

# **THERMACUT<sup>®</sup>**

## **EX-TRAFIRE<sup>®</sup>**

### **100SD**

#### **PLASMA CUTTING POWER SUPPLY**

## **Operator Manual**

**Revision: T-5**  
**English**  
**2021**



### **!IMPORTANT!**

**BEFORE SWITCHING ON OR OPERATING THE SYSTEM, READ THIS MANUAL, BECOME FAMILIAR WITH THE CONTENT. KEEP THE MANUAL LOCAL TO THE JOB SITE WITH EASY ACCESS TO ALL PERSONNEL. THE SYSTEM IS TO BE USED FOR METAL CUTTING ONLY.**

**PLEASE, CHECK THE LATEST VERSION OF THE OPERATOR MANUAL ON OUR WEBSITE:**

[www.ex-trafire.com](http://www.ex-trafire.com)

**THERMACUT<sup>®</sup>**  
THE CUTTING COMPANY<sup>®</sup>

EX-5-907-001  
N-22158

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**SECTION 1.**

**SAFETY:**

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# SAFETY

1



## !CAUTION!

The symbol shown in this section means: **!Caution!** !Beware!  
 ¡There are possible hazards with this procedure!

When you find this symbol in the manual or on the system, be cautious, and follow the related instructions to avoid the hazard.



## CAUTION! READ OPERATOR'S MANUAL

Follow the safety instructions to avoid danger.

Only qualified persons should install, operate, maintain and repair the system.

Keep out of reach of children.

2



## PLASMA ARC RAYS CAN BURN EYES AND SKIN

Arc rays from the cutting/gouging processes produce intense visible and invisible rays that can burn eyes and skin.

Use protective clothing made from durable, flame-resistant material, appropriate footwear and hand protection.

- Use face protection (welding helmet or shield) with the correct shade of filter lens fitted to protect your eyes and face (see Table 1.1).
- Warn people of the dangers of looking at the arc, use signs to warn/inform.



## NOISE CAN DAMAGE HEARING

Prolonged exposure to noise from plasma cutting/gouging can cause hearing damage.

- Use approved ear protection when operating the plasma system.
- Warn others about the dangers of noise.



## FLYING SPARKS (ARC SPRAY) CAN CAUSE INJURY, FIRE OR EXPLOSION

Flying sparks are created during the metal cutting/gouging processes; the area around the cutting process should be kept free from flammables.

- Use face shield/safety glasses with side protection.
- Wear flame resistant clothing, footwear and hand protection.
- Use earplugs/defenders that are flame resistant to prevent sparks entering the ear and to reduce the noise level.

3



**CUTTING CAN CAUSE FIRE OR EXPLOSION**

**FIRE PREVENTION**

- Keep flammable items away from the work area.
- Ensure that there is a fully charged fire extinguisher in the work area.
- Ventilate the work area, check for flammable/combustible gases, liquids and materials, remove prior to cutting as they present a fire risk.

**EXPLOSION PREVENTION**

- Do not cut in areas containing explosives, flammable gases or vapors.
- Do not place the system on, over, or near combustible surfaces.
- Do not operate the system in areas with an atmosphere containing high concentrations of dust, flammable gases or vapors.
- Do not use the system to cut pressurized containers that have not been de-pressurized, vented and cleaned.



**FLYING SPARKS (ARC SPRAY) CAN CAUSE INJURY, FIRE OR EXPLOSION**

Flying sparks are created during the metal cutting/gouging processes; the area should be kept free from flammables.

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- Wear flame resistant clothing, footwear and hand protection.
- Use earplugs/defenders that are flame resistant to prevent sparks entering the ear and to reduce the noise level.

4



**ELECTRIC SHOCK CAN KILL**

Touching electrical parts could cause a fatal shock or severe burns.

