

## INSTRUCTIONS FOR USE

### UNIFIRE 31PFC

MANUAL PORTABLE PLASMA CUTTING SYSTEM



**TO THE OPERATOR:** PLEASE READ AND UNDERSTAND THIS MANUAL BEFORE USING THE SYSTEM. IT IS *ABSOLUTELY VITAL* TO KNOW THE INFORMATION PRESENTED IN THIS MANUAL IN ORDER TO USE THE MACHINES IN THE BEST WAY. WITH THIS KNOWLEDGE AND A PROFESSIONAL APPROACH, YOU WILL BE ABLE TO SOLVE MANY COMPLICATED CUTTING APPLICATIONS WITH THESE SYSTEMS.

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## 1. Technical data

### Unifire 31PFC

Power supply	110/230 V, 1~50/60 Hz
Mains fuse	16A@230V, 32A@110V slow blow
Maximum power	2,85 kVA*
Process power	95 V, 5-30 A
Duty cycle @ 40°C	35%@230V, 25%@110V
Power factor	0,95
Open circuit voltage	424 VDC
Protection class	IP 23S
Cooling	F
Temperature class	F
Dimensions LxWxH	440x190x320
Weight	9,5 kg
Maximum cutting capacity	10mm
Quality cut	8 mm
Pressure/flow	3,5Bar / 115L/min

## 2. Installation.

After connecting to electrical power and compressed air equipment is ready to use.

### Electric power supply

Connect the machine only to 1-phase AC, 50 Hz, 230V. fuse protection should be 16 A slow. when connected to 110V, the fuse must be 32A.

Please note that the warranty requires that the machine is installed in accordance with these instructions. In the event of damage, the damage can be much greater if fusing is not correct. The warranty does not then cover the damage.

### Air connection

Connect clean, dry and oil-free compressed air to the pressure regulator on the back of the power source and adjust the pressure to about 3.5 bar.

### **3. Operating instructions**

Check that the machine has been properly connected to power supply.

Check that the torch is fitted with appropriate consumables for the job at hand.

Connect the earth lead clamp directly at the work piece, ensuring that a good contact is obtained. If necessary, clean the surface from paint, rust, dirt, etc.

#### **Cutting**

- Switch the machine's main power switch ON.  
The READY lamp will light and the fan will start working.
- Choose process power, 5-30 A. Check that the consumables in the torch match the current setting.
- Manoeuvre the torch in position for cutting.
- Press the START-switch on the torch handle.  
The pilot arc will burn for a few seconds. If contact with the work piece is not obtained within this time, the pilot arc goes out. Then make a new try.
- To end the process, release the START-switch. The plasma arc goes out instantaneously. Air will continue to flow for about 30 seconds.

NOTE! When the machine is not in use or is only working at long intervals, switch off the machine. It contains mechanical components that should not be exposed to unnecessary wear. It also protects against unvoluntarily firing the pilot arc.

