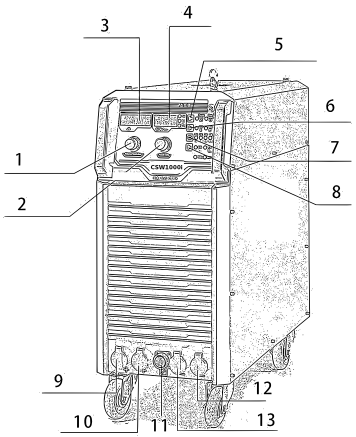
Inverter DC Submerged Arc Welding Machine

FLUXOR 1000 · FLUXOR 1250

with welding trolley and trolley control box

Operation Manual



Please read this manual carefully before using the machine.

Cruxweld Industrial Equipments Pvt. Ltd. · 5, Sector 29, Faridabad – 121008 (Haryana), India
Phone: +91 8800 882 983 | Email: sales@cruxweld.com | Website: www.cruxweld.com

Contents

1. Safety precautions 3
2. Electromagnetic compatibility considerations 5
3. Application and features 7
4. Working principle 8
5. Function introduction 9
6. Installation 17
7. Operation 19
8. Technical data 25
9. Maintenance and troubleshooting 26
10. Wiring diagram 30

Please read before use
1. To ensure safety, arrange for qualified personnel, or personnel with in-depth knowledge of welding machines, to carry out installation, maintenance, inspection and repair. **2.** Operate the welding machine only after fully understanding the contents of this manual. **3.** After reading this manual, keep it in a place where the relevant personnel can easily reach it. Read it again whenever necessary.

1. Safety Precautions

General safety precautions

- Be sure to follow the precautions specified in this manual, otherwise an accident may occur.
- The design, construction, installation and site selection of the input power supply must follow the relevant standards and regulations.
- Unrelated personnel are not allowed to enter the welding workplace.
- Have qualified professionals install, maintain and use the welding machine.
- This welding machine must not be used for any purpose other than welding (for example battery charging, heating, or thawing pipes).
- If the ground is uneven, take care to prevent the welding machine from tipping over.

To prevent electric shock and burns

- The welding machine is live. Do not touch live parts or bare metal parts of the welding circuit.
- Have a qualified electrician earth the welding machine according to the regulations.
- Have a qualified electrician connect the machine to the supply according to the regulations; the insulating sheath must not be damaged.
- When working in damp or confined conditions, ensure insulation between the body and the base metal.
- When working at height, use a safety harness or safety net.
- When the machine is not in use, switch off the input power.

Avoid harm from welding fumes and gases

- Use extraction equipment to avoid gas poisoning and suffocation accidents.
- When working inside a container, harmful gas collects around the operator and can cause suffocation. Pay special attention to ventilation.

Avoid harm from the arc, spatter and slag

- Wear protective goggles or a helmet with a sufficient shade number. Arc radiation irritates the eyes, and spatter and slag can burn them.
- Wear leather gloves, long-sleeved clothing, a cap, foot protection and an apron to avoid burns from arc radiation, spatter and slag.

Prevent fire, explosion and similar accidents

- Do not place combustible material at the welding position. Spatter and hot weld seams can start a fire.
- The welding cable and the base metal must be connected tightly; a loose connection generates heat and can cause a fire.
- Do not weld in flammable gas, or on containers that hold flammable substances — an explosion may result.
- Do not weld sealed containers; they may rupture.
- Keep a fire extinguisher ready.

Prevent injury from rotating and moving parts

- Keep fingers, hair and clothing away from rotating parts such as cooling fans and wire feed rollers.
- When feeding the welding wire, keep the end of the torch away from your eyes, face and body, so that the wire cannot injure anyone.

Prevent injury while the machine is being moved

- When the machine is moved by forklift or crane, nobody may stand under it or in front of its movement.
- When hoisting, the rope must be able to carry the load without breaking, and the included angle of the rope at the hook must be less than 30°.

⚠ Danger — high voltage inside

The maximum voltage inside the machine is **600 V**. It is strictly forbidden to open the casing at will. Switch off the air circuit breaker before any maintenance, and take the usual precautions against electric shock.

2. Electromagnetic Compatibility Considerations

2.1 Overview

Welding can cause electromagnetic interference. The interference emitted by arc welding equipment can be minimised by a proper installation method and correct use. The products described in this manual are **Class A equipment**, suitable for all locations except residential areas supplied from a public low-voltage network.

Warning
Class A equipment is not intended for use in residential dwellings supplied from a public low-voltage network. In such locations electromagnetic compatibility is difficult to guarantee, because of both conducted and radiated disturbance.

2.2 Environmental assessment

Before installing arc welding equipment, the user should assess the potential electromagnetic disturbance problems in the surrounding environment, considering:

1. Other power cables, control cables, signal and telephone lines on and around the equipment.
2. Radio and television transmitting and receiving equipment.
3. Computers and other control equipment.
4. High-security equipment, such as industrial protection equipment.
5. The health of the surrounding staff — for example people with hearing aids or pacemakers.
6. Any equipment used for calibration or testing.
7. The immunity of other equipment nearby. The user must ensure that the surrounding equipment is compatible; additional protection may be required.
8. The time at which welding or other activity takes place.

The extent of the environment to be considered depends on the structure of the building and on the other activities taking place. It may extend beyond the boundary of the building itself.

2.3 Ways to reduce emissions

(1) Public supply system

Connect the arc welding equipment to the public supply system in the manner recommended by the manufacturer. If interference occurs, take additional precautions such as fitting filters in the supply. For a fixed installation, consider shielding the supply cable with metal conduit or an equivalent method. The shield must be electrically continuous, and must be connected to the welding power source enclosure with good electrical contact.

