



# ***RS 400x***

**Instruction manual**

# RS 400x






Instruction manual

For

Installation, Operation & General maintenance

# SAFETY

## Precautions for installation

	<p><b>Beware of electric shock!</b></p> <ul style="list-style-type: none"><li>● Install grounding device according to application standard.</li><li>● Do not touch live parts with naked skin, wet gloves or wet clothes.</li><li>● Be sure you are insulated from ground and work piece.</li><li>● Cover the cover plate of the machine before power on to avoid an electric shock.</li><li>● Confirm the safety of your working position.</li></ul>
	<p><b>Beware of fire hazard!</b></p> <ul style="list-style-type: none"><li>● Please install the machine on non-combustible materials to avoid a fire.</li><li>● Make ensure there are no inflammables near the welding position to avoid a fire.</li></ul>
	<p><b>Beware of explosion!</b></p> <ul style="list-style-type: none"><li>● Do not install the machine in an environment with explosive gas to avoid an explosion.</li></ul>

**⚠ Replacing the components can be dangerous.**

- Only professionals can replace the components of the machine.
- Make sure the connecting wires inside the machine are correctly connected after replacing the PCBs, and then the machine can be run. Otherwise, there is a risk of damage to property.
- Make sure there are no foreign bodies such as wire leads, screws, gaskets and metal bars falling into the machine inside when replacing the components.







**⚠ Carrying or moving the machine can be dangerous.**

- Cut the input power off via the switching box before moving the welding machine.
- The handle can only be used for moving the welding machine by hand in short distance, and it cannot be used for lifting. Otherwise, personal injury or property damage may be caused by a drop.
- Make sure that the flying rings are tightened, and that the machine enclosure and cover are fixed when moving the welding machine with a crane,
- Two lifting belts should be used when lifting the welding machine, and the angle formed by the

lifting belt and the vertical should be smaller than 15°.

- Do not apply any stress on the operation panel and cover when moving the welding machine. Otherwise, personal injury or property damage may be caused by a drop.
- Do not install and run the welding machine when the machine is damaged or lacks any components. Otherwise, fire hazard or personal injury may be caused.

## Precautions for operation

	<p><b>Smoke-may be harmful to your health!</b></p> <ul style="list-style-type: none"> <li>● Keep your head away from the smoke to avoid inhalation of waste gas in welding.</li> <li>● Keep the working environment well ventilated with exhaust or ventilation equipment when welding.</li> </ul>
	<p><b>Arc radiation-may hurt your eyes and burn your skin!</b></p> <ul style="list-style-type: none"> <li>● Use proper welding mask and wear protective clothing to protect your eyes and body.</li> <li>● Use proper mask or curtain to protect onlooker from being injured.</li> </ul>
	<p><b>Magnetic field can make cardiac pacemaker a bit wonky.</b></p> <ul style="list-style-type: none"> <li>● People with cardiac pacemaker should consult the doctor before carrying out welding.</li> <li>● Stay away from the welding source to reduce the effect of magnetic field.</li> </ul>
	<p><b>Improper use and operation may result in a fire or an explosion.</b></p> <ul style="list-style-type: none"> <li>● Welding spark may result in a fire, so please make ensure there are no inflammables near the welding position, and pay attention to fire safety.</li> <li>● Ensure there is fire extinguisher nearby, and make sure someone has been trained to operate the fire extinguisher.</li> <li>● Do not weld closed container.</li> <li>● Do not use this machine for pipe thawing.</li> </ul>
	<p><b>Hot work piece can cause severe scald.</b></p> <ul style="list-style-type: none"> <li>● Do not touch hot work piece with bare hands.</li> <li>● Cool the welding torch for a while after continuously working.</li> </ul>
	<p><b>Excessive noise does great harm to people's hearing.</b></p> <ul style="list-style-type: none"> <li>● Wear ear covers or other hearing protectors when welding.</li> <li>● Give warning to onlooker that noise may be potentially hazardous to hearing.</li> </ul>



**Moving parts may injure your body.**

- Please keep away from moving parts (like fan).
- Each door, panel, cover, baffle plate, and protective device the like should be closed and located correctly.



