

wilkinsonstar.com



Arc 400

DC MMA / LIFT TIG Welding machines
Order code JA-400



OPERATOR MANUAL

Your new product

Thank you for selecting this Jasic Technology, Wilkinson Star product.

This product manual has been designed to ensure that you get the most from your new product. Please ensure that you are fully conversant with the information provided paying particular attention to the safety precautions. The information will help protect yourself and others against the potential hazards that you may come across.

Please ensure that you carry out daily and periodic maintenance checks to ensure years of reliable and trouble free operation.

Wilkinson Star Limited are a leading supplier of equipment in the UK and our products are supported by our extensive service network. Call your distributor in the unlikely event of a problem occurring. Please record below the details from your product as these will be required for warranty purposes and to ensure you get the correct information should you require assistance or spare parts.

Date purchased _____

From where _____

Serial Number _____

(The serial number will normally be located on the equipment data plate on the underside of the machine or on the rear panel)

Please note products are subject to continual development and may be subject to change without notice

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Safety Precautions



These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted.

The equipment must only be used for the purpose it was designed for. Using it in any other way could result in damage or injury and in breach of the safety rules.

Only suitably trained and competent persons should use the equipment. Operators should respect the safety of other persons.



Prevention against electric shock

The equipment should be installed by a qualified person and in accordance with current standards in operation. It is the users responsibility to ensure that the equipment is connected to a suitable power supply. Consult with your utility supplier if required

If earth grounding of the work piece is required, ground it directly with a separate cable.

Do not use the equipment with the covers removed.

Do not touch live electrical parts or parts which are electrically charged.

Turn off all equipment when not in use.

Cables (both primary supply and welding) should be regularly checked for damage and overheating. Do not use worn, damaged, under sized, or poorly jointed cables.

Ensure that you wear the correct protective clothing, gloves, head and eye protection.

Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work ground.

Never touch the electrode if you are in contact with the work ground, or another electrode from a different machine.

Do not wrap cables over your body.

Ensure that you take additional safety precautions when you are welding in electrically hazardous conditions such as damp environments, wearing wet clothing, and metal structures. Try to avoid welding in cramped or restricted positions.

Ensure that the equipment is well maintained. Repair or replace damaged or defective parts immediately. Carry out any regular maintenance in accordance with the manufacturers instructions.



Safety against fumes and welding gases

Locate the equipment in a well-ventilated position.

Keep your head out of the fumes. Do not breathe the fumes.

Ensure the welding zone is in a well-ventilated area. If this is not possible provision should be made for suitable fume extraction.

If ventilation is poor, wear an approved respirator.

Read and understand the Material Safety Data Sheets (MSDS's) and the manufacturer's instructions for metals, consumable, coatings, cleaners, and de-greasers.

Do not weld in locations near any de-greasing, cleaning, or spraying operations. Be aware that heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

Do not weld on coated metals, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings on many metals can give off toxic fumes if welded.



Prevention against burns and radiation

Arc rays from the welding process produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

Wear an approved welding helmet fitted with a proper shade of filter lens to protect your face and eyes when welding or watching

Wear approved safety glasses with side shields under your helmet.

Never use broken or faulty welding helmets.

Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding area. Ensure that there are adequate warnings that welding or cutting is taking place.

Wear suitable protective flame resistant clothing.

The sparks and spatter from welding, hot work pieces, and hot equipment can cause fires and burns

Welding on closed containers, such as tanks, drums, or pipes, can cause them to explode.

Accidental contact of electrode to metal objects can cause arcs, explosion, overheating, or fire.

Check and be sure the area is safe and clear of inflammable material before carrying out any welding.



Protection against noise

Some welding and cutting operations may produce noise.

Wear safety ear protection to protect your hearing.



Protection from moving parts

When the machine is in operation keep away from moving parts such as motors and fans. Moving parts, such as the fan, may cut fingers and hands and snag garments.

