



®

DRAPER

INSTRUCTIONS FOR
230V 40A
Plasma Cutter

Stock No.85569

Part No.IPC41

IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY TO ENSURE THE SAFE AND EFFECTIVE USE OF THIS PRODUCT.



CE

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GENERAL INFORMATION

These instructions accompanying the product are the original instructions. This document is part of the product, keep it for the life of the product passing it on to any subsequent holder of the product. Read all these instructions before assembling, operating or maintaining this product.

This manual has been compiled by Draper Tools describing the purpose for which the product has been designed, and contains all the necessary information to ensure its correct and safe use. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the product itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product.

Whilst every effort has been made to ensure the accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

1. TITLE PAGE

1.1 INTRODUCTION:

USER MANUAL FOR:

230V 40A PLASMA CUTTER

Stock no. 85569.

Part no. IPC41.

1.2 REVISIONS:

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As our user manuals are continually updated, users should make sure that they use the very latest version.

Downloads are available from: <http://www.drapertools.com/b2c/b2cmanuals.pgm>

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1.3 UNDERSTANDING THIS MANUALS SAFETY CONTENT:

WARNING! Information that draws attention to the risk of injury or death.

CAUTION! Information that draws attention to the risk of damage to the product or surroundings.

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3. GUARANTEE

3.1 GUARANTEE

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship.

Should the tool develop a fault, please return the complete tool to your nearest distributor or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England. Telephone Sales Desk: (023) 8049 4333 or Product Helpline (023) 8049 4344.

A proof of purchase must be provided with the tool.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This guarantee period covering parts/labour is 12 months from the date of purchase except where tools are hired out when the guarantee period is ninety days from the date of purchase. The guarantee is extended to 24 months for parts only. This guarantee does not apply to normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accidents, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

Note: If the tool is found not to be within the terms of warranty, repairs and carriage charges will be quoted and made accordingly.

This guarantee applies in lieu of any other guarantee expressed or implied and variations of its terms are not authorised.

Your Draper guarantee is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the guarantee period.

Please note that this guarantee is an additional benefit and does not affect your statutory rights.

Draper Tools Limited.

4. INTRODUCTION

4.1 SCOPE

This Plasma cutting machine is designed with advanced inverter technology, which produces a stable current while reducing the weight and volume of the overall machine. It has a heavy duty cycle of 60%, suitable for any plasma cutting requirements up to and including 12mm severance. Any other application is considered misuse.

4.2 SPECIFICATION

| | |
|---|----------------|
| Stock no | 85569 |
| Part no | IPC41 |
| Input: | |
| Voltage† | 230V~ |
| Phase | 1 |
| Frequency..... | 50/60Hz |
| Rated Current Range..... | 20-40A |
| Main fuse† | 22A |
| Air pressure | 65psi (4.5bar) |
| Cutting thickness max. | |
| Clean cut | 10mm |
| Severance | 12mm |
| Duty cycle | 60% |
| Efficiency | 85% |
| Insulation class | F |
| Degree of ingress Protection rating | IP21S |
| Dimensions (L x W x H) | 170x260x420mm |
| Weight | 10kg |
| † No plug fitted. | |

Recommended power supply current 32A. This machine will not function and maybe damaged attempting to run on a 13A supply.

NOTE: The heating tests have been carried out at ambient temperature and the duty cycle (duty factor) at 20° has been determined by simulation.

4.3 HANDLING & STORAGE

This machine should be stored in a dry location and in its box. Avoid storing this machine in areas prone to damp or humidity.

When handling this machine never pick up or carry this machine by the electrode holder, earth clamp or power supply cable. Always use the transport handles provided.

5. HEALTH & SAFETY INFORMATION

5.1 GENERAL SAFETY INSTRUCTIONS FOR CUTTING

WARNING: When using electric tools basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury including the following.

Read all these instructions before attempting to operate this product and save these instructions.

