

Sherman[®]

V4.4 14/8/26

USER MANUAL

**INVERTER PLASMA CUTTER
CUTTER 90, CUTTER 110**



CE



WARNING!

Before installing and starting the appliance, please refer to this manual

1. GENERAL COMMENTS

The device can only be commissioned and operated after carefully reading these Operating Instructions.

Due to the continuous technical development of the device, some of its functions may be modified and their operation may differ in detail from the descriptions in the manual. This is not a fault of the device, but the result of progress and continuous modification work of the device.

Damage to the device caused by improper operation will void your warranty rights.
Any modifications to the cutter are prohibited and will void the warranty.

2. SAFETY

Employees operating the device should have the necessary qualifications to perform plasma cutting:

- know the rules of health and safety in the operation of power equipment, such as plasma cutting equipment and auxiliary equipment powered by electricity,
- know the rules of health and safety when operating air compressors.
- Be familiar with the contents of this manual and operate the appliance for its intended purpose.



WARNING



Plasma cutting can endanger the safety of the operator and other people in the vicinity. Therefore, special precautions should be taken when cutting. Before pruning, you should familiarize yourself with the health and safety regulations applicable at the workplace.

The following hazards exist during plasma cutting:

- **ELECTRIC SHOCK – CAN BE FATAL**
- **NEGATIVE EFFECTS OF THE BOW ON HUMAN EYES AND SKIN**
- **SMOKE AND GAS POISONING**
- **BURNS**
- **EXPLOSION AND FIRE HAZARDS**
- **NOISE**

Electric shock prevention:

- connect the device to a technically efficient electrical system with proper protection and zeroing efficiency (additional protection against electric shock); other devices at the workplace should also be checked and correctly connected to the network,
- install power cables when the device is switched off,
- Do not touch the non-insulated parts of the plasma torch, the workpiece to be cut and the device housing at the same time.
- do not use torch and power cords with damaged insulation,
- in conditions of particular risk of electric shock (work in environments with high humidity and closed tanks), work with an assistant supporting work and watching over safety, use clothing and gloves with good insulating properties,
- if you notice any irregularities, you should contact competent people to remove them,
- It is forbidden to operate the device with the covers removed.

Preventing the negative effects of the electric arc on the eyes and skin of a person:

- Wear protective clothing (gloves, apron, leather shoes),
- Use protective shields or visors with a properly selected filter,
- Use protective curtains made of non-flammable materials and properly choose the colors of walls that absorb harmful radiation,
- Protect people in the vicinity with screens and protective materials.

Prevention of poisoning by fumes and gases emitted during cutting:

- Keep your head out of the smoke area,
- Use ventilation devices and exhausts installed in positions with limited air exchange,
- Blow fresh air when working in confined spaces (tanks),

- Use masks and ventilators.

Burn prevention:

- Wear appropriate protective clothing and footwear to protect against burns caused by arc radiation and spatter,
- Avoid staining the garment with greases and oils that may lead to ignition

Explosion and fire prevention:

- It is forbidden to operate the device and cut in rooms at risk of explosion or fire,
- The cutting station should be equipped with fire-extinguishing equipment,
- The cutting station should be located at a safe distance from flammable materials.

Preventing the negative effects of noise:

- Use earplugs or other noise protection equipment,
- Warn of danger to people nearby.

**WARNING!**

Do not use a power source to defrost frozen pipes.

Before starting the device, you should:

- Check the condition of electrical and mechanical connections. It is forbidden to use torch and power cords with damaged insulation. Improper insulation of torch and power wires may result in electric shock,
- Ensure proper working conditions, i.e. ensure proper temperature, humidity and ventilation in the workplace. Outside closed rooms, protect against precipitation,
- Place the cutter in a place that allows it to be easily operated.

People operating the cutter should:

- know and comply with health and safety regulations applicable when performing plasma cutting,
- use appropriate, specialized protective equipment: gloves, apron, rubber shoes, welding shield or visor with a properly selected filter,
- Be familiar with the contents of this instruction manual and operate the cutter as intended.

Any repairs to the appliance may only be carried out by unplugging the plug from the power socket.

When the appliance is connected to the mains, it is not allowed to touch any of the components that make up the cutting current circuit with your bare hand or through damp clothing.

It is forbidden to remove the external covers when the device is plugged in.

Any modifications to the cutter on your own are prohibited and may impair safety conditions.

All maintenance and renovation work may only be carried out by authorized persons in compliance with the occupational safety conditions applicable to electrical equipment.

It is forbidden to operate the cutter in rooms with a risk of explosion or fire!

The cutting station should be equipped with fire extinguishing equipment.

When you have finished working, the power cord of the appliance must be unplugged.

The hazards and general health and safety rules presented above do not exhaust the issue of occupational safety during cutting, as they do not take into account the specifics of the workplace. An important complement to them are workplace health and safety instructions as well as training and instructions provided by supervision employees.

3. GENERAL DESCRIPTION

The CUTTER 90, CUTTER 110 cutters are used for cutting sheet metal and steel, aluminum and copper elements with air plasma. These are inverter devices manufactured from the most technologically advanced components made in IGBT technology.

The devices are equipped with a Fan Stop function that turns off the fan at low load on the cutter, which reduces noise and improves the comfort of using the devices.

The design and front panels for the CUTTER 90 and CUTTER 110 are identical, the only difference is the parameters and cutting torch.

