



**POWER
WELDERS**

INSTRUCTIONS FOR:
PLASMA CUTTER
MODEL: **PL60/1.V2**

Thank you for purchasing a Sealey plasma cutter. Manufactured to a high standard this product will, if used according to these instructions and properly maintained, give you years of trouble free performance.



IMPORTANT: BEFORE USING THIS PRODUCT, PLEASE READ THE INSTRUCTIONS CAREFULLY. MAKE CAREFUL NOTE OF SAFETY INSTRUCTIONS, WARNINGS AND CAUTIONS. THIS PRODUCT SHOULD ONLY BE USED FOR ITS INTENDED PURPOSE. FAILURE TO DO SO MAY CAUSE DAMAGE OR PERSONAL INJURY, AND WILL INVALIDATE THE WARRANTY. RETAIN THESE INSTRUCTIONS FOR FUTURE USE.

1. SAFETY INSTRUCTIONS

1.1. ELECTRICAL SAFETY. ⚠ WARNING! Electrical installation of the plasma cutting unit must only be carried out by a qualified electrician. Make sure that power supply cable is correctly connected to Earth Plate. It is the user's responsibility to read, understand and comply with the following:

You must check all electrical equipment and appliances to ensure they are safe before using. You must inspect power supply leads, plugs and all electrical connections for wear and damage. You must ensure the risk of electric shock is minimised by the installation of appropriate safety devices. An RCCB (Residual Current Circuit Breaker) should be incorporated in the main distribution board. We also recommend that an RCD (Residual Current Device) is used with all electrical products. It is particularly important to use an RCD together with portable products that are plugged into an electrical supply not protected by an RCCB. If in doubt consult a professional electrician. You may obtain a Residual Current Device by contacting your Sealey dealer. **You must** also read and understand the following instructions concerning electrical safety.

- 1.1.1. The **Electricity At Work Act 1989** requires all portable electrical appliances, if used on a business premises, to be tested by a qualified Electrician at least once a year by using a Portable Appliance Tester (PAT).
- 1.1.2. The **Health & Safety at Work Act 1974** makes owners of electrical appliances responsible for the safe condition of the appliance, and safety of the appliance operator. **If in any doubt about electrical safety, contact a qualified electrician.**
- 1.1.3. Ensure the insulation on all cables and the product itself is safe before connecting to the mains power supply. See 1.1.1. & 1.1.2. above and use a Portable Appliance Tester (PAT).
- 1.1.4. Ensure that cables are always protected against short circuit and overload.
- 1.1.5. Regularly inspect power supply, leads, plugs and all electrical connections for wear and damage, especially power connections, to ensure that none are loose.
- 1.1.6. **Important:** Ensure the voltage marked on the product is the same as the electrical power supply to be used, and check that plugs are fitted with the correct capacity fuse. A 13Amp plug may require a fuse smaller than 13Amps for certain products (**subject to 1.1.11. below**) see fuse rating at right.
- 1.1.7. **DO NOT** pull or carry the powered appliance by its power supply lead. Products such as welders must not be pulled or carried by their output cables.
- 1.1.8. **DO NOT** pull power plugs from sockets by the power cable.
- 1.1.9. **DO NOT** use worn or damage leads, plugs or connections. Immediately replace or have repaired by a qualified Electrician.
- 1.1.10. **DO NOT** use this product with a cable extension reel.
- 1.1.11. **This product will require MORE than a 13Amp electrical supply, so no plug will be fitted. You must contact a qualified Electrician to ensure a 30 Amp fused supply is available. We recommend you discuss the installation of a industrial round pin plug & socket with your electrician.**

- ⚠ **WARNING!** Reminder, the electrical installation of the plasma cutting unit must only be carried out by a qualified electrician. Make sure that power supply cable is correctly connected to Earth Plate.
- ⚠ **WARNING!** Be very cautious if using a generator to power the Inverter. The generator must be self regulating and stable with regard to voltage, waveform and frequency. The output must be greater than the power consumption of the cutter. If any of these requirements is not met the electronics within the cutter may be affected.
NOTE:The use of an unregulated generator may be dangerous and will invalidate the warranty on the cutter.
- ⚠ **WARNING!** The cutter may produce voltage surges in the mains supply which can damage other sensitive equipment (e.g. computers). To avoid this happening it is recommended that the cutter is connected to a power supply that does not feed any sensitive equipment.