ELECTRIC SHOCK CAN KILL:

- Remove the plug from the socket before carrying out adjustment, servicing or maintenance.
- Allow 5 minutes waiting time for the capacitors to discharge before removing the panels for any maintenance operations
- Do not touch live electrical parts.
- Never use electrode holders or cables with damaged or deteriorated insulation.
- Keep working environment, equipment, cables and clothing free from grease, oil, moisture and dirt.
- Ensure machine has been correctly earthed and all panels are fitted securely.
- The operator must be insulated from the floor and work bench using a dry insulation mat.
- Wear isolating footwear and gloves that are in good condition, i.e. without holes.
- In hazardous conditions of increased electric shock always ensure a second person is present in case of accident.
- Never change electrodes with bare hands or damp gloves.
- Keep welding cables away from power cables.
- Regularly inspect the condition of the cutting, earth and power cables for signs of damage.
- Do leave machine unattended and remove plug from socket when not in use.
- Do not use cables unsuitable for the amperage.
- Ensure earth clamp is adjacent to cut, secured to bare metal and when not in use is insulated for safety.
- Keep all equipment well maintained.
- The operator shall prevent gas cylinders in the vicinity of the work piece from becoming part of the cutting circuit.

FUMES & GASES CAN BE HARMFUL:

- The cutting process generates hazardous fumes as a by product. Inhalation of these fumes is hazardous to health.
- Keep your head away from the cut to avoid breathing the fumes.
- If cutting in confined spaces ensure adequate ventilation and use a fume extractor.
- Fumes displace oxygen. Danger of suffocation.
- By products of cutting can react with other chemical vapours to produce a toxic/explosive environment.

WELDING CAN CAUSE FIRE OR EXPLOSION:

- Cutting and allied processes can cause fire and explosions and precautions shall be taken to prevent these hazards.
- Before starting a cut ensure the area is clear of flammable materials.
- Remove any inflammables to a safe distance, especially substances likely to generate a dangerous vapour.
- The cutting flame can cause serious burns. Avoid contact with skin.
- Sparks and molten metal are cast out during cutting. Take precautions to prevent fire igniting and wear protective clothing.
- Sparks and molten metal will pass through gaps. Be aware that fire can start out of sight. Flammables in a locked cabinet may not be safe.
- Do not cut pressurised containers.
- Do not cut tanks, drums or other vessels until they have been correctly cleaned/prepared for welding.
- Always have appropriate and fully maintained fire fighting equipment suitable for the materials used and for use in electrical environments available in close proximity at all times.
- Keep clothing free from oil and grease.
- Wear hat, flame-proof apron, woollen clothing, gloves, long sleeve tops with closed neck, trousers (without turn-ups) to cover nonslip boots.

5. HEALTH & SAFETY INFORMATION

- Protective head and shoulder coverings should be worn when overhead cutting.
- Avoid taking any fuels with you e.g. cigarette lighters or matches.
- Hot spots and their immediate surroundings should be observed until their temperature has dropped to normal.

PERSONAL PROTECTION:

- The body should be protected by suitable clothing.
- The use of neck protection may be necessary against reflected radiation.
- Wear safety glasses when chipping, wire brushing, grinding or when near cooling cuts as metal filings or slag can be thrown up. Fully enclosed goggles are advisable.
- **Arc machines generate a magnetic field which is detrimental to pacemaker recipients. Consult your doctor before going near welding equipment/operations.**
- The UV and IR radiation generated by cutting is highly damaging to the eye, causing burns. This can also affect the skin. Protect the eyes and face.
- The face and eyes shall be protected by suitable welding shields equipped with appropriate ocular protection filters.
- Where environments are subject to pedestrians and traffic ensure a protective screen is used to avoid accidental arc glare.
- Do not cut in the vicinity of children or animals and ensure no one is looking before striking up.
- In the cutting environment, damaging levels of noise can exist. Wear hearing protection if the process dictates.
- Do not touch hot equipment or metal. Allow the cut time to cool, use the correct tool and wear protective welding gauntlets.
- Wear flame retardant clothing (leather, wool, etc.).
- Take care when adjusting or maintaining the torch that it has had time to cool sufficiently and is disconnected.

- The arc generates ultra-violet radiation (can damage skin and eyes);
- visible light (can dazzle eyes and impair vision);
- infra-red (heat) radiation (can damage skin and eyes);
- Such radiation can be direct or reflected from surfaces such as bright metals and light coloured objects.

