



USER MANUAL

WS-PC40-DV WS-PC65

WS-PC120 Plasma



Introduction to your new product

Thank you for selecting this Weld Star Infinium product.

This product manual has been designed to ensure that you get the most from your new Weld Star 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.

Please call your Weld Star distributor in the unlikely event of a problem occurring.

Please record below the details of your new Weld Star product as these may be required for warranty purposes should you require assistance or spare parts.

Date purchased _____

Purchased from _____

Model name _____

Serial number _____

(The serial number is normally located on the product packaging, top or underside of the machine)

Disclaimer

Whilst every effort has been made to ensure that the information contained within this manual is complete and accurate, no liability can be accepted for any errors or omissions.

Please note:

Products are subject to continual development and may be subject to change without notice. www.weldstar.uk

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SAFETY INSTRUCTIONS



These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted. The user is responsible for installing and operating the equipment in accordance with the enclosed instructions.

It is important that users of this equipment protect themselves and others from harm, or even death. 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 operate the equipment.

Pacemaker wearers should consult their doctor prior to using this equipment.

PPE and workplace safety equipment must be compatible for the application of the work involved.

Always carry out a risk assessment before carrying out any welding or cutting activity.

General electrical safety



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 your utility supplier if required.

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.

In the case of abnormal behaviour of the equipment, the equipment should be checked by a suitably qualified service engineer.

If earth bonding of the work piece is required, bond it directly with a separate cable with a current carrying capacity capable of carrying the maximum capacity of the machine current.

Cables (both primary supply and welding) should be regularly checked for damage and overheating.

Never use worn, damaged, under sized or poorly jointed cables.

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

Never touch the electrode if you are in contact with the work piece return.

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.

The EMC classification of this product is class A in accordance with electromagnetic compatibility standards CISPR 11 and IEC 60974-10 and therefore the product is designed to be used in industrial environments only.

WARNING: This class A equipment is not intended for use in residential locations where the electrical power is provided by a public low-voltage supply system. In those locations it may be difficult to ensure the electromagnetic compatibility due to conducted and radiated disturbances.

General operating safety



Never carry the equipment or suspend it by the carrying strap or handles during welding.

Never pull or lift the machine by the welding torch or other cables.

Always use the correct lift points or handles. Always use the transport under gear as recommended by the manufacturer.

Never lift a machine with the gas cylinder mounted on it.

If the operating environment is classified as dangerous, only use S-marked welding equipment with a safe idle voltage level. Such environments may be for example: humid, hot or restricted accessibility spaces.

SAFETY INSTRUCTIONS

Use of Personal Protective Equipment (PPE)

⚠ CAUTION Welding arc rays from all welding and cutting processes can produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

PPE REQUIRED AT ALL TIMES

- Wear an approved welding helmet fitted with an appropriate shade of filter lens to protect your face and eyes when welding, cutting or watching.
- Wear approved safety glasses with side shields under your helmet.
- Never use any equipment that is damaged, broken or faulty.
- Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding and cutting area.
- Ensure that there are adequate warnings that welding or cutting is taking place.
- Wear suitable protective flame resistant clothing, gloves and footwear.
- Ensure adequate extraction and ventilation is in place prior to welding and cutting to protect users and all workers nearby.
- Check and be sure the area is safe and clear of flammable material before carrying out any welding or cutting.



Some welding and cutting operations may produce noise. Wear safety ear protection to protect your hearing if the ambient noise level exceeds the local allowable limit (e.g: 85 dB).

Welding and Cutting Lens Shade Selector Guide

Current	MMA Electrodes	MIG Light Alloys	MIG Heavy Metals	MAG	TIG	Plasma Cutting	Plasma Welding	Air Arc Gouging	Current		
10	8	10	10	10	9	11	10	10	10		
15									15		
20									20		
30	9				10		10		11	11	30
40											40
60											60
80	10			11	11		12		12	80	
100										100	
125										125	
150	11	11	12	12	13		11			150	
175										175	
200						12		12	13	14	13
225	225										
250	250										
275	275										
300	12	13	12	13	14	14	13	300			
350								350			
400		13	14	13				14	14	400	
450										450	
500	14	15	14	15				15	500		

SAFETY INSTRUCTIONS

Safety against fumes and welding gases



Warning
Fumes and
Gases

The HSE have identified welders as being an 'at risk' group for occupational diseases arising from exposure to dusts, gases, vapours and welding fumes. The main identified health effects are pneumonia, asthma, chronic obstructive pulmonary disease (COPD), lung and kidney cancer, metal fume fever (MFF) and lung function changes.

During welding and hot cutting 'hot work' operations, fumes are produced which are collectively known as welding fume. Depending upon the type of welding process being performed, the resultant fume generated is a complex and highly variable mixture of gases and particulates.

Regardless of the length of welding being carried out, all welding fume, including mild steel welding requires suitable engineering controls to be in place which is usually Local Exhaust Ventilation (LEV) extraction to reduce the exposure to welding fume indoors and where LEV does not adequately control exposure it should also be enhanced by using suitable respiratory protective equipment (RPE) to assist with protecting against residual fume.

When welding outdoors appropriate RPE should be used.

Prior to undertaking any welding tasks an appropriate risk assessment should be carried out to ensure expected control measures are in place.



An example of personal fume protection

Locate the equipment in a well-ventilated position and keep your head out of the welding fume.

Do not breathe in the welding fume.

Ensure the welding zone is well-ventilated and provision should be made for suitable local fume extraction system to be in place.

If ventilation is poor, wear an approved airfed welding helmet or 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.

For further information please refer to the HSE website www.hse.gov.uk for related documentation.

Precautions against fire and explosion



Caution
Risk of fire

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

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

Remove all flammable and combustible materials from the welding, cutting and surrounding areas.

Do not weld or cut fuel and lubricant containers, even if empty. These must be carefully

cleaned before they can be welded or cut.

Always allow the welded or cut 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.

Take care to avoid accidental contact of the torch electrode to metal objects, as this could cause arcs, explosion, overheating or fire.

Know and understand your fire extinguishers

	Water	Foam spray	ABC powder	Carbon dioxide	Wet chemical
Symbol found on fire extinguishers at what they mean					
Wood, paper & textiles	✓	✓	✓	✗	✓
Flammable liquids	✗	✓	✓	✓	✗
Flammable gases	✗	✗	✓	✗	✗
Electrical contact	✗	✗	✓	✓	✗
Cooking oil & fat contact	✗	✗	✗	✗	✓

SAFETY INSTRUCTIONS

The working environment



Ensure the machine is mounted in a safe and stable position allowing for cooling air circulation.
Do not operate equipment in an environment outside the laid down operating parameters.
The welding power source is not suitable for use in rain or snow.

Always store the machine in a clean, dry space.

Ensure the equipment is kept clean from dust build up.

Always use the machine in an upright position.

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 managed 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 towards your body.

Always ensure machine covers and protective devices are in operation.

Risks due to magnetic fields



Warning
Strong magnetic field

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.

Keep the torch cable and work return cable as close to each other as possible throughout their length.

This can help minimise your exposure to harmful magnetic fields.

Do not wrap the cables around the body.

Handling of compressed gas cylinders and regulators



Danger
Compressed gas

Mishandling gas cylinders can lead to rupture and the release of high pressure gas.

Always check the gas cylinder is the correct type for the welding to be carried out.

Always store and use cylinders in an upright and secure position.

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 and never move with regulator and hoses connected.

Use a suitable trolley for moving cylinders.

Regularly check all connections and joints for leaks.

Full and empty cylinders should be stored separately.

Never deface or alter any cylinder

SAFETY INSTRUCTIONS

Fire awareness



The cutting and welding process can cause serious risks of fire or explosion. Cutting or welding sealed containers, tanks, drums or pipes can cause explosions. Sparks from the welding or cutting process can cause fires and burns. Check and risk assess the area is safe before doing any cutting or welding. Ventilate all flammable or explosive vapour from the workplace.

Remove any and all flammable materials away from the working area. If necessary, cover flammable materials or containers with approved covers (following manufacturers instructions) if unable to remove from the immediate area.

Do not cut or weld where the atmosphere may contain flammable dust, gas or liquid vapour.

Always have the appropriate fire extinguisher nearby and know how to use it.

Hot parts



Always be aware that material being cut or welded will get very hot and hold that heat for a considerably long time which will cause severe burns if the appropriate PPE is not worn. Do not touch hot material or parts with bare hands.

Always allow for a cooling down period before working on material recently cut or welded.

Use the appropriate insulated welding gloves and clothing to handle hot parts to prevent burns.

Noise awareness



The cutting and welding process can generate noise that can cause permanent damage to your hearing. Noise from cutting and welding equipment can damage hearing.

Always protect your ears from noise and wear approved and appropriate ear protection if noise levels are high.

Consult with your local specialist if you are unsure how to test for noise levels.

RF Declaration



Equipment that complies with directive 2014/30/EU concerning electromagnetic compatibility (EMC) and the technical requirements of EN60974-10 is designed for use in industrial buildings and not 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.

SAFETY INSTRUCTIONS

Materials and their disposal



Welding equipment is manufactured with BSI published standards meeting CE requirements for materials which do not contain any toxic or poisonous materials dangerous to the operator.

Do not dispose of the equipment with normal waste. The European Directive 2012/19/EU on Waste Electrical and Electronic Equipment states that electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility for disposal.

For more detailed information please refer to the HSE website www.hse.gov.uk

PACKAGE CONTENTS AND UNPACKING

Supplied within your new Weld Star Infinium product package will be the following items with each model. Use care when unpacking the contents and ensure all items are present and not damaged. If damage is noted or items are missing, please contact the supplier in the first instance and before installing or using the product.

Record the product model, serial numbers and purchase date in the information section found on the inside front page of this operating manual.

Weld Star WS-PC40-DV

PC-40-DV Plasma Power Source
4m TH-35 Plasma Hand Torch
Air Regulator
Work Return Lead
PCL Air Fitting
USB Stick with Operating Manual

Weld Star WS-PC65

PC-65 Plasma Power Source
6m UPH-125 Plasma Hand Torch
Consumable spare parts starter Pack (BLKITUPH125/65A)
Air Regulator
Work Return Lead
PCL Air Fitting
USB Stick with Operating Manual

Weld Star WS-PC120

PC-120 Plasma Power Source
6m UPH-125 Plasma Hand Torch
Consumable spare parts starter Pack (BLKITUPH125/120A)
Air Regulator
Work Return Lead
PCL Air Fitting
USB Stick with Operating Manual

Please Note: Package contents may vary depending on country location and package part number purchased.

PRODUCT OVERVIEW

The Weld Star Infinium inverter plasma cutting machine range with built-in compressor has been designed as integrated portable cutting machines which incorporate the most advanced IGBT inverter technology.



Weld Star Plasma WS-PC40-DV, WS-PC65 and WS-PC120 Product Features:

- The PC40-DV is a dual voltage (110v/230v) compact, lightweight and portable inverter based plasma cutting machine with an in-built air compressor that offers excellent operator flexibility.
- The 3ph 400V PC65 and PC120 plasma cutting machines offer excellent operator flexibility with an in-built air compressor.
- Advanced, high efficiency plasma systems that offer flexible portability along with smooth and precise cutting characteristics that's ideal when cutting steel, stainless, copper, cast iron as well as aluminium.
- The Weld Star Infinium plasma range offers the flexibility of switching between the in-built compressor or using your own workshop supplied compressed air.
- The Weld Star Plasma WS-PC40-DV offers a clean cut of 12mm and a severance cut of 16mm. *
- The Weld Star Plasma WS-PC65 offers a clean cut of 25mm and a severance cut of 30mm. *
- The Weld Star Plasma WS-PC120 offers a clean cut of 35mm and a severance cut of 40mm. *
- Auto pilot restart allows for faster restarting of the pilot arc which allows for uninterrupted cutting of grid or perforated type material.
- Plasma cutting speeds can be up to 1.8 times faster when compared with oxy acetylene cutting.
- Advanced non HF pilot arc ignition via the supplied plasma cutting torch (The PC120 offers optional HF pilot starting circuitry).
- The PC40-DV has a single carry handle which offers excellent portability when working or maneuvering when on site or in the workshop.
- The PC65 and PC120 are mounted on a trolley for easier movement.
- Well laid out, simple to use operator control panels.
- Generator friendly (with built-in AVR).
- Optional circle cutting guide kit available.

* Based on mild steel using workshop compressed air.

PRODUCT DETAILS AND APPLICATION

Advanced digital circuitry

In traditional machines, consistency and performance is often governed by the tolerances of the components used in manufacture and environmental conditions such as temperature and humidity. The Weld Star plasma cutting machine range incorporate high end digital control technology which is enhanced by being controlled with the latest software.

These digital controlled plasma cutting machines offer many improvements in function and performance when compared with traditional (older) type plasma cutting machines.

