

Cut 45P

Air Plasma Cutting machine
Order code JP-45P



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

This is a digital plasma cutting machine with high performance and using advanced technology. The CUT45P is an ultra-portable plasma cutting system suitable for a variety of application requirements. It can be used in handheld cutting or with automated cutting systems. The CUT45P can cut conductive metal, such as low carbon steel, stainless steel and aluminium etc.

The modern design concept of this machine and the application of a large number of advanced and mature technologies ensure the user's investment for the future.

Advanced digital control mode

The CUT45P adopts intelligent digital control technology, and all its major functions are performed using this advanced software. It is this digital control which has led to improvements in both and performance when compared with the traditional plasma cutting machines.

With PWM technology and high power IGBT components, it inverts the DC voltage, which is rectified from 50Hz/60Hz input AC voltage, to 30K~100KHz AC high voltage. Then the voltage is dropped and rectified to output the high power DC power supply for cutting.

The machine adopts switching power supply inverter technology, greatly reducing the volume and weight of the plasma cutter, and obviously enhancing the power efficiency. The switching frequency is beyond audio range, which almost eliminates the noise pollution.

High consistency and stable performance

Generally speaking, for a cutting machine with analogue circuit control, the performance characteristics are determined by the parameters of various components. Cutting performance of the machines differ as a result of the inconsistent parameters of the components, so even for the cutting machines of the same brand, their parameters often differ from each other. In addition, cutting performance of the machine may change, since parameters of the components may vary according to the environment such as temperature and humidity, etc.

One of the characteristics of digital control is that it is not sensitive to the change of parameters; the performance of cutting machine will not be affected by the change of the parameters of certain parts. Therefore, the consistency and stability of digital control cutter is better than that of traditional cutter.

Powerful cutting performance

This machine is economical and practical since it can cut metals by using compressed air as the plasma gas source. The cutting speed is increased by 1.8 times when compared with oxy-acetylene cutting.

It can cut steel, stainless steel, copper, cast iron and aluminium conveniently and quickly.

It has an easy start ignition mode, and a post-flow cooling function is available.

Its simple operation and high cutting speed, gives excellent cut quality.

Both contact and non-contact mode is available for successful arc ignition.



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Technical data

MODEL	CUT45P
Rated input voltage (V)	230V AC±15%
Rated input frequency (Hz)	50/60
Rated input capacity (KVA)	5.1
Recommended supply fuse (A)	20
Compressed air requirement	0.45Mpa; 170L/Min.
No load voltage	280V DC
Cutting current (A)	20-45
Rated output voltage (V)	98
Rated duty cycle (%)	45A @ 35%
Efficiency (%)	85
Power factor	0.99
Insulation class	F
Protection class	IP21S
Arc ignition	Without HF
Maximum cutting thickness (mm)	19
Weight (kg)	9.2
Overall size (mm) (L×W×H) without handle	439*165*328

Tested at the environment temperature of 40° C

Product design may vary due to customer requirements.