GAS CYLINDERS:

- Gas cylinders should be located or secured so that they cannot be knocked over.
- Shield gas containers can explode if damaged. Take care when handling.
- Ensure gas cylinders are shut-off when not in use and between operations.
- Take care that no build-up of gas is permitted to form in confined areas.
- Cylinders must be in an upright position at all times during use and storage.
- The gas cylinder must never come in to contact with the electrode.
- Follow the manufacturer's instructions for handling, storing and using the gas bottle correctly and safely.
- Use the correct equipment to connect the gas bottle to the welding torch.

LIMITATIONS:

- Do not use for;
 - operations in severe conditions (e.g. extreme climates, freezer applications, strong magnetic fields etc).
 - operations subject to special rules (e.g. potentially explosive atmospheres, mines etc).
 - operations that require ingress protection greater than IPX0, e.g. in rain or snow etc.

GENERAL:

- Training should be sought out in
 - the safe use of this equipment;
 - the processes;
 - the emergency procedures;
- Cutting power sources are not to be used for pipe thawing.

5. HEALTH & SAFETY INFORMATION

- Take precautions against toppling over, if the power source shall be placed on a tilted plane.
- All equipment should be kept in good working condition, inspected and, when defective, promptly repaired or withdrawn from service - All equipment should be placed so that it does not present a hazard in passageways, on ladders or stairways, and should be operated in accordance with the manufacturer's instructions.
- In the vicinity of an arc, non-reflective curtains or screens shall be used to isolate persons from the arc radiation. A warning, e.g. a symbol for eye protection, should refer to the hazard of arc radiation.

5.2 CONNECTION TO THE POWER SUPPLY

Make sure the power supply information on the machine's rating plate are compatible with the power supply you intend to connect it to.

This machine is supplied without a plug. It is designed for connection to a 32A power supply rated at 230V AC using a 32A site plug. Connection of the plug should be carried out by a qualified electrician.

This machine will not function and may be damaged attempting to run on a 13A supply. Because it is constructed mostly of metal parts, it is a Class 1 machine; meaning, it must have an earth connection in the power supply. This is to prevent electrocution in the event of a failure.

6. TECHNICAL DESCRIPTION

6.1 IDENTIFICATION



- | | | | |
|---|---------------------------|---|---------------------------|
| ① | ON/OFF switch | ⑧ | Trigger connection |
| ② | Power indicator light | ⑨ | Compressed air connection |
| ③ | Over load indicator light | ⑩ | Power inlet |
| ④ | Carry handle | ⑪ | Cooling fan |
| ⑤ | Current meter | ⑫ | Compressed air feed |
| ⑥ | Current adjustment | ⑬ | Earth connection external |
| ⑦ | Earth lead connection | | |

7. UNPACKING & CHECKING

7.1 PACKAGING

Carefully remove the machine from the packaging and examine it for any sign of damage that may have happened during shipping. Lay the contents out and check them against the parts shown below. If any part is damaged or missing; please contact the Draper Helpline (the telephone number appears on the Title page) and do not attempt to use the machine.

The packaging material should be retained at least during the guarantee period: in case the machine needs to be returned for repair.