Having the latest PWM technology and high power IGBT components offers a greater level of stability and reliability which ultimately give the operator a very stable DC output which is transferred to the plasma cutting torch to create the required plasma pilot and cutting arc.

This inverter technology allows for modern machines to be smaller, lighter and more electrically efficient than traditional type transformer machines along with excellent cutting performance.

This high efficiency technology provides switching frequencies which are outside the audible range.

Powerful cutting performance

The Weld Star Infinium plasma range of machines provides economical cutting of metals using either the in-built compressed air or workshop compressed air supply as the plasma gas source.

Cutting speeds can be up to 1.8 times faster when cutting carbon steel compared with oxy-acetylene cutting.

Plasma machines can cut steel, stainless steel, copper, cast iron and aluminium easily and quickly.

The plasma pilot arc is efficiently started when using non HF arc ignition technology.

There is a gas post flow function that assists in cooling the plasma torch after cutting finishes.

Simple operation, high cutting speeds and smooth cutting surface make the plasma process an excellent cutting method.

Product features

The Weld Star Plasma Infinium range cutting current can be accurately set by the operator via the control panel which allows the machine to be set and then cut material of different thicknesses easily and quickly.

Low cutting amperage is used when cutting thin plate and when required to cut thicker material then increasing the cutting current will offer flexibility to the operator in achieving excellent cut quality which also offers energy savings.

Further features include, under and over under (input) voltage protection, thermal overheating, air purge and the ability to cutting grid/perforated type material.

Application

The non-HF pilot arc circuitry of the plasma infinium range combined with the plasma torch design offers excellent starting pilot arc ignition and cutting arc characteristics which will cut through rusty and painted material that offer excellent cut quality performance with ferrous and non ferrous materials which can effectively prolong the lifespan of the electrode and nozzle consumables of the plasma cutting torch.

It can be widely used in various industries involving metal cutting such as boiler, pressure vessel manufacturing, chemical container manufacturing, power plant installation, construction industry, metallurgy, chemical engineering, aerospace, automobile, engineering vehicles manufacturing, construction and many more.

TECHNICAL SPECIFICATIONS

Parameter	Unit	WS-PC40-DV		WS-PC65	WS-PC120
Rated input voltage	V	110V AC ±15%	230V AC ±15%	400V AC ±15%	400V AC ±15%
Rated input frequency	Hz	50/60		50/60	50/60
Rated input power	kVA	3.8	5.2	12.4	23.5
Rated input current I _{max}	A	34.5	22.6	18	34
Rated input current I _{eff}	A	20.4	16	17.1	26
Cutting current range	A	20 ~ 30	20 ~ 40	20 ~ 65	20 ~ 120
Rated output voltage	V	92	96	106	128
No load voltage	V	400	400	450	420
Rated duty cycle 40°C	%	30A@35% 22A@60% 20A@100%	40A@35% 36A@60% 30A@100%	65A@90% 61A@100%	120A@60% 100A@100%
Clean cut (Int/ext air) *	mm	5/6	10/12	20/25	30/35
Severance cut (Int/ext air) *	mm	6/8	14/16	25/30	35/40
Minimum air pressure (external)	psi	5 Bar (73psi)		5.2 Bar (75psi)	5.2 Bar (75psi)
Maximum air pressure (external)	psi	6 Bar (87psi)		8 Bar (116psi)	8 Bar (116psi)
Minimum gas flow (external air)	-	4.5CFM 120 Ltr/min		7.1CFM 200 Ltr/min	7.1CFM 200 Ltr/min
Efficiency	%	85		85	85
Idle State Power	W	11		22	22
Power factor	cosφ	0.99		0.99	0.99
Plasma torch	-	4m TH-35		6m UPH-125	6m UPH-125
Standard	-	EN60974-1		EN60974-1	EN60974-1
Protection class	IP	IP23 S		IP23 S	IP23 S
Insulation class	-	H		H	H
Arc ignition	-	Non HF		Non HF	Non HF
Noise	Db	<110		<110	<110
Operating temperature	°C	-10 ~ +40		-10 ~ +40	-10 ~ +40
Storage temperature	°C	-25 ~ +55		-25 ~ +55	-25 ~ +55
Overall size (HxWxD) (without trolley)	mm	610 x 215 x 420		790 x 245 x 610	790 x 245 x 610
Overall size (HxWxD) (with trolley)		N/A		930 x 330 x 775	930 x 330 x 775
Weight	Kg	21		56	60
Circle cutting guide kit	-	Pt No 51844		Pt No 51865	Pt No 51865

* Based on mild steel and thickness ratings can vary depending on cutting speed.

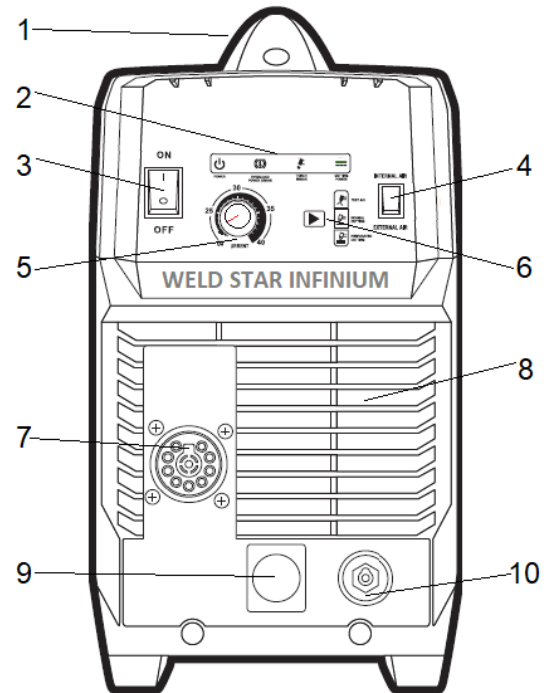
Please Note

Due to variations in manufactured products all claimed performance ratings, capacities, measurements, dimensions and weights quoted are approximate only. Achievable performance and ratings when in use can depend upon correct installation, applications and use along with regular maintenance and service.

DESCRIPTION OF CONTROLS

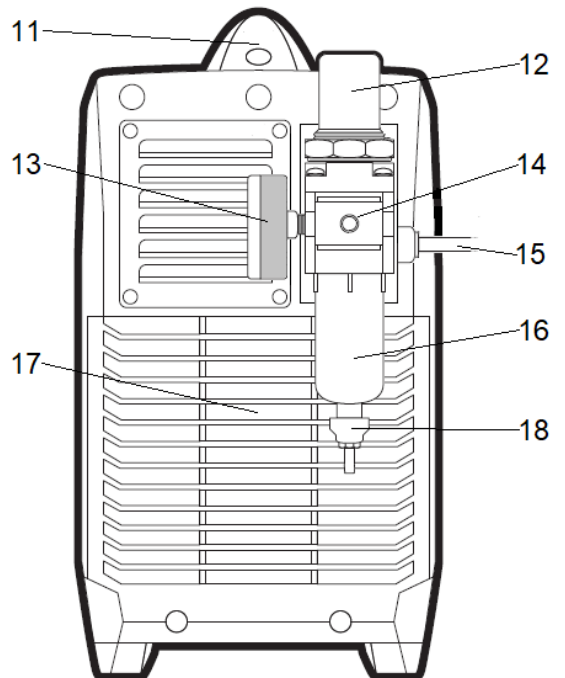
Front view Weld Star Plasma WS-PC40-DV

1. Carry handle
2. Control panel indicators
3. Machine ON/OFF power switch
4. Internal/external air selector switch
5. Current control dial
6. Control selector switch
7. Torch connector, the plasma torch connection
(see page 21 for fitting instructions)
8. Cooling air vent
9. N/A
10. Work return connector
(10/25mm dinse socket)



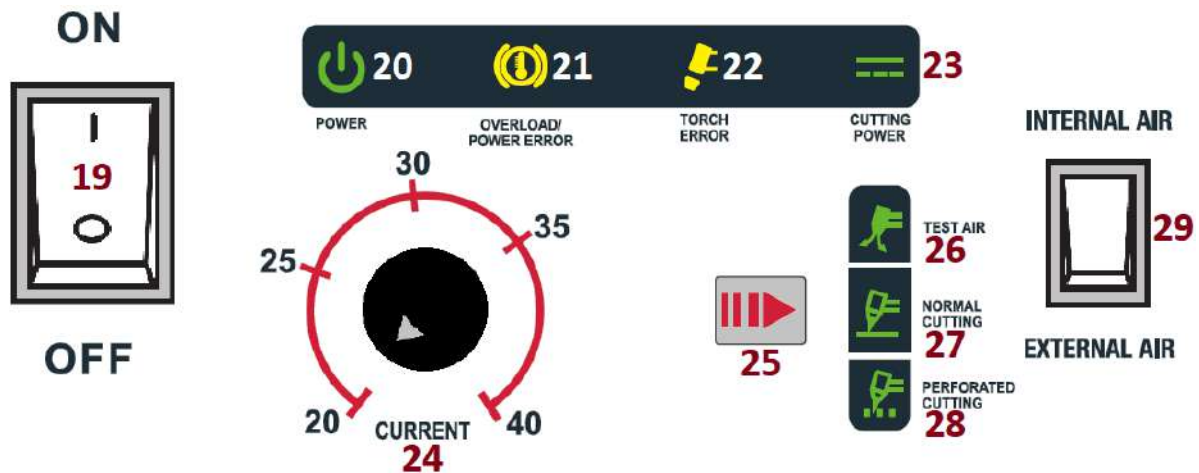
Rear view Weld Star Plasma WS-PC40-DV

11. Carry handle
12. Air pressure regulator adjustment knob
13. Air pressure gauge
14. Air pressure inlet
(from workshop compressor)
15. Mains input cable
16. Air pressure regulator filter
17. Air vent
18. Air pressure regulator drain



CONTROLS

Control panel view - Weld Star Plasma WS-PC40-DV

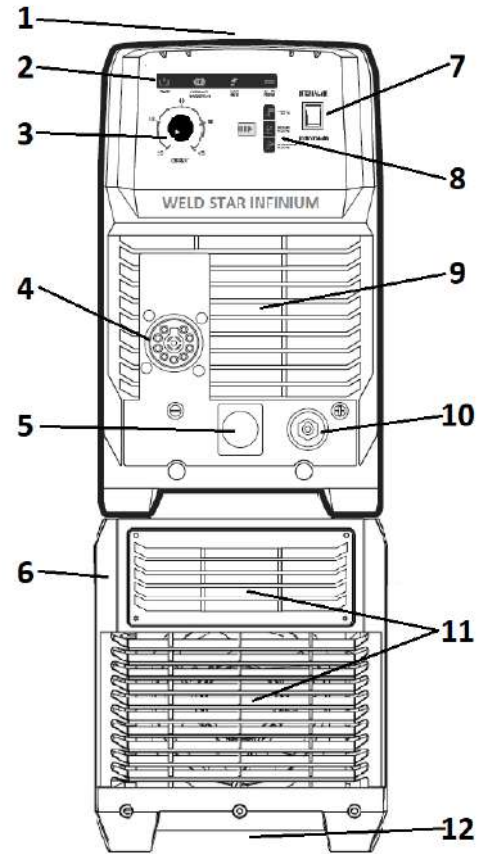


Number	Symbol	Function
19	-	Mains power ON/OFF switch. Use this switch to turn the machine on and off. Turn off and disconnect the machine from the mains supply when not in use.
20		Power indicator: This LED will illuminate when the machine is connected to the mains power and the ON/OFF switch is turned ON.
21		Power or overload error LED: This LED will light up when over-voltage, over-current or overheating (exceeding duty cycle) is experienced and the unit enters protection mode. When this LED is lit, the output will be disabled until the system overload has either reduced or has been removed and only then will the indicator LED go out.
22		Plasma torch error LED: This LED will light up when an error or fault has been detected with either the plasma torch or air supply. Cutting output will be disabled until the fault clears. A flashing LED will mean that the torch shield cap is not fitted correctly. A continuous LED will mean either a missing consumable, torch damage or insufficient air pressure supply to the machine/plasma torch.
23		Cutting output LED: This LED will be lit when the output power has been activated and will remain lit while cutting.
24		Current control dial: This dial allows the user to set the required output current demand which is shown via the settings alongside the dial of 20 - 40amps.
25		This selection switch allows the user to switch between options (numbers) 26, 27 and 28
26		Air purge switch: This switch allows the user to activate gas flow to allow the gas flow to be checked and set.
27		Normal cutting LED: When this option is selected the user is in standard cutting mode i.e. for use with solid workpieces.
28		Grid/Perforated metal cutting LED: When this cutting option is selected the user can cut grid/perforated material without having to remove the finger from the torch trigger as the pilot arc will automatically restart.
29	-	Internal/external air switch: Allows the user to select either the internal air compressor or to select to use 'external' workshop supplied compressed air.