4. TECHNICAL PARAMETERS

4.1 Cutter

	CUTTER 90	CUTTER 110
Supply Voltage	AC 3x400V 50Hz	AC 3x400V 50Hz
Maximum power consumption	7.5 kVA	10.0 kVA
Rated Cutting Current / Duty Cycle	85 A / 60%	105 A / 60%
Maximum Cutting Thickness	30 mm	40 mm
Cutting current adjustment range	30-85 A	30-105 A
Cutting current adjustment method	Liquid	Liquid
Maximum power consumption	18.7 A	24.9 A
Fuse protection	20 A	25 A
Mass	31.5 kg	33.5 kg
Dimensions	635 x 455 x 515 mm	635 x 455 x 515 mm
Degree of protection against electric shock	IP21	IP21

4.2 Plasma torch

	CUTTER 90	CUTTER 110
Torch Type	A-81 typu Trafimet	A-101 typu Trafimet
Maximum current carrying capacity	80A	100A
Duty cycle	60%	60%
Air Pressure	3.0-5.0 bar (0.30-0.50 MPa)	3.0-5.0 bar (0.30-0.50 MPa)
Airflow	160 l/min	180 l/min
Ignition of the arc	Non-contact (HF)	Non-contact (HF)
Length	6m	6m

Maximum Cutting Thickness

The value of the maximum cutting thickness was determined under optimal cutting conditions of carbon steel of ordinary quality. In order to select the right device, it is recommended to perform technological tests in real operating conditions and on an example material sample.

Duty cycle

The duty cycle is based on a 10-minute period. A 60% duty cycle means that a 4-minute break is required after 6 minutes of operation of the device. A 100% duty cycle means that the device can operate continuously, without interruptions.

Attention! Heating tests were carried out at the temperature of the surrounding air. The duty cycle at 40°C was determined by simulation.

Degree of protection

IP determines the extent to which the device is resistant to the ingress of solid and water contaminants. IP21 means that the device is suitable for indoor use and is not suitable for use in rain or snow.

5. CONSTRUCTION AND OPERATION

The basis for the construction of the power conversion system of the cutter are electronic systems made in IGBT technology enabling operation in the frequency range above 200 kHz.

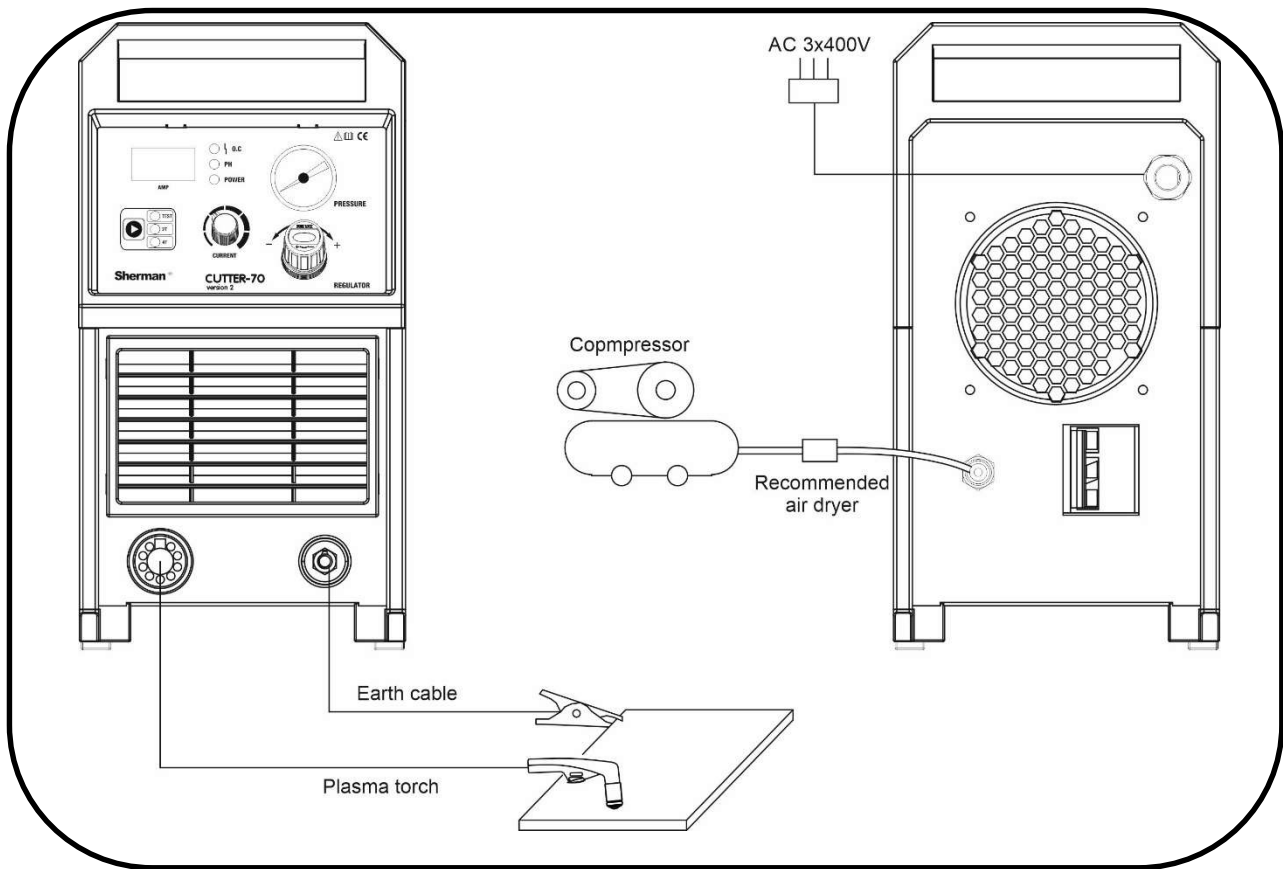
The principle of operation is to rectify the voltage of the single-phase power supply network to DC voltage, convert the obtained DC voltage into a high-frequency rectangular waveform, transform the voltage into the range required by the cutting process, and re-rectify the resulting voltage to DC voltage.

