



**AUTOWELD Series
Inverter DC Submerged
Arc Welding Machines**

Operating Manual

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Thank you for selecting WARPP brand inverter welding machine. In order to keep you safe away from unexpected accidents, and enjoy full benefits offered by our quality products during welding, please read the instruction in details prior to operation. Complying with procedures defined in this manual is always appreciated.

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Usage & features

AUTOWELD Series DC Inverter Submerged Arc Welding Machines are manufactured to comply with the following standards: GB15579, 1-2004 “Arc Welding Machines·Chapter One·Power Source”.

This Series DC Inverter submerged arc welding machines are newly designed, high-efficient and energy-saving equipments, which include AUTOWELD-630/800/1000/1250, etc., used for carbon, stainless, heat-resistant and alloy steel welding and extensively applied in ship, boiler, chemical container, bridge, crane and metallurgy facility building industries.

Because of its ideal static and dynamic characteristic as well as comprehensive controlling functions, this series arc welding machines have the following features:

- (1)Welding current remains steady even when fluctuation of input primary power occurs and arc length changes due to IGBT inverter technology.
- (2)Adjustment of welding current according to welding parameters is available result in high success rate of arc-starting.
- (3)Adjustment of arc force current is available result in pretty weld formation, accurate penetration control and flexible adaptability to context change.
- (4)Carbon arc gouging and SMAW in one machine
- (5)Wider range of welding current, the minimum current is 60A
- (6)Light, small and easy to move.
- (7)High power factor, high-efficiency and energy-saving

Safety Precautions



General security rules

- Please strictly comply with rules defined in this manual to avoid unexpected accidents
- How to connect to power supply, select working area and use pressure gas, please comply with proper rules
- Not allow non-operator to enter working area
- Welder's installation, inspection, maintenance, and manipulation must be completed by authorized person.
- Don't use welding machine for unrelated purpose (Such as recharging, heating or pipeline thaw, etc.)
- Must take safe precaution in case welder falling when it is put on the uneven ground

 **Avoid being electric shock and burnt**

- Never touch on the hot electrical units.
- Please instruct the authorized electrician to ground the welder frame by using proper-sized copper wire.
- Please instruct the authorized electrician to connect the welder to power supply by using proper- sized, well-insulated copper wire.
- When operating in the damp, space limited area, must ensure well-insulated between body and work piece
- When operating in the high-rising location, must ensure safety by using safe net.
- Please power off the machine when no longer welding.

 **Avoid breathing in hazardous welding fume or gas**

- Please use specified ventilation to prevent being gas poisoned and asphyxiated, especially in the container where oxygen is depleted easily.

 **Avoid being harmed by arc flash, hot spatter and slag**

- Arc rays can injure your eyes, make your eyes feel uncomfortable. Hot spatter and slag can burn your skin.
- Please wear proper welding helmet, leather gloves, long- sleeved suit, cap, apron and boots before welding.

 **Preventing from fire, explosion, container break accidents**

- Don't put flammable material in the working area. Hot spatter and hot weld can easily start a fire.
- Cable must be connected the work piece firmly to ensure good conductivity in case causing fire by resistance heat.
- Don't weld in the flammable gas or weld container which contains flammable material, otherwise it can cause explosion.
- Don't weld encapsulated container, otherwise it can cause break.
- Ensuring fire extinguisher at hand in case a fire breaks out

 **Avoid being hurt by moving parts.**

- Never let the finger, hair, and cloth near the rotary cooling fan and wire feeder rollers.
- When feeding wire, don't let the bottom of gun near your eyes, face and body, to prevent being harmed by wire.



Avoid being hurt by welding machine while in transport

- When moving the welding machine by fork-lift truck or crane, nobody can be allowed for standing downright the route of the moving welder, in case being hurt by the falling welding machine.
- The ropes or wires which used for hanging up the welding machine must be strong enough to withstand corresponding tension strength. The rope or wire inclination hanging on the tackle must be no more than 30°

Installation

1. Installing situation

- (1) Must place welding machine in the room where is no straight sunlight, no rain, less dust, low humidity ,and temperature range of -10°C ~ +40°C
- (2) The gradient of ground must be no more than 15°.
- (3) Ensure no wind at the welding position, or use screen to block the wind.
- (4) The distance between welder and wall must be more than 20cm, between welders more than 10cm to ensure enough heat radiation.
- (5) When using water cooled gun, must be care of not being frozen.

2. Requirement of input volt:

- (1)Input volt must be standard sine wave, effective value 380V±10%, frequency 50Hz/60Hz.
- (2)Unbalance degree of 3- phase volt must be no more than 5%.