- Do not touch live electrical components.
- Wear dry insulated gloves, shoes and protective clothing.
- Insulate yourself from the work and ground using dry insulating material large enough for the work area.
- The working area should be clean and dry.
- Switch OFF the system for cleaning and maintenance operations.
- Do not wrap cables around your body.
- Turn OFF the machine when not in use.
- Periodically check the power supply cable, to insure that the outer insulation is intact. Replace the power supply cable immediately if damaged. DO NOT use the system with bare or exposed wires, this is highly dangerous.
- Before removing the cover or handling any of the internal components of the system, wait 5 (FIVE) minutes to ensure complete discharge of the capacitors.
- Keep the system in good condition; repair or replace damaged parts immediately. Maintain the system in accordance with the manual.

5



**PLASMA ARC CAN INJURE**

The plasma arc is activated immediately after the torch trigger is depressed.

- Turn off the power before changing the torch consumables, the plasma arc can burn through skin and gloves.
- Do not place your hand or hold the work piece near the cutting path.
- Do not point the torch toward yourself or other persons.



**HOT PARTS CAN CAUSE SEVERE BURNS**

Caution! After cutting, the workpiece will be HOT!

- Do not touch hot parts bare handed, wear suitable hand protection.
- Allow cooling time before handling.

6



**SMOKE AND GASES CAN BE HAZARDOUS**

Induction heating of certain materials, adhesives, and fluxes may cause fumes or smoke.

- Breathing the fumes and smoke can be hazardous to your health. Keep your face out of the smoke, do not breathe the fumes.
- Use local exhaust ventilation for fume removal.
- If ventilation is poor, wear an approved air-supplied respirator.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. The smoke and gases from the cutting/gouging process can displace air and lower the oxygen level causing injury or death.
- Monitor the breathable air quality as required.

7



**CAUTION WHEN CUTTING AROUND GAS CYLINDERS**

Gas cylinders which contain gas under high pressure can rupture and explode if damaged.

- Handle and use compressed gas cylinders in accordance with local or national codes.
- Never allow electrical contact between the plasma arc and a cylinder.
- Never expose cylinders to excessive heat, sparks, slag or flames.



**MAGNETIC FIELD CAN AFFECT PACEMAKERS**

- People with pacemakers/hearing aids should avoid close contact with plasma arc power supply.
- People with pacemakers/hearing aids should consult their doctor before operating plasma arc power supply.



**Do not exceed the recommended duty cycle, this can lead to overheating and cause damage to the system.**

- Allow a suitable cooling off period with high demand usage.
- Observe the duty cycle rating shown on the label attached to the system.



**PLASMA CUTTING CAN CAUSE INTERFERENC**

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers, or computer-driven equipment.
- Ensure that all equipment in the cutting area is electromagnetically compatible.
- Ensure that the plasma arc cutting system is installed and positioned in accordance with this manual.

Plasma Arc Cutting Current	Protection glass shade number*
Up to 150A	ISO (DIN) 11
150A to 250A	ISO (DIN) 12
250A to 400A	ISO (DIN) 13
OVER 400A	ISO (DIN) 14

\* According to ISO 4850:1979



# Safety Sticker

## Safety instructions



**WARNING!**  
**Plasma arc is generated immediately when the torch trigger is depressed.**



The plasma arc will cut quickly through gloves and skin. Make sure the power is switched off before changing consumables.