**Seek professional support when trouble strikes.**

- When trouble strikes in installation and operation, please inspect according to related contents in this manual.
- If you still cannot understand fully, or you still cannot solve the problem, please contact the service center to obtain professional support.

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# Specifications / Technical Data RS 400x

## General Description

The RS 400X is thyristor based MMA welding machine. This unit uses 3~Phase 415V, 50 Hz AC power input supply. This machine is suitable for rutile and basic electrodes. It can weld carbon steel, stainless steel.

It's main parts include: main transformer, three phase thyristor rectifier, control PCB and inductance.

Description		Specification
Model		RS 400x
Input power	V	415
Frequency	Hz	50
Rated input current	A	47
Rated input capacitance	KVA	19.5
No-load voltage	V	70
Rated working voltage	V	36
MMA welding current	A	50-400
Welding current (10min)	A	60%@400
100% duty cycle	A	310
Insulation class		H
Enclosure protection	IP	21S
Cooling type		Fan cooled
Dimension	LxWxH mm	705*420*790
Weight	kg	130

# INSTALLATION AND CONNECTION

## Installation Requirements

### 1) Environment requirements

- a) Do not install the machine at places with excessive dusts and metal powders.
- b) Do not install the machine at places with corrosive or explosive gas.
- c) The temperature of the working environment should be between -10°C and 40°C.
- d) Do not carry out welding with the welding machine placed on a platform with a pitch greater than 15°.
- e) The machine should be installed in a well-ventilated place with humidity of 90% or less and without water condense.
- f) Pay attention to the wind at the welding site, and use wind deflector if necessary. Otherwise, the welding process will be affected.

### 2) Installation space requirements

The welding machine should be at least 20cm away from the walls, and there should be at least 30cm between them when two machines are installed side by side. Please refer to the table below to determine the installation position of the welding machine.

Table 2-1: Reserved space when installing the welding machine

Machine part	Front	Top	Left	Right	Rear
Reserved space	≥20cm	≥10cm	≥20cm	≥20cm	≥20cm