3. Power supply

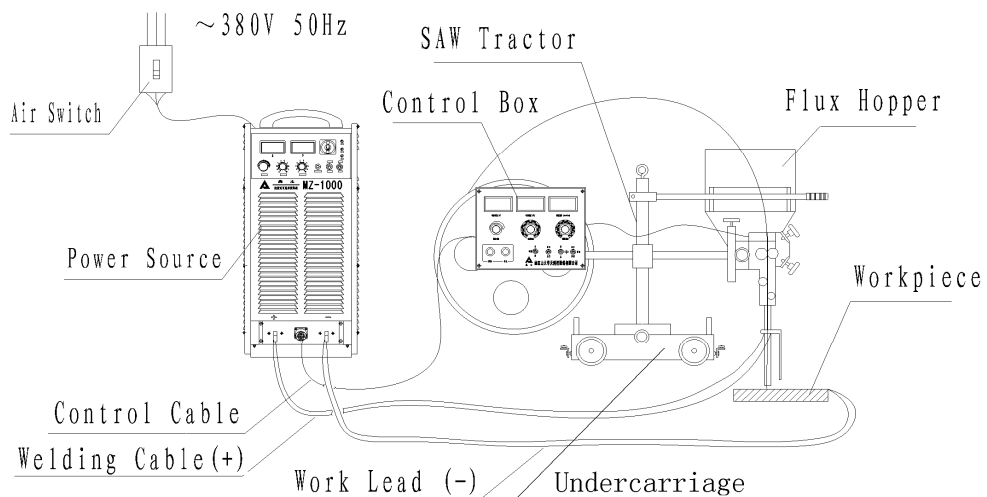
Product type		AUTOWELD-630	AUTOWELD-800	AUTOWELD D-1000	AUTOWELD-1250
Input primary power		3 phase AC380V			
Min capacity	Power network	53KVA	66KVA	83KVA	120KVA
	generator	70KVA	88KVA	110KVA	158KVA
Input volt protection	Fuse	60A	70A	90A	130A
	Breaker	100A	100A	120A	160A
Cable size (cross-section)	Input	10mm ²	16mm ²	25mm ²	35mm ²
	Output	95mm ² ×1	50mm ² ×2	70mm ² ×2	95mm ² ×2
	Ground lead	10mm ²	16mm ²	16mm ²	16mm ²

Tip: The size of fuse and breaker in the above table are only for reference.

4. Installation

4.1 AUTOWELD series welders wire diagram. See picture 1.

4.2 Operators should have appropriate switchboard or switch box. Connect the input primary power cable to the switchboard or switch box, while grounds the lead safely.

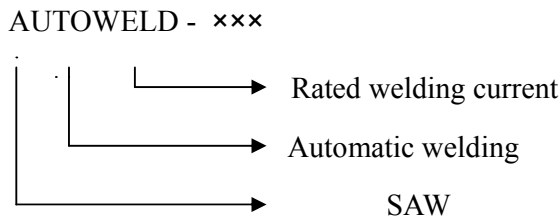


Picture 1: Wire diagram

- 4.3 Wire welding machine terminal (+) to tractor by welding cable.
- 4.4 Wire welding machine (-) to workpiece by work lead.
- 4.5 Wire welding machine to tractor by control cable.

Definition of Product Model Number

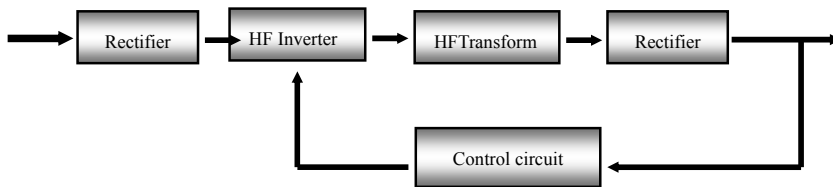
AUTOWELD Series DC Inverter Submerged Arc Welding Machine codification of product model number illustrate by picture 2:



Picture 2: Definition of Product Model Number

Principle in Brief

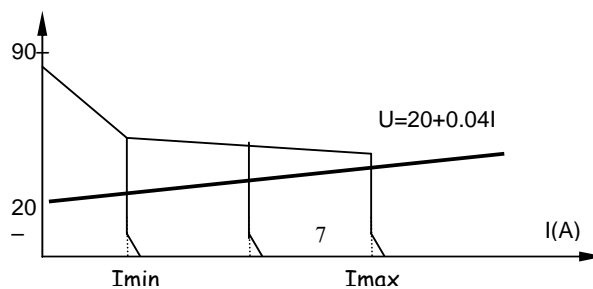
Block diagram of principle:



Picture 3 Block diagram of principle

This series welding machines apply IGBT soft switch inverter technology. 3- phase input volt are rectified by rectifier, inverted into HF AC, reduced by HF transformer, rectified and filtered by HF rectifier, then output DC power suitable for welding. After this process, the welder's dynamical responsive speed has been greatly increased, so the welder size and weight are reduced noticeably. Power source enjoy sound anti-fluctuating ability and high-quality performance.

MZ Series DC Inverter SAW welding machine output characteristic



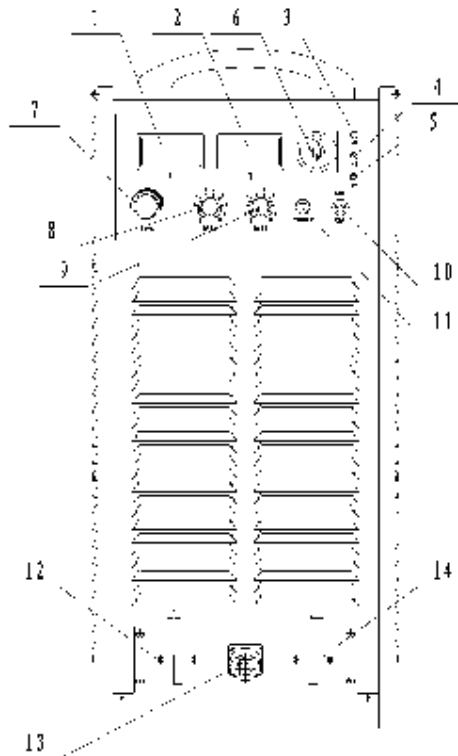
Picture 4

Operating Instruction

1. Function introduction

1.1 Front panel illustration and parts number reference

AUTOWELD Series DC Inverter Submerged Arc welding machine front panel (take AUTOWELD-1000 for example) illustrates in picture 5.