Cutting speed guide - Quality cut

12 mm at 500 mm/min

19 mm at 250 mm/min

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Controls

PANEL LAYOUT

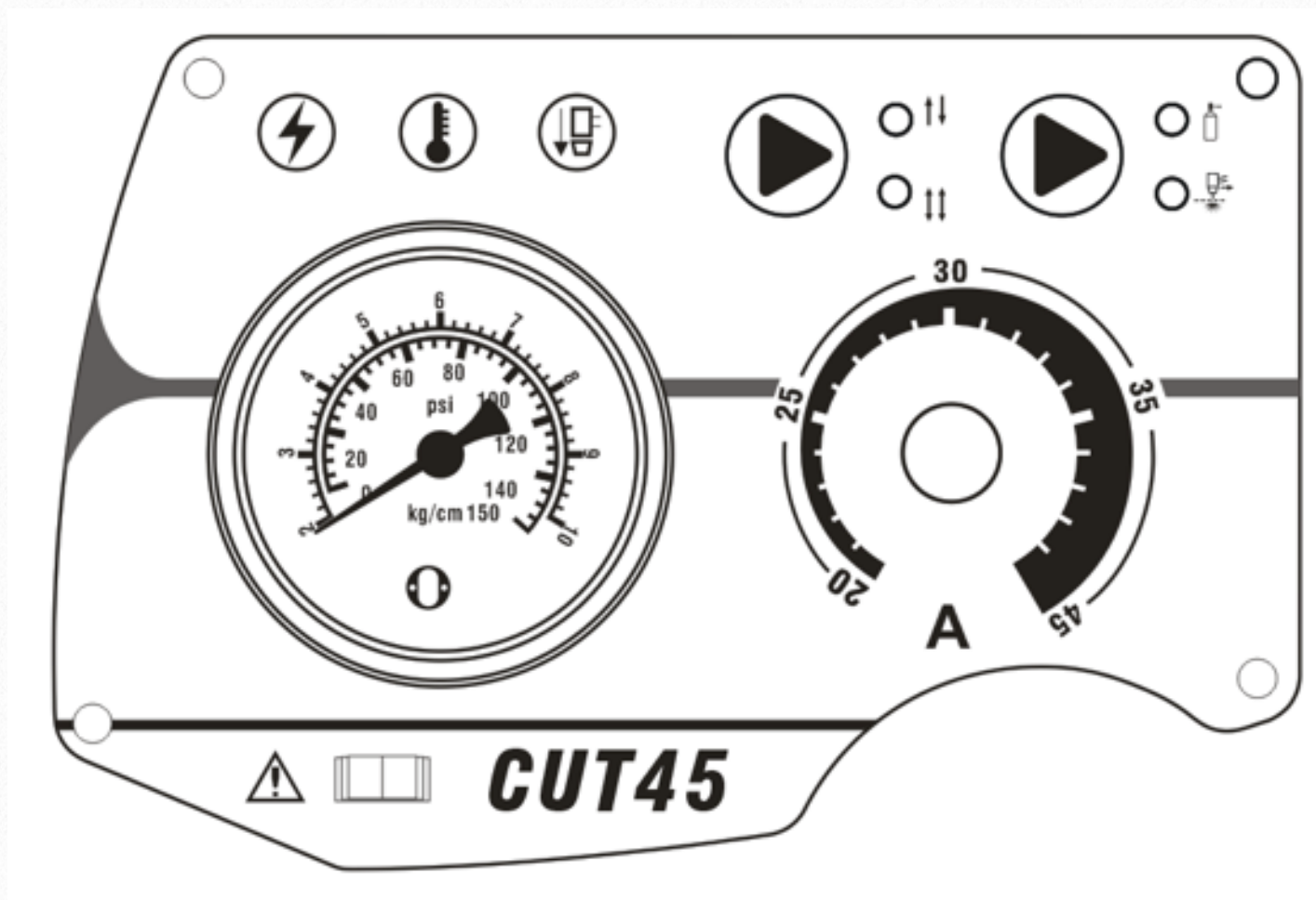


FRONT

REAR

1	AIR PRESSURE GUAGE	5	MAINS INPUT CABLE
2	WORK RETURN CONNECTOR	6	MAINS ON/OFF SWITCH
3	TORCH CONNECTOR	7	AIR INLET CONNECTION
4	CURRENT CONTROL KNOB		

Front panel of CUT45P



No.	Symbol	Function
1		Power indicator: It illuminates when the machine is powered on, and it flashes after arc is successfully ignited.
2		Overheating indicator: It illuminates when the working temperature of the IGBT is too high. When in this state, the machine stops working.
3		Torch protection indicator: It illuminates when the consumable parts of the machine are incorrectly fitted or the torch head is shorted. When in this state, the machine stops working.
4		2T indicator: It illuminates when the machine is in 2T status.
5		4T indicator: It illuminates when the machine is in 4T status.
6		Gas-check indicator: It illuminates when the machine is in gas-check status. At this moment, the machine cannot cut.
7		Metal mesh cutting indicator: The machine can cut metal mesh when this indicator illuminates.
8		The machine is under normal cutting status when neither of the indicators illuminates.