## Electrical connection

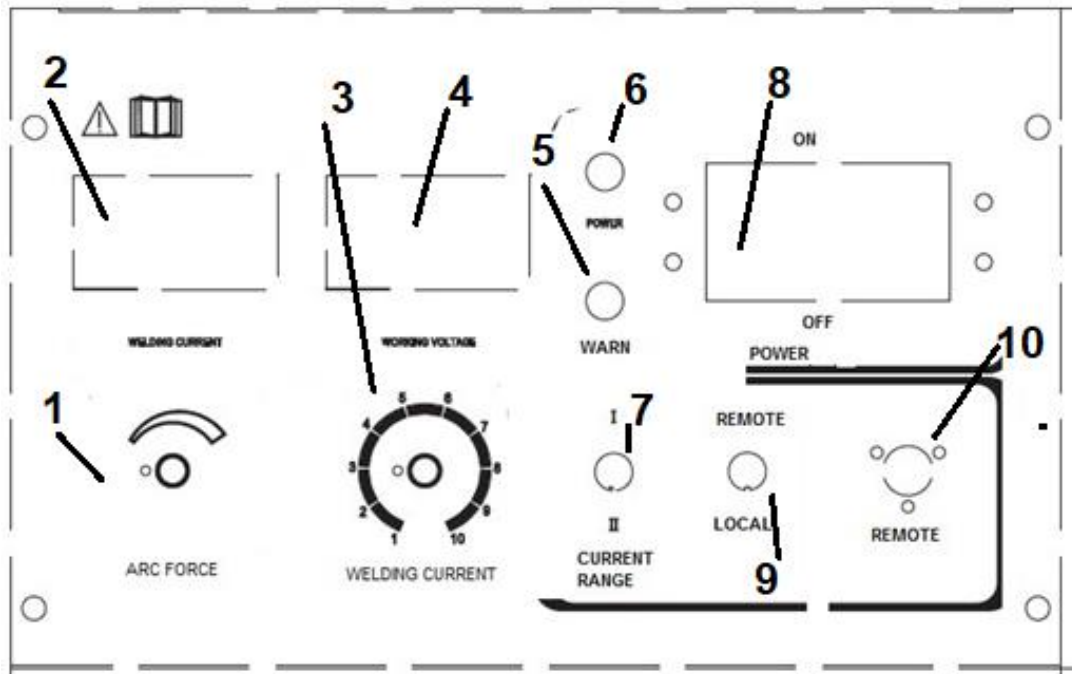
### **▲WARNING**

- High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This welder must be grounded while in use to protect the operator from electrical shock.
- Do not remove grounding prong or alter the plug in any way. Do not use any adapters between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF when connecting your welder's power cord to a properly grounded 3 phase 415 VAC, 50Hz, power supply.



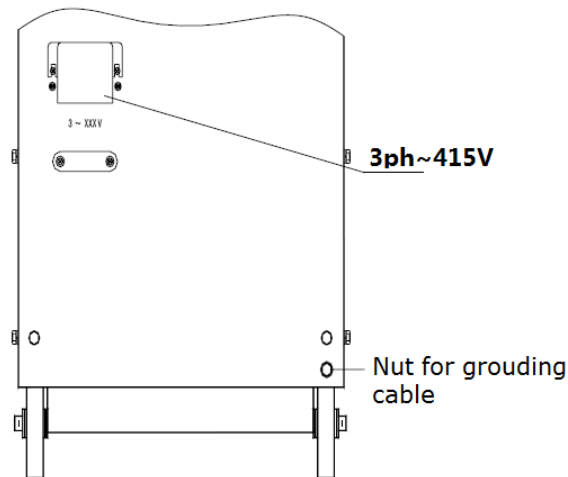
# OPERATION

## Panel functions of RS 400x



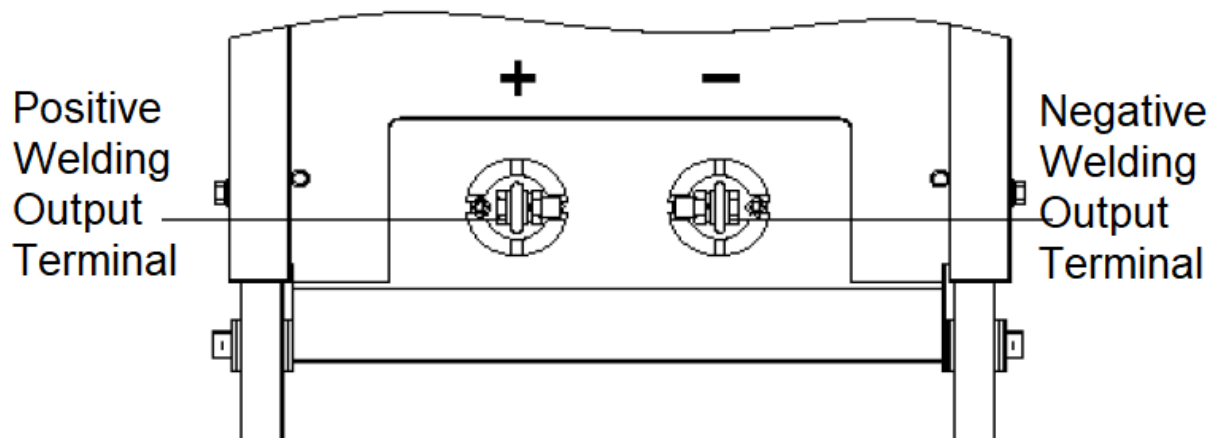
1. Arc force adjusting knob
2. Digital display for output Amp
3. Output Current adjusting knob
4. Digital display for output Volt
5. Thermal protection indicator
6. Power input indicator
7. Output current range selecting switch
8. Main Power Switch
9. Remote control selecting switch
10. Remote control connector socket

## Rear panel



Connect input cable with size  $\geq 10\text{mm}^2$ .