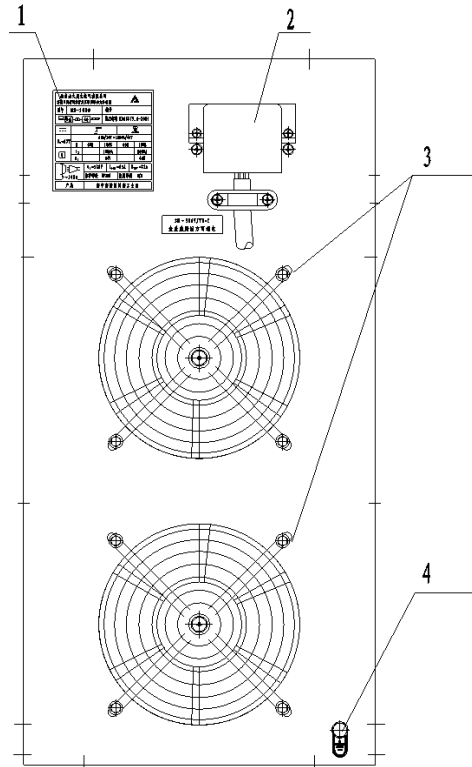
Picture 5 Front panel

- (1) Amp meter (A): Display preset value of current while in open load, and display practical value while in welding.
- (2) Voltage meter (V): Display preset value of volt while in open load, and display practical value while in welding.
- (3) Power indication lamp: Lamp indicating whether power source is effectively connected to power supply

- (4) Working indication lamp: the welding machine is started when it lights on.
- (5) “Protection” indicator lamp
Welding machine will automatically stop working when it is overheat, and the lamp will be light on.
- (6) working switch: the welding machine starts working when it is on “1”, while the welding machine stops working when it is on “0”.
- (7) Welding current adjustment knob: it is used for adjust welding current.
- (8) Arc force current/ down-slope time knob: it is used for adjusting arc force current to control penetration and improve the weld formation.
- (9) Arc starting current adjustment knob: it is used for adjusting arc start current adapting to power change.
- (10) Remote/ panel control switch: when it is on “Panel”, you can adjust welding current through knobs on the panel; when it is on “Remote”, you can adjust welding current through knobs on the control box.
- (11) Working mode switch: when it is on “SMAW”, you can use it as a SMAW; when it is on “SAW”, you can use it as a submerged arc welding machine.
- (12) Control box protector (5A): it is to protect control box power source 120V.
- (13) Terminal socket (+)
- (14) Control cable socket : it is used for connect the control box to welding machine, providing power source for controlling box and transport control signals between the welding machine and control box.
- (15) Terminal socket (-)

1.2 The rear panel and parts number reference

AUTOWELD Series DC Inverter Submerged Arc welding machine rear panel (take AUTOWELD-1000 I for example) illustrates in picture 6.



Picture 8. AUTOWELD Rear panel

- (1) Input power cable connector: it is used to connect to input 3 phase AC 380 V power cable
- (2) Name tag: notes the parameters of the welding machine.
- (3) Cooling fan: Cool down the heat components in the welding machine.
- (4) Ground bolt : To ensure operators not to be harmed and welding machine to be working normally, make sure the ground bolt grounded firmly by ground lead specified in the table 1, or ground wire(mixed-colored) of the input power cord grounded firmly.

2. Routine checkup prior to operation:

2.1 Checkup the welding machine with no power on.

- (1) Check if input power cable is well-connected or not.
- (2) Check if the working mode switch on front panel and the control mode switch are on the right selection or not.
- (3) Check if welding cable is well-connected or not.
- (4) Check if control cable is well-connected or not.
- (5) Check if ground bolt is well-connected or not.

2.2 Checkup on open load

After your doing the above examination, please exam the machine according to the following procedure:

- (1) Turn on the power of switchboard or switch box, plug input primary power cable into the socket; power indication lamp will light on.
- (2) Shift the working switch to “On”, working indication lamp will light on and cooling fan will rotate. When working mode is on “SMAW”, there is a voltage indication on voltage meter; when working mode is on “SAW”, it would be 0 on voltage meter.
- (3) Tuning the knob of welding current, the display would be changed.
- (4) Shift working switch to “Off”, working indication lamp will turn off and cooling fan will stop.

After all the above-mentioned examination passed, you can come into normal welding.

3. Normal welding

3.1 On SMAW

- (1) Well connect the input power cable;
- (2) Well connect the ground lead;
- (3) Shift working mode switch to “SMAW”;
- (4) Connect the welding cable to the terminal socket “+”;
- (5) Connect the work piece to the terminal socket “-” by work lead;
- (6) Connect control box to the welder by control cable when needed;
- (7) Select proper control mode, “Panel” or ”Remote” when needed
- (8) Regulating current of the crater filler and arc force
- (9) Wire input 3-phase power cable to switchboard or switchbox and turn on the air switch.
- (10) Tuning the knob of welding current, setting up the parameters for welding.

Tip: When working on SMAW, there is no current output if working mode switch is on “SAW”. Operators can refer to table 1 when working on SMAW.