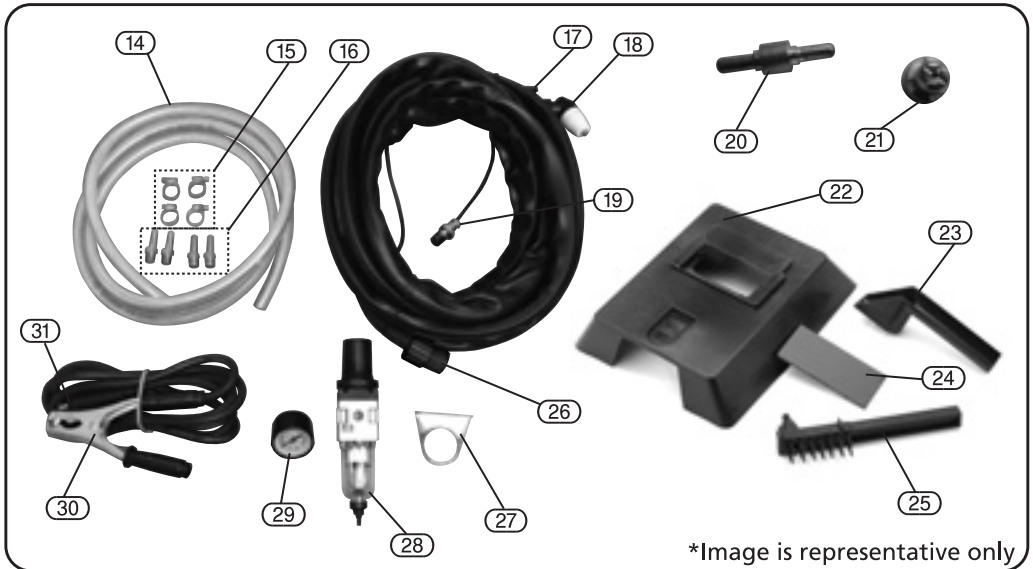
Warning! Some of the packaging materials used may be harmful to children. Do not leave any of these materials in the reach of children.

If any of the packaging is to be thrown away, make sure they are disposed of correctly; according to local regulations.

7.2 WHAT'S IN THE BOX?

As well as the welder; there are several parts not fitted or attached to it.

- | | |
|---------------------------------|--|
| (14) Compressed air supply hose | (24) Face shield welding filter glass* |
| (15) Hose clip x4 | (25) Welding brush/hammer* |
| (16) Hose connector x4 | (26) Compressed air hose |
| (17) Plasma torch trigger | (27) Air regulator bracket |
| (18) Plasma torch | (28) Air regulator |
| (19) Trigger connection | (29) Air regulator dial |
| (20) Torch Electrode x4 | (30) Earth clamp |
| (21) Torch nozzle x4 | (31) Earth lead connection |
| (22) Face shield | |
| (23) Welding mask | |
| (24) Face shield handle | |



*Image is representative only

8. PREPARING THE PLASMA CUTTER

8.1 GENERAL

This medium weight, portable cutter requires no special lifting instructions, however it contains dedicated circuitry and must be handled with care.

NOTE: Although the Electrode and nozzle are classed as a nonconsumable, it will be consumed by the cutting process and require eventual replacement.

8.2 LOCATION

Locate the machine in close proximity to the correct power supply and allow $\geq 460\text{mm}$ air gap around to ensure sufficient ventilation. The fan located in the rear of the machine housing which must be kept clear. Equally, ensure no debris can be drawn into the machine.

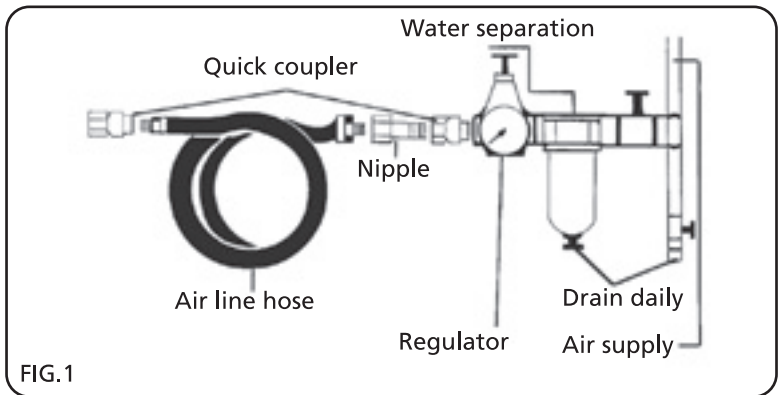
Make certain the location does not pose any hazards as detailed in the safety instructions, before attempting to start the machine.

NOTE: Refer to the rating label for energy input details.

WARNING: Remove the plug from the socket before carrying out adjustment, servicing or maintenance.

8.3 RECOMMENDED AIR SUPPLY SET UP – FIG. 1

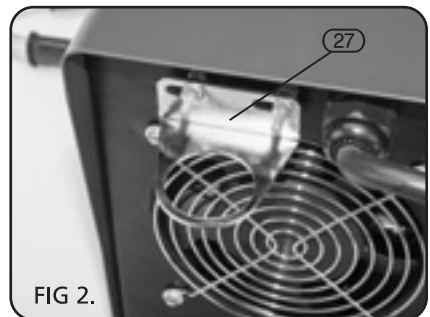
NOTE: The air must remain dry at all times.