## Output Terminals



## Work after welding

- 1) Cut off the power of the welding machine 3~5min after the welding work is finished, so as to cool the internal part of the machine.
- 2) Turn off the air switch on the welding machine first and then switch off the power in the switching box when shutting off the power.

# MAINTENANCE

## Daily maintenance



The power of the switching box and the welding machine should be shut down before daily checking (except appearance checking without contacting the conductive body) to avoid personal injury accidents such as electric shock and burns.

Tips:

- 1) Daily checking is very important in keeping the high performance and safe operation of this welding machine.
- 2) Do daily checking according to the table below, and clean or replace components when necessary.
- 3) In order to ensure the high performance of the machine, please choose components provided when replacing components.

Table 4-1: Daily checking of the welding machine

Items	Checking requirements	Remarks
Front panel	Whether any of the components are damaged or loosely connected; Whether the cables at the bottom are tightly connected; Whether the abnormality indicator illuminates after starting the machine.	If not proper, check the interior of the machine, and tighten or replace the components.
Back panel	Whether the input power cable is in good condition; Whether the air intake is unobstructed.	
Cover	Whether the bolts are loosely connected.	If not proper, tighten or replace the components.
Chassis	Whether the rubber feet are damaged or loosely connected.	
Side plates	Whether the side plate is distorted, damaged or loosely connected.	
Fan	Whether the fan or fan guard is distorted or damaged. Whether the fan works or sounds normal when the	If not proper, eliminate the failures or replace the fan.

	machine is running;	
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Table 4-2: Daily checking of accessories

Items	Checking requirements	Remarks
Earth cable	Whether the grounding wires (including work piece GND wire and welding machine GND wire) break off.	If not proper, tighten or replace the components.
Welding cable	Whether the insulating layer of the cable is worn, or the conductive part of the cable is exposed; Whether the cable is drawn by an external force; Whether the cable connected to the work piece is well connected.	Use appropriate methods according to the work site situation to ensure safety and normal welding.

## Periodic check







### WARNING

**Periodic check should be carried out by qualified professionals to ensure safety. The power of the switching box and the welding machine should be shut down before periodic check to avoid personal injury accidents such as electric shock and burns. Due to the discharge of capacitors, checking should be carried out 5 minutes after the machine is powered off.**