DESCRIPTION OF CONTROLS

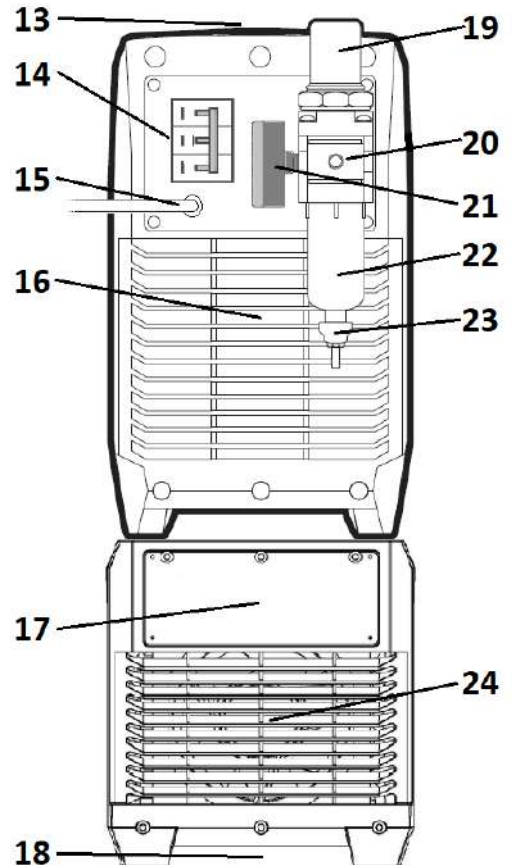
Front view Weld Star Plasma WS-PC65 (Trolley not shown)

1. Handle (not shown)
2. Control panel indicators
3. Current control dial
4. Torch connector, the plasma torch connection (see page 21 for fitting instructions)
5. N/A
6. Compressor unit
7. Internal/external air selector switch
8. Control selector switch
9. Cooling air vent
10. Work return connector (10/25mm dinse socket)
11. Compressor air vents
12. Wheel kit (not shown)



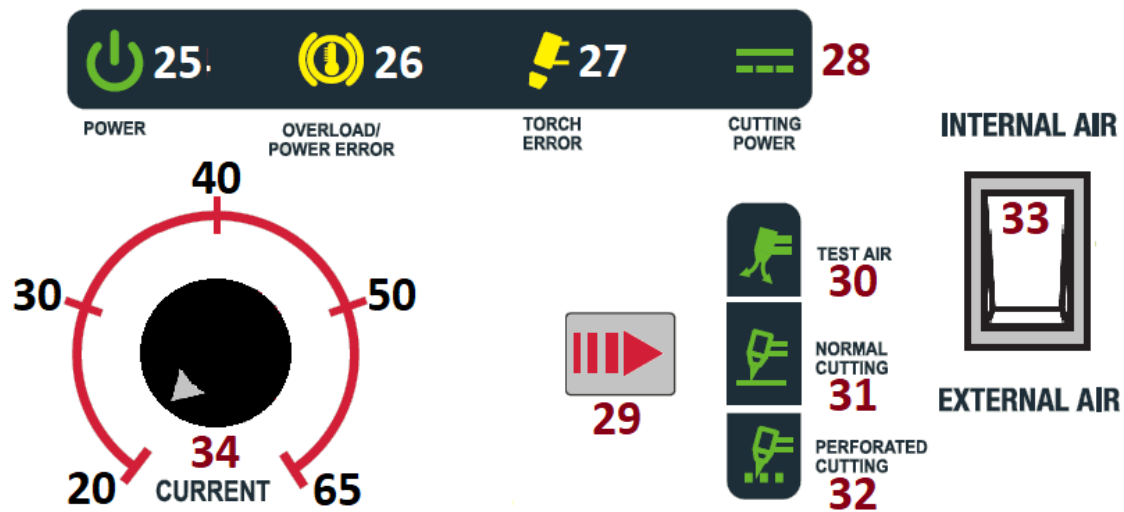
Rear view Weld Star Plasma WS-PC65

13. Handle (not shown)
14. ON/OFF mains power switch
15. Mains input cable
16. Air vent
17. Compressor unit
18. Wheel kit (not shown in image)
19. Air pressure regulator adjustment knob
20. Air pressure inlet (from workshop compressor)
21. Air pressure gauge
22. Air pressure regulator filter
23. Air pressure regulator drain
24. Compressor air vent



CONTROLS

Control panel view - Weld Star Plasma WS-PC65

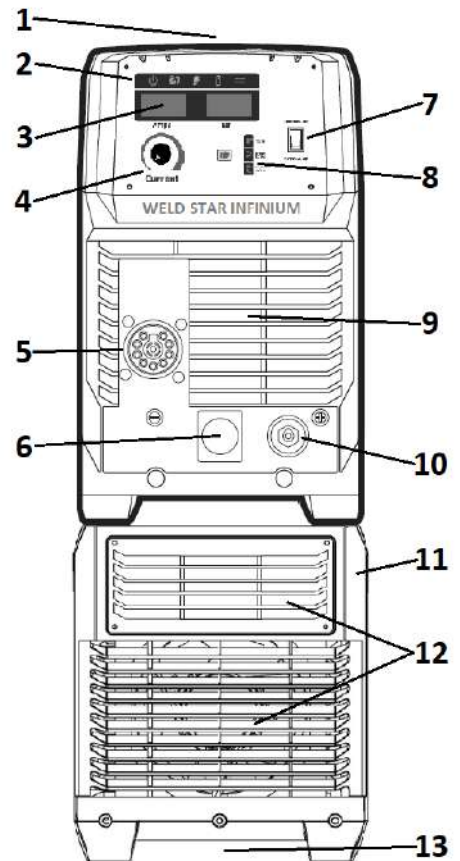


Number	Symbol	Function
25		Power indicator: This LED will illuminate when the machine is connected to the mains power and the ON/OFF switch is turned ON.
26		Power or overload error LED: This LED will light up when over-voltage, over-current or overheating (exceeding duty cycle) is experienced and the unit enters protection mode. When this LED is lit, the output will be disabled until the system overload has either reduced or has been removed and only then will the indicator LED go out.
27		Plasma torch error LED: This LED will light up when an error or fault has been detected with either the plasma torch or air supply. Cutting output will be disabled until the fault clears. A flashing LED will mean that the torch shield cap is not fitted correctly. A continuous LED will mean either a missing consumable, torch damage or insufficient air pressure supply to the machine/plasma torch.
28		Cutting output LED: This LED will be lit when the output power has been activated and will remain lit while cutting.
29		This selection switch allows the user to switch between options (numbers) 26, 27 and 28
30		Air purge switch: This switch allows the user to activate gas flow to allow the gas flow to be checked and set.
31		Normal cutting LED: When this option is selected the user is in standard cutting mode i.e. for use with solid workpieces.
32		Grid/Perforated metal cutting LED: When this cutting option is selected the user can cut grid/perforated material without having to remove the finger from the torch trigger as the pilot arc will automatically restart.
33	-	Internal/external air switch: Allows the user to select either the internal air compressor or to select to use 'external' workshop supplied compressed air.
34		Current control dial: This dial allows the user to set the required output current demand which is shown via the settings alongside the dial of 20 - 65amps.

DESCRIPTION OF CONTROLS

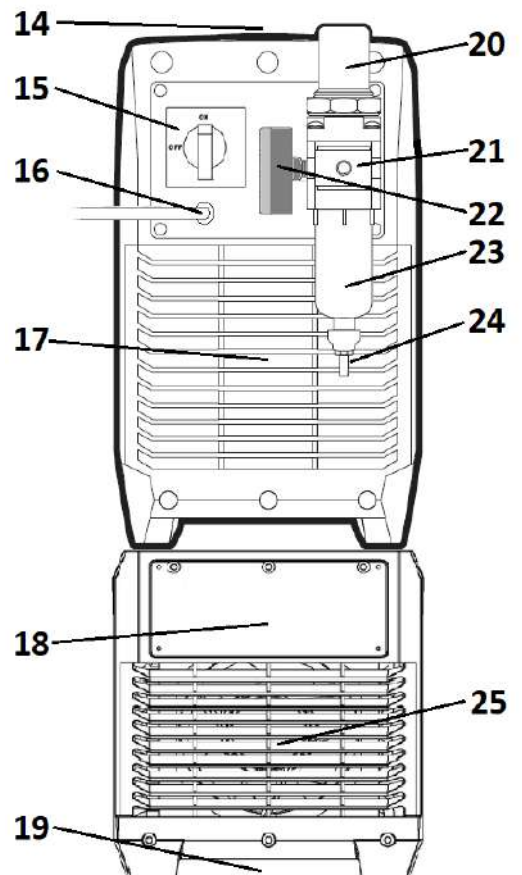
Front view Weld Star Plasma WS-PC120 (Trolley not shown)

1. Handle (not shown)
2. Control panel indicators
3. Current and air pressure digital displays
4. Current control dial
5. Torch connector, the plasma torch connection (see page 21 for fitting instructions)
6. N/A
7. Internal/external air selector switch
8. Control selector switch
9. Cooling air vent
10. Work return connector (10/25mm dinse socket)
11. Compressor unit
12. Compressor air vents
13. Wheel kit (not shown)



Rear view Weld Star Plasma WS-PC120

14. Handle (not shown)
15. ON/OFF mains power switch
16. Mains input cable
17. Air vent
18. Compressor unit
19. Wheel kit (not shown)
20. Air pressure regulator adjustment knob
21. Air pressure inlet (from workshop compressor)
22. Air pressure gauge
23. Air pressure regulator filter
24. Air pressure regulator drain
25. Compressor air vent



CONTROLS

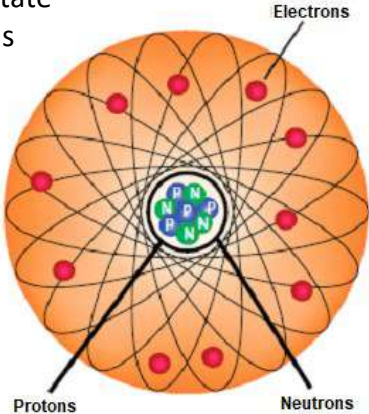
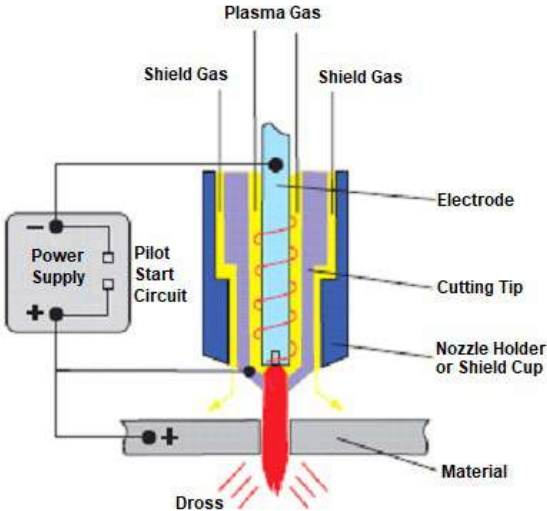
Control panel view

Weld Star Plasma WS-PC120



Number	Symbol	Function
26		Power indicator: This LED will illuminate when the machine is connected to the mains power and the ON/OFF switch is turned ON.
27		Power or overload error LED: This LED will light up when over-voltage/current or overheating (exceeds duty cycle) is experienced and the unit enters protection mode. When this LED is lit, the output will be disabled until the systems overload has either reduced or has been removed and only then will the indicator LED go out.
28		Plasma torch error LED: This LED will light up when an error or fault has been detected with either the plasma torch or air supply. Cutting output will be disabled until the fault clears. A flashing LED will mean that the torch shield cap is not fitted correctly. A continuous LED will mean either a missing consumable, torch damage or insufficient air pressure supply to the machine/plasma torch.
29		Compressed error LED: This LED will light up if the internal compressor or an external workshop compressor is connected but not delivering enough air pressure.
30		Cutting output LED: This LED will be lit when the output power has been activated and will remain lit while cutting.
31	-	Digital ammeter display: This display will show preset current and actual current when cutting. When in gas test mode this display will show 'GAS'.
32		Current control dial: This dial allows the user to set the required output current demand which is shown on the digital ammeter display of 20 - 120amps.
33		This mode selection switch allows the user to switch between options (numbers) 26, 27 and 28
34		Air purge switch: This switch allows the user to activate gas flow to allow the gas flow to be checked and set.
35		Normal cutting LED: When this option is selected the user is in standard cutting mode i.e. for use with solid workpieces.
36		Grid/Perforated metal cutting LED: When this cutting option is selected the user can cut grid/perforated material without having to remove the finger from the torch trigger as the pilot arc will automatically restart.
37	-	Internal/external air switch: Allows the user to select either the internal air compressor or to select to use 'external' workshop supplied compressed air.
38	-	Digital air pressure display: This display shows the air pressure setting.