Table 1

Thickness (mm)	< 1	2	3	4 ~ 5	6 ~ 12	≥13
Diameter (mm)	1.5	2	3.2	3.2 ~ 4	4 ~ 5	5 ~ 6
Welding current(A)	40	40 ~ 50	90 ~ 120	90 ~ 120	160 ~ 250	250 ~ 400

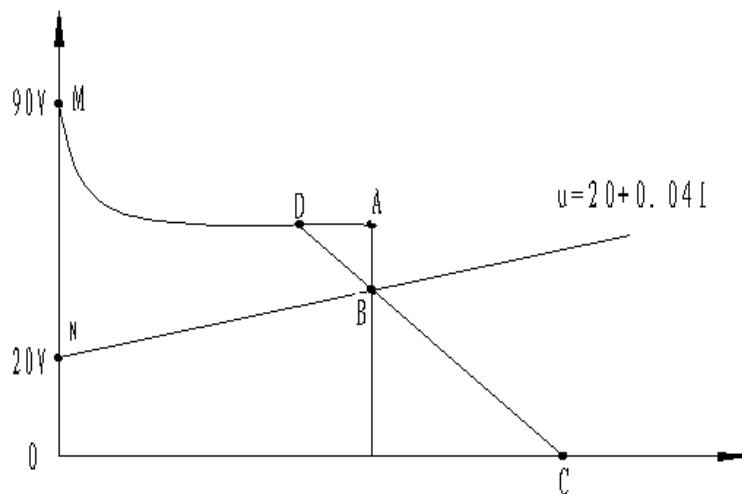
3.2 On SAW

- (1) Well-connect the input primary power cable;
- (2) Well-connect the ground lead;
- (3) Shift working mode switch to “SAW”;
- (4) Connect tractor to welder’s the terminal socket “+”by welding cable;
- (5) Connect the work piece to the terminal socket “-” by work lead;
- (6) Connect control box to the welder by control cable;
- (7) Select proper control mode, “Panel” or ”Remote” when needed
- (8)Regulating current of the crater filler and arc force
- (9)Wire input 3-phase power cable to switchboard or switchbox and turn on the air switch.
- (10)Tuning the knob of welding current, setting up the parameters for welding

Tip: Power off the welder when you change the welding cable or the contact tip.

3.3 Relationship between parameters setting and welding condition

Output static characteristic curve of inverter DC SAW shows as picture 7.



Picture 7 Output characteristic curve of inverter DC SAW

Line M-A-B-C: output static character curve

- (1) Regulate welding current by tuning the current knob, the same as to adjust the distance between line AB and vertical axial. The line AB which is the constant current output characteristic curve of SAW, ranges from minimum welding current to rated welding current.
- (2) Regulate arc force current by tuning the arc force knob, corresponding to line DC of the curve, the same as to adjust the slope of the line DC. On SMAW, regulation range from 0 to 150A; on SAW, range from 0 to 450A.
- (3) Regulate instantaneous additional current of arc-start by tuning arc-start knob. The reasonable arc-start current can anti sticking effectively and increase success rate of arc-start substantially. Regulation range from $80 \pm 10A$ to $80 + I/4$ (I refer to as SAW rated welding current)
- (4) Weld formation & parameters regulation

Weld formation has the close relationship to parameters regulation, usually present in following rules:

When parameters are selected in the range of flattening area (arc force current is 0), the penetration becomes shallow, the reinforcement becomes high and the weld becomes narrow.

When parameters are selected in the range of drooping area (arc force current is 0), the penetration becomes deep, the reinforcement becomes low and the weld becomes wide.

Increasing welding current, the penetration becomes deep and the weld becomes wide.

Increasing arc force current, the penetration becomes shallow and the weld becomes narrow.

Increasing welding voltage of SAW, the penetration becomes shallow, the reinforcement becomes low and the weld becomes wide.

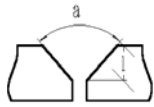
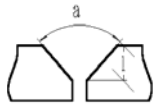
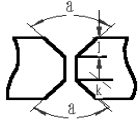
Decreasing the speed of welding torch walking, the penetration becomes deep and the weld becomes wide.

Operators should regulate parameters above-mentioned comprehensively to obtain pretty weld formation or refer to welding parameters in tables from 2 to 8. When weld defects occurs, please take remedies described in table 9.

Table 2 : Range of welding current for different wire diameter

Wire diameter (mm)	2	3	4	5	6
Current density (A/mm ²)	63 ~ 125	50 ~ 85	40 ~ 63	35 ~ 50	28 ~ 42
Welding current (A)	200 ~ 400	350 ~ 600	500 ~ 800	700 ~ 1000	820 ~ 1200

Table 3 : Parameters of Automatic grooved double-side welding with flux bed

Work piece thickness (mm)	Groove form 	wire diamet er (mm)	Welding direction	Dimensions of groove		Arc voltage (V)	Welding current (A)	Weldin g speed (m/h)
				α (°)	v/κ (mm)			
14		φ5	Forward	80	6	36 ~ 38	830 ~ 850	25
			backward	—	—	36 ~ 38	600 ~ 620	45
16		φ5	Forward	70	7	36 ~ 38	830 ~ 850	20
			backward	—	—	36 ~ 38	600 ~ 620	45
18		φ5	Forward	60	8	36 ~ 38	830 ~ 860	20
			backward	—	—	36 ~ 38	600 ~ 620	45
22	φ6	Forward	55	13	38 ~ 40	1050 ~	18	
		backward	—	—	36 ~ 38	1150 600 ~ 620	45	
24		φ6	Forward	40	14	38 ~ 40	1100	24
		φ5	backward	40	14	36 ~ 38	800	28

30		φ6	Forward	80	10	36 ~ 40	1000 ~	18
			backward	60	10	36 ~ 38	1100	20
							900 ~ 1000	

Table 4 : Parameters of Automatic double-side-formation single-side welding with flux bed