Protections and coverings may be removed for maintenance and controls only by qualified personnel, after first disconnecting the power supply cable.

Replace the coverings and protections and close all doors when the intervention is finished, and before starting the equipment.

Take care to avoid getting fingers trapped when loading and feeding wire during set up and operation.

When feeding wire be careful to avoid pointing it at other people or toward your body.

Always ensure machine covers and protective devices are in operation.



Precautions against fire and explosion

Avoid causing fires due to sparks and hot waste or molten metal

Ensure that appropriate fire safety devices are available near the cutting / welding area.

Remove all flammable and combustible materials from the cutting / welding zone and surrounding areas

Do not cut/weld fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be cut/welded.

Always allow the cut/welded material to cool before touching it or placing it in contact with combustible or flammable material.

Do not work in atmospheres with high concentrations of combustible fumes, flammable gases and dust.

Always check the work area half an hour after cutting to make sure that no fires have begun.



Risks due to magnetic fields

The magnetic fields created by high currents may affect the operation of pacemakers or electronically controlled medical equipment.

Wearers of vital electronic equipment should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

Do not go near welding equipment with any sensitive electronic equipment as the magnetic fields may cause damage.

RF Declaration

Equipment that complies with directive 2004/108/EC concerning electromagnetic compatibility (EMC) and the technical requirements of EN60974-10 is designed for use in industrial buildings and not those for domestic use where electricity is provided via the low voltage public distribution system. Difficulties may arise in assuring class A electromagnetic compatibility for systems installed in domestic locations due to conducted and radiated emissions.

In the case of electromagnetic problems, it is the responsibility of the user to resolve the situation. It may be necessary to shield the equipment and fit suitable filters on the mains supply.

LF Declaration

Consult the data plate on the equipment for the power supply requirements.

Due to the elevated absorbance of the primary current from the power supply network, high power systems affect the quality of power provided by the network. Consequently, connection restrictions or maximum impedance requirements permitted by the network at the public network connection point must be applied to these systems.

In this case the installer or the user is responsible for ensuring the equipment can be connected, consulting the electricity provider if necessary.



Materials and their disposal



The equipment is manufactured with materials, which do not contain any toxic or poisonous materials dangerous to the operator.

When the equipment is scrapped, it should be dismantled separating components according to the type of materials.

Do not dispose of the equipment with normal waste. The European Directive 2002/96/EC on Waste Electrical and

Electronic Equipment states the electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.



Handling of Compressed gas cylinders and regulators

All cylinders and pressure regulators used in welding operations should be handled with care.

Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.

Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

Always secure the cylinder safely

Never deface or alter any cylinder

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Product Overview

The unique electronic structure and air channel design in this series of machines provides efficient cooling of the power devices as well as improving the duty cycles of the machines. The design of the forced air-cooling system channel can effectively prevent the power devices and control circuits from being damaged by the dust introduced into the machine by the fan. The reliability of the machine is greatly improved as a result. The streamline design means front and rear panels are naturally integrated via large-radian transition. The front and rear panels of the machine and the handle are coated with rubber oil*, giving the machine a very tactile and comfortable grip with an excellent appearance.

Product functions

- Hot start arc ignition functions: ensure the arc ignition in MMA welding easier and more reliable.
- Anti-sticking function: Reduces the welding current if a short circuit occurs during welding.
- Self-adaptive arc force technology: Maintains the optimum arc conditions during welding even with long cables.
- Advanced scratch start arc ignition: supports TIG welding without HF arc ignition circuit.

Product performance characteristics

- Advanced IGBT inverter technology
- High Inverting frequency greatly reduces the size and weight of the welder.
- Great reduction in magnetic and resistance loss enhances the welding efficiency and energy saving effect.
- Working frequency is beyond the audio range, which almost eliminates noise pollution.
- Industry leading control system
- Advanced control technology meets the various welding applications and provides excellent welding performance.
- It can be used with a wide range of welding electrodes.