WHAT IS PLASMA?

- Plasma is commonly described as the fourth state of matter (i.e. solid, liquid, gas then plasma).
 - If you increase gas to an extremely high temperature you get the fourth state plasma, the energy begins to break apart the gas molecules and the atoms begin to split. Normal atoms are made up of protons and neutrons in the nucleus surrounded by a cloud of electrons. In plasma, the electrons separate from the nucleus. Once the energy of heat releases the electrons from the atom, the electrons begin to move around quickly. The electrons are negatively charged and they leave behind their positively charged nuclei. These positively charged nuclei are known as ions. When the fast-moving electrons collide with other electrons and ions, they release vast amounts of energy. This energy is what gives plasma its unique status and unbelievable cutting power.
- 
- Plasma is a gas which has been heated to an extremely high temperature and ionized so that it becomes electrically conductive. An example of naturally occurring plasma is lightning.
 - The plasma arc cutting, gouging and welding processes uses plasma to transfer an electrical arc to the work piece, the electrically conductive gas will transfer the energy from the plasma power source through a plasma torch to the material being cut.
 - The plasma arc cutting process basics can be seen in the illustration. The basic principle is that the arc is formed between the electrode and the work piece by forcing the plasma gas and the electrical arc through a small orifice within the copper tip. This will increase the speed and temperature of the plasma exiting the tip.
 - The temperature of the plasma is in excess of 15000°C and the speed can approach that of sound. This plasma gas flow in conjunction with the high temperature enables a deeply penetrating plasma jet to cut through the work piece material and at the same time molten material is blown away from the cut.
- 
- The process differs from the oxy-fuel process in that the plasma process works by using the high temperature arc to melt the metal to be cut. With the oxy-fuel process, the oxygen oxidises the metal to be cut and the heat from the exothermic reaction melts the metal. So, unlike the oxy-fuel process, the plasma process can be used to cut metals including those which form protective refractory oxides such as aluminium, stainless steel, non-ferrous alloys and cast iron.
 - The output current (amps) of the power supply will determine the cutting thickness and speed capabilities of the plasma machine.
 - While the primary goal of plasma arc cutting is the separation of metal, plasma arc gouging is used to remove metals to a controlled depth and width.
 - Plasma machines consist of a power supply, an arc starting circuit, a plasma torch and a compressed air supply.
 - Direct current (DC) straight polarity is used for plasma cutting with the electrode being negative (-) and the tip/work piece being positive (+).

INSTALLATION



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

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 mains power connection

Before connecting the machine you should ensure that the correct supply is available.

Details of the machine requirements can be found on the specification data plate of the machine or within the technical parameters shown in the manual.

The equipment should be connected to the mains supply by a suitably qualified competent person.

Always ensure the equipment has a proper grounding in accordance with local standards.

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

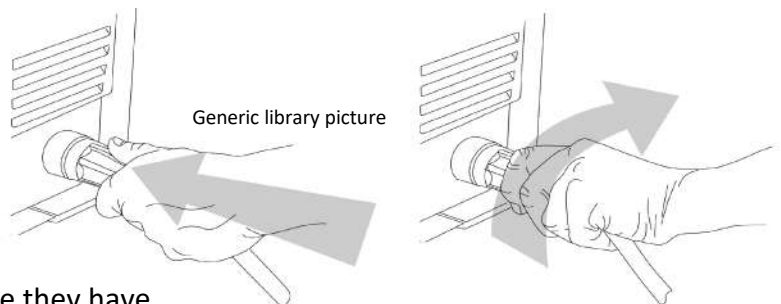
Input air connection (if using workshop supplied compressed air)

- The Weld Star Plasma range of machines are only designed to be used with compressed air (**DO NOT USE OXYGEN or any other gas**) and the compressor or air cylinder air requirements are as follows:
 - Minimum air input: 5 Bar (75psi)
 - Maximum air input: 7 Bar (87psi)
 - Minimum air flow: 4.5CFM (120Ltr/min)
- Connect the compressed air with the supplied air hose and air fitting to the machine via the inlet connection on the rear panel (max 8 Bar).
- The air regulator for the Weld Star plasma machine is mounted on the rear panel and is fully adjustable. To adjust please see page 22 for further instructions.
- Any moisture/water which has been collected by the air regulator will be drained by the auto drain system of the in-built air regulator.
- Ensure your compressor offers only dry compressed air and is capable of delivering the volume of air that is required to run your plasma cutting machine to specification. We recommend minimum air supply requirements of 120 Ltr/min @ 5 Bar (75psi).
- When using either a compressed air cylinder or a compressor ensure it is equipped with a suitably fitted high pressure regulator capable of reducing the pressure to the required amount.

Output connections

Work return cable

Insert the cable plug of the work return lead into the dinse socket on the front panel of the welding machine and tighten it clockwise.



Please Note:

Check these power connections daily to ensure they have not become loose otherwise arcing may occur when used under load.

OPERATION - USER SET UP



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

Output connections

Plasma torch

The plasma torch supplied with your Weld Star machine has the 'euro style' power/gas connection (in this case the gas used is compressed air), pilot cable and the torch switch pin connections.

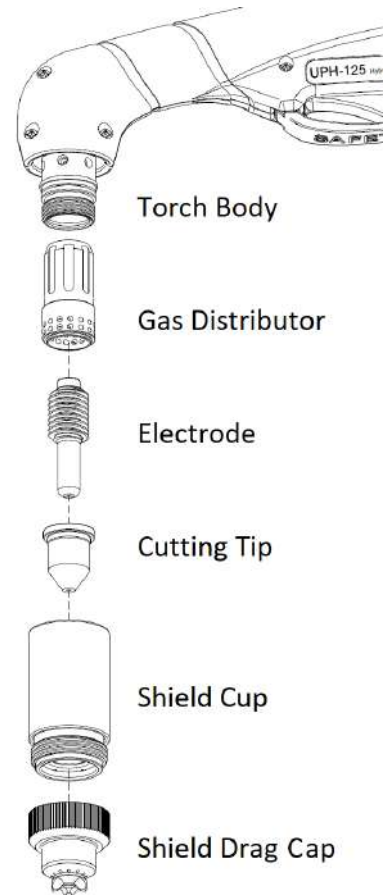
The Weld Star plasma cutting systems and torches incorporate a safety circuit to prevent operator injury when changing consumables etc.

This is a simple ring circuit that breaks the electrical torch switching as soon as the retaining cap is removed preventing machine operation.

Without such protection circuitry, as previously mentioned, the open circuit voltage could be as high as 350V DC at the torch head.

The torch head encompasses a full set of consumables as shown right, these consumables are made up of a cooling tube, torch electrode, swirl ring for gas distribution, cutting tip, retaining cap and if required a stand off device to ensure the same distance between tip and material being cut.

Do not overtighten the shield cup body to the torch head.



Fitting the supplied plasma torch

On the Weld Star Infinium plasma machine range, the torch fitting instructions (shown below) need to be observed.

- ⇒ Locate plasma torch plug into euro connector socket as shown in image 1
- ⇒ Push the torch as shown in image 2
- ⇒ Rotate the locking nut clockwise until fully connected and tight as shown in image 3

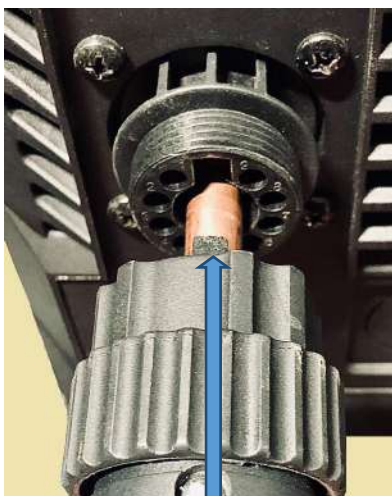


Image 1

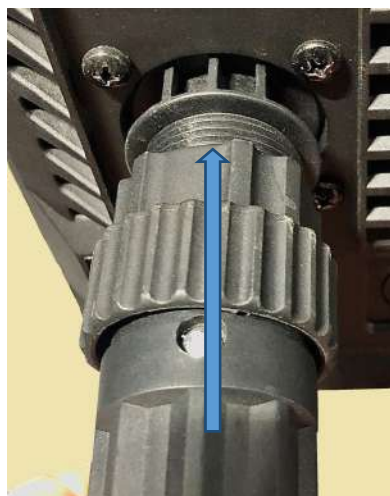


Image 2



Image 3

OPERATION - USER SET UP



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

Please note: The following should only be carried out by the authorised operator.

Air pressure setting

The external air pressure regulator is mounted on the machines rear panel and is only present and used when workshop compressed air is connected.

If for any reason adjustment is required then it can easily be carried out by the operator following the instructions below:

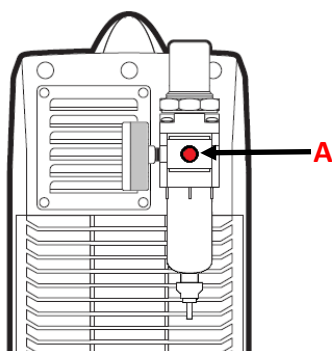


Image 1

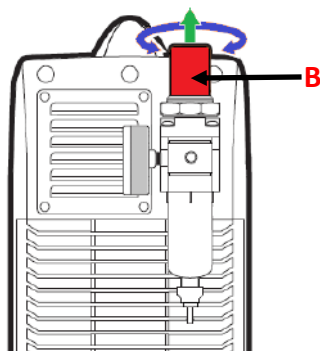


Image 2

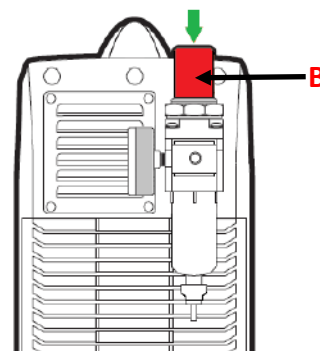


Image 3

1. Ensure the plasma torch is securely in place (see page 22).
2. Connect the workshop air supply to the machine via the air regulator inlet (A) mounted on the rear panel (image 1).
3. Connect the machine to the mains supply and switch the machine ON (located on the front panel for the PC-40 and via the rear panel on the PC-65 and PC-120 machines (see from pages 15)).
4. Press the selection button (C) until you select the test air option (D) which will then activate air purging to start the air flow through the machine and plasma torch (shown in image 4).
5. Using your fingers, lift up the pressure control knob (B) of the pressure regulator to 'unlock' it shown in image 2.
6. Now (if required) adjust the air pressure by rotating the knob (B) in either clockwise direction to increase the air pressure setting or anticlockwise to reduce the pressure which will be noted on the pressure gauge.
7. When the correct air pressure is set on the regulator gauge, push down the adjusting knob (B) in image 3 to lock it.

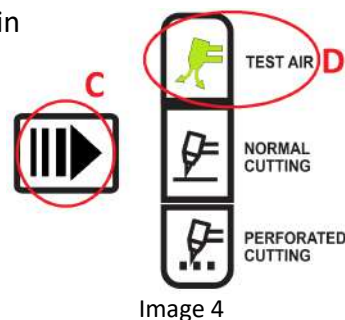


Image 4

Please Note:

- ♦ The PC-120 machine also has the air pressure shown on the front digital display.
- ♦ Any water which has been collected by the air regulator will be drained by the auto drain of the regulator.
- ♦ Always ensure that your compressed air supply is clean and dry, this can be achieved by installing air filters and air driers as required.
- ♦ Due to condensation build up in supply pipes from the compressor, its good practice to always have an air filter and/or air drier mounted inline at the outlet (connection point) for the plasma machine.

OPERATION - USER SET UP

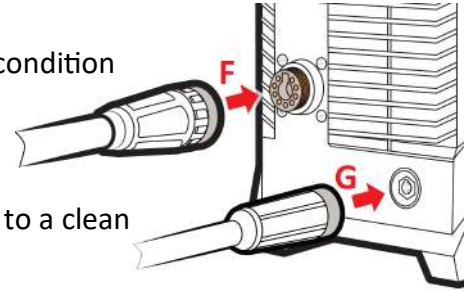


Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any personnel within the welding area.

Plasma cutting

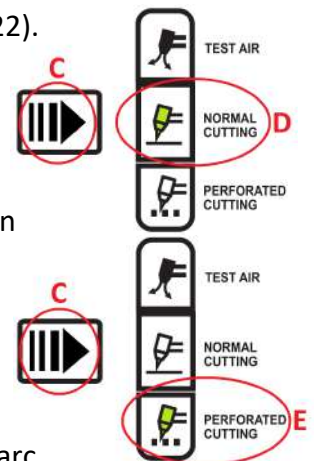
Check that all connections have been made as required. Check the following before using the machine:

- Check if the machine is connected to the correct input supply and is reliably grounded according to the relevant local standards.
- If using workshop air, check that the air supply is dry and free from contaminants and that the air hose is connected to the plasma machine.
- Check that the plasma torch is connected correctly (F) and in good condition with the correct consumables fitted for the application.
- Connect the work return lead plug to the socket located (G) on the front panel and ensure it is fitted tightly.
- Ensure that the work return lead ground clamp is securely clamped to a clean section of the material being cut.