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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

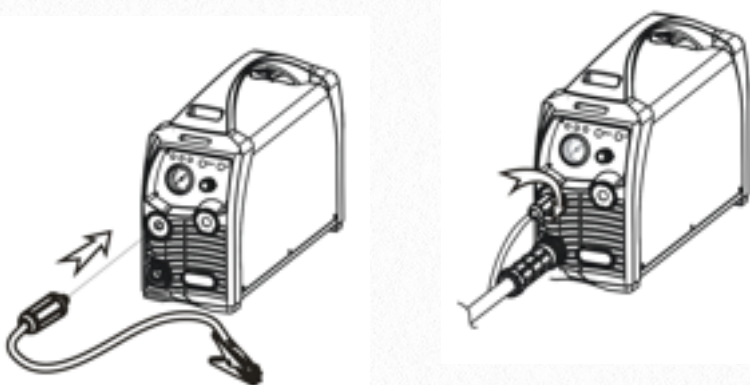
Before connecting the machine you should ensure that the correct supply is available. Details of the machine requirements can be found on the data plate of the machine or in the technical parameters shown in the manual.

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.

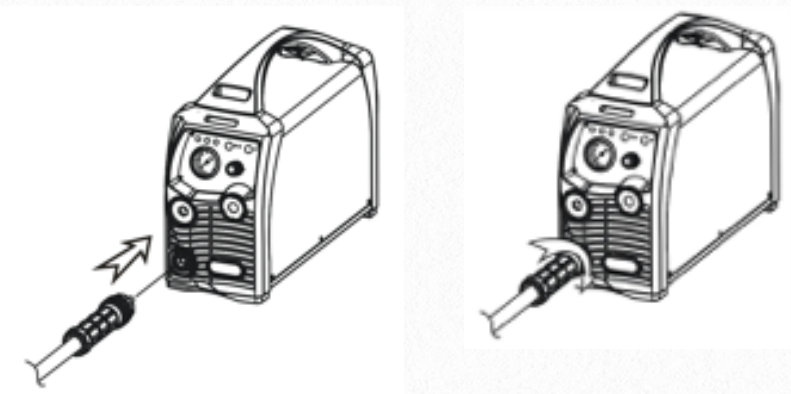
Connection of work cable

Insert the quick plug on the work cable into the quick socket at the bottom of the front panel of the machine, and tighten it clockwise. Clamp the workpiece with the work clamp at the other end of the earth cable.



Connection of cutting torch

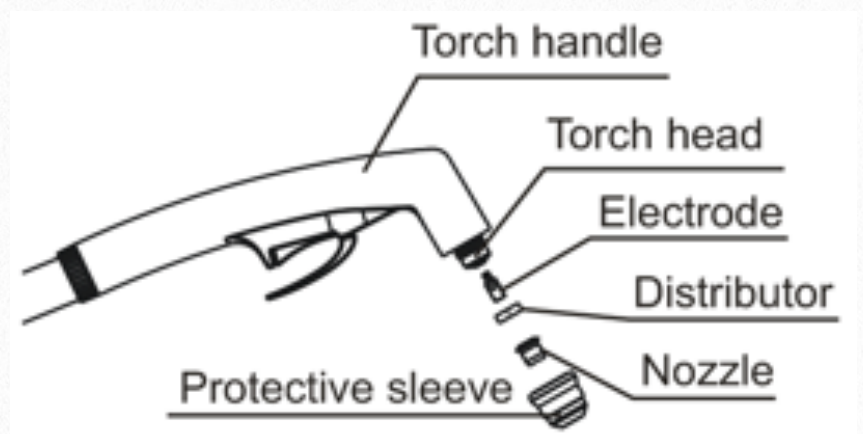
Connect the central connection plug on the cutting torch to the central connection socket of the power supply, and tighten it clockwise to avoid gas leakage.