- Easy arc starting, less spatter, stable current and good weld bead shaping.
- Modern high tech design
- Streamline design of front and rear panels.
- Front and rear panels made of high-intensity plastics suitable for working in severe conditions.
- Remote control option
- Water-resistant, antistatic and anticorrosion design.
- It can be used with a wide range of welding electrodes.
- Digital amp and voltmeter

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Technical data

MODEL	ARC400	ARC500	ARC630
Input voltage range (V)	400V±15 % 50/60Hz		
Recommended fuse capacity (A)	40	60	60
Rated output	400A/36V	500A/40V	630A/44V
Welding current range (A)	20~400	25~500	30~630
Arc force current range (A)	20~200	20~200	20~200
No-load voltage (V)	65	67	80
Arc ignition current range (A)	50—320A	63—400A	75—480A
Rated duty cycle 60%	400	500	630
Overall size (mm)	540×275×510	650×330×624	650×355×624
Weight (kg)	31	38	52
Protection class	IP21S		

Tested at the environment temperature of 40° C

Product design may vary due to customer requirements.

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Controls

Front view

- 1. Over current LED
- 2. Low voltage LED: LED on indicates that the input voltage is low.
- 3. Digital ammeter.
- 4. Current control knob
- 5. Arc force control
- 6. "+" Output terminal: To connect the electrode holder.
- 7. Remote control socket.
- 8. "-" Output terminal: To connect the work clamp.
- 9 Hot start ignition control
- 10 Local / remote switch
- 11 Digital voltmeter
- 12 Overheating LED on indicates that the temperature inside the machine is too high and the machine is under overheating protection status.



Rear view

- 13 Mains input cable gland
- 14 Data plate
- 15 Mains switch



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Installation

Unpacking

Check the packaging for any signs of damage.

Carefully remove the machine and retain the packaging until the installation is complete.

Location

The machine should be located in a suitable position and environment. Care should be taken to avoid moisture, dust, steam, oil or corrosive gases

Place on a secure level surface and ensure that there is adequate clearance around the machine to ensure natural airflow.

Input connection

Before connecting the machine you should ensure that the correct supply is available. Details of the machine requirements can be found on the data plate of the machine or in the technical parameters shown in the manual.

The equipment should be connected by a suitably qualified competent person. Always ensure the equipment has a proper grounding.

Never connect the machine to the mains supply with the panels removed.

Output connections

Electrode polarity

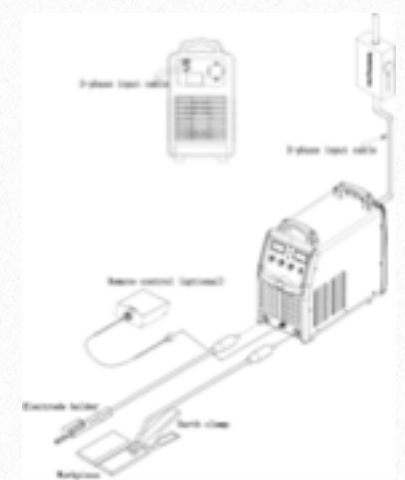
In general when using manual arc welding electrodes the electrode holder is connected to the positive terminal and the work return to the negative terminal. Always consult the electrode manufacturer's data sheet if you have any doubts.

When using the machine for TIG welding the TIG torch should be connected to the negative terminal and the work return to the positive terminal

MMA welding

Insert the cable plug with electrode holder into the “+” socket on the front panel of the welding machine, and tighten it clockwise.

Insert the cable plug of the work return lead into the “-” socket on the front panel of the welding machine, and tighten it clockwise



TIG Welding

Insert the cable plug with the work clamp into the “+” socket on the front panel of the welding machine, and tighten it clockwise.

Insert the cables plug of the TIG torch into the “-” socket on the front panel of the machine and tighten clockwise.

Connect the gas hose to the regulator / flowmeter located on the shield gas cylinder and connect the other end to the machine.