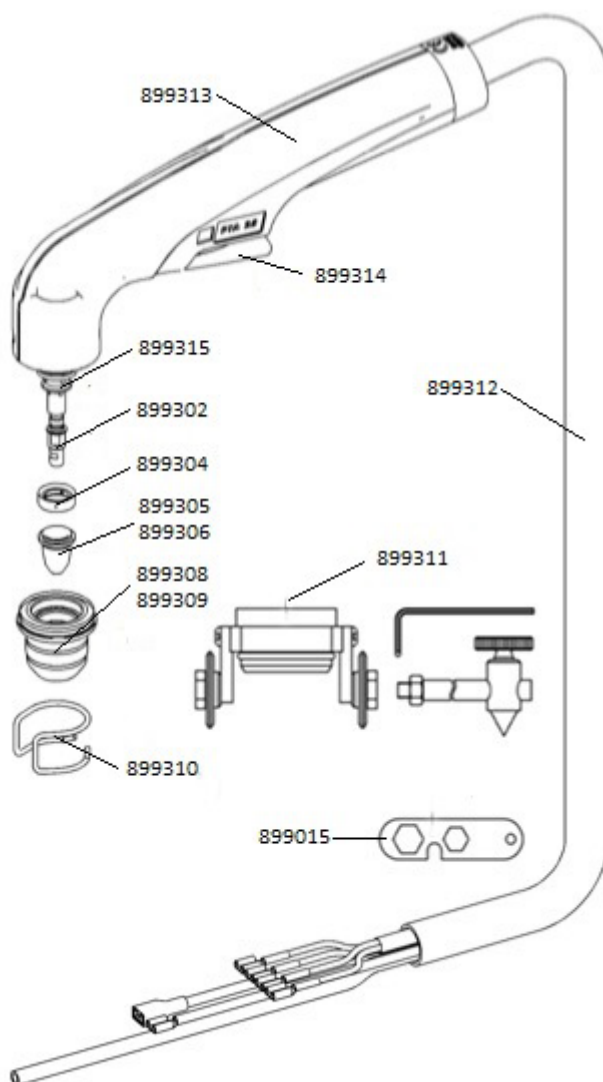
## 4. CHANGING CONSUMABLES

### Removing the consumables.

1. Switch off the machine.
2. Unscrew the protective cap (6).
3. Remove the nozzle (4/5) and the swirl ring (3).
4. Unscrew the electrode (1/2) with the special tool that is delivered with the machine.

### Replacing the consumables.

1. Mount the electrode (1/2) with the special tool.
2. Mount the swirl ring (3) and the nozzle (4/5).
3. Mount the protective cap (6).
4. Switch the machine on.



Part. No	Denomination
454057	UNIFIRE 31PFC med 4 m PTA 25
899315	Torch body PTA 25
899302	Electrode
899304	Swirl ring
899305	Nozzle 0.65 5-20A
899306	Nozzle 0.8 15-30A
899308	Protective cap UF 26C
899309	Protective cap UF 31 PFC
899310	Distance cutting guide
899311	Circle cutting guide PTA 25
899313	Handle PTA 25
899314	Button PTA 25
899312	Hose parcel PTA 25 4m
899015	Consumable tool
899301	Torch PTA 25 4m

## **5. MAINTENANCE**

### **DAILY**

Inspect and, if necessary, change the torch consumable parts.

Carefully inspect the hose assembly and torch body with regard to any leak or damage. Never use a damaged torch.

### **EVERY SIX MONTHS**

Disconnect the machine from electricity. Remove the cover. Clean the machine with dry, clean and oil free compressed air. Inspect cable connections and gas system.

Remove and clean or exchange the compressor intake filter.

In unusually dirty environments this procedure should be carried out every month.

**6. TROUBLE SHOOTING.**

The machine delivers no power. The green working indicator is on. The thermal protection indicator is continuously on.	The thermal protection of the plasma unit is on.	Wait until the end of the cooling phase.
The machine delivers no power. The green working indicator is on. The thermal protection indicator blinks 2 times then lights off	The supply voltage is outside the permitted range. 85-265V.	Check your electrical network or your electric generator then switch off and on your machine.
The machine delivers no power. The green working indicator is on. The thermal protection indicator blinks quickly.	Torch defect.  Low air pressure	Check your torch assembly and consumables. Check air pressure. Turn off and on the machine again.
By pressing the trigger, the air flows but the pilot arc is not working.	Consumables damaged.	Check and replace consumables.
The electrical arc switches off after about 5 seconds.	Earth problem.	Check the earth clamp is well connected to a clean area of the part to cut.

**If the pilot arc does not strike:**

- Check consumables and torch.

**If the pilot arc is unstable:**

- Check the compressors intake filter and clean change if necessary.