1			
2		2.1	
3	3.1	3.2	3.3
4	4.1	4.2	4.3
5	5.1	5.2	5.3
6	6.1	6.2	6.3
7			

## Torch consumable installation

Hand torch



Machine torch



EX-0-904-008  
 N-21626

**THERMACUT®**  
 THE CUTTING COMPANY®

## SECTION 2.

### SPECIFICATIONS:

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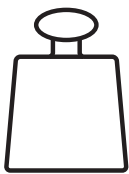
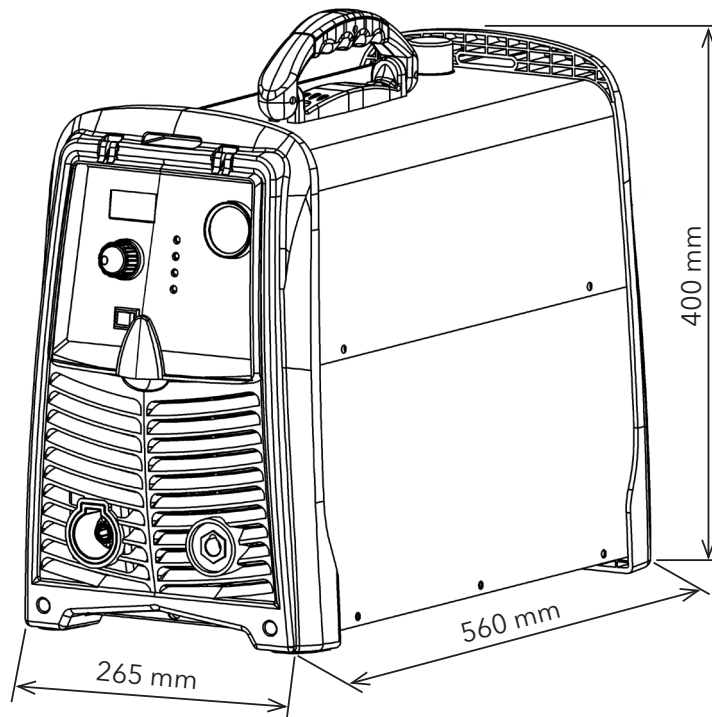
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# SPECIFICATIONS

## EX-TRAFIRE®100SD

- Is a portable plasma arc cutting system.
- It can be used for machine and handheld cutting or handheld gouging too.
- Uses air or nitrogen for cutting electrically conductive metals (mild steel, stainless steel, and aluminium).

## Dimensions and weight of the plasma arc power supply



24.0 kg\*

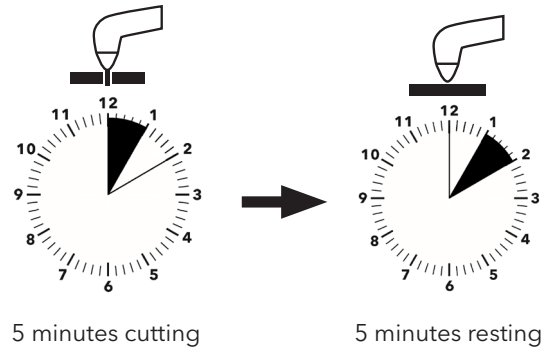
\* Weight of plasma arc power supply without torch.

## Specifications: plasma arc power supply

Open circuit voltage ( $U_0$ )	300 VDC		
Output characteristic* * Curve is defined as the output voltage versus output current	Drooping		
Input voltage ( $U_1$ )	3 x 400 VAC $\pm$ 15%		
Rated output current ( $I_2$ )	30 - 100 A		
Standard rated output voltage ( $U_2$ ) $U_1 = 400\text{VAC} \pm 15\%$	170 V (Extra-Boost 220 V)		
	X	50%	100%
	$U_2$	170	170
Cutting current at 50%/100% duty cycle (A)	3 x 400 VAC $\pm$ 15%	100 A	80 A
Maximum input power	3 x 400 VAC $\pm$ 15%	24.6 kVA	
Duty cycle ( $X^*$ ) at 40° C at rated conditions ( $U_1, I_1, U_2, I_2$ ) * $X = T_{on}/T_{base}$ , $T_{on}$ = time, minutes $T_{base}$ = 10 minutes	$U_{1rms}$	X	
	400 VAC $\pm$ 15%	50%	
Operating temperature	-10° - +40° C		
Rated AC phases (PH) and line frequency (Hz) Model CE	PH	Hz	
	3	50-60	
Rated input voltage ( $U_1$ ), rated input current ( $I_1$ ) and effective input current ( $I_{1eff}^*$ ) at rated output voltage ( $U_2$ ) and rated output current ( $I_2$ ) - for cutting only.  * $I_{1eff} = (I_1) \sqrt{X}$ used to determine rating of power cord.  eff = effective rms = root mean square	$U_{1rms}$	$I_{1rms}$	$I_{1eff}$
	3 x 400 VAC $\pm$ 15%	39.3*A	27.8*A
	This equipment conforms to IEC 61000-3-12, EN 60974-1		
Isolation class	H/F		
IP Code - Degree of protection provided by enclosure	IP23S* IP - "International Protection" 2 - No ingress foreign objects $\geq$ 12.5 mm 3 - No harmful ingress spraying water. S - fan stationary during water test. <b>*WARNING: ! DO NOT OPERATE IN RAIN !</b>		
Toppling, tilting ( with or without Wheel kit)	Up to 15° incline		
Gas type	Air	Nitrogen	
Gas quality specification	Recommended Air quality: ISO 8573-1 Class 1.2.2.	Purity $\geq$ 99.99%	
	Air max. particle size: 0.1 microns, class 1 ref. to ISO 8573,		
	Air max. oil: 0.1 mg / m <sup>3</sup> , class 2 ref.: ISO 8573,		
	Air max. dewpoint: +3° C, class 4 ref. to ISO 8573		
Gas quality	Clean, moisture-free, without oil		
Gas input pressure and flow	10 bar / 145 psi 270 l/min		