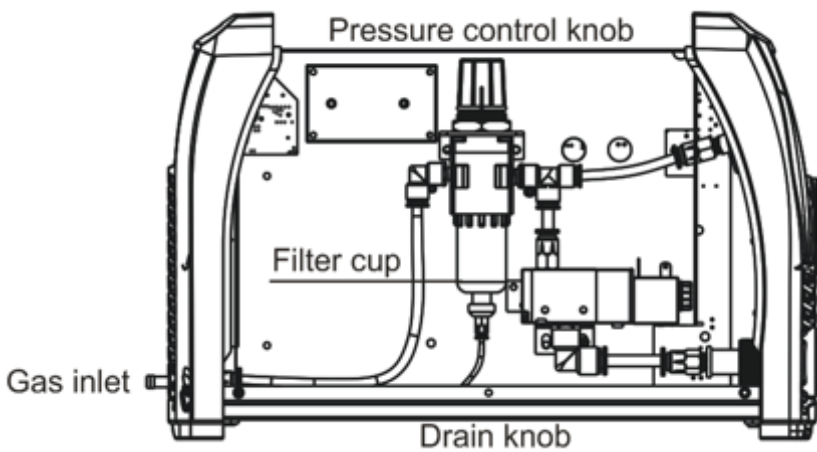
Installation of the cutting torch

- 1) Screw the end of the electrode with screw thread into the torch head, and tighten it.
- 2) Insert the other end of the electrode into the distributor.
- 3) Connect the nozzle with the electrode and distributor.
- 4) Connect the protective sleeve with the nozzle, screw it into the torch head, and tighten it.

Note: Screw the electrode into the torch with an inner hexagon spanner, and tighten it. Otherwise, the inner thread of the electrode will be burned.



Operation of the reducer valve



Embedded filter reducer

The embedded filter reducer is correctly set when leaving factory, and users do not need to set it themselves in general.

If users need to set the embedded filter reducer, the machine cover should be opened as shown in the above figure.

Ensure the mains supply is disconnected whilst removing the cover.

Reconnect the mains supply but take care to avoid any contact with live electrical components.

Switch on the machine.

Start the gas flow

Lift the pressure control knob upward.

Adjust the gas pressure to the desired value by rotating the knob (rotate to “+” direction to increase gas pressure; rotate to “-” direction to reduce gas pressure).

Press down the pressure control knob to lock the adjusting knob.

Any water will be drained automatically via the auto-drain function in the embedded filter reducer.

Ensure the mains supply is disconnected whilst replacing the cover.

Over current / over voltage / overheating protection circuit

An over current / over voltage / overheating protection circuit is installed in this machine. When the mains voltage, output

current or inner temperature exceeds the set standard, the machine will stop automatically. However, excessive use (e.g. too high voltage) of machine may also damage the machine:

Operation

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

Check that all connections have been made as shown above

Check the following before starting the machine.

- 1) Check if the machine is reliably grounded according to the relevant standard.
- 2) Check that there are no bad contacts.
- 3) Check if the power cord is connected to the correct input voltage.
- 4) Check if the connecting cables and gas hoses are in good condition and are not twisted.

Operation

- 1) Turn on the power switch on the back panel of the machine, and the power LED is on.
- 2) Select the working mode and function. There are two working modes available on the machine panel: 2T and 4T. There are two functions available: normal cutting and metal mesh cutting. The electrode and nozzle wear is increased in metal mesh cutting.
- 3) Set cutting current according to the thickness of workpiece.
- 4) Bring the copper nozzle of the cutting torch at a distance of about 2mm between the copper nozzle of the torch and the workpiece.), and then push the torch trigger. After the arc is ignited and cutting starts.
- 5) It is recommended that a torch of maximum length of 4 metres is used. If the torch cable is too long, the performance of this cutting machine such as arc ignition will possibly be affected due to the fact that the inner resistance of the cable will reduce the output voltage.