8.4 ATTACH REGULATOR BRACKET – FIG. 2

NOTE: The air must remain dry at all times.

Fix the regulator bracket (27) to the back of the casing as shown.



8. PREPARING THE PLASMA CUTTER

8.5 ATTACH REGULATOR TO HOSE - FIG. 3

The hose connectors (16) need to be fitted to the regulator (28) using PTFE tape.

Cut 30cm off the tube supplied, using hose clips (15) attach long length to the left side of regulator facing you, and the short length to the right.

FIG 3.



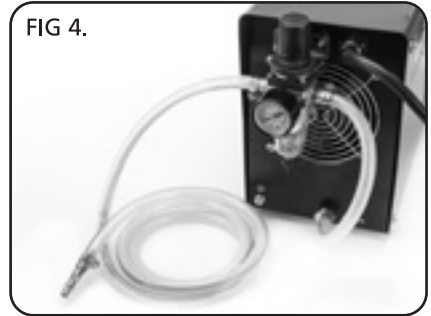
8.6 ATTACH REGULATOR AND HOSES TO BACK OF UNIT - FIG. 4

Attach regulator to bracket.

Connect short hose to the entry port (12) at the back of the case, the other end connects to an air supply (see fig.1).

Fit dial (29) to regulator using PTFE tape.

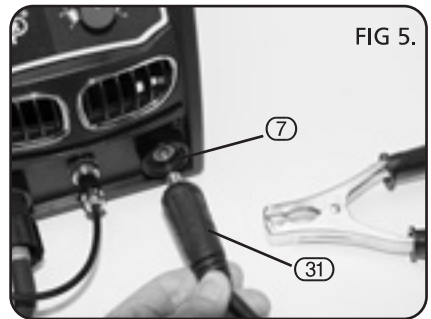
FIG 4.



8.7 ATTACH EARTH CLAMP - FIG. 5

With the lug on the pin at top, push the connector (31) fully into the port (7) then turned clockwise 180° to lock hand tight only.

FIG 5.

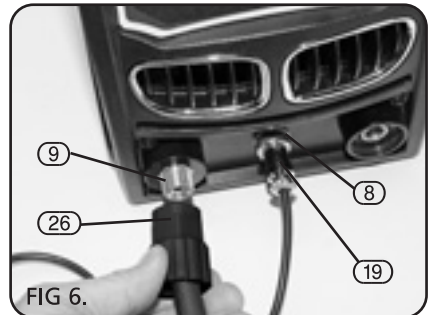


8.8 ATTACH TORCH - FIG. 6

To connect the torch trigger (19), align the 2 pins and push to fit, then secure using the outer metal ring screwing it onto trigger port (8).

The torch hose (26) is a screw fit onto port (9).

FIG 6.



9. PLASMA CUTTER OPERATION

NOTE: Under no circumstances must the plasma nozzle be removed or any other work be carried out on the torch with the machine switched on. Ignoring this precaution could lead to serious burns or contact with high DC voltages.

If the machine has just been used for cutting, allow the cooling air to stop before switching the machine off for torch servicing.

The torch should be kept free of slag at all times to ensure the free passage of air.

9.1 TORCH ASSEMBLY - FIG. 7

To assemble / dismantle the torch:

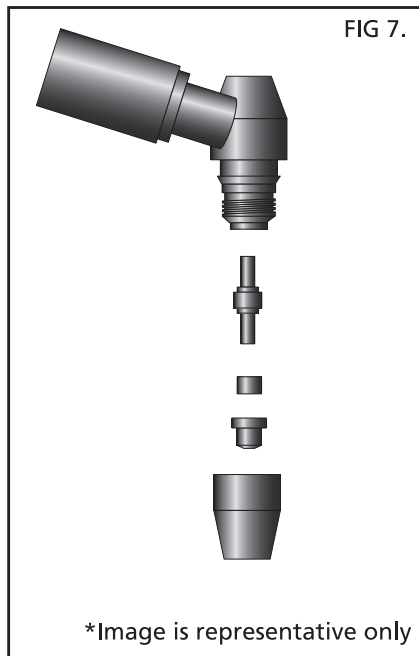
1. Invert the torch so the tip points upwards.
2. Unscrew and remove the shield cup.
3. Remove the Tip, swirl baffle and electrode.
4. Ensure the torch head thread is upper most.
5. Fit electrode into end of torch head.
6. Fit swirl baffle onto electrode, ensure it is seated fully onto the electrode.
7. Fit tip onto the swirl baffle.
8. Fit shield cup and screw on.

The Tip and electrode need replacing when worn.

Indication of wear are a loss off cutting capacity or that the cut is no longer 90 degrees.

When inspecting the Tip look for erosion of the hole in the centre of the tip or a build up of metal residue.

When inspecting the electrode look for erosion in centre of the electrode



9. PLASMA CUTTER OPERATION

9.2 OPERATING INSTRUCTIONS

1. Check all safety instructions have been observed.
2. Check correct air supply is connected.
3. Drain any water from bowl on the filter regulator.
4. Set machine to required current range according to the thickness of metal to be cut.

DO NOT change range while cutting.

CAUTION: DO NOT attempt to cut material beyond the range specified, as this will damage the torch.

1. Check the torch consumables are in good condition.
2. Check torch and earth lead connections are tight.
3. Connect return lead to the work piece, using an area free of rust and paint, for a good contact.
4. Connect to mains supply and switch on. The green light will come on.
5. Adjust air pressure to 4.5 Bar.
6. Set the cutting current via the current control, an indication of the setting will be shown on the digital display
7. Adjust the post gas control, if cutting at a high current setting or making a long cut set the control near maximum, this will give a longer cool time for the torch.
8. Place the torch at the edge of the work piece with the centre of the tip slightly beyond the edge. Press the torch trigger. The air will flow after a short delay the arc will ignite. The torch should be moved steadily along the work piece at a rate slow enough for the metal to be cut right through in one pass. If the cut penetration is incomplete, then the torch could be damaged. (While the air is flowing, check it is still 4.5 Bar.)
9. When the cut is complete, release the torch trigger button. The arc will immediately extinguish, but air will continue to flow for a short time. DO NOT turn the machine off until this cooling air has stopped flowing as this is necessary to prevent damage to the torch.

PIERCING

When piercing, the torch head should be angled back so as to allow the molten material to escape to one side. The normal angle of cut can be resumed once the metal has been pierced.

NOTE piercing will reduce the life of the torch consumables.

10. CONSUMABLES

Please contact your local Draper dealer for a current and complete list of accessories.

| Stock No. | Description |
|------------------|--------------------|
| 80883 | Ceramic shroud |
| 80884 | Nozzle |
| 80885 | Electrode |
| 80886 | Ring |

11. TROUBLESHOOTING

11.1 TROUBLESHOOTING

WARNING: For your own safety, turn the switch off and remove the plug from the power supply socket.

| PROBLEM | POSSIBLE CAUSE | REQUIRED ACTION |
|--|---|--|
| <ul style="list-style-type: none"> Plasma arc will not start. | <ul style="list-style-type: none"> Unit not powered up. | <ul style="list-style-type: none"> Check mains supply, on/off switch is on. |
| | <ul style="list-style-type: none"> Work clamp connection. | <ul style="list-style-type: none"> Check ground clamp has a good connection to the material being cut, clean surface of material if it is dirty or corroded. |
| | <ul style="list-style-type: none"> Air supply is low pressure. | <ul style="list-style-type: none"> Check air is flowing from the torch tip with cut switch pressed. Check the compressor is maintaining 60psi at the gauge while cutting is in progress. Check the regulator fittings have been assembled properly using PTFE tape. |
| | <ul style="list-style-type: none"> OC Light on front panel of unit comes on. | <ul style="list-style-type: none"> Check the cutting tip is not blocked by molten metal splatter. Switch machine off and wait about 2-3 minutes, Switch machine back on. This can occur if the unit is overheating due to a high ambient temperature. Use 32A cable for power lead extensions, a standard 13A type is unsuitable if a long extension is required. If the voltage at the unit 'dips' below the minimum value as the arc strikes the unit will turn off and the OC light will come on. Try operating the cutter at 20A set current, if this is OK then there is a problem with the stability of the mains supply to the unit. Use a different power source or thicker mains cable to connect to the unit mains lead. |
| <ul style="list-style-type: none"> Torch Assembly / Air flow | <ul style="list-style-type: none"> Check the torch has been assembled correctly. Note the presence and position of the swirl ring. Wait for air flow to finish flowing before operating cutting switch. Plasma will not start if air is already flowing from nozzle when the cutting switch is pressed. | |