## Duty cycle

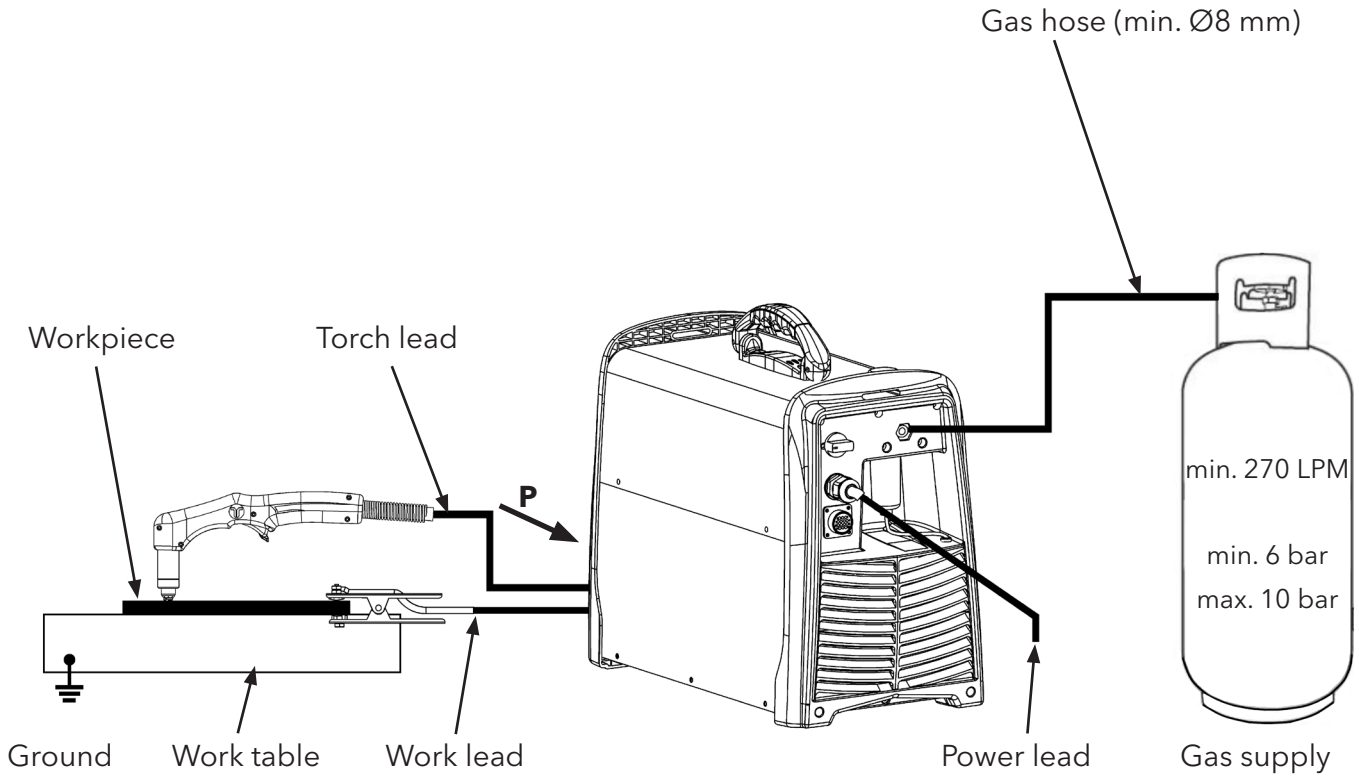
Duty cycle is the percentage of time, during a period of 10 minutes, that the power supply can continuously cut. The following diagram represents a duty cycle of 50%.