(2) Maintenance of the arc welding equipment

Maintain the equipment routinely as recommended. While the machine is running, all inlets, auxiliary doors and covers must be closed and properly tightened. The equipment must not be modified in any way unless the instructions allow the corresponding change.

(3) Welding cables

Keep the welding cables as short as possible, run them close together, and run them close to or on the ground.

(4) Equipotential bonding

Pay attention to the bonding of all metal objects in the surrounding area. Metal objects bonded to the workpiece increase the risk that the operator receives an electric shock when touching such an object and the electrode at the same time. The operator must be insulated from all these metal objects.

(5) Earthing of the workpiece

Workpieces such as ship hulls or structural steel frames may not be earthed, for reasons of electrical safety or because of the location and size of the workpiece. Earthing the workpiece can sometimes reduce emission, but not always. Take care that earthing the workpiece does not increase the risk of electric shock, or damage other electrical equipment. Where necessary the workpiece should be connected directly to earth; in some countries direct earthing is not permitted and the connection must be made through a suitable capacitor selected according to national regulations.

(6) Shielding

Selective shielding of the surrounding equipment and of other cables can reduce electromagnetic interference. For special applications, shielding the whole welding area may be considered.

3. Application and Features

3.1 Application

This series of Cruxweld inverter DC submerged arc welding machines — **FLUXOR 1000** and **FLUXOR 1250** — is new-generation, high-efficiency, energy-saving equipment. It can be used for welding carbon structural steel, stainless steel, heat-resistant steel, composite steel and similar materials, and is widely used in shipbuilding, boiler making, chemical vessels, bridges, lifting machinery and metallurgical machinery manufacturing.

3.2 Features

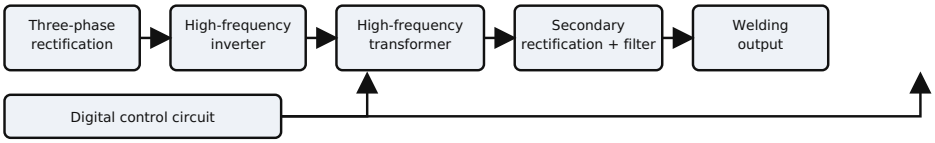
The machines have ideal static and external characteristics, good dynamic characteristics and complete control functions. The main features are:

- Single-chip microcomputer and CPLD control technology give fully digital control of the welding process, improving control accuracy and reducing the failure rate.
- IGBT inverter technology keeps the welding current highly stable when the mains voltage fluctuates and when the arc length changes; the arc self-adjusting ability is strong.
- High arc-ignition success rate. Two output characteristics — **flat (constant voltage)** and **drooping (constant current)** — suit wire diameters from 2.0 to 6.0 mm.
- Can also be used for carbon arc gouging and manual metal arc (MMA) welding.
- Wide current adjustment range.
- Light weight, small size, easy to move.
- High efficiency and high power factor — genuinely energy-saving equipment.

> The machines are manufactured to the arc welding equipment standard for welding power sources (Part 1: welding power sources).

4. Working Principle

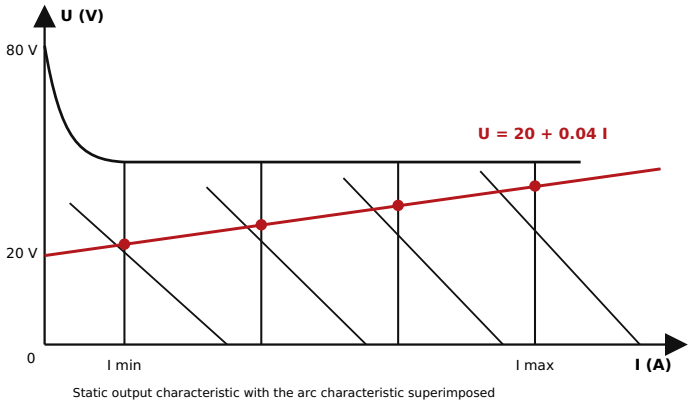
The power flow through the machine is as follows:



Principle chart

The machines use IGBT high-frequency inverter technology. The mains-frequency three-phase supply is rectified and fed to an inverter built from IGBTs and associated devices, where it becomes high-frequency alternating current. This improves the dynamic response of the DC submerged arc welding machine and reduces the size and weight of the transformer and the reactor.

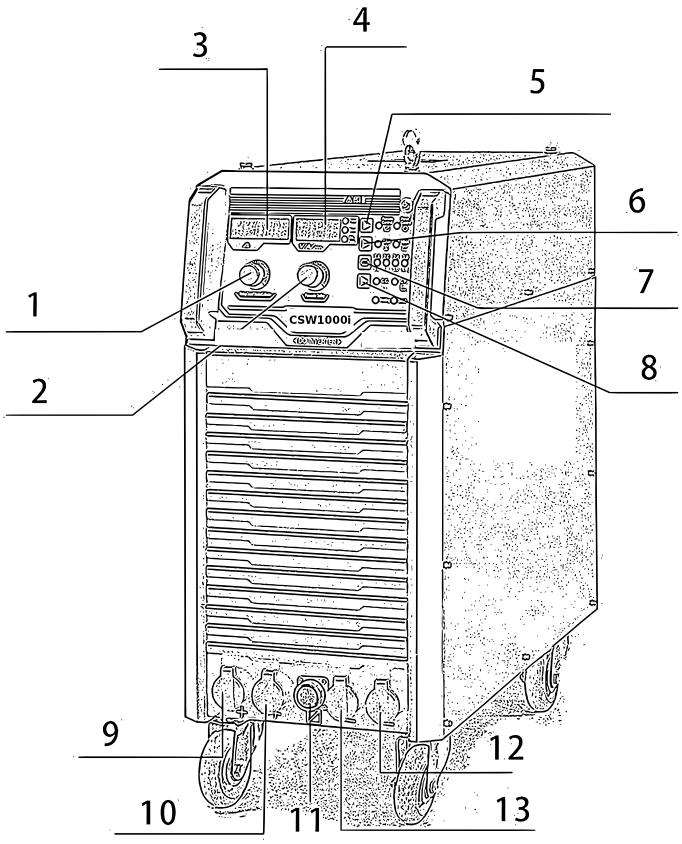
The control circuit provides closed-loop control of the whole machine, so that when external conditions change — mains voltage fluctuation, different output cable lengths and so on — the welding specification stays stable, the arc ignites easily, the arc is steady, the weld bead forms well, and the welding current can be adjusted continuously.