6. CONNECTION TO THE POWER SUPPLY

1. The appliances should only be used in a three-phase, four-wire, grounded zero point power supply system.
2. The CUTTER 90 plasma cutter is designed to work with a 3x400V 50 Hz network protected by 16A delay-acting fuses, and the CUTTER 110 is designed to work with a 3x400V 50 Hz network protected by 25A delay-acting fuses.

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- The device is equipped with a cord and a power plug. Before connecting the power supply, make sure that the power switch (12) is in the OFF position.

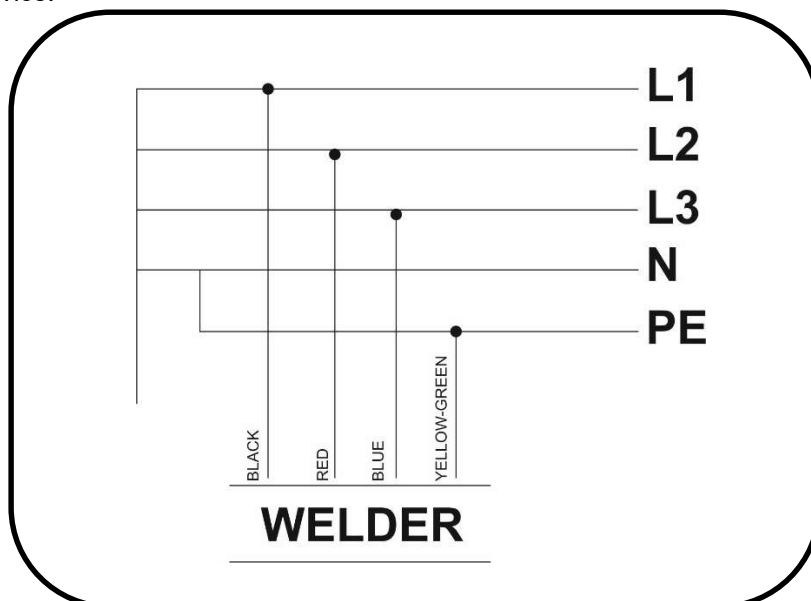


Device connection diagram

6.1 Connecting the Power Cords to the AC Plug

The yellow-green cable (protective cable) should be connected to the mains plug in the place marked with the symbol "PN" or "N".

The black, red, blue wires are the cables that supply power to the device (phase) and must be connected to the mains plug in the places marked with the symbols L1, L2, L3 or R1, S2, T3. The order in which the phase wires are connected to the plug in the marked places is arbitrary and does not cause any changes in the operation of the device.

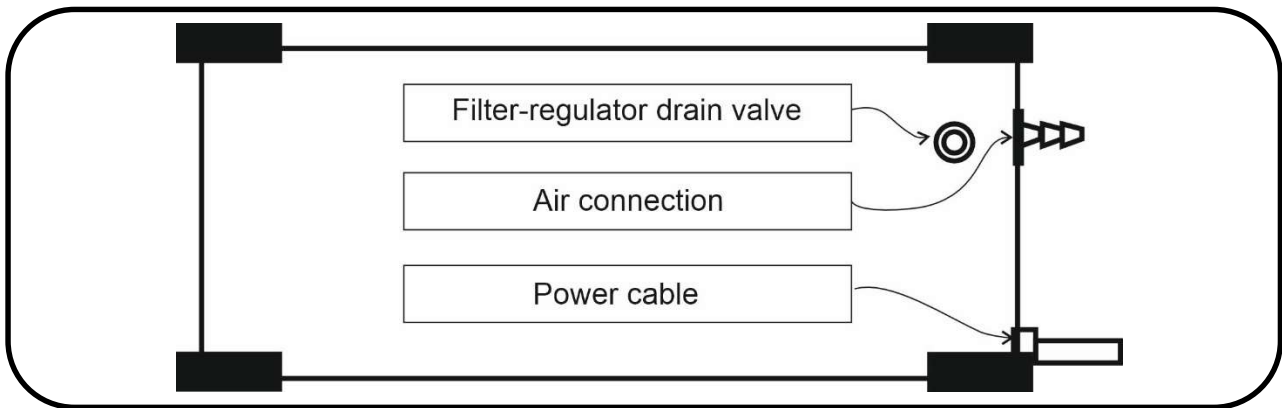


7. CONNECTION TO THE AIR SYSTEM

Inside the device there is an air preparation unit with a filter-dryer. The filter-dryer is equipped with an automatic drainage valve, the outlet of which is located in the bottom wall of the device. The filter-dryer is emptied automatically after being cut off (disconnected) from the pneumatic system or when the pressure drops to "0". The device should be placed on the ground in such a way as to allow the liquid to flow freely. **The appearance of liquid flowing out from under the device is a normal symptom and signals the proper operation of the drainage valve.** The filter-dehumidifier does not require additional user service, it should only be checked periodically.