IMPORTANT: Please note all repairs/service should be carried out by a qualified person.

11. TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | REQUIRED ACTION |
|--|--|--|
| • Plasma arc stops while cutting | • Hand too tense, inadvertently releasing the cut switch | • Hold the torch lightly against the material being cut, don't push down. Try and relax the hand. |
| | • Cutting speed too slow | • If all material cut from under the arc the arc will extinguish. |
| | • Torch moved too far away from material | • Move torch closer to the metal to be cut. |
| | • Compressor unable to keep up with air demand | • Check air pressure gauge reading when cut stops. • Check air pressure gauge is reading 60psi with cut switch pressed. • Check torch lead connections at unit and torch are tight. • Check torch hose is undamaged. • Check compressor, give the compressor time to recover if making long cuts when using a smaller compressor. Check the regulator fittings have been assembled properly using PTFE tape. |
| • Sparks are shooting upward not downward through the material | • Plasma arc not piercing material | • Torch travel speed too fast • Check grounding clamp is making a good connection to the material being cut and is tightly connected at the unit. Clean a patch of material for clamp if rusty |
| | | • Increase current |

IMPORTANT: Please note all repairs/service should be carried out by a qualified person.

12. MAINTENANCE

NOTE: Remove the plug from the socket before carrying out adjustment, servicing or maintenance.

1. Clear dust from machine at regular intervals use clean dry compressed air, if use in a dirty environment the machine should be cleaned once a month.
2. Check all connections are clean and tight, if there is any oxidization clean the connection with a mild abrasive or wire brush.
3. If the machine is not to be used for a long time, store it in the original packing a dry place.

13. EXPLANATION OF SYMBOLS

13.1 EXPLANATION OF SYMBOLS

IP21S

Welding unit's protection class.



Semiconductor diode rectifier.†



Welding unit is a Plasma cutter.



Warning.

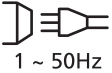


The welding unit is suitable for use in environment where there is a high risk of electric shock.



Read instruction manuals before operating and servicing this equipment.

Pictogram Symbols:



Power supply identifier
e.g. socket outlet with 3 poles.



Do not dispose of WEEE*
as unsorted municipal waste.



Direct Current (DC) delivery.†



Transformer.†



Inverter†
Frequency conversion stage.

† Symbols can be combined
for example:



Single Phase D.C. welder.

* Waste Electrical & Electronic Equipment.

Letter Symbols:

U_0V Secondary no-load voltage (in volts)

X Rated duty cycle

I_2A Welding current in AMPS

U_2V Welding voltage in VOLTS

U_1 Rated supply voltage

I_{1max}A Welding unit's maximum absorbed current in AMP

I_{1eff}A Welding unit's effective absorbed current in AMP

14. DISPOSAL

14.1 DISPOSAL

- At the end of the machine's working life, or when it can no longer be repaired, ensure that it is disposed of according to national regulations.
- Contact your local authority for details of collection schemes in your area.

In all circumstances:

- Do not dispose of power tools with domestic waste.
- Do not incinerate.
- Do not abandon in the environment.
- Do not dispose of WEEE* as unsorted municipal waste.



* Waste Electrical & Electronic Equipment.

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- **Sales Desk:** (023) 8049 4333
- **General Enquiries:** (023) 8026 6355
- **Service/Warranty Repair Agent**
For aftersales servicing or warranty repairs, please contact the Draper Tools Helpline for details of an agent in your local area.

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