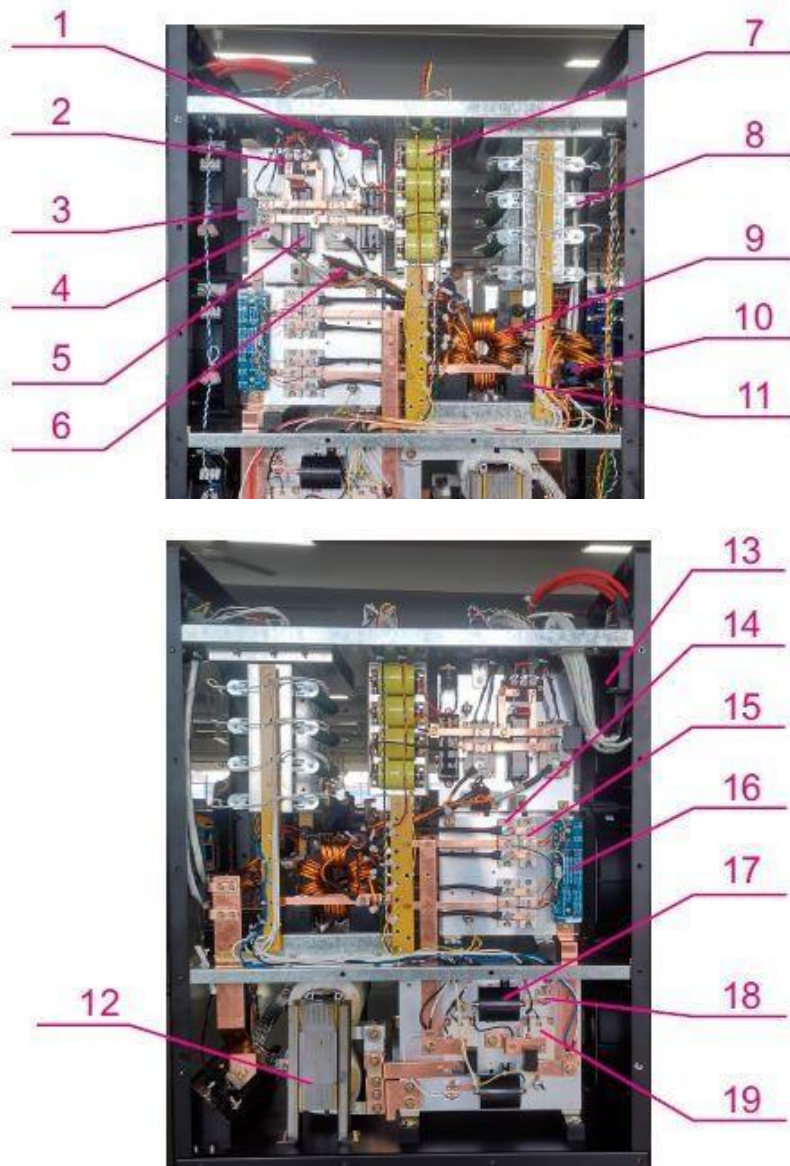
No.	Fault	Cause	Troubleshooting
1.	Power indicator off when turn on the machine	1. Three phase input wrong	Check three phase input
		2. Air breaker damage	Replace breaker or restart machine
		3. Control transformer fuse damage	Replace fuse
		4. Control transformer damage	Replace control transformer
		5. Power supply damage	Repair power supply
		6. Indicator damage	Repair panel
2.	Turn on the power source, the cooling fan doesn't work	1. The input wire of three phase power source is under trouble.	Check three phase input
		2. The fuses on the front panel is broken;	Replace fuse
		3. Control circuit damage	Repair or replace PCB
		4. The cooling fan is damaged.	Repair or replace fan
5.	Machine have abnormal shake or power switch trip	1. IGBT module damage	Replace IGBT
		2. Main transformer damage	Check transformer
		3. Driving board damage	Replace board
6.	The current out of control when welding	1. Cable connection wrong	Check wire connection
		2. Given abnormal	Check controller
		3. Hall sensor connection loose	Check hall sensor connection
		4. PCB damage	Repair or replace PCB
7.	Machine can't work when power on, welding voltage is 0	1. Arc voltage inspection wire damage	Check the wire connection
		2. Welding cable connect unstable	Check the cable connection
		3. PCB damage	Repair or replace PCB
		4. IGBT or diode damage	Check reason and replace module
8.	Overheat indicator on	1. Radiator overheat	Ambient temperature too high, too much dust inside machine
		2. Fan not work	Check reason and take measurement

		3. Temperature relay damage	Replace temperature relay
9.	Voltage abnormal indicator on	1. Three input lack phase	Check three phase input
		2. Three input lack voltage	Check the input voltage and cable square meter too small or not
		3. Voltage inspection too sensitive	Lower the sensitivity

※Attention: If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact our service department for technical assistance.