Output characteristic of the machine

5. Function Introduction

5.1 Front view



Front view (illustration shows the FLUXOR 1000)

5.2 Front panel controls

(1) Welding current adjustment knob
Adjusts the welding current under close (local) control. The adjustment range is from 60 A to the rated maximum current of the power source.

(2) Arc force / inductance adjustment knob
In the MMA (electrode) welding state it adjusts the arc-force (thrust) current. In the constant-voltage submerged arc welding state it adjusts the arc force, which improves welding stability.

(3) Current display (A)
In standby it shows the preset current of the machine; when the machine has output current it shows the actual welding current. Fault codes are also shown in this display — see the fault table in section 9.

(4) Right digital display (V / A)
During MMA welding it shows the actual welding voltage; while the thrust knob is being turned it briefly shows the preset thrust current.
During submerged arc welding it shows the preset welding voltage in standby and the actual voltage after starting; when the arc-force knob is turned in the flat-characteristic state it briefly shows the preset arc-force value.

(4.1) Voltage / arc force / inductance indicator lamps
Show whether the value on the right-hand display is the welding voltage, the thrust current or the arc force.

(5) Remote / local control selector
In the **remote** position the welding current is adjusted from the trolley control box. In the **local** position the welding current is adjusted with the welding current knob on the machine panel.

(5.1) Overload protector
If the armature current of the wire feeder or carriage motor, or the field current of the wire feeder motor, becomes too high, the overload protector operates, the machine stops and fault **E43** is reported. After the motor circuit fault has been cleared, press the overload protector in and the machine can continue to work.

(6) MMA / SAW selector

One position selects manual metal arc (electrode) welding; the other selects submerged arc welding.

(7) Welding wire diameter selector

In the **drooping (constant current)** characteristic, ø3, ø4, ø5 and ø6 mm can be selected according to the wire in use.
In the **flat (constant voltage)** characteristic, ø1.6, ø2.0, ø2.4 and ø3.0 mm can be selected.

(8) Constant current / constant voltage selector

Constant current (drooping) suits thick wire welding, wire diameter ≥ 3.0 mm; the output characteristic is a constant-current drooping characteristic.
Constant voltage (flat) suits thin wire welding, wire diameter ≤ 3.0 mm; the output characteristic is a constant-voltage flat characteristic.

(9) / (10) Output positive terminal

For submerged arc welding, connect the positive terminal of the machine to the submerged arc welding trolley with the positive cable. For MMA welding, connect the electrode holder here.

(11) Control cable socket

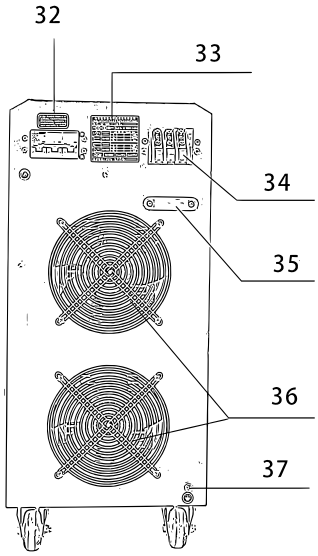
The trolley control box is connected here with the control cable. This provides the working supply for the control box, transmits the control signals and feeds back the arc voltage.

(12) / (13) Output negative terminal

Connect the negative output of the machine to the workpiece with the earth (return) cable.

⚠ **Attention**
Do not change the position of the MMA / SAW selector, the characteristic selector or the wire diameter selector while welding is in progress. Stop welding first.