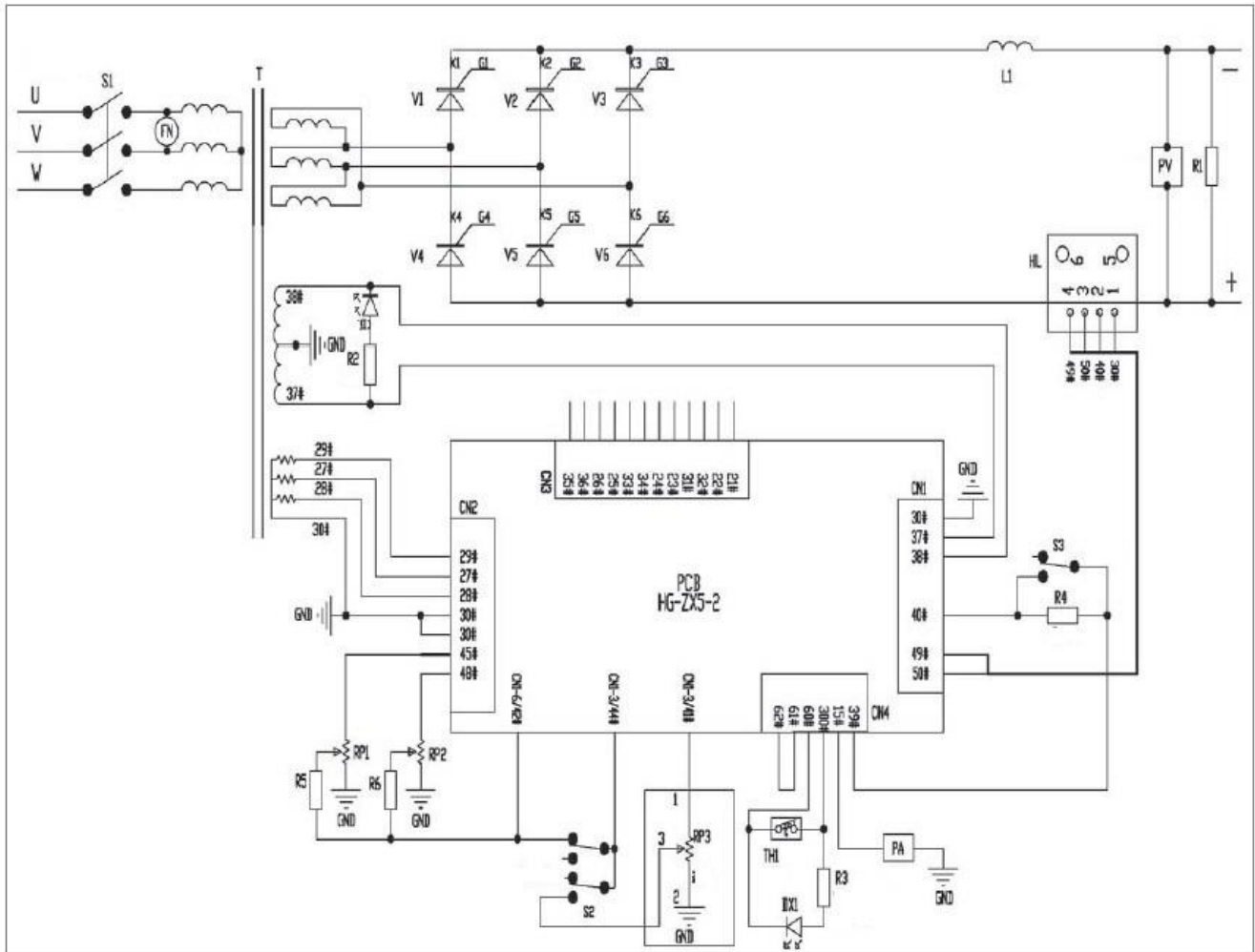
### Tips

	<p><b>Safety</b></p> <p>All maintenance and checking should be carry out after the power is completely cut off. Make sure the power plug of the machine is pulled out before uncovering the welding machine.</p> <p>When the machine is powered on, keep hands, hair and tools away from the moving parts such as the fan to avoid personal injury or machine damage.</p>
	<p><b>Periodic check</b></p> <p>Check periodically whether inner circuit connection is in good condition (esp. plugs). Tighten the loose connection. If there is oxidization, remove it with sandpaper and then reconnect.</p> <p>Check periodically whether the insulating layer of all cables is in good condition. If there is any dilapidation, rewrap it or replace it.</p>

	<p><b>Beware of static</b></p> <p>In order to protect the semiconductor components and PCBs from the static damage, please wear antistatic device or touch the metal part of the enclosure to remove static in advance before contacting the conductors and PCBs of the machine internal wiring.</p>
	<p><b>Keep it dry</b></p> <p>Avoid rain, water and vapor infiltrating the machine. If there is, dry it and check the insulation of the welding machine (including that between the connections and that between the connection and the enclosure) with an ohmmeter. Only when there are no abnormal phenomena anymore, can the machine be used.</p> <p>Put the machine into the original packing in dry location if it is not to be used for a long time.</p>
	<p><b>Pay attention to maintenance</b></p> <p>Periodic check should be carried out to ensure the long-term normal use of the machine. Be careful when doing the periodic check, including the inspection and cleaning of the machine interior.</p> <p>Generally, periodic check should be carried out every 6 months, and it should be carried out every 3 months if the welding environment is dusty or with heavy oily smoke.</p>
	<p><b>Beware of corrosion</b></p> <p>Please clean the plastic parts with neutral detergent.</p>