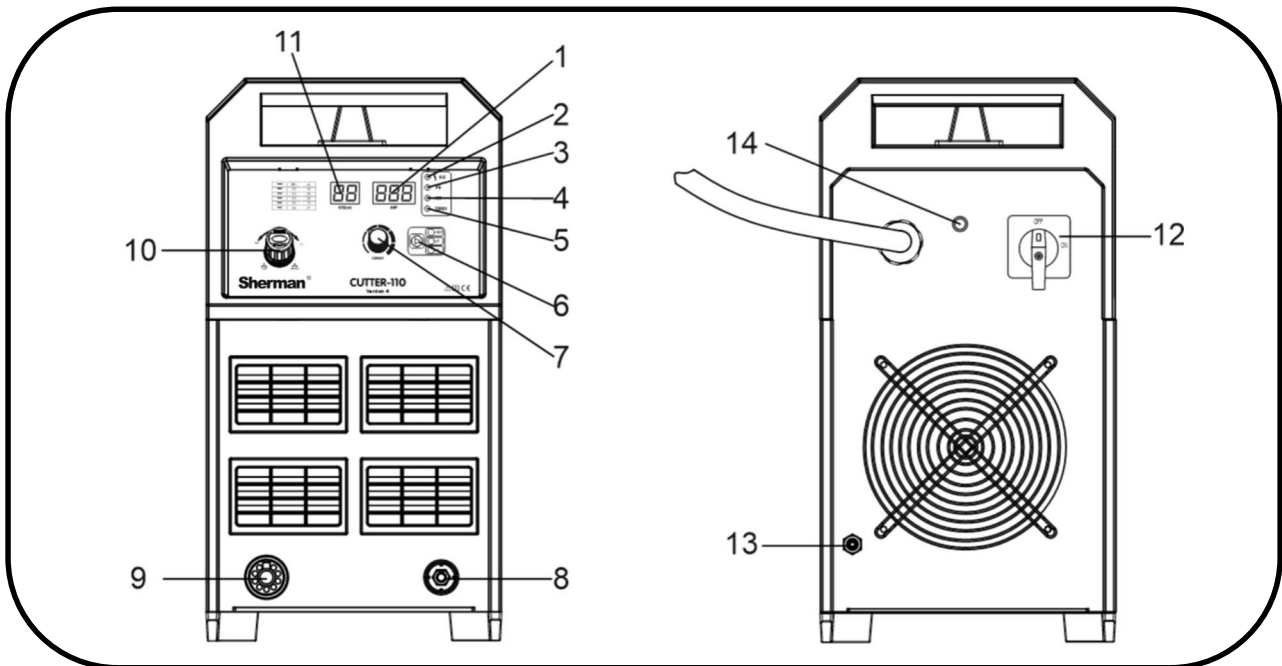
The compressed air must be connected to the inlet port (12) on the rear wall of the unit.

It is recommended to use an additional, external dehumidifier.



View of the bottom wall of the device

8. FUNCTION DESCRIPTION OF SWITCHES AND KNOBS

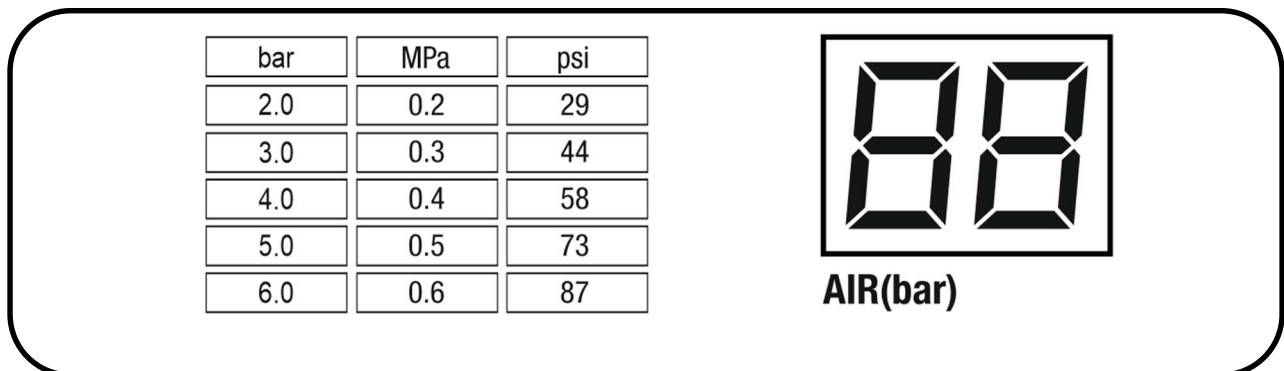


1. Cutting current display
2. Thermal protection or malfunction LED
3. Wrong supply voltage LED
4. Air pressure control LED
5. LED indicating an untightened protective sleeve in a plasma holder
6. 2T/4T/TEST Switch
7. Cutting current adjustment knob
8. Ground Cable Slot
9. Plasma torch connector
10. Air pressure control knob
11. Air pressure display

12. Main switch
13. Compressed air connection
14. Fuse

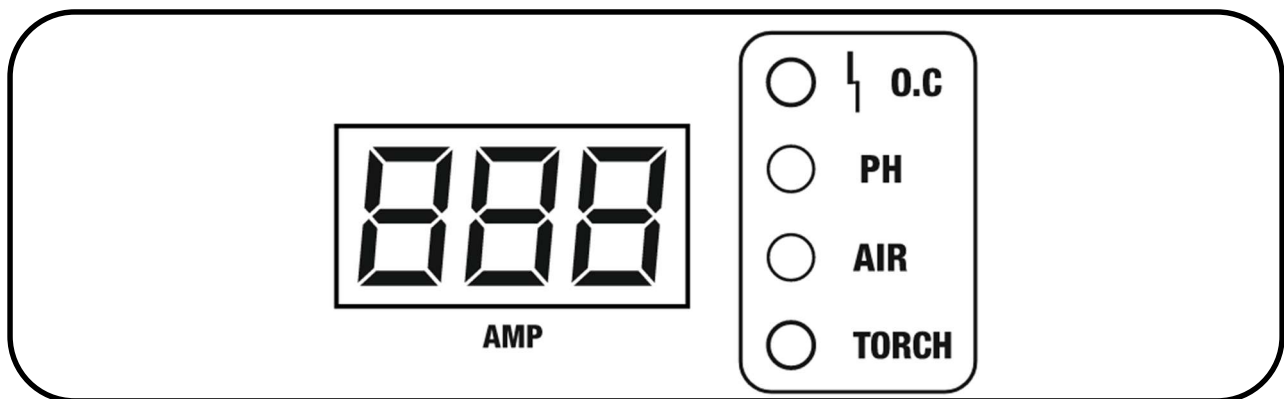
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Air pressure display

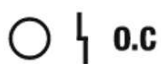


The display indicates the air pressure in bars. To convert pressure to other units, use the conversion table on the left side of the display.