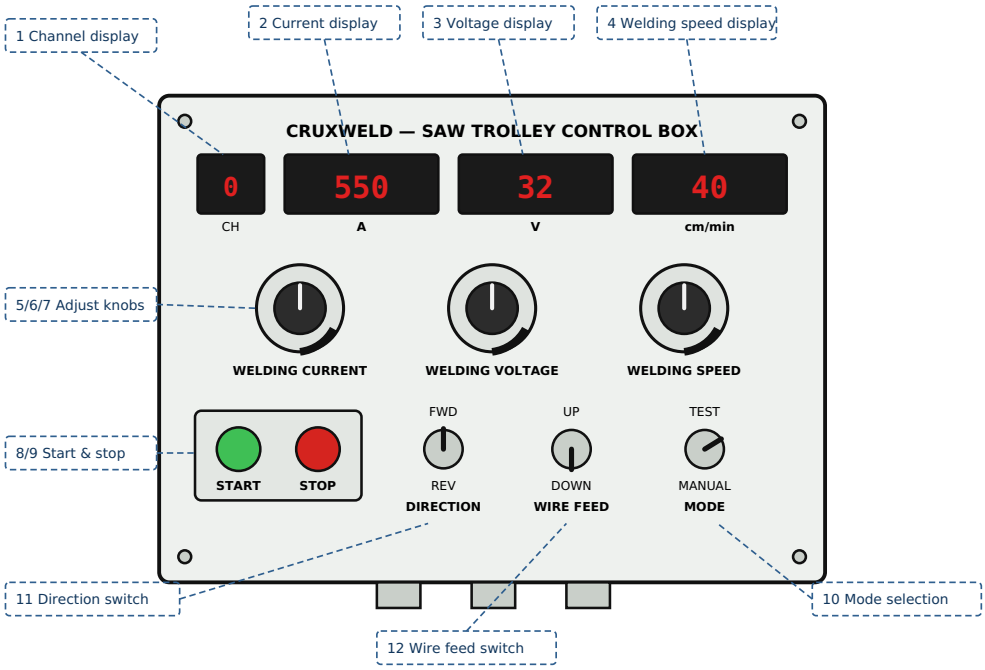
5.3 Back view



Item	Name	Function
(32)	Air circuit breaker	The three-phase supply reaches the machine through this switch. It cuts the power automatically if the machine is overloaded or fails. Normally it is left in the ON position, and the machine is started and stopped from the user's switchboard; it should not be used as the everyday power switch.
(33)	Nameplate	Gives the parameters of the machine.
(34)	Input cable junction box	Connection point for the three-phase AC supply cable.
(35)	Blanking plate	Clamps and secures the three-phase AC cable.
(36)	Fan	Cools the heat-generating components inside the machine.
(37)	Earthing bolt	For personal safety and correct operation, the machine must be reliably earthed at this bolt.

Note: the fan does not run as soon as the power is switched on. It starts when welding begins, and stops automatically after welding has been stopped for a few minutes.

5.4 Welding trolley control box



Welding trolley control box

Item	Function
(1)	**Channel display** — shows the welding specification channel number.
(2)	**Current display** — in standby shows the preset welding current; after the arc has started it shows the actual welding current, and it shows the fault code when a fault occurs.
(3)	**Voltage display** — in standby shows the preset welding voltage; after the arc has started it shows the actual welding voltage.
(4)	**Welding speed display** — in standby shows the preset welding speed; after the arc has started it shows the actual welding speed.
(5)	**Current adjustment knob** — adjusts the welding current.
(6)	**Voltage adjustment knob** — adjusts the welding voltage.
(7)	**Welding speed adjustment knob** — adjusts the welding speed.

Item	Function
(8)	**Start button** — press to start the machine after power-on; the start indicator lights.
(9)	**Stop button** — press while the machine is working to stop it; the stop indicator lights.
(10)	**Mode selection switch** — controls driving and stopping of the trolley. With the trolley clutch handle set to “manual”, the trolley can be pushed by hand. With the clutch handle set to “auto”, selecting **Test** makes the trolley travel; selecting **Manual** stops it.
(11)	**Travel direction switch** — controls the direction in which the trolley travels.
(12)	**Wire feed / retract switch** — feeds the welding wire up or down.

> **Note:** during normal welding only the **stop button**, the **travel direction switch**, the **current**, **voltage** and **welding speed** adjustment knobs are active.

5.5 Protection and convenience functions

Wire-touch protection

When the wire feed / retract switch is operated, if the welding wire is touching the workpiece the wire-touch protection acts and the wire cannot be fed downwards. If the wire must be fed down, hold the wire feed / retract switch for more than **3 seconds**.

Automatic shutdown

After the start button is pressed, if the arc does not start successfully within about **20 seconds**, the machine stops automatically. Once welding has started, if there is no welding current for about 20 seconds the machine also stops automatically.

Factory reset

With the control box stopped, select the required characteristic on the machine panel — drooping or flat — select **channel 7**, then press the adjustment knob and the welding speed adjustment knob together for three seconds. The welding specifications stored in channels 0 to 9 are restored to the factory settings.

5.6 Factory welding specifications

Drooping (constant current) characteristic

Channel	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)
0	300	28	30
1	450	30	30
2	550	32	40
3	400	30	40
4	550	30	40
5	650	32	40
6	750	35	40
7	500	30	40
8	600	32	40
9	700	35	40

Flat (constant voltage) characteristic

Channel	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)
0	200	28	30
1	250	29	30
2	300	30	40
3	350	31	40
4	400	32	40
5	450	32	40
6	500	33	40
7	550	33	40
8	600	34	40
9	650	34	40

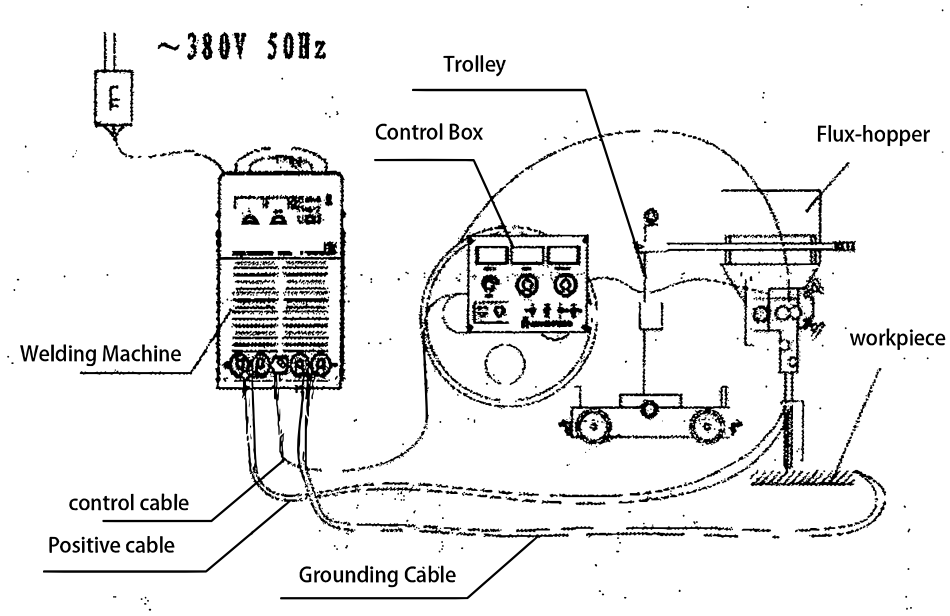
5.7 Quick reference — choosing the characteristic