## TROUBLESHOOTING

No	Fault	Cause	Solutions
1	Power indicator light is OFF.	No power. LED / Circuit Faulty.	Check main supply. Check LED / Circuit.
2	Cooling Fan is not working or turning slowly.	Fan faulty. Connection problem.	Replace Fan. Check the connection.
3	Unstable Welding current.	Earth Cable faulty. Work Piece is not clean.	Fix Earth cable problem. Clean the work piece.
4	Amp / Arc Force is not changing.	Potentiometer faulty. Control PCB faulty.	Change Potentiometer. Change Control PCB
5	Others		Contact ESAB Service.



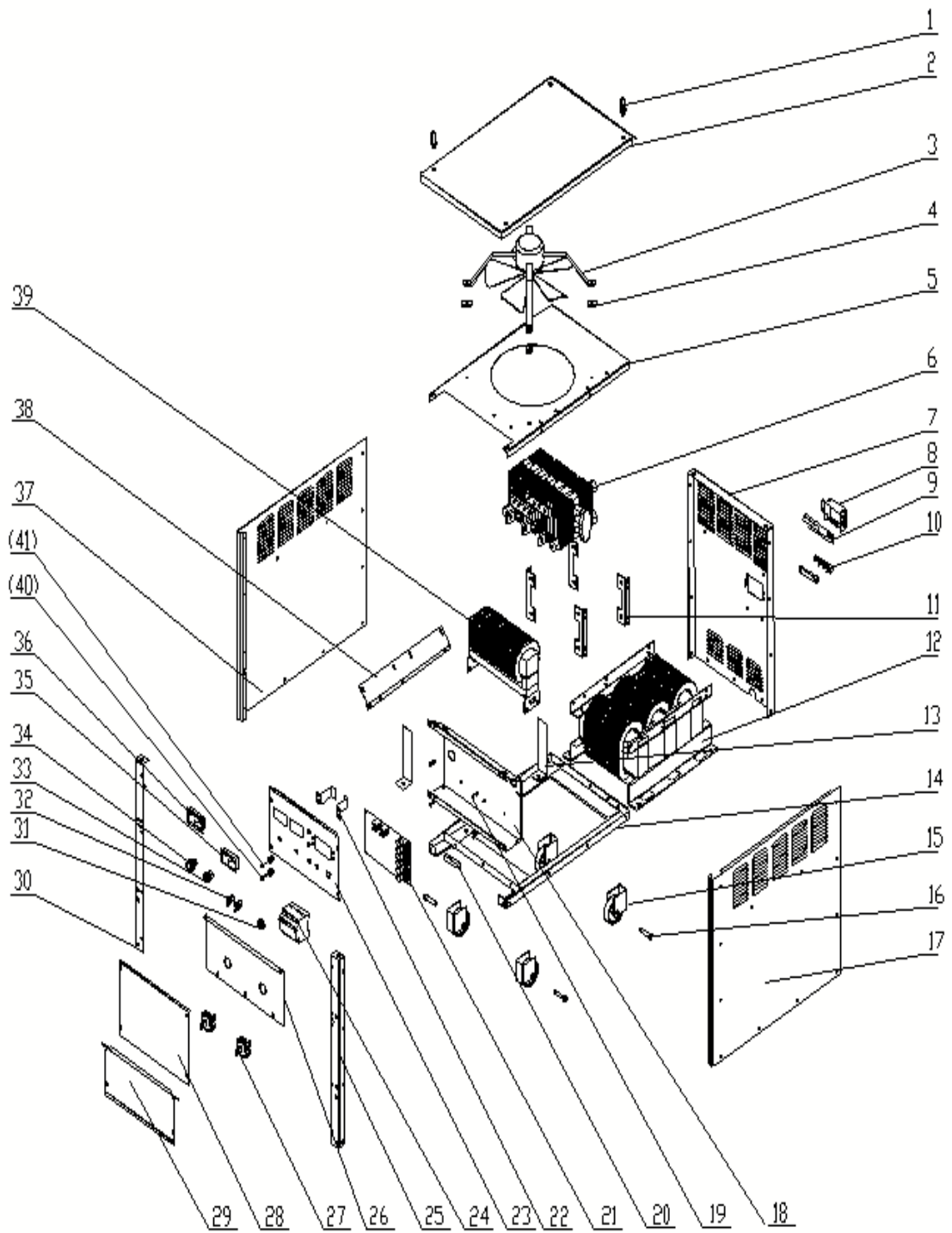
**Wiring Diagram**

## SPARES LIST AND EXPLODED VIEW

No	Code No	Item Description
1	020060040002	LIFTING RING RS 400x
2	011010010603	TOP PANEL RS 400x
3	020070890060	COOLING FAN RS 400x
4	020050060018	INSULATION SLEEVE RS 400x
5	012020140079	MIDDLE PANEL RS 400x
6	020070380045	THYRISTOR RS 400x
7	011010031562	BACK PANEL RS 400x
8	020050050046	THREE PHASE JUNCTION BOX RS 400x
9	020050050032	THREE PHASE CABLE CONNECTOR RS 400x
10	020050050037	CABLE BRACKET RS 400x
11	011020013495	BRACKET FOR HEAT SINK RS 400x
12	011040011242	CONTROL TRANSFORMER RS 400x
13	011020013497	AIR CHANNEL RS 400x
14	011010040246	BOTTOM FRAME RS 400x
15	020010310023	WHEEL RS 400x
16	020060240012	LOCKING PIN RS 400x
17	011010020744	RIGHT SIDE PANEL RS 400x