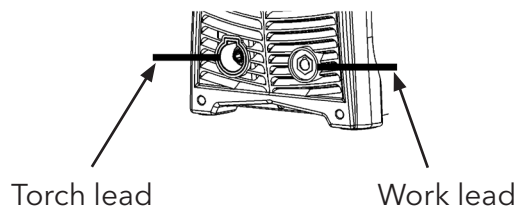
PARAMETERS	EX-TRAFIRE®100SD
Supply voltage (VAC)	3 x 400±15%
Frequency (Hz)	50/60
Maximum input current 80%-100% (A)	29.6
Maximum input power (KVA)	20.7
Open circuit voltage (VDC)	300
Rated output voltage (VDC)	170 (Extra-Boost 220V)
Cutting current at 100% duty cycle (A)	80
Recommended cutting capacity (mm)	35
Maximum cutting capacity (mm)	50
Severance cutting capacity (mm)	50
Piercing capacity (mm)	20
Gouging capability (Kg/h)	up to 8
Protection level	IP23S
Isolation class	H/F
Dimensions ( l x h x w ) (mm)	560 x 400 x 265
Weight (kg)	24
Gas pressure ( bar )	5.5
Gas flow ( lpm)	270

It is recommended to unfold the cable, because of bigger heat generation if it's longer than 8 m.