Open the valve on the TIG torch and “scratch” the electrode on the work piece to start the arc.

Operation

Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the area.

MMA

After connecting the welding leads as detailed you will need to switch the power switch on the back panel to “ON”

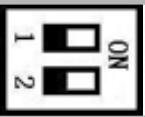
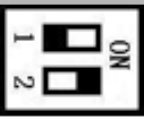
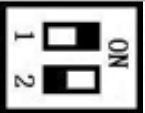
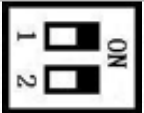
Select MMA by switching to the MMA welding mode. There is voltage output at both output terminals.

Set the amperage on the machine suitable for the electrode being used. Please see below a guide to amperages required. Ensure you check that you have the electrode polarity correct.

Electrode Diameter (mm)	Recommended Welding Current (A)
1.0	20~60
1.6	44~84
2.0	60~100
2.5	80~120
3.2	108~148
4.0	140~180
5.0	180~220
6.0	220~260

The arc ignition time (hot start) is set internally in the machine in accordance with the table below. This should only be carried out by a competent trained person as it involves removing the machine cover.

Always disconnect the machine from the mains supply before setting this time position

SW1 status	Arc ignition time	SW1 status	Arc ignition time
	300ms		150ms
	200ms		70ms (factory default)

Tips

It is generally recommended that the Arc ignition current is to be adjusted to a larger value to facilitate good arc ignition but it can also be reduced to a lower value to prevent the burning of the workpiece when the workpiece is too thin or to reduce spatter during arc ignition.


The arc force current should be adjusted appropriately. If the arc force current is high enough, electrode sticking seldom occurs. However, if the arc force current is too high, the spatter increases. It is very important to choose the correct arc force current especially welding with thin electrodes or in all-position welding. Specific parameters are determined by the welding application requirements.


Remote control

This series of machines has the capability of two types of remote control:


A remote control with cable

A carrier wave remote control which eliminates the need for a connection cable.

When using the remote control with cable, insert the control plug on the remote control cable into the control plug socket of remote control at the bottom on the front panel of the welding machine, and tighten it clockwise. After switching the remote control/local control switch to “” position, the current control knob and arc force control knob on the front panel of the machine are ineffective, while the current control knob and arc force control knob on the remote control functions.

When using the wave carrier remote control, wave carrier receiving board should be installed inside the machine. Switch the remote control/local control switch on the front panel to “” position, and connect the two wires of the wave carrier remote control respectively with the electrode holder and work clamp. And then the welding current and arc force current can be adjusted with the remote control.

For details, please consult the operator’s manual for wave carrier remote control.

When not to use remote control, please switch the “remote control/Local control” switch on the front panel to “” position to ensure normal welding.

Note: Either remote control is an optional item.

For welder training please visit our Academy website at

www.wilkinson-welding-academy.com

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Maintenance and troubleshooting

The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers.

In order to guarantee that the arc welding machine works efficiently and in safety, it must be maintained regularly. Operators should understand the maintenance methods and means of arc welding machine operation. This guide should enable customers to carry on simple examination and safeguarding by oneself, try to reduce the fault rate and repair times of the arc welding machine, so as to lengthen service life of arc welding machine

Period	Maintenance item
Daily examination	<p>Carry out a full visual inspection. Check for any damage to the machine, leads, cables and connections. Replace where necessary.</p> <p>Switch on the machine and check for any warning Led's and general operation</p>
Monthly examination	<p>Using the dry compressed air to clean the inside of arc welding machine. Especially check for build up of dust / debris on intake grills, main voltage transformer, inductance, IGBT module, the fast recover diode and PCB, etc. Take care when blowing electronic components and do not dislodge any wiring connections</p> <p>Check the security of output connections and plugs. Replace if signs of overheating.</p>
Yearly examination	<p>Carry out an annual service. Check earth continuity and insulation resistance of the machine at the relevant points.</p> <p>PLEASE NOTE THIS WORK SHOULD BE CARRIED OUT BY A TRAINED COMPETENT PERSON.</p>

Troubleshooting




Before arc welding machines are dispatched from the factory, they have already been checked thoroughly. The machine should not be tampered with or altered.