Main parts list

AUTOWELD 1200 IADC

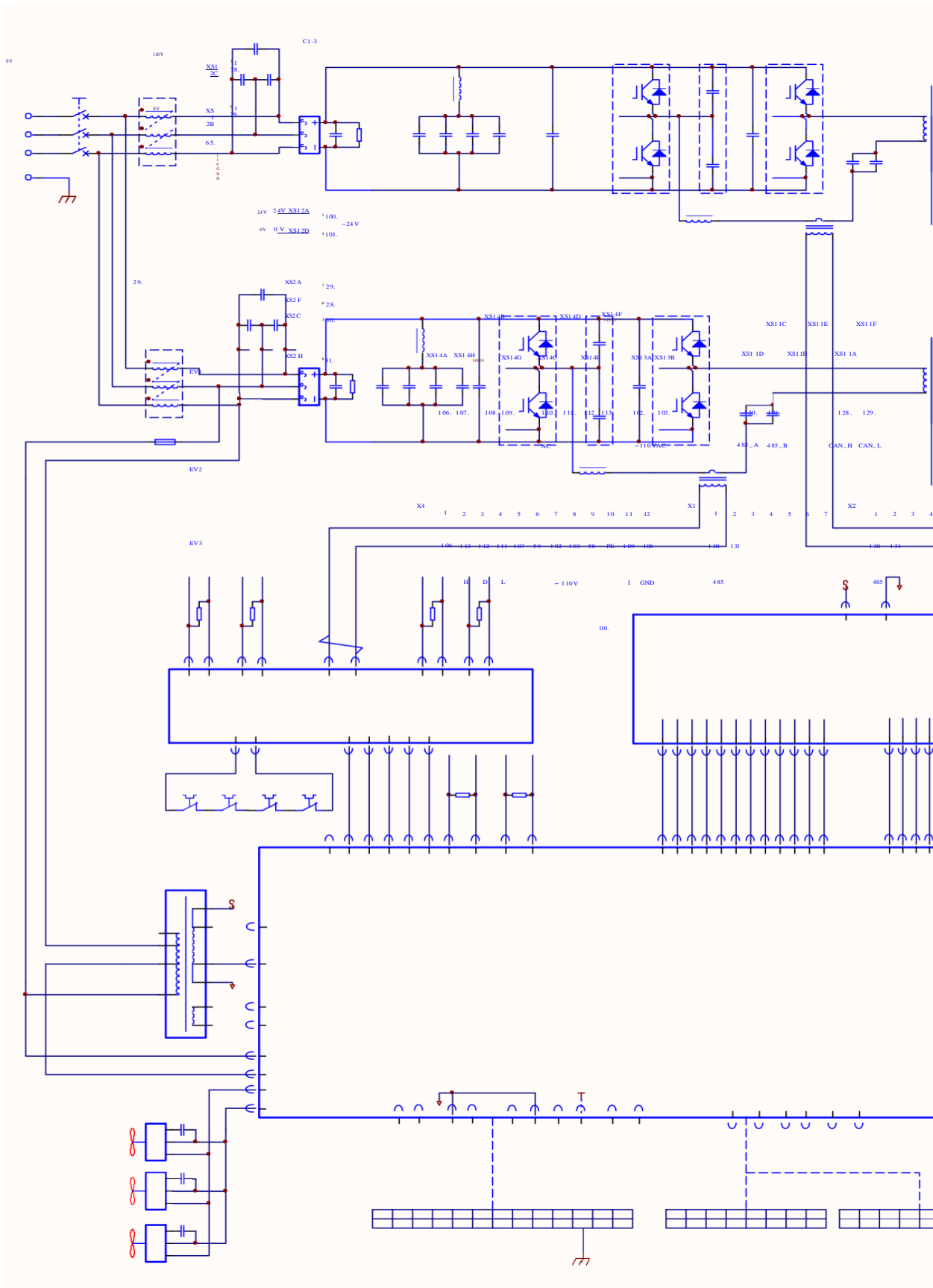


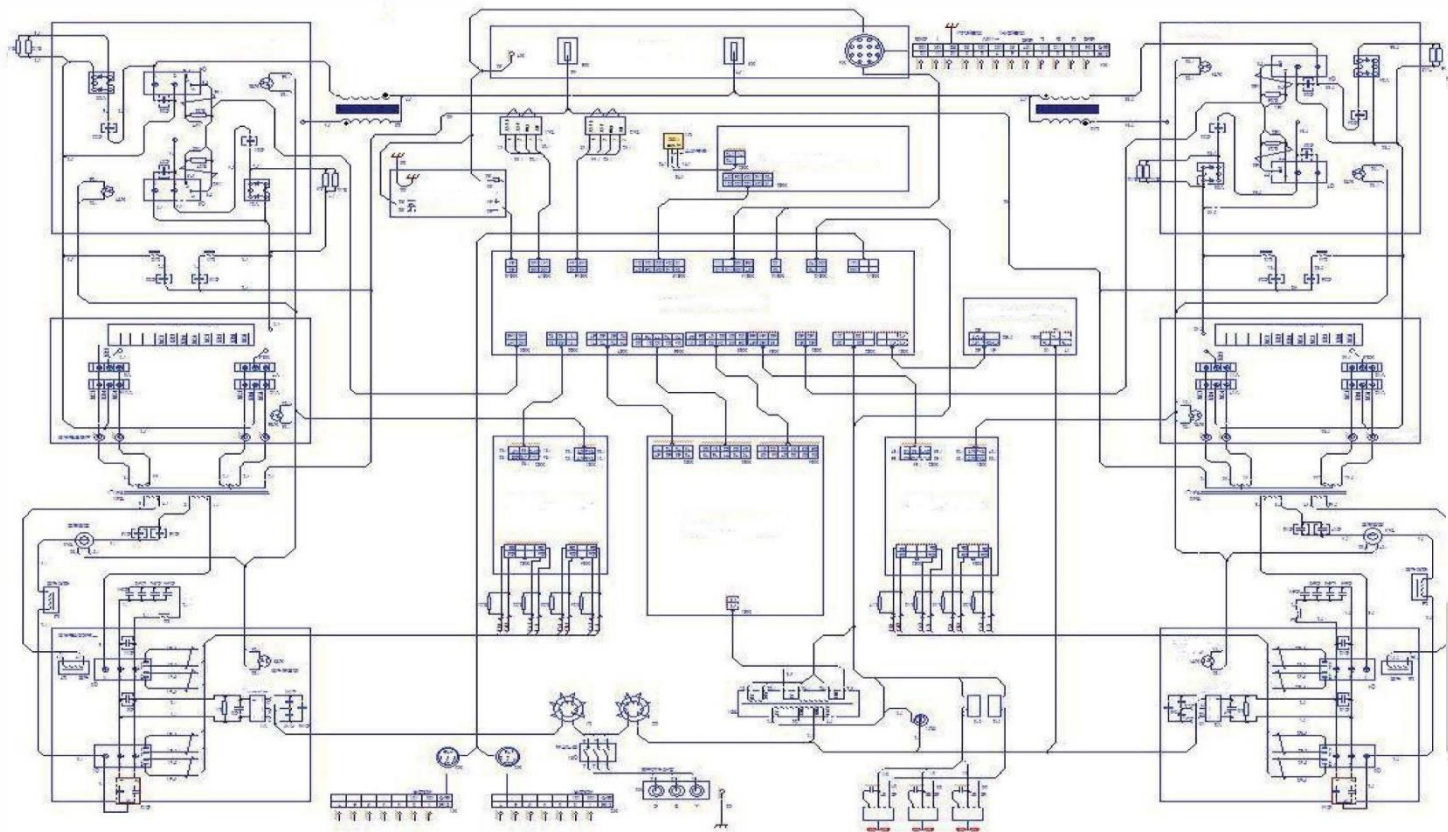


No.	Item	Model	Note
1	Choke inductance	LT03	
2	Bridge rectifier	MDS100-12	
3	Capacitor	HYC2007	
4	IGBT	2MBI150HJ-120-50	
5	Capacitor	HYC4002	
6	Linear inductance		
7	Capacitor	500VAC-100 μ F	
8	Resistor	RXG13-400W-20 Ω -J	
9	Inverter transformer		
10	Hall sensor	HAS500-S/SP50	
11	Capacitor	HYC3001	
12	Filter reactor		
13	Cooling fan	TG28080HA2BL-C	
14	Diode	MMF150S120DA	
15	Diode	MMF150S120DK	
16	PCB	PD04	
17	Capacitor	CBB88-500VAC-100 μ F-K	
18	Diode	MMF2X100J120D	
19	IGBT	FZ600R12KE4	
20	PCB	PD02	
21	PCB	PT13	
22	PCB	PT05	
23	PCB	PD01	

24	Control transformer	TD02	
25	PCB	PD03	
26	Three phase inductance		
27	Air breaker	CDM3-125S(125A)	

12 Electric Diagram





AUTOWELD 1200 IADC