Work piece Thickness (mm)	Assembling gap (mm)	wire diameter (mm)	Welding current (A)	Arc voltage (V)	Welding speed (m/h)	Pressure of flux bed MPa
2	0 ~ 1.0	φ1.6	120	24 ~ 28	43.5	0.08
3	0 ~ 1.5	φ3	400 ~ 425	25 ~ 28	70	0.08
4	0 ~ 1.5	φ4	525 ~ 550	28 ~ 30	50	0.10 ~ 0.15
5	0 ~ 2.5	φ4	575 ~ 625	28 ~ 30	46	0.10 ~ 0.15
6	0 ~ 3.0	φ4	600 ~ 650	28 ~ 32	40.5	0.10 ~ 0.15
7	0 ~ 3.0	φ4	650 ~ 700	30 ~ 34	37	0.10 ~ 0.15
8	0 ~ 3.5	φ4	725 ~ 775	30 ~ 36	34	0.10 ~ 0.15

Table 5 : Parameters of fillet welding in flat position

Work piece thickness (mm)	Wire diameter (mm)	Welding current (A)	Arc voltage (V)	Welding speed (m/h)
	Φ5			
6	Φ5	450~475	34~36	40
8	Φ5	550~600	34~36	30
8	Φ5	575~625	36~36	30
10	Φ5	600~650	34~36	23
10	Φ5	650~700	34~36	23
12	Φ5	600~650	34~36	15
12	Φ5	725~775	36~38	20
12	Φ5	775~825	36~38	18
	Φ5			

Table 6 : Parameters of Automatic double-side-formation single-side welding with pressing gantry & copper backing

work piece thickness (mm)	Assembling gap (mm)	Wire diameter (mm)	Welding current (A)	Arc voltage (V)	Welding speed (m/h)
3	2	Φ3	380~420	27~29	47
4	2~3	Φ4	450~500	29~31	40.5
5	2~3	Φ4	520~580	31~33	37.5
6	3	Φ4	550~600	33~35	37.5
7	3	Φ4	640~680	35~37	34.5
8	3~4	Φ4	680~720	35~37	32
9	3~4	Φ4	720~780	36~38	27.5
10	4	Φ4	780~820	38~40	27.5
12	5	Φ4	850~900	39~41	23
14	5	Φ4	880~920	39~41	21.5

Table 7 : Parameters of Automatic double-side welding with preset gap flux bed

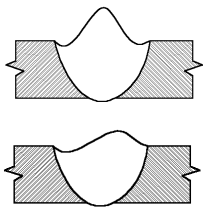
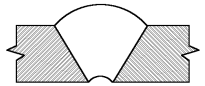
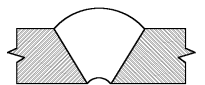
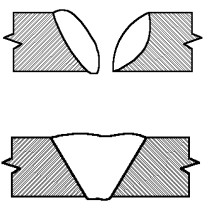
work piece thickness (mm)	Assembling gap (mm)	wire diameter (mm)	Welding current (A)	Arc voltage (V)	Welding speed (m/h)
14	3~4	Φ5	700~750	34~36	30
16	3~4	Φ5	700~750	34~36	27
18	4~5	Φ5	750~800	36~40	27
20	4~5	Φ5	850~900	36~40	27
24	4~5	Φ5	900~950	38~42	25
28	5~6	Φ5	900~950	38~42	20

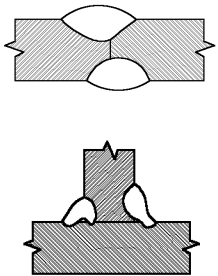
30	6~7	Φ5	950~1000	40~44	16
		Φ5			
		Φ5			

Table 8 : Parameters of Automatic suspended double-side welding

Wire diameter (mm)	work piece thickness (mm)	processing order	Welding current (A)	Arc voltage (V)	Welding speed m/h)
Φ4	6	P	380~420	30	34.6
		N	430~470	30	32.7
Φ4	8	P	440~480	30	30
		N	480~530	31	30
Φ4	10	P	530~570	31	27.7
		N	590~640	33	27.7
Φ4	12	P	620~660	35	25
		N	680~720	35	24.8
Φ4	14	P	680~720	37	24.6
		N	730~770	40	22.5
Φ4	15	P	800~850	34~36	38
		N	850~900	36~38	26
Φ4	17	P	850~900	35~37	36
		N	900~950	37~39	26
Φ4	18	P	850~900	36~38	36
		N	900~950	38~40	24
Φ4	20	P	850~900	36~38	35
		N	900~1000	38~40	24
Φ4	22	P	900~950	37~39	32
		N	1000~1050	38~40	24

Table 9 Weld defects and troubleshooting in SAW

Weld defects	Typical shape of weld	cause	Possible solution
Inconsistent weld	Different width or depth of each pass	(1) Inconstant welding speed (2) Instable wire feeding (3) Contact tip worn out	(1) Check circuit (2) Adjust driving roller (3) Replace contact tip
Undercut		(1) Too high welding speed (2) Too big welding current (3) Too big welding voltage (4) Incorrect wire end alignment	(1) Reduce welding speed or apply double-arc or multiple-arc welding (2) Reduce welding current (3) Reduce welding voltage (4) Adjust wire position
Convex		Too big flux backing pressure	Adjust flux backing
Metal spillage		(1) Too long of wire extension (2) Bevel at small angle (3) Too low welding voltage (4) Incorrect wire end alignment	(1) Reduce wire extension (2) Enlarge bevel angle (3) Increase welding voltage (3) Adjust wire position
Burn-through and thick back weld		(1) Too big welding current (2) Too slow welding speed (3) Large groove gap (4) Loose flux backing	(1) Reduce welding current (2) Haste welding speed (3) Improve fit-up (4) Improve fixture apparatus