Maintenance must be carried out carefully. If any wire becomes loose or is misplaced, it maybe potential danger to user!

Only professional maintenance personnel should repair the machine!

Ensure the power is disconnected before working on the machine. Always wait 5 minutes after power switch off before opening the case.

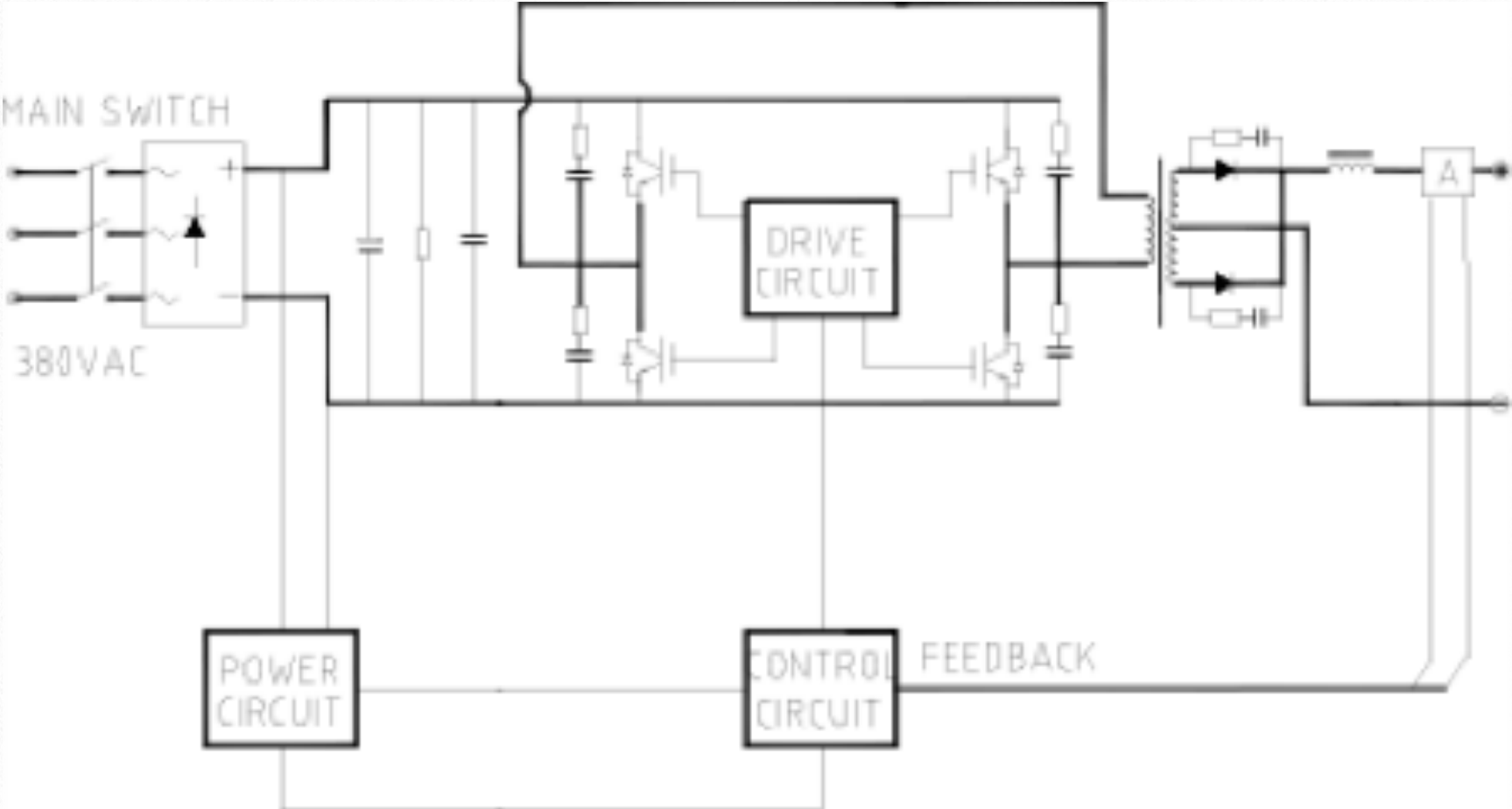
LED Warnings

	Over current LED	If the over current LED is on during welding, it indicates that the machine fails or accidental interference occurs. Restart the machine. If the phenomenon cannot be eliminated, shut down the machine and contact the service centre of our company.
	Overheating LED	If the overheating LED is on during welding, it indicates that the main circuit works for so long time that welding is forced to stop. It is unnecessary to shut down the machine, but just wait for the overheating LED to go out, and then welding can be continued.
	Under voltage LED	When the mains voltage is below 260V during welding or the auxiliary power supply fails, the under voltage LED will be on. Check the 3-phase power supply or auxiliary power supply of the machine.

Symptom	Cause	Solution
Difficult to ignite the arc	The arc ignition current is too low or the arc ignition time is too short.	Increase the arc ignition current or prolong the arc starting time.
No arc can be started	Phase failure of the mains power supply or the mains supply cable is not connected.	Solve the phase failure problem or reconnect the mains supply cable.
Electrode sticking	The arc force current is too low.	Increase the arc force current
The fan does not work or it works abnormally.	The mains power supply or the mains supply cable is not connected.	Reconnect the mains supply cable.
	Phase failure	Solve the phase failure problem.
	The mains voltage is too low.	Welding can be carried out after the mains voltage recovers.
The no-load voltage is “0”, and the under voltage LED is on.	The mains voltage is too low.	Welding can be carried out after the mains voltage recovers.
	Auxiliary power fails.	Replace the fault circuit board of the auxiliary power.
The no-load voltage is “0”, and the overheating LED is on.	Over heating protection	It will recover automatically after the welding machine is cooled.
The no-load voltage is “0”, and the over current LED is on.	Over current or damage of power parts	Restart the machine. If over current problem still exists, contact the service centre of your distributor
The electrode holder becomes very hot.	The rated current of the electrode holder is lower than its actual working current.	Replace it with a higher rated current holder.
Other malfunction		Contact the service centre of your distributor.