Notes for cutting operation

- 1) Do not touch the hot workpiece with bare hands to avoid burning.
- 2) It is recommended not to ignite the arc in the air if not necessary, for it will shorten the lifespan of the electrode and nozzle of the torch.

3) It is recommended to initiate the cutting from the edge of workpiece, unless penetration is needed.

4) Ensure spatter comes from the bottom of workpiece while cutting. If spatter comes upward from the top of workpiece, it indicates that the workpiece has not been fully cut through. This could be due to not enough power or the cutting torch is moved too fast.

5) For cutting a round workpiece or to meet precise cutting requirement, a stencil board or other tools are needed.

7) It is recommended to pull the cutting torch while cutting.

8) Keep the nozzle of cutting torch upright over the workpiece, and check if the arc is moving with the cutting line. Do not bend the cable too much, step on or press upon the cable to avoid restricting the air flow. The cutting torch may be burned if the air flow is too low. Keep the cutting cable away from sharp edges.

9) When the workpiece is nearly cut off, slow down the cutting speed and release the torch trigger to stop cutting.

10) Maintain the torch consumables frequently to prolong the life

6) Always ensure the correct consumables are fitted in the torch. Incorrect items may cause damage to the torch or machine

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	Carry out a full visual inspection. Check for any damage to the machine, leads, cables and connections. Replace where necessary. Switch on the machine and check for any warning Led's and general operation
Monthly examination	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 modules, the fast recover diode and PCB, etc. Take care when blowing electronic components and do not dislodge any wiring connections Check the security of output connections and plugs. Replace if signs of overheating.
Yearly examination	Carry out an annual service. Check earth continuity and insulation resistance of the machine at the relevant points. PLEASE NOTE THIS WORK SHOULD BE CARRIED OUT BY A TRAINED COMPETENT PERSON.

Troubleshooting

Before arc cutting 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!

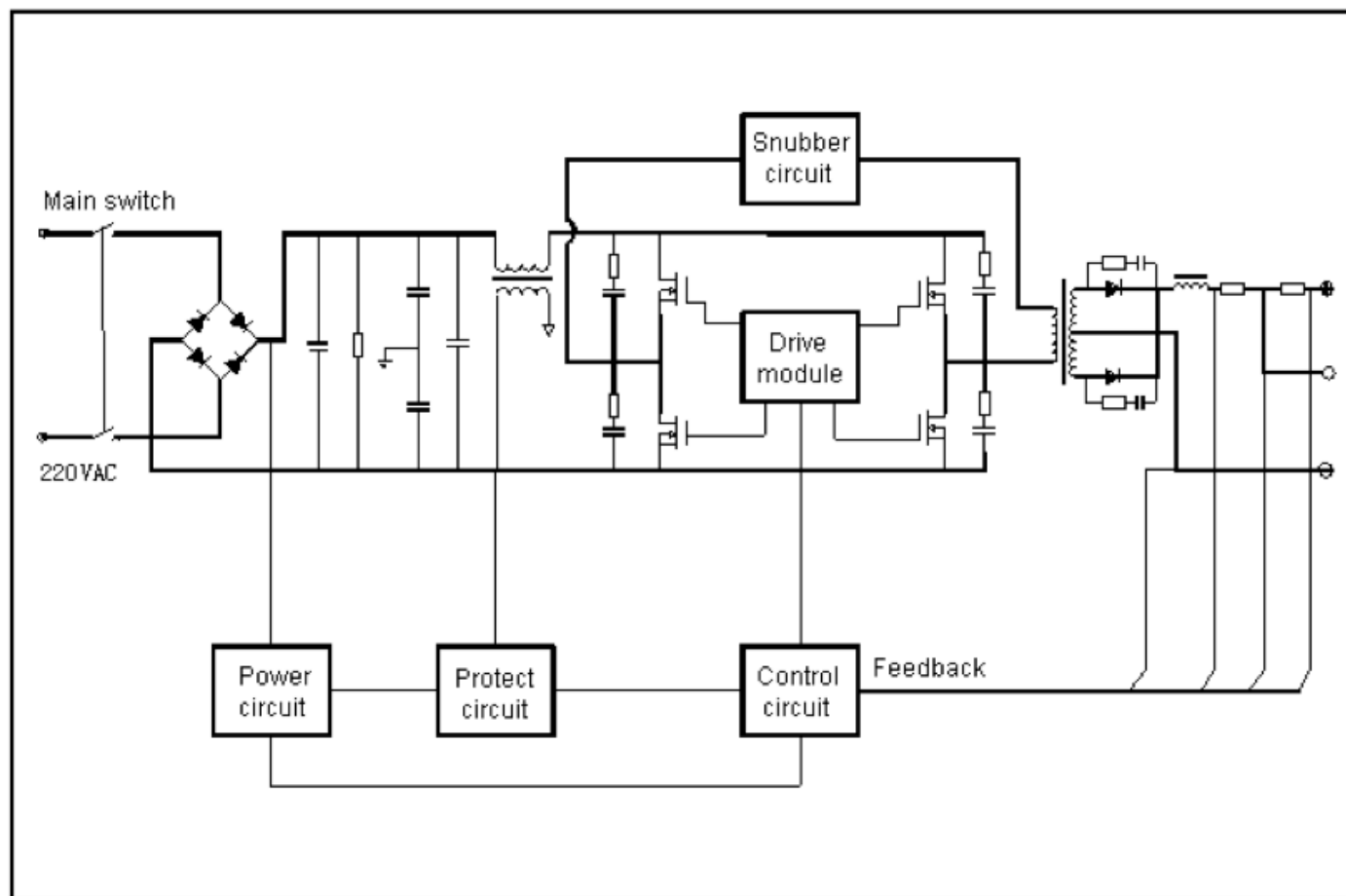
Only professional maintenance personnel should repair the machine!