FUSE RATING
TO GAIN MAXIMUM
OUTPUT THE PLASMA
CUTTER MUST BE
CONNECTED TO A
30 Amp FUSED
ELECTRICAL SUPPLY

1.2. GENERAL SAFETY

- ▲ **DANGER!** Direct contact with the plasma cutter circuit or torch is dangerous. You **MUST** unplug the cutter from the mains power supply, (and the compressed air supply) before connecting or disconnecting cables or performing maintenance or service.
- ✓ Keep the plasma cutter, cables and torch in good working order and condition. (Take immediate action to repair or replace damaged parts).
- ✓ Use recommended parts and accessories only. (Non recommended parts may be dangerous and will invalidate the warranty).
- ✓ Only use the cutting torch provided with the system, and ensure any replacement is of the same type.
- ✓ Use the plasma cutter in an adequate working area for its function. Ensure the area has adequate ventilation as welding fumes are harmful. For enclosed areas we recommend the use of an air and smoke extraction system. If you are not able to provide adequate extraction and/or ventilation, wear a respirator suitable for protection against toxic fumes, smoke, and gases.
- ✓ Ensure there are no obstructions to the flow of clean cool air and ensure there is no conductive dusts, corrosive vapours or humidity which could enter the unit and cause serious damage.
- ⚠ **WARNING:** Use a welding head shield to protect your eyes and avoid exposing skin to the ultraviolet rays given off by the electric arc. Always wear protective clothing, insulating gloves and shoes. Keep all protective items clean and undamaged.
- ✓ Remove ill fitting clothing before wearing protective clothing, also remove ties, watches, rings, and other loose jewellery, and contain long hair.
- ✓ Stand correctly keeping a good footing and balance, and ensure the floor is not slippery, and wear non-slip shoes.
- ✓ Ensure the workpiece is correctly secured before operating the plasma cutter.
- ✓ Avoid unintentional contact with workpiece. Accidental or uncontrolled switching on of the torch may be dangerous and will wear the nozzle.
- ✓ Keep unauthorised persons away from the working area, and any persons working within the area must wear the same protective items.
- x **DO NOT** use cables and torch if the insulation is worn or connections are loose.
- x **DO NOT** attempt to fit any non authorised torches, components, or parts to the plasma cutting unit.
- x **DO NOT** cut surfaces that are painted, galvanic coated, oily or greasy.
- x **DO NOT** use cables over 10m in length.
- x **DO NOT** use any metallic structure which is not part of the work piece to substitute the return cable of the plasma current.
- ▲ **DANGER! DO NOT** cut near inflammable materials, solids, liquids, or gases. Remove all flammable materials such as waste rags etc.
- x **DO NOT** cut containers or pipes which have held flammable materials or gases, liquids or solids. DO NOT cut materials that have been cleaned with chlorinated solvents (or near such solvents) as vapours from the arc action may produce toxic gases.
- x **DO NOT** operate cutter while under the influence of drugs, alcohol or intoxicating medication, or if fatigued.
- x **DO NOT** force the plasma cutter to achieve a task it was not designed to perform.

- x **DO NOT** operate the plasma cutter if any parts are damaged or missing as this may cause failure or possible personal injury.
- x **DO NOT** carry, or pull cutter by leads or cables. **DO NOT** strain or bend cables, protect from sharp or abrasive items, **DO NOT** stand on cables or leads. Protect from heat. Long lengths of slack must be gathered & neatly coiled. **DO NOT** place cables where they endanger others.
- x **DO NOT** hold unsecured work in your hand.
- x **DO NOT** get the plasma cutter wet or use in damp or wet locations or areas where there is condensation.
- x **DO NOT** touch the workpiece close to the cut as it will be very hot. Allow to cool. The cut edge of the workpiece will also be very sharp.
- x **DO NOT** touch the torch immediately after use. Allow the torch to cool.
- ✓ When not in use store the unit in a safe, dry, childproof area.

1.3. AIR SUPPLY GENERAL SAFETY

- **WARNING!** turn off air supply and de-pressurise the air before removing the pump unit from the plasma system. Failure to comply with this instruction may damage the unit and will invalidate your warranty.
- **WARNING!** ensure correct air pressure is maintained and not exceeded. Recommended pressure 55-70psi, required air flow 120lt./min.
- **WARNING! DO NOT** exceed maximum entry pressure of 90psi. Excessive pressure may cause possible damage and/or personal injury.
- ✓ Keep air hose away from heat, oil and sharp edges. Check air hose for wear before each use, and ensure that all connections are secure.
- x **DO NOT** carry the cutter by the hose, or yank the hose from the air supply, and **DO NOT** direct air from the air hose at yourself or others.
- **WARNING!** turn off air supply and de-pressurise the control nozzle before removing the pump unit from any installation or mobile system. Failure to comply with this instruction may damage the unit and will invalidate your warranty.