Operation

1. Set the cutting current according to the thickness of the material being cut (see page 29 for a guide).
2. Ensure that the cutting tip and consumables fitted match the application and cutting amperage set via the front control panel of the machine.
3. Switch the machine power ON via the mains switch located on the front or rear panel (depending on model). The power LED will illuminate when the machine is ON.
4. Choose between internal air or workshop supplied air via the internal/external selection switch.*
5. Check that the air pressure is set correctly. Enter gas purge mode by pressing the selector switch (C) to purge the gas to correctly set the air pressure (See page 22).
6. Press the work mode selection switch again to put the machine into either normal cutting (D) or perforated (E) cutting mode, the corresponding LED will then light up.
7. Bring the plasma torch cutting tip to a distance of about 2mm from the work piece. Upon pressing the torch trigger, the air will flow and the pilot arc ignition will start. ** For modes of cutting, see from page 24.
8. After the pilot arc has ignited ***and you are within transfer distance of the work piece the pilot arc will transfer to the main cutting arc and cutting starts. You can now start moving the torch at a regular speed along the material you are cutting.
9. To stop cutting, remove your finger from the plasma torch trigger. The plasma arc will stop although the air flow will continue for a short period of time to cool the torch head.



* Please Note:

If you have an air supply connected from a workshop compressor to your Weld Star plasma, and turned ON, then this air choice will automatically be used even if the internal/external air switch is set to 'internal'. If you want to run the plasma via the internal compressor, ensure you have disconnect the Weld Star plasma from your workshop compressor supply.

** Please note:

It maybe necessary to double press the torch trigger on first start up of the plasma machine as this allows the plasma torch to be purged with compressed air first to enhance the pilot start characteristics.

*** Please note:

The electrode and nozzle will wear much quicker if the operator holds the torch in pilot arc mode away from the plate prior to cutting. Always keep the time between piloting and cutting to a minimum.

OPERATION - USER SET UP



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

Operation continued

Normal cutting mode



NORMAL
CUTTING

Normal cutting - this mode is the most commonly used for edge start or piercing cutting.

When edge cutting, hold the torch perpendicular to the edge of the material being cut with the cutting tip near (but not touching) the edge of the workpiece at the point where the cut is to start. Press and hold the trigger and once the pilot arc has initiated slowly move the torch over the material until the cutting arc is established then 'cutting' movement can commence. Generally the direction of cutting is towards the user.

To stop cutting just release the torch trigger.

However if the plasma torch is either pulled away from the material or you come to the end of the material being cut and you run off the plate the plasma cutting arc will automatically stop and to re-initiate the plasma arc you would have to release the torch trigger to repress the trigger, so in the case of cutting grid or perforated material we have the following option that should be used.

Perforated cutting mode



PERFORATED
CUTTING

Perforated cutting - This setting is ideal if you are cutting mesh, grid or perforated type material (as image 1 shows below) where you have gaps between the material being cut.

When cutting in 'normal' mode the plasma arc will automatically 'cut out' if it can't find metal to complete the electric circuit, so switching the machine to perforated cutting mode will keep the plasma arc ON otherwise, you'll have to keep releasing/pressing the trigger to restart the plasma arc over and over.

When in perforated cutting mode and when cutting in the travel direction as shown in image 2 below, the torch plasma arc circuit will switch between piloting mode and cutting mode automatically, depending if your torch is above the material or not.

Image 1

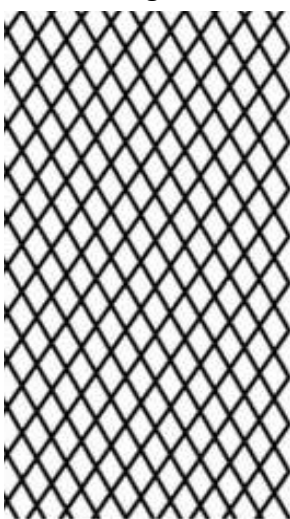


Image 2

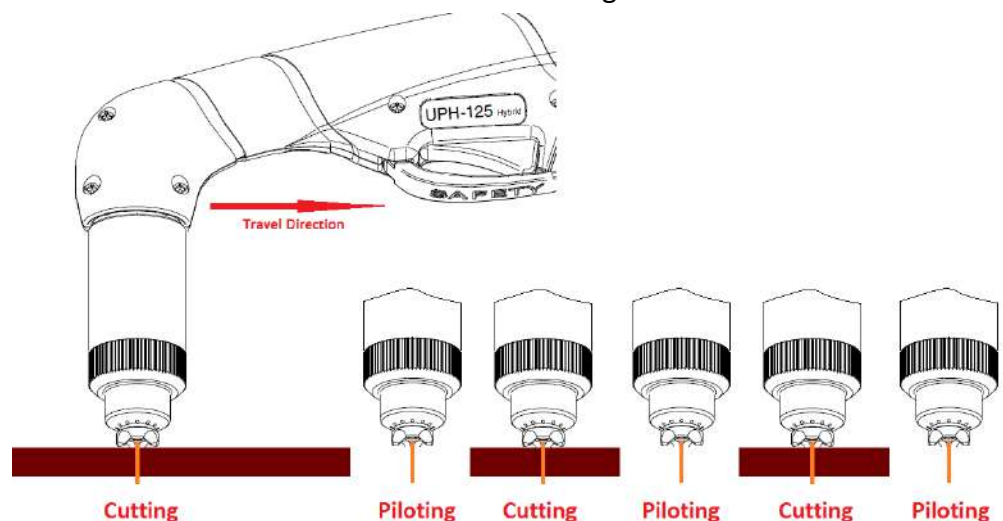


Image 1 shows an example of material which when cutting would be used in the 'perforated' setting mode.

Image 2 helps to explain how the machine can cut perforated material and automatically switches between pilot and cutting mode without the operator having to release and then press the torch trigger multiple times.

OPERATION - MODES OF CUTTING

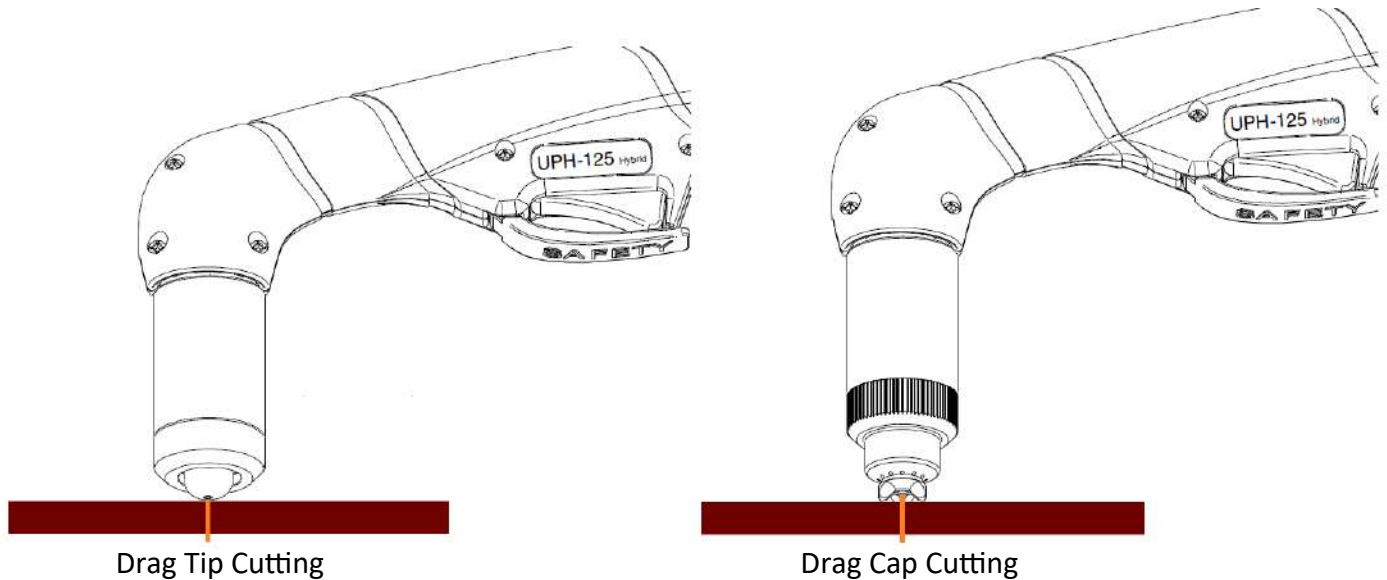


Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any personnel within the welding area.

Modes of cutting

The images below show two different ways by using different consumable configurations that allows the operator to cut material with the plasma torch.

See pages 31-34 for the full consumable selection options for the supplied plasma torch.



Drag Tip Cutting

Drag tip cutting is the process of dragging the tip of the torch along the workpiece to cut the metal. This is often the easiest way to cut while minimizing heat input but usually only on cutting currents of 40/45 amps and below. This technique works best when the material being cut is 5mm or less. Drag tip cutting does require a 'drag' cutting tip and you need to ensure that the plasma machines output amperage is matched to the amperage with the cutting tip. It can often be helpful to use a non-conductive straight edge to help maintain a straight cut.

Drag Shield Cap Cutting

The drag shield cap option allows the same technique to be used but having the cutting tip insulated (shielded) from the material being cut. Using a drag shield cap allows you to rest the torch (via the drag cap) on the workpiece while maintaining an optimal 2-3mm standoff without touching the cutting tip to the material for amperages of 40amps and above. (When cutting at above 40amps, touching the tip to the work material will adversely affect your cut quality and consumable life). When you start to drag cut, you would place the tip/cap of the torch on the workpiece and begin dragging (moving) the torch across the workpiece. You should always start with the torch placed at the furthest point from you and then cut by pulling the torch towards you while making sure to keep the torch upright to the material being cut throughout the cutting process. As you are drag cutting ensure you maintain a smooth and consistent travel speed to make a clean, precise cut.

The main benefits of drag cutting is:

- Much easier for the operator because you don't need to maintain a distance between the cutting tip and the workpiece. You can simply drag the end of the plasma torch along a template or a straight edge. This process usually ensures a more accurate cut.
- Drag cutting produces less spatter and blow back and improves the life of the front end torch parts.
- Best cut quality for material of 5mm or less.

OPERATION - MODES OF CUTTING



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

Modes of cutting continued

Piercing When not starting your cut from the material edge, most likely you will be piercing the material when starting the cut which is the process in which a quick hole is made in the work piece.

Piercing is often just a starting hole that will be used to make a 'circular' cut within the material.

You can use standard cutting tips for piercing although you must ensure the plasma machines output amperage matches the cutting tip amperage rating. The thickness of the material to be pierced will need to fall in the correct amperage range for the machine and cutting tip installed. If the material is slightly thicker than the machines piercing capacity, you can pre-drill a hole and treat your cut like an edge start cut.

There are two different techniques for piercing depending on the thickness of the work piece.

If the work piece is less than 2mm sheet metal, the torch can be held at a 90° (perpendicular) angle to the material being cut with the cutting tip or torch stand off touching or about 2mm away from the work piece (this can depend on which consumable configuration you have installed). Begin by establishing the pilot arc and as soon as the pilot arc/main cutting arc penetrates the work piece maintain your normal cutting height and the cutting process can then begin.

If the material being cut is thicker than 2mm the torch should be held at a 30 ~ 60° angle approximately 2 to 3mm above the work piece ensuring to direct the 'blown back' particles away from the torch tip, operator and any bystanders. Begin by establishing the pilot arc and when the pilot arc transfers, use a smooth, slow rolling motion to move the torch to a 90° (perpendicular) angle. At this point, the pierce should have been created (if not hold the torch still until the cutting arc sparks exits the bottom of the work piece). Now the pierce has been made, the cutting process can begin.

Bevelling allows you to angle the edge of a flat plate or pipe to allow for deeper weld penetration.

This process is normally used for materials that are 9mm or thicker.

You can utilize standard cutting tips for bevelling, but again, you need to ensure you utilize the correct plasma machine amperage to match the cutting tips used. Ensure that the thickness of the material to be bevelled falls in the amperage range of the plasma machine and cutting tip that you will be using. If bevelling by hand, a roller and/or angle guide can be helpful in maintaining the consistent bevel face and the desired angle which is usually determined by the weld joint design.

The industry standard angle ranges are from 15 ~ 45°. The cutting tip would normally be between 3-6mm from the work piece. Bevel type roller guide kits can also be very helpful in creating the bevel cuts required.