Wire diameter	Output characteristic	Typical use
ø1.6 – ø3.0 mm	**Flat** (constant voltage)	Thin wire submerged arc welding; the arc length is held by the self-adjusting action of the constant-voltage source.
ø3.0 – ø6.0 mm	**Drooping** (constant current)	Thick wire submerged arc welding; the welding current is held constant and the arc voltage is set by the arc length.

Working with the arc force knob
In the flat-characteristic (constant-voltage) state, the arc force knob changes how quickly the source responds to a short circuit. Increase it if the arc feels soft and the wire tends to stub; reduce it if spatter increases. In the MMA state the same knob sets the thrust (hot-start / anti-stick) current.

Remember: the current, voltage and travel speed for submerged arc welding are set at the **trolley control box** when the machine is in remote control. The machine panel sets the current only when local control is selected.

6. Installation



External wiring diagram

6.1 Submerged arc welding installation

1. When the machine is used for submerged arc welding with the welding trolley, connect it as shown in the external wiring diagram.
2. The user must provide a suitable switchboard (cabinet). With the switchboard isolated, connect the three-phase **380 V / 415 V, 50 Hz** supply through the air circuit breaker to the input cable junction box on the rear panel, and make sure the machine is reliably earthed.
3. Connect the output **positive** terminal of the machine to the submerged arc welding trolley with the positive cable.
4. Connect the output **negative** terminal of the machine to the workpiece with the earth cable.
5. Connect the machine and the trolley control box with the control cable.

6.2 MMA installation

1. Connect the three-phase 380 V / 415 V, 50 Hz supply through the air circuit breaker to the input cable junction box on the rear panel, and make sure the machine is reliably earthed.
2. Connect the electrode holder to the output **positive** terminal.
3. Connect the output **negative** terminal to the workpiece with the earth cable.

⚠ Warning

All supply connections must be made by a qualified electrician with the switchboard isolated. Check that the phase voltages are within ±10 % and that no phase is missing before switching on.

7. Operation

7.1 MMA welding or carbon arc gouging

1. Select the **MMA** working mode.
2. Connect the electrode holder cable, or the carbon arc gouging torch, to the **positive** output.
3. Select **remote** or **local** control as required. For remote control the control cable between the machine and the control box must be properly connected.
4. Preset the thrust current.
5. Preset the welding current.
6. Weld.

> **Note:** if the welding current display shows fault code **E70** at this point, there is an accidental short circuit between the positive and negative output of the machine. Shut the machine down and clear the short circuit.

Welding procedure specification for electrode arc welding (reference)

Workpiece thickness (mm)	< 1	2	3	4 – 5	6 – 12	≥ 13
Electrode 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

7.2 Submerged arc welding

1. Select the **SAW** working mode.
2. Select **remote** control.
3. Select the output characteristic to suit the wire diameter — **flat** for wire ≤ 3.0 mm, **drooping** for wire ≥ 3.0 mm.
4. Select the wire diameter actually in use.
5. When welding with the flat characteristic, adjust the arc force knob to a suitable value for the job.
6. Decide the welding specification from the process requirement, and preset the welding current, welding voltage and travel speed at the trolley control box.
7. Prepare the trolley for welding according to its operating instructions.
8. Weld.

> **Note:** switch the machine off before changing the welding cable or the contact tip.

7.3 Weld formation and specification adjustment

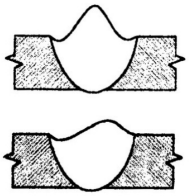
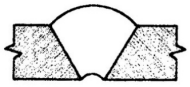
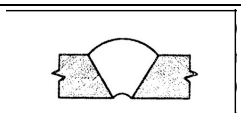
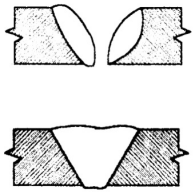
Weld formation is closely related to the welding specification, and generally follows these rules:

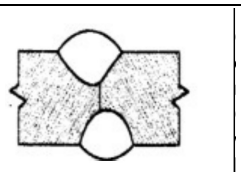
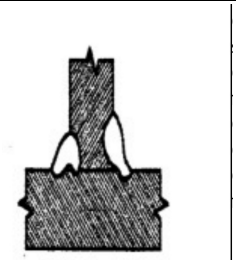
- Increasing the **welding current** increases the penetration depth and widens the bead. Choose the current range from the wire diameter.
- Increasing the **welding voltage** reduces the penetration depth, widens the bead and reduces the reinforcement height.
- Reducing the **travel speed** of the trolley increases the penetration depth and widens the bead.
- In practice all three parameters have to be adjusted together to obtain a good weld.