Cutting current display and control LEDs



Display indicates cutting current



LED to indicate that the device is overheating or that the cutter is not working properly



Wrong supply voltage LED. If the LED lights up, check the power supply and the correct connection of the device to the mains.

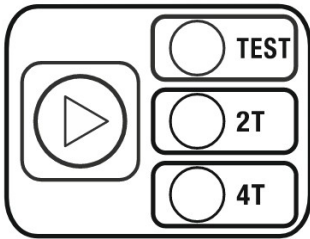


Air pressure control diode. If the LED lights up, there is no air supply or the air pressure drops below 1.8 bar.



The LED indicates that the plasma chuck consumables are incorrectly attached, the control pins in the torch are broken off, or the protective sleeve is not tightened.

Button to control the operation of the device



The button is used to select the control mode of the cutter (two-stroke / four-stroke). The TEST item is used to check the correct operation of the air system and its cleaning. When starting the operation of the device after it has been stopped at night, blow the plasma torch of the cutter in TEST mode for about 30 seconds to remove condensation from the circuit. This process will increase the service life of the consumable parts and make it easier to start the cutter.

9. OVERHEATING PROTECTION

The power source is equipped with a thermal, self-acting overload switch. When the temperature of the cutter is too high, the protection will disconnect the cutting current and the LED indicating overheating will light up (2). When the temperature drops, the circuit breaker will automatically reset.

10. AIR PLASMA CUTTING

10.1. Preparing the device for operation

Connect the appliance to a compressed air source. The air should be dry and free of oil. (If the air from the compressor contains oil or water, the air system must be equipped with an additional air dryer and filter.) Set the correct air pressure. Connect the ground wire to the workpiece to be cut. Connect the appliance plug to a 3x400V 50Hz mains socket.

10.2. Setting Cutting Parameters

Use the knob (7) to set the desired cutting current value.

10.3. Arc initiation and cutting guidance

The CUTTER 90 and CUTTER 110 can be controlled in two-stroke or four-stroke mode. To ignite the arc in two-stroke mode, bring the torch close to the workpiece to be cut and, depending on the thickness of the material to be cut, lightly touch it or hold it at a distance of approx. 2 mm, turn on the button on the torch. An arc ignites between the electrode and the chuck nozzle, while opening the air valve, which will blow the pilot arc out of the nozzle. If the nozzle is in contact or at a sufficient distance from the workpiece to be cut, the main arc will ignite and thus the cutting process will begin, which will continue until the button on the torch is released.

In four-stroke mode, the bow is initiated in the same way as in two-stroke mode, but after igniting the bow, you can release the button on the torch and cut with the button released. To finish cutting, press and release the button on the torch again.

ATTENTION! Do not turn on the button at a distance of more than 2 mm from the material to be cut. If the arc does not ignite within 2 seconds, release the button. Running the ionizer for more than 2 seconds risks damaging the ionizer!

To avoid interference with the arc glow during cutting, the movement of the torch relative to the material should be uniform and the torch nozzle should be positioned perpendicular to the workpiece to be cut, at a constant distance from it. If the arc glow is interrupted during cutting, release and then press the button on the torch, the pilot arc will be lit again.

The correct assessment of the cutting speed is made on the basis of the assessment of the angle at which the material to be cut is ejected on the lower edge of the cut, as well as on the basis of observations of the material flow and the cut surface. The best cutting results are obtained by using the maximum permissible speeds.

In the event that the cutting speed is too high, the stream is not able to sufficiently melt the metal and throw it outside the cut element, which can cause some of the molten metal to be directed towards the nozzle, and thus lead to a serious failure.

When cutting thin sheets and aluminum, the cut should start slowly to penetrate the material properly. The cutting speed can be increased when the arc penetrates through the bottom edge of the material to be cut.

During normal operation, the distance of the torch should be between 0 and 2 mm.

It is not recommended to turn on the pilot arc without the intention of cutting, as this causes unnecessary wear on the electrode and nozzle.

In the event of arc flares, or if the arc flame is green or makes any abnormal noise, turn off the unit immediately and check the condition of the wear parts.

The cut can be interrupted by releasing the button in the holder or by abruptly detaching the torch from the material. When you release the button on the torch, the arc will be extinguished immediately, and after a dozen or so seconds, the compressed air flow will be turned off. The delay in shutting off the compressed air flow is intended to cool down the heated components of the chuck.

11. BEFORE YOU CALL FOR SERVICE

In the event of malfunction of the device, before sending the cutter to the service, you should check the list of basic malfunctions and try to fix them yourself.

Any repairs to the appliance may only be carried out by unplugging the plug from the power socket.

Attention! The device is not sealed and the user can remove the cutter housing to remove minor malfunctions.

ATTENTION! The welding machine is equipped with a Fan Stop function that turns off the fan a few minutes after welding is finished and the device has cooled down. The fan restarts under load.