2. INTRODUCTION & SPECIFICATIONS

The PL60/1, plasmatic cutter, produces a powerful cutting flame using only compressed air and electricity. Features a pilot ignition for quick, clean commencement of cut up to 6mm steel on a single phase 30Amp supply.

Mains Voltage (50Hz)230V - 1ph	Max cutting depth6 mm
Absorbed Power6.8kVA	(on "C" class steel)
Absorbed current30A	Air pressure(Max)90psi
Cutting Current Pos.135% @ 25A	Air Capacity120ltr/min
Cutting Current Pos.225% @ 30A	Weight40kg

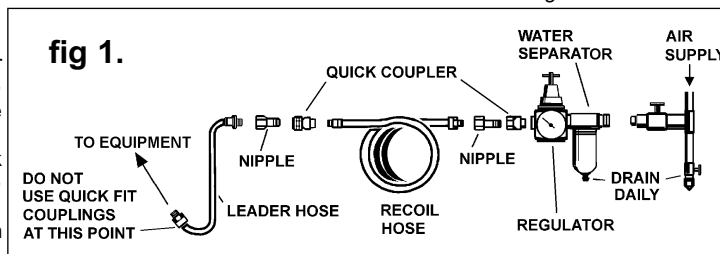
For more specification details see ratings plate on front panel and explanation in Section 9.

3. ASSEMBLY

- 3.1. Invert the unit and slide the wheel axle through the location holes at the back of the base.
- 3.2. Fit the wheels and secure using the split pins provided.
- 3.3. Remove the three screws (without spring washers) from the front of the base, align the front stand and secure using the three screws previously removed.
- 3.4. Stand the unit the correct way up, insert the handle such that it slopes to the back of the unit and secure using the screws provided. **Note:** Long screw into the top hole, short screw into the bottom hole.
- 3.5. The Torch is supplied already connected to the power source by means of an internal connection. No further assembly is required before starting the machine.

4. AIR SUPPLY

- **WARNING!** Ensure you have read and understood the safety instructions in 2.3. before connecting or operating the air supply.
 - 4.1. An external compressed air supply must be attached to the plasma cutter. The supply must produce a minimum working pressure of 73psi with a capacity of 120 L/min for operating unit. The maximum entry pressure into the unit however must not exceed 90psi.
 - 4.2. To avoid excessive wear of the cutter ensure the air supply is clean and free from moisture. We recommend the fitting of a clean air filtration unit as pictured in fig 1 with connection procedure.
 - 4.3. The air inlet filter system should be cleaned weekly.
 - 4.4. Line pressure should be increased to compensate for unusually long air hoses (over 8 metres). The minimum hose diameter should be 10mm I.D. and fittings must have the same inside dimensions.
 - 4.5. Keep hose away from heat, oil and sharp edges. Check hoses for wear, and make certain that all connections are secure.
- Note:** **DO NOT** use oiler with the air system, the air must remain **DRY** at all times.



5. CONTROL INSTRUCTIONS

□ **WARNING!** before operating the machine ensure that you read, understand and apply chapter 1 safety instructions. Ensure the machine is disconnected from the power supply before moving or changing accessories.

- 5.1. **Locating the Machine.**
 - 5.1.1. Ensure your work area has a good airflow and that there is no dust, smoke or gas present.
 - 5.1.2. Ensure that there is a minimum clearance of 500mm around the machine, and there are no obstacles to prevent a cool air flow. Also check to ensure the side grills are not blocked.
 - 5.1.3. When moving the machine disconnect the unit from the mains power supply, and gather all cables safely.
- 5.2. **Connecting the Earth cable.**

Connect the work cable clamp to the piece to be cut or to the metallic workbench as follows:

 - 5.2.1. Check that there is a good electrical contact. **Caution:** Ensure you have made good contact on oxidised or insulate coated sheets.
 - 5.2.2. Make the Earth connection as close to the cutting area as possible.
 - 5.2.3. **DO NOT** use metallic structures or objects to make contact (i.e. return cable), other than the metallic workbench which is holding workpiece. To do so may endanger the system safety and will give a poor cut. **DO NOT** make Earth connection to the off cut, or piece that will be removed.
- 5.3. **ON / OFF Switch.**
 - 5.3.1. The on/off switch is located on the front panel of the machine (fig.2.1). When the switch is in the "O" position the machine is turned off. When switched to the "I" position the machine is turned on and the switch will illuminate. The control and duty circuits are now live but the torch will remain in a 'stand-by' mode until the torch button is pressed.
- 5.4. **The Range Selector.**
 - 5.4.1. The cutting current is regulated by the switch on the front panel (fig.2.4). This switch regulates the supply of current required in order to cut different thicknesses of metal at different rates of progress.