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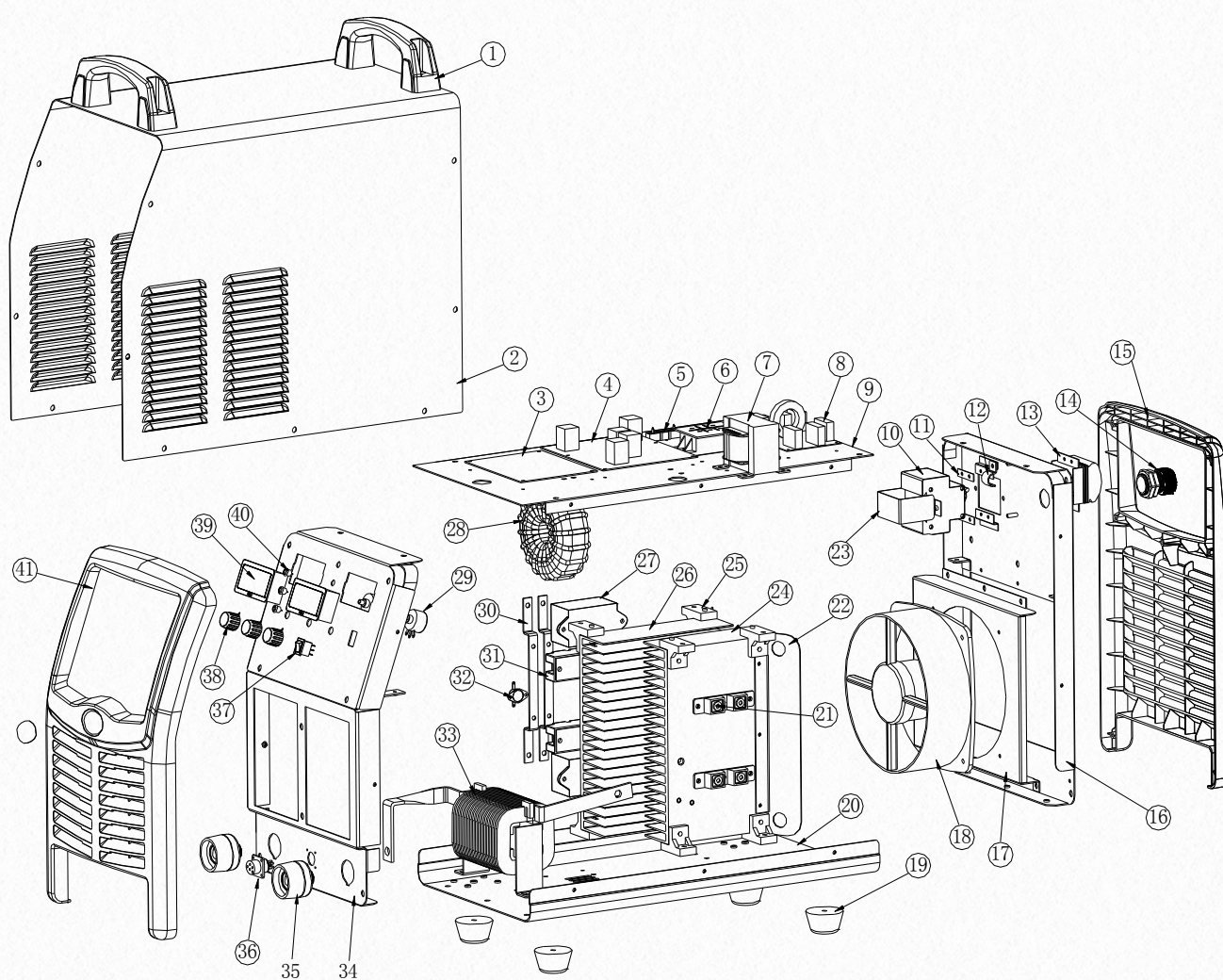
Electrical schematic



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Parts list

Arc 400 - (JA-400)



No.	Part no	Description	No.	Part no	Description
1	10027491	The handle	22	10013609	Wind deflector
2	10043860	Machine Cover	23	10016137	Corner pieces
3	10000650	Main control board	24	10016274	The small radiator
4	10000716	Power Drive board	25	10016565	Stand
5	10001707	Cement Resistor	26	10016273	The big radiator
6	10006634	Three-phase rectifier bridge	27	10005899	No-inductive capacitance
7	10001062	Transformer	28	10006115	The main transform
8	10026027	EMC board	29	10001231	Current POT
9	10043869	The partition	30	10015882	Copper interconnects
10	10004925	Power switch	31	10007237	IGBT module
11	10027473	Stator	32	10006443	Thermal switch
12	10016621	Cable fixing plate	33	10002016	Electric reactor
13	10027470	Waterproof cover	34	10043838	Front panel(Steel)
14	10004895	Cable buckle	35	10028782	Quick outlet
15	10039141	Back panel(plastic)	36	10044144	Five-pin socket
16	10043840	Back panel(steel)	37	10003606	Switch
17	10039104	Mounting bracken	38	10004918	Knobs
18	10001857	The Fan	39	10006797	Meter
19	10016490	Rubber feet	40	10027708	Indicator
20	10043842	Bottom panel	41	10039142	Front panel(plastic)
21	10006645	Diode Module	42	10019356	Trademark

JA Arc 400 DC TIG/MMA WELDING MACHINE

Order code JA-400

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