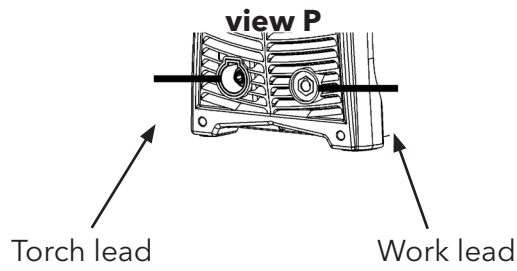
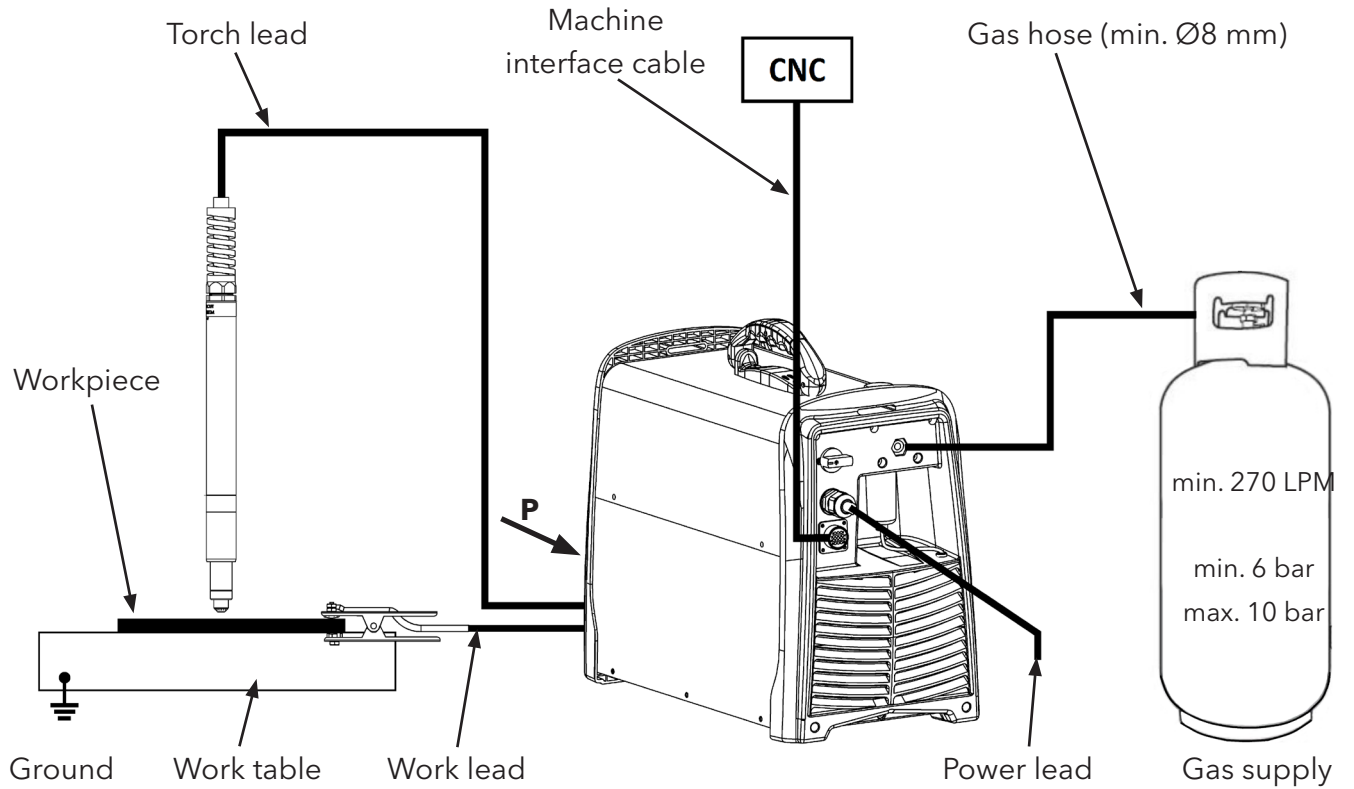
## Hand torch setup



**view P**



## Machine torch setup





## Symbols and marking



**For compliance with the European Norm, it is NOT permissible to use unshielded consumables in Hand-Held applications.**

### S Mark;

The  mark indicates that the power supply and torch are suitable for use in environments with danger of electrocution. The hand torches must have shielded consumable parts fitted to maintain  mark compliance.

### CE Mark;








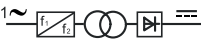
This marking signifies the manufacturer's declaration of conformity to applicable European directives and standards (EMC & LVD).

### C-Tick Mark;

This marking signifies compliance with appropriate Australian EMC standard.

### IEC symbols;

The following symbols may be present on the plasma arc power supply data plate, control labels and switches.

Symbol	Description	Symbol	Description
	Alternating Current (AC) power		Cutting Mode
	Over-Temperature (OT)		Gouging Mode
	(TIP/TORCH) Missing or loose nozzle/torch spare parts (consumables)	<b>ON</b>	Power is ON
	(GAS) Low inlet gas pressure alarm	<b>OFF</b>	Power is OFF
	The terminal for the external protective (earth) conductor		An inverter-based power supply



### SECTION 3.

#### INSTALLATION:

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# INSTALLATION

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## Upon receipt of goods

1. Verify that all ordered items have been received, for short shipment or damage to equipment, contact the Authorized Supplier.
2. If there is evidence of damage, see Claims, below.
3. All communication relating to this plasma arc system should include the model and serial number located on the bottom of the plasma arc power supply.
4. Read the information in the SAFETY section of this manual before installing and operating the system.