5.5. Air Regulator

- 5.5.1. Unlock the air regulator knob (fig.2.6) by pulling it away from the unit. Turn the regulator knob until the pressure gauge (fig.2.5) registers 65psi - 75psi (4.5 bar - 5 bar).
5.5.2. Push the air regulator knob towards the unit to lock it.

5.6. Energised Torch (Green Light).

- 5.6.1. When the Energised Torch (green light) is illuminated (fig.2.3) the cutting circuit has been activated resulting in either the pilot arc or cutting arc being "ON".

5.7. Thermic Security (Amber Light).

- 5.7.1. As a safety feature, should the power transformer overheat, the torch will automatically de-activate and the amber light (fig.2.2) illuminate. Restoration is automatic, the lamp will turn off once the temperature of the power transformer has lowered within the required limits.

5.8. The Torch

- 5.8.1. Although the machine and torch may be fully powered, the torch button is the only device that will activate the cutting process.
5.8.2. To turn the cutting process on, the torch button must be fully depressed
5.8.3. Release the button and the cutting cycle will stop immediately. The cooling air (post-air) will continue to function.
5.8.4. As a safety feature, operation of the button is inhibited if the insulating nozzle holder is either not fitted or incorrectly fitted to the torch.
NOTE: To minimise the possibility of accidental starting, the on button must be pushed for at least 300 milliseconds before the cutting operation will start.

- 5.9. **Technical Data.** Please refer to the explanation of the ratings plate symbols given in Section 9.

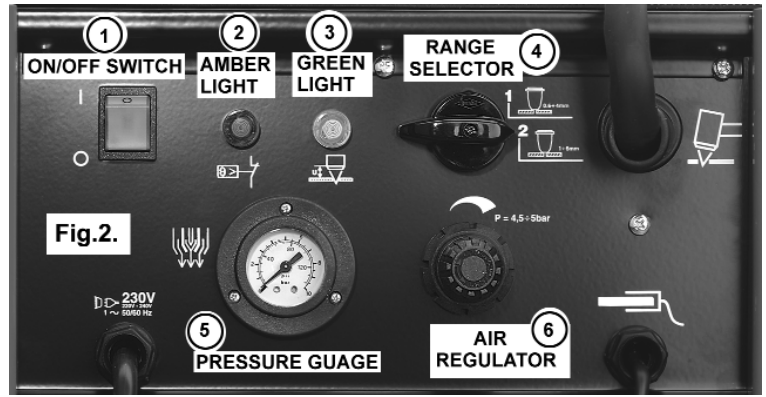
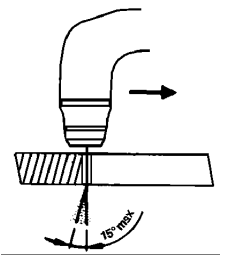


Fig.3.



6. OPERATING INSTRUCTIONS

WARNING! before operating the machine ensure that you read, understand and apply section 1 safety instructions, and that you have familiarised yourself with the controls. Ensure the machine is disconnected from the power supply before moving or changing accessories.

6.1. Set up

- 6.1.1. Ensure you have the compressed air connected correctly to the machine. (See section 4).
6.1.2. Check that the Earth cable is correctly clamped to the piece to be cut. (See section 5.2).
6.1.3. Switch on the mains power supply. Switch on the machine by operating the switch on the front panel (fig.2.1).
6.1.4. Set the range selector switch to the appropriate position for the task to be performed (fig.2.4).
6.1.5. Press the torch button (0.5 seconds) causing air outflow for approximately 30 seconds - post gas.
6.1.6. Set the air pressure and check that the air pressure (fig.2.5) gauge indicates the correct value.(See section 5.5)
6.1.7. Allow the air flow to continue until any condensation has been removed from the torch. At this point the air flow should automatically stop.