<p>Poor fusion</p>		<ol style="list-style-type: none"> (1) Too low welding current (2) Too high welding speed (3) Too large welding voltage (4) Incorrect wire end alignment (5) Fluctuation of input voltage 	<ol style="list-style-type: none"> (1) Increase welding current accordingly (2) Reduce welding speed (3) Reduce welding voltage (4) Straighten wire and adjusting welding head position (5) Avoid peak of power utility
<p>Pore</p>	<ol style="list-style-type: none"> (1) Cylindrical ditch (2) Center around weld (3) Sporadic or swarm distribution 	<ol style="list-style-type: none"> (1) Oil stained base metal, (2) Incomplete rust or oil clean-up on the wire or damp wire (3) Incorrect flux composition or poor quality 	<ol style="list-style-type: none"> (1) Clean up wire (2) Drying flux (3) Replace flux
<p>Thermal crack</p>	<ol style="list-style-type: none"> (1) Growing along the line of longitude or latitude crystal boundary of the weld (2) At beginning or ending of Automatic double-formation single-side welding 	<ol style="list-style-type: none"> (1) Over-segregation of low melt point sulphide (2) Insufficient binding force of weld crystallization at begin or end of weld 	<ol style="list-style-type: none"> (1) Select low carbon, low sulphur, high manganese wire and low silicon, high manganese flux (2) Extend run-on tab and intensify weld cohesiveness. Apply grooved run-on tab
<p>Slag-entrapment</p>		<ol style="list-style-type: none"> (1) Slag remains in multi-pass bead (2) Incorrect wire end alignment in next pass welding 	<ol style="list-style-type: none"> (1) Clean up slag between passes (2) Adjusting welding head position

Repair & Maintenance

In principle welders maintenance will be completed by us. Clients will be instructed by us to solve the problems which they come across in using.

Warning: Should not open up case freely, the max volt inside machine will be 600V. Customer must take safe precautions preventing from being electric shock while in maintenance.

1. Apparently misunderstood failures

Normal phenomenon occurs in welding

(1)Welder doesn't work while in pretty low input volt.

(2)When welder has worked for a long time in high temperature or in high welding current context , the thermal-sensitive circuit breaker will tripped to stop welder working, protection lamp will light on and LED will show "804" protection code. Welder will automatically reinstate after merely running up for several minutes in open load (not necessarily shut down welder).

When welder has worked for a long time in high temperature or in high welding current context, the circuit breaker on the rear panel will tripped to power off. When this situation occurs, please switch off the disconnected switchboard, and then halt the welder lasting at least five minutes to restart. When restarting the welder, please reset the circuit breaker firstly, then turn on the disconnect switchboard or switch box to power on welder, finally use for welding after running up for several minutes in open load.

2 . Attentions:

2.1 Welding machine should be located on which are dry and smooth ventilation, not overheat or damp.

2.2 The input volt should range from 340 to 420V, and no phase missing.

2.3 Check if the ground lead is connected correctly and firmly or not.

2.4 Must check up connection of cables periodically, be sure that wiring welding cable to terminal plug socket firmly in case burning out the terminal which lead to welding process instability.

2.5 Shut down welding machine when welding finished.

3.1 Checking procedure prior to maintenance

(1)Check if the input volt lose phase, and range are between 340-420V.

(2)Check if input primary power cable is connected correctly and firmly.

(3)Check if the ground lead is connected correctly and firmly.

(4)Check if the cables are connected correctly and firmly

2. Periodical checkup and maintenance

(1)Removes dust from power resource with pressure air by authorized maintainer every 3-6 months. Check if the jointers are loosened.

(2)Check frequently if cables are worn out, knobs are loosening, and components of panel are damaged.

Technical Data

1、 Main technical parameters

Item	AUTOWELD- 630 I	AUTOWELD- 800 I	AUTOWELD 1000 I	AUTOWELD- 1250 I
Input voltage/ frequency	Three phase 380V±10%/50HZ			
Rated output power	27KW	35KW	44KW	55KW
Rated input current	52A	66A	83A	120A
Duty cycle	100%			
Range of welding current	60-630A	60-800A	60-1000A	60-1250A
Output open load	SAW : 90V	MMA : 67V		
Full-load	92%			
Full-load power factor	0.88			
Wire diameter	1.6-4mm	3-5mm	3-6mm	3-6mm
weight(kg)	55	80	95	100
dimension(mm ³)	530×320×600	767×352×757		767×352×802
Insulated degree	Main transformer		H	
	Power source transformer, output reactor ,etc.		B	

2. Main circuit diagram

Note: The main circuits of AUTOWELD-800/1000 and AUTOWELD-1250 include the frame of dot lines, but AUTOWELD-630's not includes.