Welding current range suitable for different wire diameters

Wire diameter (mm)	2	3	4	5	6
Current density (A/mm²)	63 – 125	50 – 85	40 – 63	35 – 50	28 – 42
Welding current (A)	200 – 400	350 – 600	500 – 800	700 – 1000	820 – 1200

7.4 Weld defects, causes and preventive measures

Defect	Appearance	Cause	Measures
Uneven weld	Weld width varies along the seam	1) Uneven travel speed 2) Unstable wire feeding 3) Unstable contact at the contact tip	1) Clear the circuit fault 2) Adjust the wire feed roller 3) Replace the contact tip
Undercut		1) Travel speed too fast 2) Welding current too high 3) Arc voltage too high 4) Wire end out of alignment	1) Reduce the travel speed, or use twin-arc / multi-arc welding 2) Reduce the welding current 3) Reduce the welding voltage 4) Correct the wire position
Concave bead		Too much pressure on the backing bar	Improve the backing bar
Overflow		1) Wire stick-out too long 2) Groove too small 3) Arc voltage too low 4) Wire end out of alignment	1) Reduce the stick-out 2) Change the groove size 3) Increase the arc voltage 4) Correct the wire position
Burn-through, back bead too high		1) Welding current too high 2) Travel speed too slow 3) Root gap too large 4) Backing bar not tight against the joint	1) Reduce the welding current 2) Increase the travel speed 3) Improve the assembly 4) Improve the clamping device

Defect	Appearance	Cause	Measures
Porosity	1) Cylindrical pores 2) Distributed along the centre of the weld 3) Single pores or in groups	1) Base metal stained or not cleaned 2) Incomplete de-rusting or degreasing of the wire 3) Damp flux 4) Poor flux composition or performance	1) Improve the cleaning 2) Dry the flux 3) Change to a suitable flux
Hot cracking	1) Along the longitudinal or transverse grain boundaries of the weld 2) At the start or end of a single-sided weld with double-sided forming	1) Excessive segregation of low-melting-point sulphide 2) Insufficient restraint when the start or end of the weld crystallises	1) Use wire with low sulphur and high manganese content, and a low-silicon high-manganese flux 2) Increase the width and the weld length of the run-on and run-off plates, and use a grooved run-on plate
Slag inclusion		1) Interpass slag not cleaned properly in multi-layer welding 2) Wire end out of alignment on the final pass	1) Clean the joint thoroughly between passes 2) Adjust the position of the welding head
Lack of penetration		1) Welding current too low 2) Travel speed too fast 3) Arc voltage too high 4) Wire end out of alignment 5) Mains voltage fluctuating too much	1) Increase the current 2) Slow the travel speed down 3) Reduce the arc voltage 4) Straighten the wire and adjust the head position 5) Avoid peak periods of electricity consumption

7.5 Welding trolley operation

This series of submerged arc welding control boxes can carry out submerged arc welding with a single thick wire, a single thin wire, or twin thin wires on a single arc. Taking single thick wire submerged arc welding as the example, the steps are:

1. Switch the machine on and check that everything is normal. On the machine panel set the characteristic selector to **drooping**, the remote / local selector to **remote**, the MMA / SAW selector to **SAW**, and select the wire diameter.
2. Check that the wire feed roller and the contact tip match the wire diameter, and that up / down wire feeding and the test run work correctly.
3. Turn the power switch on the control box to **ON**; the stop indicator lights.
4. Use the wire feed / retract switch to bring the wire to **3 – 5 mm** from the workpiece, and set the trolley clutch handle to the **automatic** position. Set the required welding specification on the control box, then press **Start**: the start indicator lights, the stop indicator goes out, the wire feeds slowly, the trolley starts to travel, the wire touches the workpiece and ignites the arc, and normal welding begins with the trolley travelling at the preset speed.
5. The welding specification can be adjusted at any time during welding. When the weld is finished, press **Stop**: the trolley stops travelling, the start indicator goes out, the stop indicator lights, the wire burns back automatically and the welding process ends.

⚠ **Attention**
Make sure the flux covers the joint before the arc is struck, and never look at the arc if the flux cover breaks down. Keep hands clear of the wire feed rollers and of the trolley wheels while the machine is powered.

7.6 Practical notes on setting the specification

If the weld shows…	Most likely cause	First adjustment to try
Narrow, high bead	Arc voltage too low	Increase the welding voltage a little
Wide, flat bead with poor penetration	Arc voltage too high	Reduce the welding voltage
Deep, narrow penetration with undercut	Current too high for the speed	Reduce the current or reduce the travel speed
Shallow penetration	Current too low or speed too high	Increase the current, or slow the trolley down
Irregular bead width	Unstable wire feed or worn contact tip	Check the feed rollers; replace the contact tip
Porosity	Damp flux, or oil / rust on the joint	Dry the flux; clean the joint

Change **one** parameter at a time and run a test bead after each change. Recording the settings that work for each joint type, and storing them in the ten channels of the control box, makes the job repeatable.

Flux
Use only flux that is suitable for the wire and the parent material, and keep it dry. Re-dry flux that has been exposed to the air according to the flux manufacturer's instructions. Recovered flux must be sieved before it is used again.

8. Technical Data

8.1 Welding power source

Item	FLUXOR 1000	FLUXOR 1250
Input voltage	415 V ±15 %, 3 phase, 50/60 Hz	
Rated input power	52 kVA	60 kVA
Rated input current	95 A	105 A
Output current range	100 – 1000 A	100 – 1250 A
Output voltage range	24 – 44 V	30 – 44 V
Welding current at 100 % duty cycle	1000 A	1250 A
No-load voltage	80 V	
Output characteristic	CC / CV	
SAW wire diameter	2.5 / 3.2 / 4.0 mm	2.4 / 3.2 / 4.0 / 5.0 / 6.0 mm
MMA electrode diameter	3.2, 4 and 5 mm	3.2, 4, 5 and 6.3 mm
Gouging electrode diameter	Up to 10 mm	Up to 12 mm
Efficiency	85 %	
Power factor	0.93	
Protections	Overheat, overcurrent, overvoltage, undervoltage, phase detection, thermal	
Degree of protection	IP23S	
Insulation class	H	
Cooling	Forced air	
Dimensions (L × W × H)	760 × 380 × 820 mm	775 × 550 × 810 mm
Weight	128 kg	158 kg

8.2 Welding trolley control box

Item	SAW welding trolley control box
Rated input	DC 110 V
Welding speed	10 – 120 cm/min
Wire diameter	1.6 – 6 mm
Current range	50 – 1250 A
Weight	5 kg
Size	34 × 11 × 24 cm

The rating plate on the machine is binding. The specifications and technical content of this product are subject to change without notice.