OPERATION - MODES OF CUTTING



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

Gouging

Gouging creates a smooth, clean concaved groove within the material being gouged which is often weld ready. This process is primarily used for weld removal or back gouging.

Gouging has specific consumables and settings depending on the gouge you need to produce which include the gouging tip, shield cup and gas distributor that would be specific to gouging.

To begin the gouging process, hold the tip of the torch approximately 12mm from the workpiece angling the torch approximately 20° ~ 40° to the surface, engage the pilot arc and once established slowly move the tip closer to the work piece until the main arc has transferred. Once the main arc is established, retract the tip until the distance from the work piece to the tip is approximately 15mm.

Make sure that you keep the tip of the torch angled approximately 20° ~ 40° during this entire gouging process.

To create a narrow u-groove in the workpiece, the operator should maintain a constant, smooth travel speed.

With this technique the gouge created will be approximately 6mm wide by 6mm deep but this may depend on the gouging tip profile.

To create a wider groove, you can oscillate the plasma torch side to side in a half-moon sequence while maintaining a constant, smooth travel speed. The gouge created will be wider but not as deep.

Due to the nature of the gouging process, lead covers, gouging deflectors and torch covers are some accessories that will help to protect the equipment used in the gouging process. Gouging can be carried out on all conductive materials.

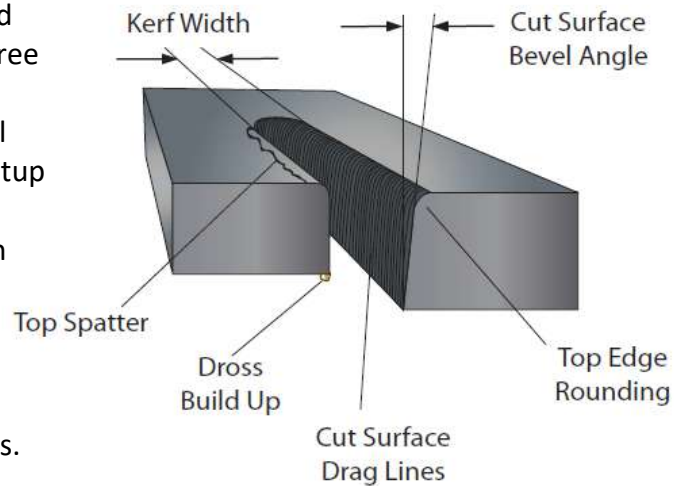
Before you start gouging, check the torch, consumables, and cables for excessive wear and damage. If the electrode, swirl ring or the cutting tip orifice shows signs of wear and tear, replace it with a new component that is sized correctly for your unit and application. Cutting or gouging with worn-out consumables only leads to poor cutting/gouging performance.

Use clean, dry workshop air (install a filter if necessary) and match pressure and flow requirements to those of the plasma cutter. Adjust the gas pressure on the machine according to the owner's manual. For torch leads longer than 6m, add 4 PSI for each additional 6m. Setting the pressure when the air is flowing through the torch will ensure that you have proper pressure and airflow while cutting.

OPERATION - CUTTING TECHNIQUE

The plasma process cuts by melting the material and therefore a characteristic feature is the greater degree of melting towards the top of the metal resulting in poor edge squareness, top edge rounding or a bevel on the cut edge. Cut quality can often depend on setup and your application parameters with torch height, cutting speeds, compressed air pressures along with the users ability to maintain these during the cutting process.

To help understand cut quality, it is best that the characteristics of the finished cut are looked at in close detail, the image adjacent will help explain this.



Cutting or torch angle

Generally when cutting with a plasma torch, the torch should be held perpendicular to the piece being cut.

Stand off distance

The distance between the torch tip and the work piece during the cutting process will have an effect on the bevel angles. The greater the distance, the greater the bevel angle will be. Typically, smaller hand cutting systems (40 amps and under) are designed to drag the tip on the plate. For higher amperage hand cutting systems, use of a drag shield cup, a standoff guide or a cutting guide will help keep a consistent tip to work distance for best results.

Kerf width

During the plasma cutting process a void is left behind which is called the kerf in the material being cut.

Bevel angle

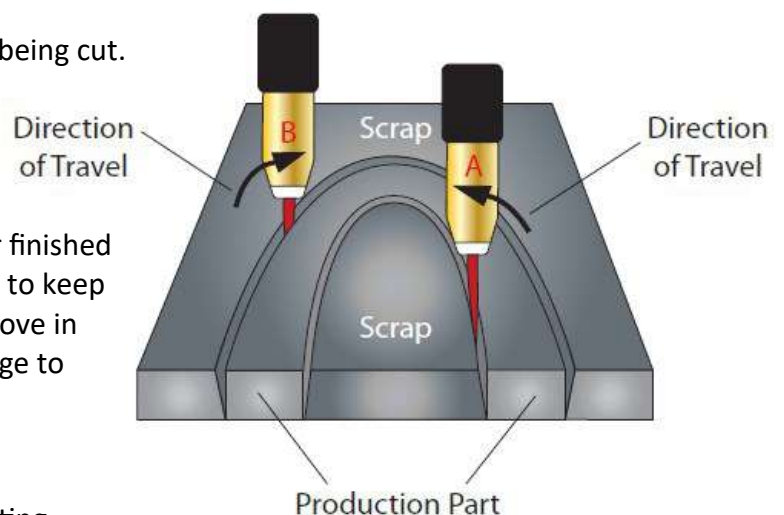
In an ideal cut, the bevel angle or angle of the cut surface would be perfectly square. The plasma cutting process does result in a slight angle which is called a bevel angle, on both the cut and scrap side of the work piece. This is why direction of cut is important. When the plasma gas flows, it has a swirling action as it leaves the cutting tip's orifice. This swirl is generally in a clockwise direction which results in one side of the material being cut being squarer than the other.

This means it is very important to consider the travel direction in relation to the piece being cut.

In the image adjacent, a circle shaped object is being cut.

The inside cut (A) is done in the anti-clockwise direction and the outside cut (B) is done in a clockwise direction.

So remember, if you are making a circular cut and plan to keep the inside round piece as your finished work, move in a clockwise direction. If you plan to keep The piece from which the circle was cut then move in an anti-clockwise direction as shown in the image to the right.



The Weld Star Infinium range offer optional Circle Cutting Guide Kits to assist with circle cutting.

OPERATION - CUTTING TECHNIQUE

Dross

The formation of dross on the bottom of the plate can be caused when cutting parameters such as speed, amperage, arc voltage, gas pressure/flow and type of gas are not correct for the metal type and thickness being cut. Most commonly, incorrect cutting speeds are to blame for excessive dross.

High cutting speeds can result in high speed dross that can be very hard to remove without grinding.

Low speed dross can be easily removed with a brush or chip hammer.

Top edge rounding

This is when the top edge of the cut face has eroded away and is not square which is created from the plasma cutting process. It is generally caused when cutting with excessive current or standoff distance.

This can be a common occurrence when cutting thicker materials.

TYPICAL CUTTING SPEEDS

Cutting speeds can vary according to power source output, cutting table quality, material thickness along with material type being cut as well as the operators skill set.

Speeds shown below are offered as a guide only for our Weld Star hand cutting systems using compressed air and cutting mild steel material with the stated output currents ensuring that the cutting tip fitted matches the stated amperages.

Material Thickness	Amperage	Speed mm/m	Air Pressure
1mm	40	5000 - 6000	5 bar / 73psi
	60	6200 - 7000	5 bar / 73psi
	80	7200 - 8000	5 bar / 73psi
3mm	40	1800 - 2600	5 bar / 73psi
	60	3200 - 4200	5 bar / 73psi
	80	3800 - 4600	5 bar / 73psi
6mm	40	800 - 1100	5 bar / 73psi
	60	1200 - 2000	5 bar / 73psi
	80	1800 - 2500	5 bar / 73psi
12mm	40	200 - 300	5 bar / 73psi
	60	400 - 650	5 bar / 73psi
	80	650 - 820	5 bar / 73psi
15mm	60	400 - 500	5 bar / 73psi
	80	450 - 540	5 bar / 73psi
	100	750 - 880	5 bar / 73psi
20mm	60	280 - 340	5 bar / 73psi
	80	380 - 450	5 bar / 73psi
	100	400 - 480	5 bar / 73psi
	120	650 - 750	5 bar / 73psi
25mm	80	180 - 210	5 bar / 73psi
	100	200 - 240	5 bar / 73psi
	120	300 - 380	5 bar / 73psi
	160	400 - 480	5 bar / 73psi
30mm	160	320 - 400	5 bar / 73psi
45mm	160	230 - 350	5 bar / 73psi

OPERATION - CUTTING TECHNIQUE



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

Notes for cutting operation

1. Do not touch the hot work piece 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 the workpiece unless penetration is needed.
4. Ensure spatter comes from the bottom of work piece while cutting. If spatter comes upwards from the top of work piece, it indicates that the work piece has not been fully cut through. This could be due to not enough power or the cutting torch being moved too fast.
5. For cutting a round work piece or to meet precise cutting requirement, a stencil board or other tools are needed.
6. It is recommended to pull the cutting torch while cutting.
7. Keep the nozzle of the cutting torch upright over the work piece 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.
8. When the work piece is nearly cut off, slow down the cutting speed and release the torch trigger to stop cutting.
9. Check the torch consumables frequently to prolong the life.
10. Always ensure the correct consumables are fitted in the torch. Incorrect items may cause damage to the torch or machine.
11. It is recommended that a torch of maximum length of 6 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.

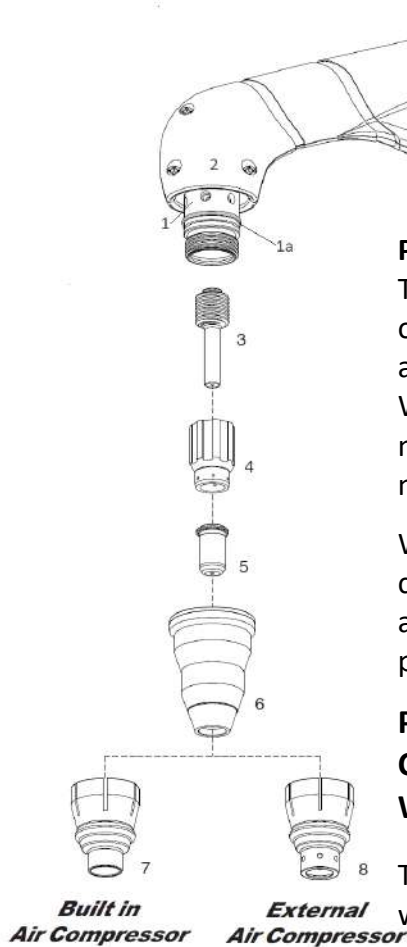
Please Note:

- * The workshop compressed air supply must be free of moisture, water, oil or any other contaminants. Excessive water or oil may cause double arcing, excessive electrode/tip wear or even torch head failure. Contaminants will also cause poor cut quality.
- * It maybe necessary to double press the plasma torch trigger on first start up of the machine, this then allows the plasma torch air hose to be purged with compressed air first to enhance the pilot start characteristics.
- * When starting the arc, ensure you keep the pilot arc time to a minimum to avoid excessive wear on the cutting tip.
- * Do not overtighten the electrode when fitting a new set of consumables. Over tightening may cause damage to the torch head thread, and the tip not to seat correctly.
- * Only use the supplied or recommended 'O' ring lubricant or grease for your plasma torch head as using the wrong lubricant which cannot withstand high temperatures could cause damage to the plasma torch head.

TH-35 HAND TORCH CONSUMABLE BREAKDOWN



The Weld Star WS-PC40-DV is supplied with the 3m TH-35 plasma torch (Pt No 03621C-4)



Please Note:

The Weld Star Plasma WS-PC40-DV has an output current rating of 40amps and the supplied plasma torch is the TH-35 which has a current rating of 35amps.

When ordering replacement cutting tips please take note that the maximum sized tip to be used would be the 35amp cutting tip part number 51218.

When cutting thinner material you may choose to fit smaller sized cutting tip. Ensure that whichever tip you fit you also match the amperage on the output current amp dial on the front control panel.

Please Note:

Configuration shown only to be used on the Weld Star WS-PC40-DV Plasma Machine

The PC40-DV machine package is supplied with the TH-35 torch which is fitted with a set of consumables.

Item No	Part Number	Description	Pack Qty
1	03601	TH-35 Torch Head	1
1a	07300.60	Torch head 'O' Ring	1
2	03606	Handle 75° c/w Switch	1
3 *	52573	Electrode	5
4 *	60009	Swirl Ring	2
5	51218.06	Cutting Tip 20A	10
5 **	51218	Cutting Tip 35A	10
6 *	60302T	Shield Cup Body	1
7 *	51955	Shield Cap (Built-in Air Compressor)	2
8 *	51954	Shield Cap (External Air Compressor)	2
N/A	51844	Circle Cutting Guide Attachment	1
N/A	51888	Bevel Cutting Guide Attachment	1

* These consumable items are supplied with the plasma torch when first purchased.