3、main parts/components

● AUTOWELD-630

No.	Mark	Item	Qty	Memo.
1	K1	circuit breaker	1	
2	D1	three phase rectifier module	1	
3	L1	Input anti-common mode inductor	1	
4	L3	Capacitor filtering inductor	1	
5	L11	Resonance inductor	1	
6	C7	polypropylene capacitor	4	
7	C9	polypropylene capacitor	2	
8	N1 ~ 4	IGBT module	2	
9	R1	Volt- sensitive resistance	1	
10	C11 ~ 18	Ceramic dielectric capacitance	12	
11	C32	polypropylene capacitor	1	
12	T2	Main transformer	2	
13	D3 ~ 4	Fast recovery diode module	4	
14	T1	Power source transformer	1	
15	L7	Output reactance	1	
16	F1	Fuse	1	
17		fuse	1	
18	M1	axial airflow fan	1	
19		toggle switch	1	
20		Digital displayer	2	
21	S1 ~ 2	thermal relay	2	
22		potentiometer	3	
23	ZKB	Main control board	1	
24	QDB	Driving board	1	

AUTOWELD-1000 I

No.	Mark	Item	Qua.	Memo.
1	K1	circuit breaker	1	
2	D1 ~ 2	three phase rectifier module	2	
3	L1 ~ 2	Input anti-common mode inductor	2	
4	L3 ~ 4	Capacitor filtering inductor	2	
5	L10-11	Resonance inductor	2	
6	C7 ~ 8	polypropylene capacitor	8	
7	C9 ~ 10	polypropylene capacitor	4	
8	N1 ~ 8	IGBT module	4	
9	R1 ~ 2	Volt- sensitive resistance	2	
10	C11 ~ 26	Ceramic dielectric capacitance	24	
11	C31 ~ 32	polypropylene capacitor	2	
12	T2、 T3	Main transformer	1	
13	D3 ~ 6	Fast recovery diode module	6	
14	T1	Power source transformer	1	
15	L7 ~ 8	Output reactance	1	
16	F1	fuse	1	
17		fuse	1	
18	M1 ~ 2	axial airflow fan	2	
19		toggle switch	1	
20		toggle switch	1	
21		Digital displayer	2	
22	S1 ~ 3	Thermal relay	2	
23		potentiometer	3	
24	ZKB	Main control board	1	
	QDB	Driving board	2	

● AUTOWELD-1250 I

No.	Mark	Item	Qua.	Memo.
1	K1	circuit breaker	2	
2	D1 ~ 2	three phase rectifier module	2	
3	L1 ~ 2	Input anti-common mode inductor	2	
4	L3 ~ 4	Capacitor filtering inductor	2	
5	L10 ~ 11	Resonance inductor	2	
6	C7 ~ 8	polypropylene capacitor	8	
7	C9 ~ 10	polypropylene capacitor	4	
8	N1 ~ 8	IGBT module	4	
9	R1 ~ 2	Volt- sensitive resistance	2	
10	C11 ~ 26	Ceramic dielectric capacitance	26	
11	C3-32	polypropylene capacitor	2	
12	T2、 T3	Main transformer	2	
13	D3 ~ 6	Fast recovery diode module	8	
14	T1	Power source transformer	1	
15	L7 ~ 8	Output reactance	2	
16	F1	fuse	1	
17		fuse	1	
18	M1 ~ 2	axial airflow fan	2	
19		toggle switch	1	
20		toggle switch	1	
21	S1-3	Digital displayer	2	
22		thermal relay	2	
23		potentiometer	3	
24	ZKB	Main control board	1	
25	QDB	Driving board	2	

Parts or components depicted above are standard outfits for AUTOWELD series inverter DC SAW welders. Customers' special needs can be stipulated in the contract according to the real situation. Actual parts or components included will be in accordance with the packing list.

Appendix A: Ordinary failures, probable cause & countermeasures

№	Trouble	probable cause	Remedies
1	Indicator lamp does not light on, welder doesn't work and axial flow fan does not rotate when machine switches on.	① Phase missing ② Fuse (5A)broken down ③ Input cable break down ④ Air switch tripped Following components or parts may be damaged: IGBT module, 3-phase rectifier module, output diode module or others.	① Check up power supply ② Check up fan, power source transformer, main control board ③ Check up cable ④ Consult to authorized maintainers When IGBT module is damaged, the components on the output part of driving board may be also damaged, thus need replacement.
2	Instable welding current	① Phase missing ② Following parts may be damaged: potentiometers on the front panel. ③ Main control board damaged	Check up power supply Inspection and replacement
3	Welding current is not adjustable.	① Conductive wire broken ② Main control board damaged ③ Control cable broken	Inspection and replacement

List For the spares of AUTOWELD-I Series Machines

	AUTOWELD-630 I	AUTOWELD-1000 I	AUTOWELD-1250 I
DESCRIPTION	Part Code	Part Code	Part Code
MAIN PCB	PCB-AUTO-630I	PCB-AUTO-1000I	PCB-AUTO-1250I
DRIVE CARD	PCB-DRV-01L	PCB-DRV-01L	PCB-DRV-01L
IGBT	IGBT15012	IGBT10012	IGBT15012
INPUT BRIDGE MODULE	IBDG004	IBDG004	IBDG004
OUTPUT RECTIFIER MODULE	FRM001	FRM001	FRM001
FAN	FAN006	FAN005	FAN006
DC CAPACITOR	CAP001	CAP001	CAP001
AC CAPACITOR	CAP004	CAP003	CAP004
SNUBBER CARD	PCB-SNB-03	PCB-SNB-02	PCB-SNB-03
MCB	MCB003	MCB004	MCB004
DIGITAL DISPLAY METER	DSP001	DSP001	DSP001
INPUT SURGE SUPPRESSOR	ISS001	ISS001	ISS001
SNUBBER CAPACITOR	SCAP001	SCAP001	SCAP001
CONTROL TRANSFORMER	CTRAX005	CTRAX005	CTRAX005
CONTROL TRANSFORMER FOR WIRE FEED MOTOR (BIG)	CTRAX006	CTRAX006	CTRAX006
MOV	MOV001	MOV001	MOV001
SNUBBER PCB FOR OUTPUT FRM	PCB-SNB-OUT-01	PCB-SNB-OUT-01	PCB-SNB-OUT-01
OVERCURRENT PROTECTION PCB	PCB-OC-630	PCB-OC-500	PCB-OC-630
MAIN TRANSFORMER	MTRX009	MTRX010	MTRX011
FAN CAPACITOR	CAP05	CAP05	CAP05
OUT PUT CONNECTOR	OUTCON001	OUTCON002	OUTCON002
14 PIN CONNECTOR MALE	CON14PNM	CON14PNM	CON14PNM
SHUNT	SHUNT002	SHUNT004	SHUNT004
14 PIN CONNECTOR CABLE SIDE	CON-14-CM-01	CON-14-CM-01	CON-14-CM-01
PANEL ON-OFF SWITCH	SW-ON-OFF	SW-ON-OFF	SW-ON-OFF
TOGGLE SWITCH FOR SMAW/SAW (3P2W)	TSW01	TSW01	TSW01
TOGGLE SWITCH FOR REMOTE/PANEL (2P2W)	TSW02	TSW02	TSW02
RESET SWITCH	RSW01	RSW01	RSW01
POTENTIOMETER FOR CURRENT/STRIKING, CURRENT/ARC FORCE	POT001	POT001	POT001
KNOB FOR THE POT	KNOB001	KNOB001	SW-ON-OFF