9. Maintenance and Troubleshooting

Maintenance of the welding machine must be carried out by qualified personnel. If the user meets a problem that cannot be solved, contact Cruxweld service in good time.

> ⚠ **Danger**
>
> The maximum voltage inside the machine is **600 V**. It is strictly forbidden to open the casing at will. Switch off the air circuit breaker before maintenance and take proper precautions against electric shock.

9.1 Normal behaviour that is easily misunderstood

- When the input voltage is too low, the machine does not work.
- If no welding is done for about 30 minutes the fan stops automatically; it runs again automatically during welding.
- After long use in a high ambient temperature, or long use at a high current, the thermal relay stops the machine and the welding current display shows **E19**. Let the machine run off-load, without switching it off, for a few minutes and it returns to normal automatically.

9.2 Precautions for use

- Place the machine in a dry, ventilated position, not in a hot or damp place.
- The three-phase line voltage must be within 380 V / 415 V ±10 %, with no missing phase.
- The earth connection must be correct and reliable.
- Check the connecting cables regularly; tighten any joint found loose, otherwise the joint will burn and the welding process becomes unstable.
- Switch off the supply after welding.

9.3 Checks before overhaul

- Is the three-phase line voltage between 304 V and 437 V, and is any phase missing?
- Is the power input cable connected correctly and reliably?
- Is the protective earth correct and reliable?
- Is the output cable connected correctly, and is the contact good?
- Are the panel selections and the displays correct?

9.4 Regular inspection

- Qualified personnel should blow the dust out of the machine with compressed air once a quarter, and check at the same time for loose fasteners.
- Check the contact condition of the input and output terminals at least once a month.
- Check regularly that the remote control plug and the adjustment knobs are not loose, and that the control cable is not damaged.

9.5 Welding machine — faults and remedies

No.	Phenomenon	Cause	Remedy
1	After switching on, the machine has no display	1) Phase loss in the supply 2) The internal fuse (3 A) is blown 3) The air circuit breaker on the rear panel is damaged 4) The main control board is damaged 5) The power transformer is damaged	1) Check the supply 2) Replace the fuse 3) Replace the air circuit breaker 4) Replace the main control board 5) Replace the power transformer
2	When the machine is switched on, the air circuit breaker on the rear panel trips immediately	1) The air circuit breaker has failed 2) The IGBT module is damaged 3) The three-phase rectifier bridge is damaged 4) The varistor is damaged	1) Replace the air circuit breaker 2) Replace the IGBT module and the drive board together 3) Replace the three-phase rectifier bridge 4) Replace the varistor
3	The machine does not work	1) Phase loss in the supply 2) The internal fuse (3 A) is blown 3) The fan, power transformer, solid-state relay or main control board is damaged 4) A disconnection 5) The internal air circuit breaker has tripped	1) Check the supply 2) Replace the fuse 3) Check the fan, power transformer, solid-state relay and main control board 4) Check the wiring 5) Have qualified personnel check and repair — the drive board, IGBT module or three-phase rectifier module may need replacing
4	Welding parameters cannot be adjusted	1) The rotary encoder is damaged 2) The digital display board of the machine is damaged 3) The main control board of the machine is damaged 4) The digital display board of the trolley control box is damaged	Check and replace the faulty item in each case
5	Welding current unstable	1) Phase loss 2) The current sensor is damaged 3) The main control board is damaged	1) Check the supply, the breaker wiring and the three-phase rectifier bridge 2) Check and replace 3) Check and replace

No.	Phenomenon	Cause	Remedy
6	Welding voltage unstable	1) The contact tip on the trolley is burnt 2) The wire feed roller of the trolley is not pressed or is worn 3) The main control board of the machine is faulty 4) Poor contact of the earth cable, or the cable is too long	1) Replace the contact tip 2) Press or replace the wire feed roller 3) Replace the main control board 4) Check and replace
7	**E19** — thermal protection	1) The ambient temperature is much higher than 40 °C 2) Fan failure has reduced the air flow 3) The temperature relay is damaged and stays open	1) Work again once the ambient temperature has dropped 2) Clear the fan phase-sequence fault; replace the fan if it has failed 3) Check and replace
8	**E43** — communication failure	1) The control cable plug is not tightened, or the control cable is broken 2) The main control board is damaged and cannot communicate; the control box is not plugged in properly, or the overload protector has operated	1) Tighten the control cable plug and check the cable for breaks or short circuits 2) Check and replace; reset the overload protector
9	**E70** — short circuit when switching from SAW to MMA	1) The output of the machine is short-circuited when manual arc welding is selected 2) The main control board is faulty	1) Check whether the welding gun or the submerged arc welding head is short-circuited to the workpiece, and clear the short circuit 2) Check and replace
10	**E18** — head feedback line disconnected	1) The head voltage feedback line is disconnected 2) The positive cable is not connected	1) Check and replace 2) Check and connect