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

Malfunction	Cause and solution
Turn on the machine, the power indicator illuminates, the control PCB keys do not function, and there is no response when pushing the torch trigger.	The machine crashes: Shut down the machine, and restart it.
Turn on the machine, the power indicator illuminates, the control PCB keys work normally, but there is no response when pushing the torch trigger.	1) The LED1 on the main board is on: The control PCB is damaged. 2) The LED1 on the main board is off: Check the torch trigger and torch trigger wire.
Turn on the machine, the power indicator illuminates, and the fan works. When pushing the torch trigger, the solenoid valve functions, but there is no HF discharge.	The arc ignition part fails: 1) The inner electrode distance of the discharge nozzle is too long. 2) There is leakage of the HF capacitor 102/10KV. 3) The relay is damaged. 4) The input voltage is too low.
Arc can not be ignited.	The air pressure is too high or too low.

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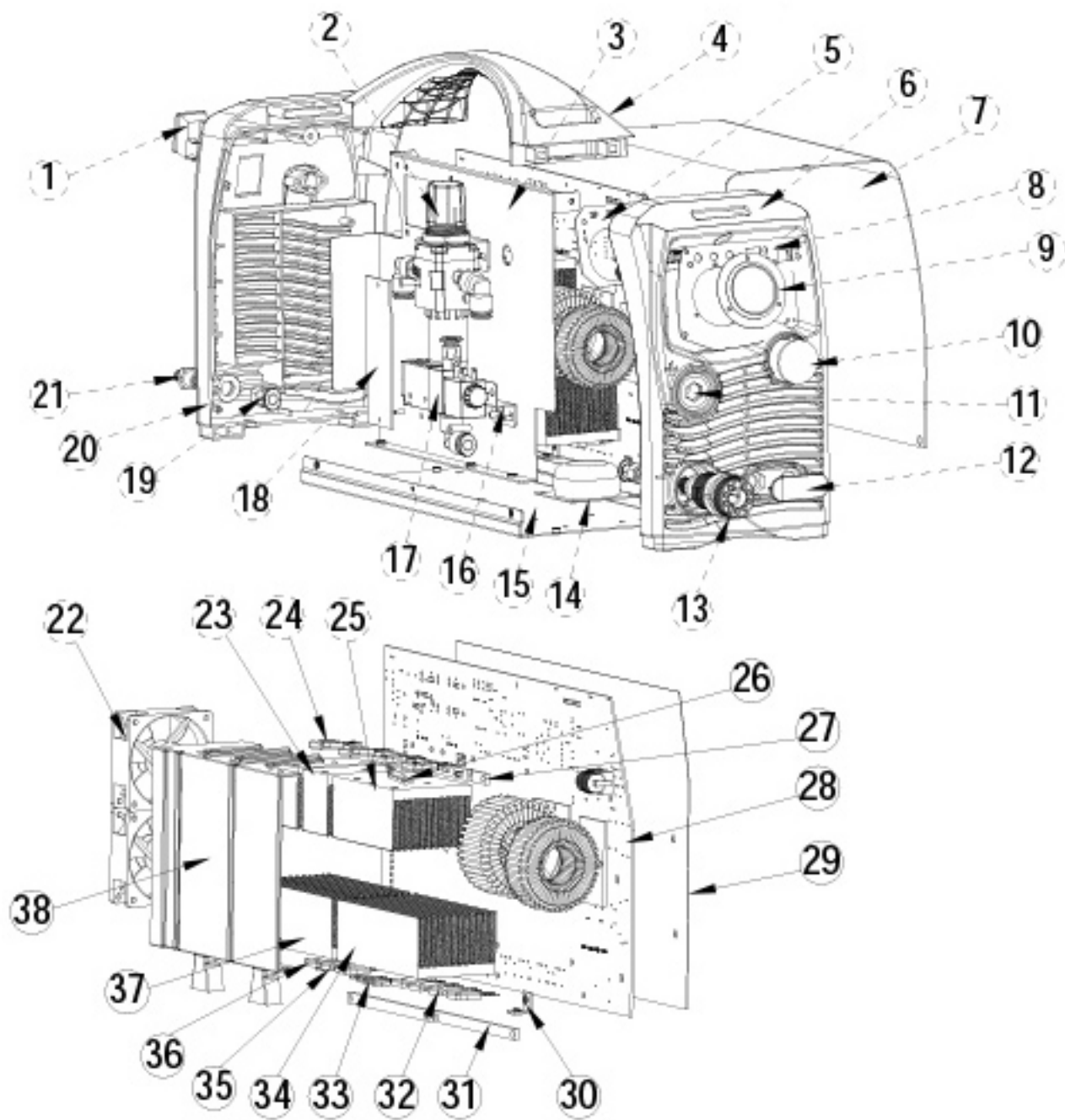