**Inferior cut quality or performance:**

- Check the torch consumables. Replace if necessary.
- Inspect the torch body and hose assembly with regard to any damage or leak.
- Check the air pressure on the back of the machine. The pressure must be 3-3.5 bar.
- Check the earth lead connection. Place the earth lead clamp directly on the work piece. If necessary, clean from paint, dirt, rust etc.

## 7. SAFETY INSTRUCTIONS

All endangerments through plasma cutting are related with the process itself. Endangerments may occur due to:

- High contact voltage
- HV ignition
- Electromagnetic interferences
- Heat and light radiation
- Gases, fumes and smoke
- Noise
- Hot metal and spatter
- Handling of pressure cylinders

The Plasma Cutting Machine has been developed in conformity with following standards:

- EN 60974-1 safety requirements for installations for arc welding and welding power sources
- EN 60974-10 electromagnetic compatibility

Before starting the Plasma Cutting Machine carefully read this Instruction Manual. Only advised personnel are allowed to operate the plasma installation!

### ***Endangerment due to high contact voltage***

#### **Warning!**

**Before opening the plasma rectifier generally the input power has to be disconnected physically from the mains (unplug mains cable)! Only advised personnel are allowed to carry out any repairs to the machine.**

**Attention! Connect the work piece cable and earth the workplace before starting the machine!**

The power source is equipped with a cooling unit and there is an electric potential between the housing and work piece in case the work piece isn't earthed and the machine is switched on. Because of the high resistance of more than 10 kOhm in the coolant the contact voltage is absolute not dangerous but sensible.

Special hints:

- Connect power source only to correctly earthed mains socket with proper connected safety conductor
- Wear insulating protective clothing (safety shoes, leather apron, gloves), place torch on insulated holder,
- Wear cutting area and plasma machine components dry and clean, arrange regular inspections, never shorten safety circuits.

### **Working under elevated electrical endangerment**

This plasma cutting machine in conformity with valid standards (EN 60974-1) can be used for operation under elevated electrical endangerment

- The power source and the plasma torches are forming a safety-proofed installation which can be separated only by using tools.
- The patented design of the torch prevents electrical danger when the torch consumables are disassembled.



Therefore the power source is marked with the S-sign and operation under enhanced electrical endangerment is allowed.

**Attention! Always follow the local safety rules!**

### ***Endangerment through high voltage (HV)***

A HV-igniter starts the pilot arc. The HV-supply is cut-off automatically after pilot arc has struck.

**Attention!** Never touch nozzle or nozzle cap when power source is switched ON!

HV-ignition may establish electromagnetic fields and can influence:

- heart pace-makers
- electronic devices

### ***Endangerment through electromagnetic interferences***

The plasma cutting unit is in conformity with the conditions of the EN 50199 “Electromagnetic compatibility”. This standard is valid for arc welding and related processes (plasma cutting) that come in use in commercial and private fields.

### **Warning!**

Special precautions may be required if the plasma unit is used in private fields (for instance screened cables etc.)

The user takes the full risk when installing and using the machine. He has to follow strictly the instructions of the supplier. If electromagnetic interferences are noticed the user is to contact the producer to solve the problem.

### **Recommendations to classify the environment (EN 50199):**

Before the installation takes place the user has to value the environment for electromagnetic problems and to take into consideration:

- Other mains supplies, control cables, signal and telecommunication lines along, above, below or beside the installation
- Broadcasting or television installations
- Computers or other controls
- Safety devices, protection circuits
- The health of people in the area (heart pace makers, hearing aids etc.)
- Devices for measuring and calibrating
- The noise immunity of equipment around the installation, so that they are compatible with electromagnetic interferences. Special measures may be required.
- The time of day that plasma cutting is performed

### **Recommendations to minimise interferences:**

If interferences take place, the following should be done:

- Apply filter for mains connection

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- Screening of mains cable of the plasma installation (safe contact between screen and housing required)
- Constant maintenance
- Always keep cover plates and doors of the plasma machines closed
- Avoid excessive length of cutting cables
- Arrange potential equalisation between metallic parts around the installation (the operator has to be insulated from those parts)
- Earthing of the work piece
- Selective screening of other cables and installations

### ***Endangerment through heat and light radiation***

The plasma arc produces intense ultraviolet and infrared radiation that can hurt the eyes and skin. Therefore the following precautions have to be arranged:

- Wearing of flame-retardant welding clothes (helmet, apron, gloves, safety shoes)
- Hand or head shield with protective glasses of medium shade for watching the cutting process
- Preparing the cutting area so that reflection and transmission of ultraviolet light is reduced:
  - painting of walls in dark colour
  - use of protective walls and screens

### ***Endangerment through fumes and smoke***

Due to the plasma process itself hazardous substances may be produced. To avoid risks on health the following has to be done:

- Keep cutting place well ventilated
- Remove fumes and smoke by exhaustion devices
- Remove all chlorinated and other solvents from the cutting area. They could form phosgene gas when exposed to ultraviolet radiation
- Wear a breathing mask when cutting galvanised materials
- Ensure that toxic limits are not exceeded

### ***Endangerment through noise***

Be aware that during plasma cutting a high noise level arises.

Cutting current	Thickness	Noise level in distance of	
		0,5 m	1,0 m
No load			56dB(A)
80A	4mm	82 dB(A)	79 dB(A)
160A	16mm	86 dB(A)	83 dB(A)
240A	16mm	96 dB(A)	92 dB(A)

Above levels are general. Variations may occur.

**Therefore wear proper ear protection.**

### ***Endangerment through spatter***

During plasma cutting sparks, slag and hot metal are produced. The risk of burns and fire exists! To avoid these endangerments the following has to be advised:

- remove all potential flammable materials from cutting area, at least in a 10 m distance
- cool down freshly cut material before handling
- make fire extinguisher available in the cutting area

### ***Handling of pressure cylinders***

In some cases compressed gases are required for the plasma cutting process. To avoid endangerments the following has to be advised:

- Place cylinders upright in secured position
- Never use damaged cylinders, pressure reducers and armatures
- Use pressure reducers only for the gas it is determined
- Never lubricate pressure reducers with grease or oil
- All parts coming in contact with oxygen must be free from oil and grease
- When using oxygen and/or flammable gases the pressure reducer has to be equipped with an explosive-proofed device (backfire-device)
- Regularly check the gas hoses and other equipment for leaks etc.
- Always follow regulation regarding gas equipment

## 8. WARRANTY

SPT Plasmatechnik AB grants a warranty for its products. The warranty covers damage caused by faulty raw material or production errors. A faulty part will be replaced by a new one, or, if possible, we will repair the faulty part without cost.

The warranty period is 2 years provided the machine is used under normal conditions (one shift working). The torch is not covered by the warranty.

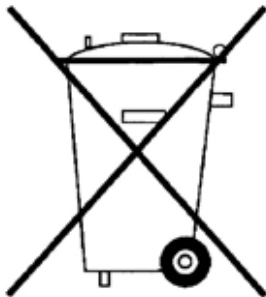
The warranty does not cover damage caused by improper or careless handling, connection to the wrong supply voltage including voltage or frequency variations outside the specifications, overload, irresponsible maintenance or natural wear.

Any use of non-original parts or consumables renders the warranty void.

Travel costs in connection with warranty repairs or freight and packaging costs are not included in the warranty.

Warranty repairs may only be performed by SPT Plasmatechnik AB or a representative assigned by SPT.

## 9. SCRAPPING



Do not throw electrical equipment in the regular rubbish! According to EU-directive 2002/96/EG regarding waste that contains electric or electronic parts (WEEE) and its implementation with national laws products must be collected separately and brought to approved recycling facilities after their useful life. As the owner of the product you should find out the location of an approved recycling facility from your local dealer.