Symptoms	Cause	Procedure
Lack of power, malfunction signal, or malfunction of the device	No connection or loose plug inside the device	Check and correct the connections of all plugs inside the device
When the power is turned on, the power indicator LED is not lit	No supply voltage	Check the fuses on the mains connection Check if there is voltage in the mains
When the power is plugged in, the power indicator LED is not lit	The power switch is in the OFF position	Switch the switch (13) to the ON position
The power indicator LED is on, the fan is not working, there is no output voltage.	The supply voltage is unstable and causes the surge protector to turn on	Turn off the appliance for 2-3 min and turn it back on
	Briefly turning the switch on and off caused the surge protector to turn on	Turn off the appliance for 2-3 min and turn it back on
	Lack of proper contact of the ground cable terminal	Improve the contact of the ground terminal
The bow does not ignite	Damaged switch in the plasma torch	Replace the switch
	Improper connection of the plasma torch to the device	Check the condition of the electrical connections of the torch, check that the pins in the socket are not broken or jammed
The thermal protection LED is on  o.c	The device has overheated.	Wait a few minutes for the LED to turn off and continue cutting.
The arc does not ignite, the "TORCH" LED is lit (5)	Incorrectly installed consumable parts of the plasma torch, broken pins in the torch, undertightened protective sleeve.	Check the correct installation of the consumable parts of the plasma holder, check whether the pins in the torch are not broken or jammed. tighten the protective sleeve.
The arc does not ignite, the "AIR" LED is on (4)	No air supply or air pressure drop below 1.8 bar.	Check the condition of the air compressor, the correct air connection and the tightness of the air system.
Fan not working	The fan has been blocked by a bent cover	Straighten the fan cover
Unsatisfactory cutting quality	Poor quality of materials and consumables used	Replace Consumable Parts
	Air flows out with inappropriate intensity	Check the air supply hose, improve the hose connection to the fittings and the condition of the quick connectors Check the air compressor

12. OPERATING INSTRUCTIONS AND LIST OF CONSUMABLE PARTS

The operation of CUTTER 90, CUTTER 110 should take place in an atmosphere free of corrosive components and high dust. Do not place the appliance in dusty areas, near running grinders, etc. Dust and metallic filing contamination of control boards, cables and connections inside the unit can lead to an electrical short circuit and consequently damage to the radiator.

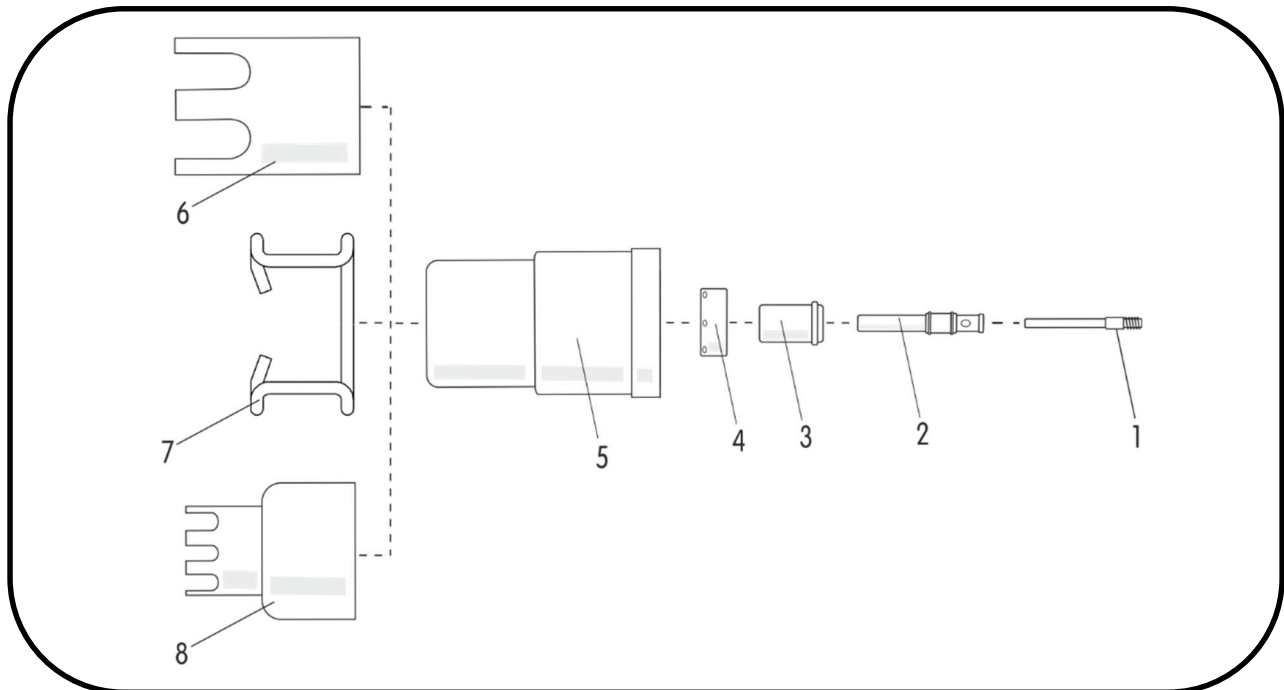
Avoid use in environments with high humidity, especially in situations where dew occurs on metal components. In the event of dew on metal elements, e.g. after introducing a cool device into a warm room, wait until the dew disappears. It is recommended that the cutter be placed under a roof in order to protect it from adverse weather conditions if it is operated outdoors.

The CUTTER 90, CUTTER 110 should be operated under the following conditions:

- changes in the rms value of the supply voltage not greater than 10%
- ambient temperature from -10°C to +40°C
- atmospheric pressure 860 to 1060 hPa