6.2. Cutting workpiece

- 6.2.1. The torch will operate without being in contact with the workpiece.
6.2.2. However, for greater cutting control and accuracy of cut, it is recommended that the torch be in contact with the workpiece.
6.2.3. Bring the torch nozzle into contact with the metal on the cutting line.
6.2.4. Press and hold down the torch button and the arc will ignite.
6.2.5. Move the torch slowly and smoothly forward along the cutting line at a steady speed.
6.2.6. Adjust cutting speed according to the thickness of the material to be cut, and the selected current.
6.2.7. Check the underside of material being cut. The arc (flame) should have a 5 - 10° tilt (fig.3).

6.3. Cutting workpiece by piercing item.

- 6.3.1. To pierce thin material, place torch nozzle directly onto the point to be pierced and ignite the torch.
6.3.2. For thicker material, place torch nozzle at an angle, ignite the torch, then slowly and smoothly bring the torch head to the upright position (fig 4).

6.4. To stop the arc.

- 6.4.1. Release torch button to stop the arc. The post-air will continue to flow cooling the nozzle.
6.4.2. Other reasons why the arc will stop operating are:
a) If the distance between the torch nozzle and workpiece is too great.
b) If you have completed a cut and have continued beyond the edge of a workpiece.
c) The waste cut off falls away from the workpiece thus increasing the gap.

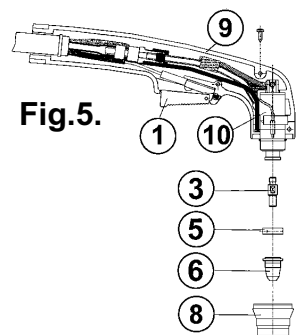
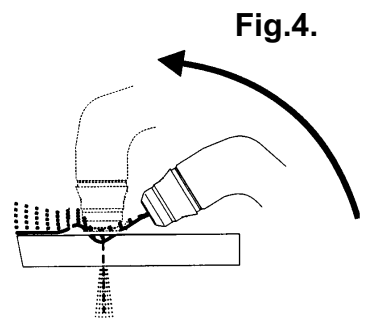


Fig.5.

7. MAINTENANCE

DANGER! Ensure machine is disconnected from power supply before performing service or maintenance on any part of the unit, cables or torch.

7.1. The power unit.

- DO NOT** open the machine. Service and maintenance of the machine must only be undertaken by an authorised service agent.
7.1.1. Keep the machine clean by wiping with a soft cloth. Do not use abrasives.
7.1.2. Ensure that the side air vents are not blocked.

7.2. Cables, and leads.

- 7.2.1. Check to ensure cables and leads are in good order and condition. If damaged contact your authorised service agent.
7.2.2. Keep cables and leads clean. Do not use solvents.

7.3. TORCH.

- Check torch regularly. Maintenance will depend on frequency and type of usage and is essential for correct and safe use of torch.
WARNING! Ensure the torch is cool before attempting any maintenance. Always re-assemble the torch in the correct order as shown in fig.5. Never use tools to tighten nozzle components, hand tighten only. Manually dismantle the torch nozzle head (fig.5).
7.3.1. **Safety cap.** (fig. 5 item 8).
Clean safety cap and check to ensure it is not damaged, (including distortion, burns, or cracks) if in any doubt replace the item.
7.3.2. **Nozzle.** (fig. 5 item 2).
If surface is oxidised clean it with extra fine abrasive paper. Check wear of the plasma arc hole and the inner and outer surfaces. If hole has widened, or nozzle is damaged in any way replace it immediately.

- 7.3.3. **Air Distributing Ring** (fig 5. item 5).
Check that the ring is not burned or cracked and that the airflow holes are not obstructed. If damaged replace immediately.
- 7.3.4. **Electrode.** (fig. 5 item 3).
Check the build up on the emitting surface of the electrode. When the build up is approximately 2mm replace the electrode. Use the spanner provided to unscrew the electrode by applying a gradual force, without jerking. When re-assembling, only apply a moderate torque using the spanner.
- NOTE:** We recommend that the electrode and nozzle should be changed at the same time.
- 7.4. **Compressed Air filter.**
- 7.4.1. The compressed air filter, situated below the air inlet, behind the rear cover, drains condensation from the air system, and must be kept clean.
- 7.4.2. Regularly inspect the filter. If the glass bowl contains water, drain by pushing the drain plug upwards.
- 7.4.3. When the filter cartridge becomes dirty replace immediately.
- 7.4.4. Clean the filter with clean soapy water only. Do not use abrasives, or solvents.

8. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY <i>(Numbers refer to chapter and item heading)</i>
Insufficient penetration or excessive scoria settlement.	Too high a cutting speed. Torch is too tilted. Workpiece is too thick. Electrode and nozzle are worn out.	Slow the cutting speed Adjust the torch tilt. Confirm workpiece thickness, and re-check technical data. Replace electrode and nozzle.
Interruption of cutting arc.	Cutting speed too low. Excessive distance between torch and workpiece. Electrode is worn out. Intervention of the protections system.	Increase cutting speed. Decrease the distance between torch and workpiece. Replace electrode and nozzle. Check warning lights and take appropriate action.
The torch is cutting at tilt when you wish it to be perpendicular.	Torch position not correct. Asymmetric wear of nozzle hole and/or wrong assembly of torch parts.	Re-align the torch position. Check assembly (see fig 9) and change nozzle if necessary.
Excessive wear of nozzle and electrode.	Air pressure too low. Contaminated air (humidity-oil). Excessive pilot arc ignitions in the air. Nozzle holder damaged.	Increase air pressure (see chapter 5). Check air supply system (see chapters 4,5, & 7). Do not casually turn the torch on and off. Change the nozzle holder.

9. RATINGS PLATE SYMBOLS

Detailed technical data relative to the performance of the machine is located on the front panel plate. **Please note** that the ratings plate shown below is an example only intended to assist with the explanations of symbols. To determine the correct technical values of the machine in your possession, you must refer to the data plate.

- 1 The EUROPEAN standard relating to safety and the construction of plasma cutting machines.
- 2 Symbol of the main internal parts of the cutter : i.e. transformer & rectifier.
- 3 Symbol for the cutting current characteristic : drooping characteristic = constant current.
- 4 Symbol of plasma cutting procedure.
- 5 Mains symbol : AC - single-phase supply.
- 6 Thermal class of insulation material: H=180C.
- 7 Cooling method: AF forced air (fan).
- 8 Case protection grade: IP22. Standard governing the required protection from water ingress and isolation of internal parts from persons and objects.
- 9 PERFORMANCE OF THE PLASMA CUTTER CIRCUIT:

- U0 :** Maximum voltage with no-load peak (welding circuit open)
- I2/U2 :** Current and corresponding voltage are normal [$U_2=(20+0.0412) V$] and may be supplied from the machine during cutting.
- X :** Intermittent cutting ratio: Indicates time during which machine can supply the corresponding current (same column). This is expressed in % on the basis of a 10min. cycle (e.g. 60% = 6 min of work, 4 min. break and so on).
- A/V-A/V :** Indicates the regulation range of the cutting current (maximum - minimum) at the corresponding arc voltage.

Type: PLASMATIC 60/1		MADE IN C.E.	
1 ~	EN 50192	SERIAL NUMBER	
2	3	2	1
4	U ₀ V	X	25% 35%
5	262	I ₂	30A 24A
6		U ₂	90V 90V
7		Cos φ 0.60 0.68	
8	U ₁ V	I ₁ A	I _h A
	230	T 20 A	30
	230	T 16 A	24
9	I. CL. H	S ₁	6.8kVA 5.5kVA
	50/60 Hz		
	AF	IP 22	S

- 10 DATA REGARDING THE MAINS.
- U1 :** Alternate current and supply frequency of the machine allowed limits (+ 10-15%).
- I1 :** Value of delayed fuses for mains protection.
- I_h :** current absorbed by mains at the corresponding current, cutting voltage and relative intermittent ratio.
- S1 :** Apparent mains power used during cutting at the corresponding current/voltage.
- cos j :** Power factor, real power of mains $P1=(S1 \cos j)$ kw.

Declaration of Conformity We, the sole importer into the UK, declare that the product listed below is in conformity with the following standards and directives.

PLASMA CUTTER Model: PL60-1
73.23/EEC
Low Voltage Directive (S.I. 1994/3260)
89/336/EEC
EMC Directive (S.I. 1992/2372 & Amendments).



The construction file for this product is held by the Manufacturer and may be inspected, by a national authority, contacting Jack Sealey Ltd.

Signed by Mark Sweetman

25th October 2002

For Jack Sealey Ltd. Sole importer into the UK of Sealey Power Welders

NOTE: It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

IMPORTANT: No liability is accepted for incorrect use of this equipment

WARRANTY: Guarantee is 12 months from purchase date, proof of which will be required for any claim.

INFORMATION: For a copy of our latest catalogue and promotions, call us on 01284 757525 and leave your full name and address including your postcode.



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