** Two 35A cutting tips are supplied with the plasma torch when first purchased.

Please Note:

Hand tighten only when fitting the shield cup body to the torch head. **Do not overtighten this cup.** If you feel any resistance when fitting the cup ensure that the threads are all OK or if the torch head 'o' ring requires lubricating before proceeding.

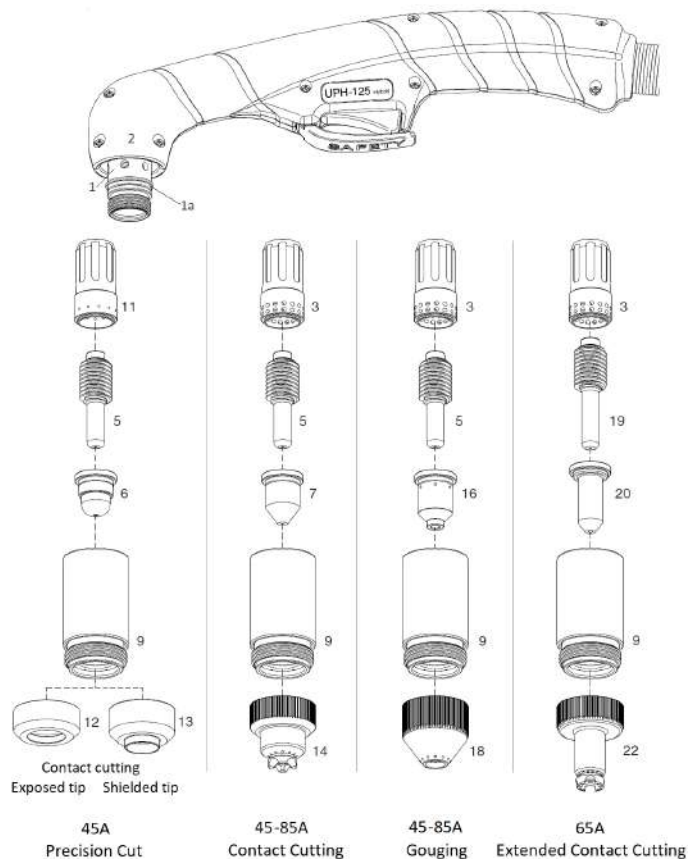
When operating the plasma torch, a small flow of compressed air vents through the gap between the shield cup body and the torch handle and this is normal operation.

Do not attempt to overtighten or force the shield cup body to reduce or close the gap as you may damage the torch head and as a result experience no or erratic pilot arc starting which could cause internal components damage as well.

HAND TORCH CONSUMABLE BREAKDOWN



The Weld Star WS-PC65 is supplied with the 6m UPH-125 plasma torch (Pt No 05921CX)



Please Note:

The Weld Star Plasma WS-PC65 has an output current rating of 60amps and the supplied plasma torch is the UPH-125 which has a current rating of 125amps.

When ordering replacement cutting tips please take note that the maximum sized tip to be used would be the 65amp cutting tip Pt No 51417.

When cutting thinner material you may choose to fit smaller sized cutting tips.

Ensure that whichever tip you fit you also match the amperage on the output current dial on the front control panel.

The UPH-125 Circle Cutting Guide Kit is Pt No 51865

Please Note:

Configuration shown only to be used on the Weld Star WS-PC65 Plasma Machine

The PC65 machine package is supplied with the consumable spare parts kit: Pt No BLKITUPH125/65A

* These consumable items are supplied with the machine package when first purchased.

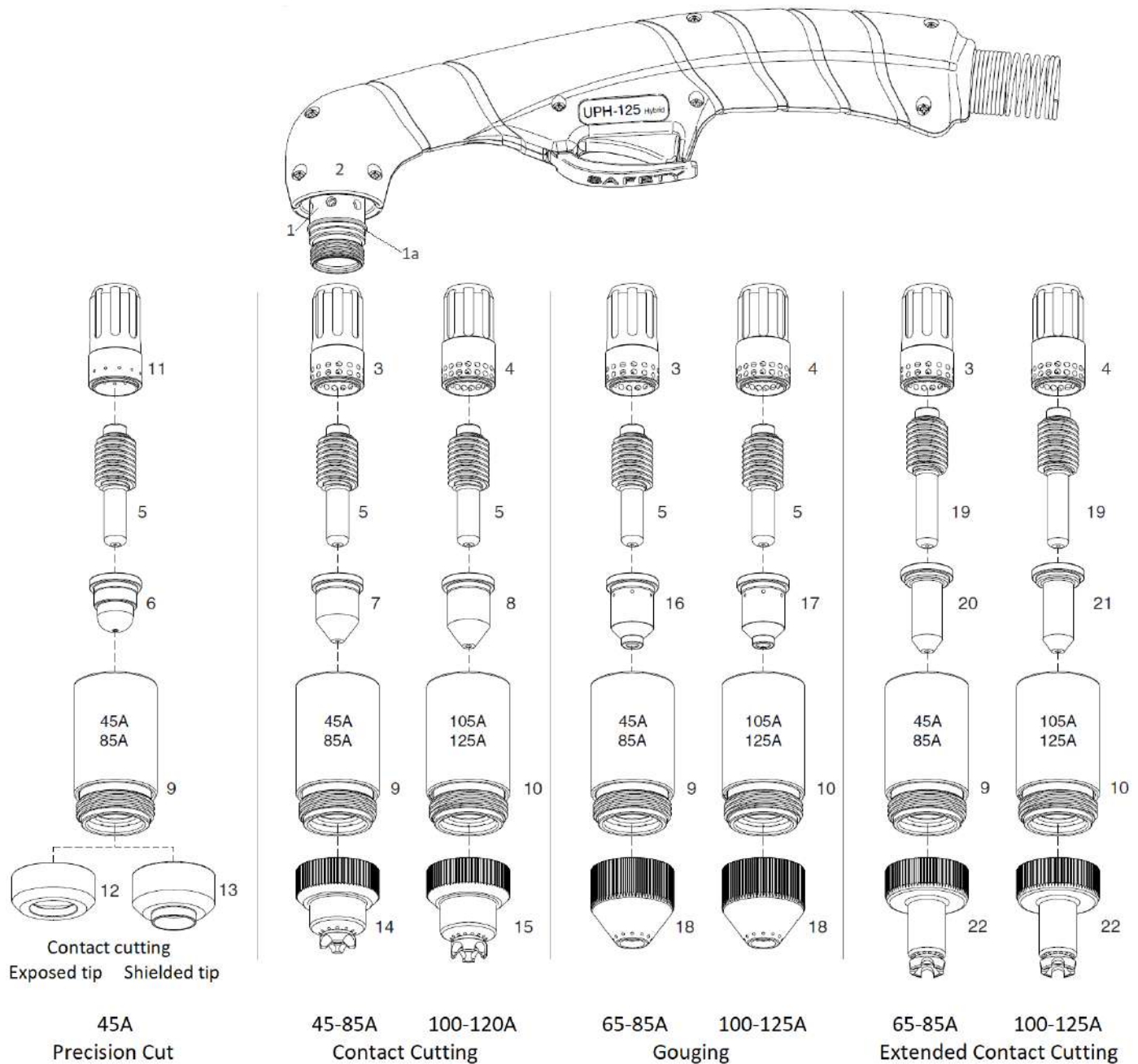
Item No	Part Number	Description	Pack Qty
1	05900	UPH-125 Torch Head	1
1A	03700.60	Torch head 'O' Ring	1
2	05905	Handle c/w Switch	1
3 *	60042	Swirl Ring 45-85A	1
5 *	52677	Electrode 45-125A	5
6	51415	Cutting Tip 45A Precision Cut	10
7	51416	Cutting Tip 45A	10
7 *	51417	Cutting Tip 65A	10
9 *	60309AV	Shield Cup Body 45-85A	1
11	60032	Swirl Ring (for 45A Precision Cut setup only)	1
12	51928	Defector (Drag exposed Tip for item 6 only)	1
13	51931	Defector (Drag Shielded for item 6 only)	1
14 *	51921	Shield Cap 45-85A	1
16	51417G	Gouging Tip 65-85A	10
18	51927G	Gouging Shield Cap	1
19	52677L	Extended Electrode	5
20	51417L.12	Extended Tip 65A	10
22	51926L	Extended Shield 65-125A	1
N/A	51865	Circle Cutting Guide Attachment	1
N/A	51880	Bevel Cutting Guide Attachment	1
N/A	BLKITUPH125/45A	45 Amp Consumable Starter Pack	1
N/A	BLKITUPH125/65A	65 Amp Consumable Starter Pack	1

* These consumable items are supplied with the machine package when first purchased.

HAND TORCH CONSUMABLE BREAKDOWN

STARPARTS

The Weld Star WS-PC120 is supplied with the 6m UPH-125 plasma torch (Pt No 05921CX)



Please Note:

The Weld Star Plasma WS-PC120 has an output current rating of 120amps and the supplied plasma torch is the UPH-125 which has a current rating of 125amps.

When ordering replacement cutting tips please take note that the maximum sized tip to be used would be the 125amp cutting tip Pt No51419.16.

When cutting thinner material you may choose to fit smaller sized cutting tips. Ensure that whichever tip you fit you also match the amperage on the output current dial on the front control panel.

The UPH-125 Circle Cutting Guide Kit is Pt No 51865

Please Note: Configuration above only to be used on the Weld Star WS-PC120 Plasma Machine

The PC125 machine package is supplied with the consumable spare parts kit:

Part Number BLKITUPH125/120A

UPH-125 HAND TORCH

CONSUMABLE BREAKDOWN 120A



Item No	Part Number	Description	Pack Qty
1	05900	UPH-125 Torch Head	1
1A	03700.60	Torch head 'O' Ring	1
2	05905	Handle c/w Switch	1
3	60042	Swirl Ring 45-85A	1
4 *	60040	Swirl Ring 100-125A	1
5 *	52677	Electrode 45-125A	5
6	51415	Cutting Tip 45A Precision Cut	10
7	51416	Cutting Tip 45A	10
7	51417	Cutting Tip 65A	10
7	51418	Cutting Tip 85A	10
8	51419	Cutting Tip 105A	10
8 *	51419.16	Cutting Tip 125A	10
9	60309AV	Shield Cup Body 45-85A	1
10 *	60309BV	Shield Cup Body 100-125A	1
11	60032	Swirl Ring (for 45A Precision Cut setup only)	1
12	51928	Defector (Drag exposed Tip for item 6 only)	1
13	51931	Defector (Drag Shielded for item 6 only)	1
14	51921	Shield Cap 45-85A	1
15 *	51926	Shield Cap 100-125A	1
16	51417G	Gouging Tip 65-85A	10
17	51418G	Gouging Tip 105A	10
17	51419G	Gouging Tip 125A	10
18	51927G	Gouging Shield Cap	1
19	52677L	Extended Electrode	5
20	51417L.12	Extended Tip 65A	10
20	51417L.13	Extended Tip 85A	10
21	51417L.15	Extended Tip 105A	10
21	51417L.17	Extended Tip 125A	10
22	51926L	Extended Shield 65-125A	1
N/A	51865	Circle Cutting Guide Attachment	1
N/A	51880	Bevel Cutting Guide Attachment	1
N/A	BLKITUPH125/45A	45 Amp Consumable Starter Pack	1
N/A	BLKITUPH125/65A	65 Amp Consumable Starter Pack	1
N/A	BLKITUPH125/120A	120 Amp Consumable Starter Pack	1

* These consumable items are supplied with the plasma torch when first purchased.

Please Note:

Hand tighten only when fitting the shield cup body to the torch head. **Do not overtighten this cup.** If you feel any resistance when fitting the cup ensure that the threads are all OK or if the torch head 'o' ring requires lubricating before proceeding.

When operating the plasma torch, a small flow of compressed air vents through the gap between the shield cup body and the torch handle and this is normal operation.

Do not attempt to overtighten or force the shield cup body to reduce or close the gap as you may damage the torch head and as a result experience no or erratic pilot arc starting which could cause internal components damage as well.

PLASMA CUTTING PROBLEMS

The proper installation, application and operation of plasma arc cutting equipment can save many man hours and reduce costs which will give you the promised cut quality and longer consumable parts life. Cut quality issues or poor consumable life are generally the most common problems seen with plasma cutting systems and more often than not are caused by the same thing, for example, low or too high air pressure, low air flow, water or oil in the supply airline, all will give you poor cut quality and premature consumable wear. It's often difficult to diagnose cutting issues without understanding the machines use and setup and there are various questions that need to be asked to be able to give the best advice. Below are listed a few pointers to help you on your way to obtaining consistently good cut quality:

- Ensure your mains power supply is suited to the plasma cutting machines specifications.
- Ensure the supplied air supply is in keeping with the requirements of the plasma machine.
- Ensure your plasma machine amperage setting matches the cutting tips amperage.
- Clean and service the plasma machine and torch regularly, it is important that the operator monitors the torch for signs of damage, contamination or over worn consumables.