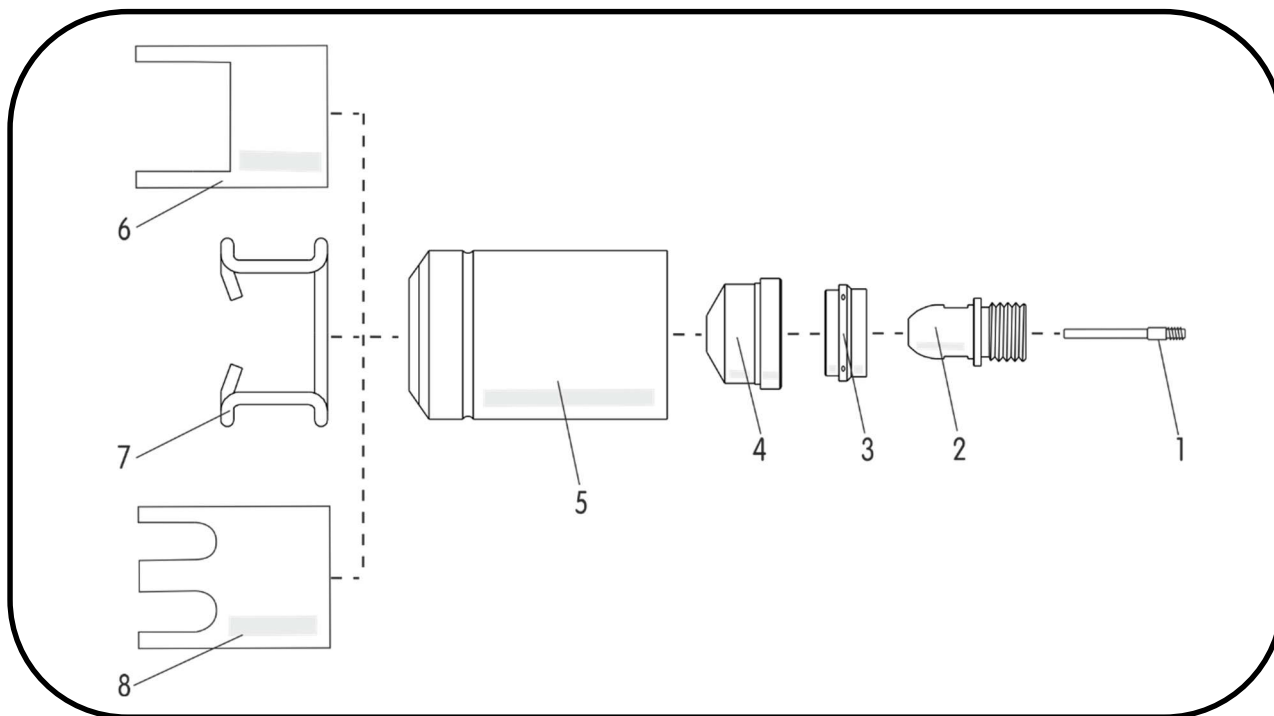
- relative humidity of atmospheric air not exceeding 80%
- altitude up to 1000m above sea level

List of consumables for the **A-81 plasma chuck (CUTTER 90)**:



Lp.	Name	Part number TECWELD	No Reference
1	Diffuser	FH0560	FH0560
2	Electrode	PR0109	PR0109
3	Nozzle 1.0	PD0105-10	PD0105-10
	Nozzle 1.1	PD0105-11	PD0105-11
	Nozzle 1.2	PD0105-12	PD0105-12
4	Swirl ring	PE0107	PE0107
5	Protective sleeve	PC0115	PC0115
6	Spacer Ring (4 Tips)	CV0033	CV0033
7	Spring sled	CV0028	CV0028
8	Spacer ring (crown)	CV0201	CV0201

List of consumable parts for the **A-101 plasma chuck (CUTTER 110)**:



Lp.	Name	Part number TECWELD	No Reference
1	Diffuser	IZN0517	
2	Electrode	CUTE-PR101	PR0101
3	Nozzle 1.1	CUTD-PD101-11	PD0101-11
	Nozzle 1.4	CUTD-PD101-14	PD0101-14
	Nozzle 1.7	CUTD-PD101-17	PD0101-17
4	Swirl ring	CUTD-PE101	PE0101
5	Protective sleeve	CUTTO-PC111	PC0111
6	Spacer Ring (2 Tips)	CV0012	CV0012
7	Spring sled	CUTS	CV0011
8	Spacer Ring (4 Tips)	CV0014	CV0014

A full list of consumables and spare parts is available on the www.tecweld.pl website and at TECWELD. It is possible to purchase these parts directly.

13. MAINTENANCE INSTRUCTIONS

As part of daily operation, keep the cutter clean and check the condition of the external connections. Regularly remove water from the filter dryer by pressing the drain valve in the bottom plate opening of the appliance.

Replace consumable parts regularly.

Periodically (depending on operating conditions), remove the enclosure and clean the unit inside by blowing with compressed air to remove dust and metal filings from the control boards and electrical wiring and connections.

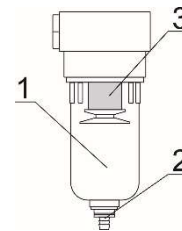
Check the condition of the filter and the water separator cup of the air preparation unit at least once a month. If they are worn, replace them with new ones.

At least once every six months, the general equipment and the condition of electrical connections should be inspected, in particular:

- state of protection against electric shock
- isolation status
- security system status
- correct operation of the cooling system
-

Damage resulting from operating the cutter under improper conditions and failure to follow maintenance recommendations are not covered by warranty repairs.