9.6 Trolley control box — maintenance and faults

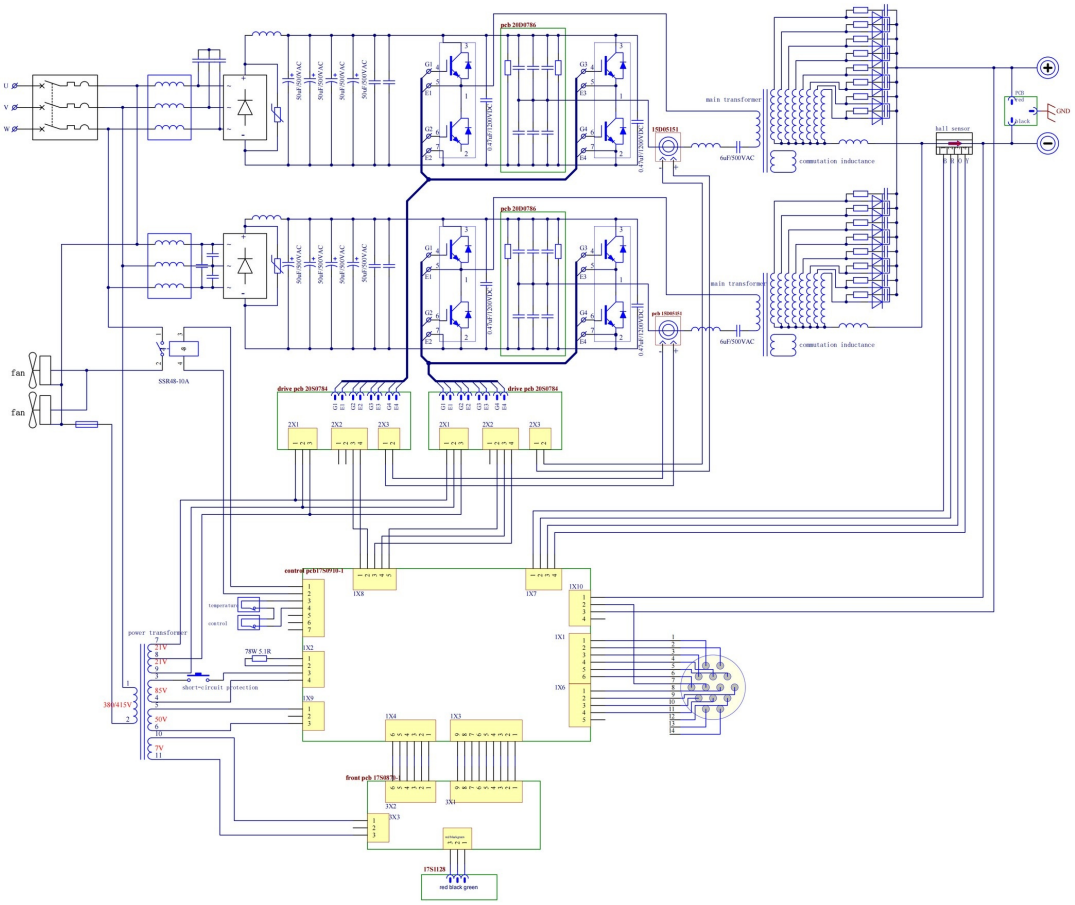
Maintenance of the control box must be carried out by qualified personnel. Inspect the unit regularly, at intervals that suit how often it is used. Check the trolley for loose fasteners, check the cables for damage, and check that the adjustment knobs and the panel components are sound.

Before maintenance, check that the switch positions on the machine and the control box are correct, that the three-phase line voltage is between 340 V and 420 V with no phase missing, that the input cable of the machine is connected correctly and reliably, and that the welding and control cables are correctly connected with good contact.

No.	Phenomenon	Cause	Remedy
1	Welding voltage unstable	A) Contact tip burnt B) Wire feed roller not pressed or worn C) Machine main control board failure D) Poor earth contact	A) Replace the contact tip B) Tighten or replace the wire feed roller C) Have the machine checked D) Tighten the earth connection
2	Unsteady travel	A) The travelling wheel is loose B) Clutch failure C) Machine main control board failure	A) Adjust and tighten the travelling wheel B) Check or replace the clutch C) Replace the main control board
3	Difficult arc starting	A) Contact tip burnt B) The selected wire diameter does not match the wire in use C) Improper specification setting D) Wire stick-out not suitable	A) Replace the contact tip B) Select the correct wire C) Set the specification correctly D) Adjust the stick-out
4	The trolley will not start	A) Control box circuit board failure B) Welding power source failure C) The 14-core control cable is broken D) The start button is broken	A) Replace the circuit board B) See the machine section of this manual C) Repair the break D) Replace the button
5	After starting, only slow wire feed — no normal welding	A) Welding power source failure B) Poor contact of the negative cable C) Machine main control board failure	A) See the machine section B) Check and clear C) Replace the main control board
6	No wire feed or no travel	A) Mechanical failure B) Motor failure C) Machine main control board failure D) The toggle switch is broken	A) Check the mechanical connection B) Check the motor brushes and the control voltage C) Replace the main control board D) Replace the toggle switch
7	Welding current out of control	A) Control cable damage B) Welding machine failure	A) Check and repair the control cable B) Check and repair the machine

If a fault persists, contact Cruxweld service at **support@cruxweld.com** or **+91 8800 882 983**, quoting the model.

10. Wiring Diagram



Internal wiring diagram

Follow this diagram strictly. All work inside the machine must be carried out by a qualified electrician with the supply isolated and the machine allowed to discharge.

Cruxweld Industrial Equipments Pvt. Ltd.

5, Sector 29, Faridabad – 121008 (Haryana), India

Phone: +91 8800 882 983 | +91 (129) 489 2868

Email: sales@cruxweld.com | Service: support@cruxweld.com

www.cruxweld.com

FLUXOR 1000 · FLUXOR 1250 — Inverter DC Submerged Arc Welding Machine

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