18	011020013498	BRACKET FOR MAIN CONTROL PCB RS 400x
19	020070910010	SUPPORTING FRAME RS 400x
20	020070070016	CEMENT RESISTOR RS 400x



21	011050020265	MAIN CONTROL PCB RS 400x
22	011020013127	BRACKET FOR SWITCH RS 400x
23	011010032316	FRONT TOP PANEL RS 400x
24	020070800285	MAIN SWITCH RS 400x
25	011010060834	RIGHT SIDE SUPPORTING FRAME RS 400x
26	011020013992	BRACKET FOR OUTPUT TERMINALS RS 400x
27	020050030018	BINDING POST RS 400x
28	011010032317	FRONT MIDDLE PANEL RS 400x
29	011020013494	FRONT BOTTOME PANEL RS 400x
30	011010060835	LEFT SIDE SUPPORTING FRAME RS 400x
31	020070540063	AVIATION CONNECTOR WITH 3PINS RS 400x
32	020070800148	SELECTING SWITCH RS 400x
33	020070110007	POTENTIOMETER KNOB RS 400x
	020070100025	POTENTIOMETER RS 400x
34	020070110008	POTENTIOMETER KNOB RS 400x
	020070100026	POTENTIOMETER RS 400x
35	020070460006	VOLTAGE METER RS 400x
36	020070460023	CURRENT METER RS 400x
37	011010020743	LEFT SIDE PANEL RS 400x
38	011020013496	AIR CHANNEL RS 400x
39	012010050183	INDUCTANCE RS 400x
40	020070280054	LED RED RS 400x
41	020070280055	LED YELLOW RS 400x



**ESAB INDIA LIMITED**

**Registered and Head Office:**

13, Industrial Estate, III Main Road,  
Ambattur, Chennai - 600058.

Telephone: + 91 44 42281100

Fax: + 91 44 4228 1107

**Web: [www.esabindia.com](http://www.esabindia.com)**