TROLLEY

TROLLEY			
MAIN PCB FOR TROLLEY	PCB-AUTO-TROLLEY-630I	PCB-TROLLEY-AUTO-1000I	PCB-AUTO-TROLLEY-1250I
DRIVE PCB FOR TROLLEY	PCB-DRV-TROLLEY-01	PCB-DRV-TROLLEY-01	PCB-DRV-TROLLEY-01
CONTROL TRANSFORMER IN TROLLEY	CTRAX006A	CTRAX006A	CTRAX006A
WELD ON PUSH SWITH WITH ELEMENT	SW-PUSH-01G	SW-PUSH-01G	SW-PUSH-01G
WELD OFF PUSH SWITH WITH ELEMENT	SW-PUSH-01R	SW-PUSH-01R	SW-PUSH-01R
ON-OFF SWITCH ON THE TROLLEY (2P2W)	TSW02	TSW02	TSW02
TOGGLE SWITCH FOR FORWARD / REVERSE (2P2W)	TSW02	TSW02	TSW02
TOGGLE SWITCH FOR WIRE INCHING (2P3W With Spring Return)	TSW05	TSW05	TSW05
TOGGLE SWITCH FOR TEST / NORMAL / WELD (2P3W)	TSW06	TSW06	TSW06
CURRENT SETTING POTENTIO METER	POT001	POT001	POT001
VOLTAGE SETTING POTENTIOMETER	POT001	POT001	POT001
TROLLEY SPPED SETTING POTENTIOMETER	POT001	POT001	POT001
KNOB FOR THE POT	KNOB001	KNOB001	KNOB001
WIRE FEED MOTOR	WFDMTR-SAW-01	WFDMTR-SAW-02	WFDMTR-SAW-02
TROLLEY MOTOR	TRMTR-01	TRMTR-01	TRMTR-01
7 PIN CONNECTOR (F) ON THE TROLLEY CONTROL BOX	CON-7-PM-F-01	CON-7-PM-F-01	CON-7-PM-F-01
7 PIN CONNECTOR (M) FOR THE WIRE FEED MOTOR CABLE	CON-7-CM-M-01	CON-7-CM-M-01	CON-7-CM-M-01
4 PIN CONNECTOR (F) ON THE TROLLEY CONTROL BOX	CON-4-PM-F-01	CON-4-PM-F-01	CON-4-PM-F-01
4 PIN CONNECTOR (M) FOR THE TROLLEY MOTOR CABLE	CON-4-CM-01	CON-4-CM-01	CON-4-CM-01
FLUX DISPENSER	FLDS01	FLDS01	FLDS01
WIRE FEED ROLLER 1.6mm	SAW-RLR-04	SAW-RLR-04	SAW-RLR-04
WIRE FEED ROLLER 2 to 2.8mm	SAW-RLR-01	SAW-RLR-01	SAW-RLR-01
WIRE FEED ROLLER 3 to 4mm	SAW-RLR-02	SAW-RLR-02	SAW-RLR-02
WIRE FEED ROLLER 4 to 5mm	SAW-RLR-03	SAW-RLR-03	SAW-RLR-03
SAW-TIP 2.5mm	TIP-SAW-2.5	TIP-SAW-2.5	TIP-SAW-2.5
SAW-TIP 3.15mm	TIP-SAW-3.15	TIP-SAW-3.15	TIP-SAW-3.15
SAW-TIP 4mm	TIP-SAW-4.0	TIP-SAW-4.0	TIP-SAW-4.0
SAW-TIP 5mm	TIP-SAW-5.0	TIP-SAW-5.0	TIP-SAW-5.0
WIRE GUIDE BAR (TORCH) BRASS	SAW-TRCH-01	SAW-TRCH-01	SAW-TRCH-01
TROLLEY WHEEL	SAW-WHL-01	SAW-WHL-01	SAW-WHL-01
FRONT CAP	SAW-FC-01	SAW-FC-01	SAW-FC-01
ROLLER ASSEMBLY	AUTO-WF-RLRASB	AUTO-WF-RLRASB	AUTO-WF-RLRASB
EXTENSION ROD	SAW-EXTN-200	SAW-EXTN-200	SAW-EXTN-200
14 PIN CONTROL CABLE	CTR-CBLE-SAW-14	CTR-CBLE-SAW-14	CTR-CBLE-SAW-14