Problem	Possible cause	Suggested action
Excessive wear of consumables (short life time)	Low (or high) air pressure or low air flow when using shop compressed air	Check for low air pressure to the plasma machine (low flow can be caused by a long air hose with a small internal diameter or leaks). Ensure your compressor is set to deliver the correct CFM as detailed in the plasma owner's manual and can keep this level maintained during your cutting operation (consider other equipment being used on the same airline).
	Contaminated air or excessive moisture in the air supply	Use suitable airline filters or air dryers and service the devices as required as per the user manual. If using a compressor, ensure the receiver is drained regularly.
	Drag cutting at high amperages	Refer to the torch spare parts of this manual for the correct use of cutting tips and their amperage ratings.
	Dragging the cutting tip against a metallic straight edge	Ensure you use a non-metallic straight edge to guide the torch along.
	Excessive piloting	Keeping the pilot arc maintained will erode the consumables much faster than when cutting. Keep piloting to a minimum.
Poor cut quality	Improper travel speed	Refer to the cutting guide chart on page 29 of this user manual for the correct settings for the material being cut.
	Cutting amperage not correct	Refer to the cutting guide chart on page 29 of this user manual for the correct settings for the material being cut.
	Stand-off height not correct	Refer to the cutting guide chart on page 29 of this user manual for the correct settings for the material being cut.
	Using incorrect torch consumables	Refer to the plasma spare parts breakdown on pages 31-33 of this user manual to ensure the correct consumable configuration is being used for the application.
	Worn consumables	Check and replace as necessary.
	Plasma not delivering enough output current	Have a technician check the output current of the plasma to ensure it is meeting demand.
	Incorrect air pressure or air flow to the machine	Check machines air demand specifications, refer to page 12 within this user manual to ensure air supply meets the requirements. See page 22 for further information.

TROUBLESHOOTING



The following operation requires sufficient professional knowledge on electrical/electronic 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.

Before any welding and 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 may be potentially dangerous to the user! There are dangerous voltages present within this plasma power supply unit. Only professionally trained 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 removing the panels.

Description of fault	Possible cause
Mains power switch is on, although the power indicator doesn't light up.	Check that the input power is turned on. Check the input power fuse. Check the input cable plug and connections. Check the ON/OFF switch for function and continuity.
Primary power switch is on, but the cooling fan does not work.	Check fan is not being blocked by debris. Check fan for functionality. Check fan supply.
No air flow at torch when either torch trigger is pressed or air purge switch is activated.	Check the compressor (internal or external compressor). Check all the input air connections and fittings. Internal connection is disconnected or loose. Check the air by activating the air purge switch for functionality.
Internal air compressor is not functioning.	Check the internal/external air switch is not set to internal. If an external air compressor line is connected to the machine's inlet air regulator, the Weld Star plasma range will always default to external air, even if the internal/external selection switch is set to internal - disconnect the external air hose. Faulty internal compressor or compressor supply circuitry.
Overheat LED lit.	Machine operated outside duty cycle, allow the machine to cool and the unit will reset automatically. Fan not working - check for obstruction blocking the fan.
Pilot arc does not initiate when the torch switch is activated or is intermittent at starting.	Air pressure too low to the machine (when external air supply is used). Worn or missing consumable. The control option 'air purge' mode is not set to normal/perforated cutting mode. It may be necessary to double press the trigger on first start up the machine as this allows the plasma torch to be purged with compressed air first to enhance the pilot start characteristics. Overtightened shield cup body, check and loosen by 1/4 ~ 1/2 turn and try again. Plasma torch too long (we recommend 6m maximum length). Faulty plasma torch, have the torch checked by a qualified technician.
Low cutting current	Cutting current set incorrectly, check and adjust to the correct setting. Check to ensure that the work return lead clamp is connected correctly to the material being cut. Internal component failures, have the machine checked by a qualified technician.
Machine cutting but with poor cut quality	Output current is set too low. Worn consumables or incorrect consumable fitted for current setting. Low or too high gas pressure/flow.

MAINTENANCE



The following operation requires sufficient professional knowledge on electrical/electronic 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 your cutting and welding machine works efficiently and safely, it must be maintained regularly.

Operators should understand maintenance methods and be conversant with operating plasma cutting machines.

This guide should enable customers to carry out simple examination and safeguarding themselves, so as to reduce the fault rate and repair times of the welding and cutting equipment, and so to lengthen the

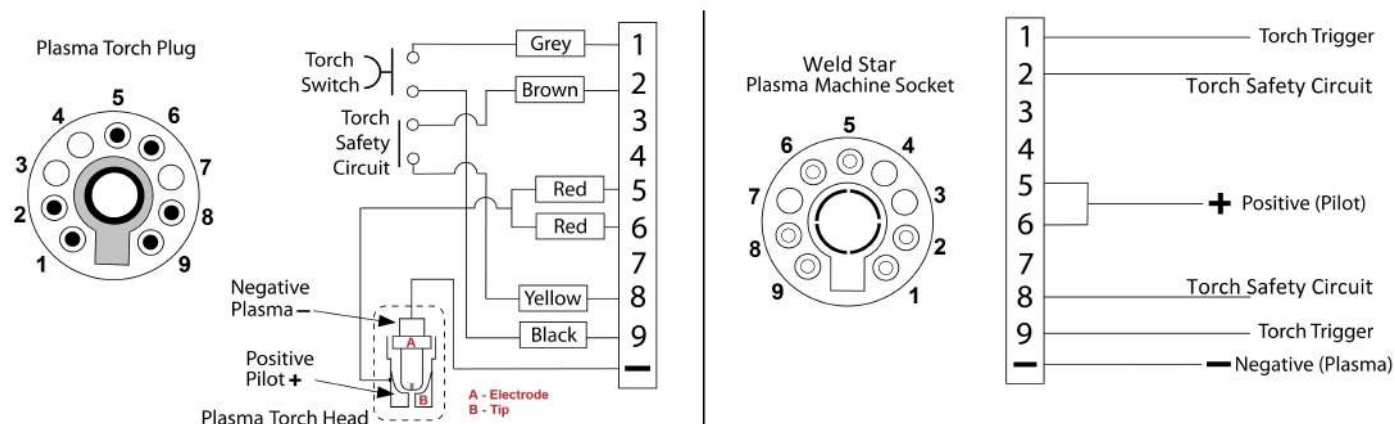
Period	Maintenance item
Daily examination	<p>Check the condition of the machine, mains cables, welding cables and connections.</p> <p>Check for any warnings LEDs and machine operation.</p> <p>Check the torch consumable condition and replace if worn.</p> <p>Check the compressor air supply and adjust as required.</p>
Monthly examination	<p>Disconnect from the mains supply and wait for at least 5 minutes before removing the cover.</p> <p>Check internal connections and tighten if required.</p> <p>Clean the inside of the machine with a soft brush and vacuum cleaner.</p> <p>Take care not to remove any cables or cause damage to components.</p> <p>Ensure that ventilation grills are clear.</p> <p>Check inline air filters.</p> <p>Carefully replace the covers and test the unit.</p> <p>This work should be carried out by a suitably qualified competent person.</p>
Yearly examination	<p>Carry out an annual service to include safety check in accordance with the manufacturers standard (EN 60974-1).</p> <p>This work should be carried out by a suitably qualified competent person.</p>

service life of your plasma machine.

Please Note:

You should avoid using compressed air to blow the dirt/dust out of the power supply, if you do then its very important to ensure that the air supply used is dry and the pressure is below 30 psi (2 bar).

The appropriate PPE must also worn.



WEEE 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 and United Kingdom's Directive The Waste Electrical and Electronic Equipment (WEEE) regulations 2013 states that electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.

Weld Star has a relevant recycling system which is compliant and registered in the UK with the environment agency. Our registration reference is WEEMM3813AA.

In order to comply with WEEE regulations outside the UK you should contact your supplier.

RoHS Compliance Declaration

We herewith confirm that the above mentioned product does not contain any of the restricted substances as listed in EU Directive 2011/65/EU and the UK directive ROHS Regulations 2012 in concentrations above the limits as specified therein.

UKCA Declaration of Conformity



The manufacturer, or its legal representative Wilkinson Star Limited, declares that the equipment described below is designed and produced according to following UK legislation:

- Electrical equipment safety 2016
- Electromagnetic compatibility (EMC) regulations 2016
- The restrictions of the use of certain hazardous substances in electrical and electronic equipment regulations 2012

And inspected according to following designated standards:

- EN 60 974-1:2018+A1:2019
- EN 60 974-10:2014+A1:2015

Any alteration or change to these machines by any unauthorized person makes this declaration invalid.

Model:

Weld Star Plasma WS-PC40-DV

Weld Star Plasma WS-PC65

Weld Star Plasma WS-PC120

Authorised Representative:

Wilkinson Star Limited
Shield Drive
Wardley Industrial Estate
Worsley
Manchester
M28 2WD

Disclaimer:

Please note that this confirmation is given to the best of our present knowledge and belief.

Nothing herein represents and/or may be interpreted as warranty within the meaning of the applicable warranty law.

CE EC DECLARATION OF CONFORMITY

The manufacturer, or its legal representative **Wilkinson Star Limited**, declares that the equipment described below is designed and produced according to following EU Directives:

- Low Voltage Directive (LVD), No.: 2014/35/EU
- Electromagnetic compatibility (EMC) Directive, No.: 2014/30/EU

And inspected according to following
EU - Norms:

- EN 60 974-1:2012
- EN 60 974-10:2014+A1

Any alteration or change to these machines by any unauthorized person makes this Declaration invalid.

Wilkinson Star model

Weld Star Plasma WS-PC40

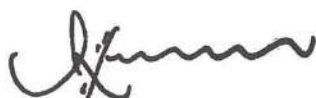
Weld Star Plasma WS-PC65

Weld Star Plasma WS-PC120

Authorised Representative

Wilkinson Star Limited
Shield Drive
Wardley Industrial Estate
Worsley
Manchester
M28 2WD

Signature



Dr John A Wilkinson OBE

Position Chairman

Date



Company stamp

STATEMENT OF WARRANTY

All Weld Star welding, plasma multi-process machines sold through our partner Wilkinson Star Ltd within the United Kingdom, Ireland and Europe shall be warranted to the original owner, non transferable, against failure due to defective materials or production.

The warranty period is 5 years following the date of purchase.

We recommend you register your product within 28 days of purchase via the registration page via the Weld Star product website www.weldstar.uk

The original invoice is documentation for the standard warranty period.

The warranty period is based on a single shift pattern.

Defective units shall be repaired or replaced by the company at our workshop.

The company may opt to refund the purchase price (less any costs and depreciation due to use and wear).

The company reserves the right to alter the warranty conditions at any time with effect for the future.

A prerequisite for the full warranty is that products are operated in accordance with the operating instructions supplied, observing the relevant installation and any legal requirements recommendations and guidelines and carrying out the maintenance instructions shown in the Weld Star operator manual. This should only be carried out by a suitably qualified competent person.

In the unlikely event of a problem, this should be reported to the Wilkinson Star Ltd technical support team to review the claim.

The customer has no claim to loan or replacement products whilst repairs are being performed.

The following falls outside the scope of the warranty:

- Defects due to natural wear and tear
- Failure to observe the operating and maintenance instructions
- Connection to an incorrect or faulty mains supply
- Overloading during use
- Any modifications that are made to the product without the prior written consent
- Software errors due incorrect operation
- Any repairs that are carried out using non-approved spare parts
- Any transport or storage damage
- Direct or indirect damage as well as any loss of earnings are not covered under the warranty
- External damage such as fire or damage due to natural causes e.g. flooding

NOTE:

Under the terms of the warranty, welding torches, their consumable parts, wire feed unit drive rolls and guide tubes, work return cables and clamps, electrode holders, connection and extension cables, mains and control leads, plugs, wheels, coolant etc. are covered with a 3 month warranty.

Wilkinson Star Ltd shall in no event be responsible for any third party expenses or expenses/costs or any indirect or consequential expenses/costs.

Wilkinson Star Ltd will submit an invoice for any repair work performed outside the scope of the warranty. A quotation for any non warranty will be raised prior to any repairs being carried out.

The decision about repair or replacement of the defective part(s) is made by Wilkinson Star Ltd. The replaced part(s) remain(s) Wilkinson Star Ltd property.

Warranty extends only to the machine, its accessories and parts contained inside.

No other warranty is expressed or implied.

No warranty is expressed or implied in regards to the fitness of the product for any particular application or use.

NOTES

[illegible]

WELD STAR | INFINIUM

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50 / A family business
engineered through
generations **since 1971**

E&OE

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