List of spare parts for the air preparation unit		
Lp.	Name	Part number TECWELD
1	Separator cup	7811366
2	Drain valve	7811368
3	Dehumidifier filter	7811367



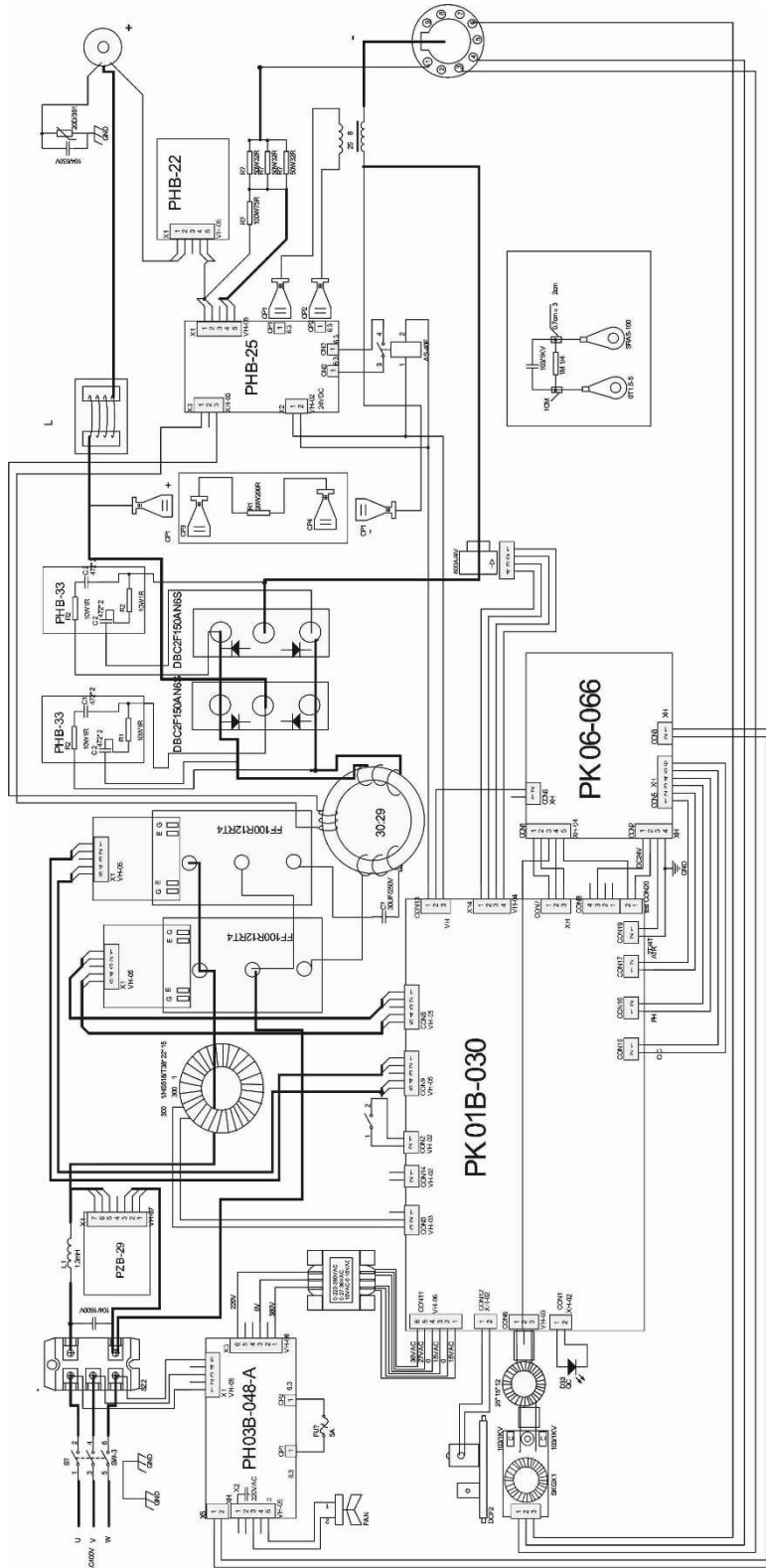
14. STORAGE AND TRANSPORT INSTRUCTIONS

Store the appliance at a temperature of -10°C to $+40^{\circ}\text{C}$ and a relative humidity of up to 80% free of corrosive fumes and dust. Transport of packaged equipment should be carried out by covered means of transport. During transport, the packaged device should be protected against movement and provided with the correct position.

15. SET SPECIFICATION

	CUTTER 90	CUTTER 110
1	Source: CUTTER 90	Source: CUTTER 110
2	A-81 Plasma Cutting Chuck Type Trafimet	A-101 Trafimet Plasma Cutting Chuck
3	Ground cable with clamp clamp	Ground cable with clamp clamp
4	User Manual	User Manual
5	Packaging	Packaging

15. ELECTRICAL DIAGRAM



17. WARRANTY

The warranty is granted for a period of 12 months for business entities, but excluding warranty claims, or 24 months for consumers from the date of sale.

The warranty will be respected upon presentation by the complainant of proof of purchase (invoice or receipt) and a warranty card with the product name, serial number, date of sale and stamped point of sale.

To order a warranty repair, you need to fill in the form on the www.tecweld.pl website in the SERVICE tab. On the basis of the notification, the device will be transported to the service by a courier company. Devices sent in any other way at TECWELD's expense will not be accepted!

The cutter must be supplied with the plasma chuck. Complaints about a device without a plasma torch will not be considered.

The device sent for complaint must be packed in the original cardboard box, secured with original polystyrene fittings. TECWELD is not responsible for damage to the welding machine resulting from transport.



If you are going to dispose of this product, do not throw it away with ordinary household waste. According to the WEEE Directive (Directive 2012/19/EU) in force in the European Union, separate disposal methods must be used for used electrical and electronic equipment.

In Poland, in accordance with the provisions of the Act of 11 September 2015 on Waste Electrical and Electronic Equipment, it is prohibited to place waste equipment marked with the crossed-out bin symbol together with other waste.

The user who intends to dispose of this product is obliged to take the waste electrical and electronic equipment to a waste equipment collection point. Collection points are run, m.in., by wholesalers and retailers of this equipment and by municipal organizational units conducting waste collection activities.

The above statutory obligations have been introduced in order to reduce the amount of waste generated from waste electrical and electronic equipment and to ensure an appropriate level of collection, recovery and recycling of waste equipment. The correct implementation of these obligations is especially important when there are hazardous components in used equipment that have a particularly negative impact on the environment and human health.

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