Electrical schematic



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Parts list

Cut 45P - (JP-45P)



No.	Part no	Description	No.	Part no	Description
1	10004949	Mains switch	20	10048680	Rear panel
2	10048390	Filter	21	10041723	Gas connection
3	10048683	Mid section plate	22	10041446	Fan
4	10041724	Handle	23	10048677	Heatsink
5	10048647	Control PCB	24	10007251	IGBT
6	10048679	Front panel	25	10048675	Heatsink
7	10048684	Cover	26	10048628	Thermal switch
8	10048681	Display panel	27	10037075	Insulating strip
9	10007295	Pressure guage	28	10050319	Main PCB
10	10041712	Jasic ident	29	10050326	Insulation
11	10037152	Quick connector socket	30	10037028	Support
12	10043926	Blanking plate	31	10048706	Base plate
13	10048633	Central connector	32	10006256	Rectifier
14	10050205	PFC inductance	33	10043394	Diode
15	10048682	Base panel	34	10050257	Heatsink
16	10048661	Bracket	35	10029693	IGBT
17	10048389	Solenoid valve	36	10006646	Diode
18	10050312	EMC board	37	10050258	Heatsink
19	10041861	Quick coupling	38	10048678	Fan cover

JP-45P AIR PLASMA CUTTING MACHINE

Order code JP-45P

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