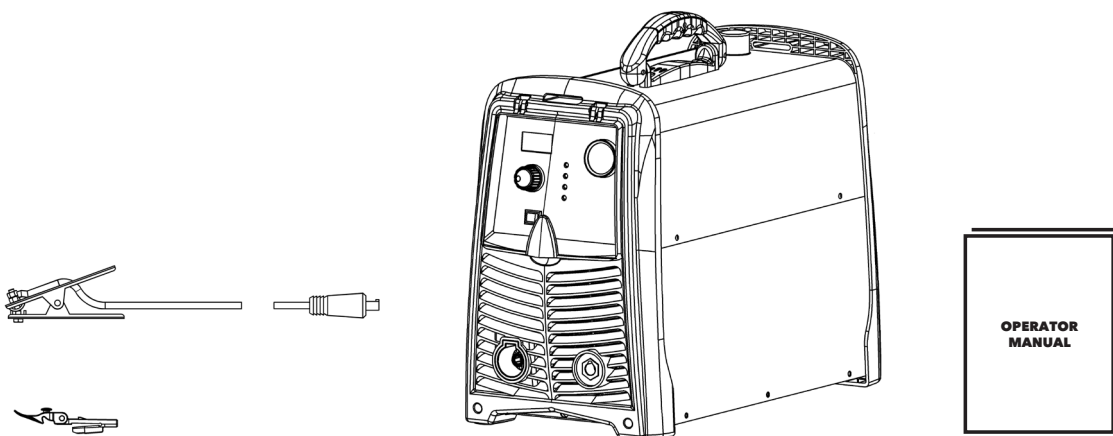
## Claims

**Claims for shipping damage;** If the unit has been damaged in transit, contact the carrier immediately, take photographs of the packaging and areas of damage on the system. Inform Authorized Supplier, who will provide copies of relevant documentation. For further assistance, contact Customer Services, details are listed at the back of this manual.

**Claims for defective or missing goods;** All systems shipped from Authorized Supplier have been subjected to a rigorous quality control procedure. If any of the parts are found to be defective or missing, contact Authorized Supplier with the relevant information. For further assistance contact Customer Services, details are listed at the back of this manual.

## Box contents

Check the items that are shown in the illustration below. Packaging also includes an air line connection DN7.2ES plug with male thread G1/4".



## Power supply location

Place the plasma arc power supply EX-TRAFIRE®100SD on a flat even surface with a minimum distance of 0.5 m of clear space all round to ensure good ventilation.

## Mains power connection

The EX-TRAFIRE®100SD plasma arc power supply requires a 400 VAC  $\pm$ 15% three-phases mains power source. Use a circuit breaker for power line input so that the operator can turn off the power supply quickly in an emergency. Locate the switch so that it is easily accessible to the operator. The interrupt level of the switch must be equal to or exceed the continuous rating of the fuses. Use slow blow fuses with a suitable capacity in accordance with local and national electrical codes.

## Connecting to an engine drive power generator

When using an engine drive generator to power the EX-TRAFIRE®100SD:

- Engine drive operation;
1. Set engine drive output to three-phases AC.
  2. Plug the EX-TRAFIRE®100SD mains power lead in to the power outlet.
  3. Hard wire connection (No plug fitted) should be performed by a certified electrician.
  4. Set the engine drive to maximum output (see chart below).
  5. For optimum performance, do not share the engine drive with other equipment such as welding plant, lighting systems or angle grinders.

Three-phases, 50/60 Hz, 400 VAC  $\pm$ 15%

Engine drive rating	Current output	EX-TRAFIRE 100SD Performance
25 kW	100 A	Full arc stretch
22.5 kW	100 A	Limited arc stretch

## Grounding

To reduce electromagnetic interference (EMI) and to ensure personal safety and correct operation, the EX-TRAFIRE®100SD must be properly grounded through the mains power lead in accordance with local and national electrical codes of practice. The three-phases service must be of the 4-wire type with a protective green-yellow wire for protective earth ground and must comply with national and local electrical codes of practice.

## Mains power lead

EX-TRAFIRE®100SD is supplied with a 3 meter length of 4 core 4 mm<sup>2</sup> flexo cable without plug.

Use of a mains power lead extension is at the discretion of the user. The extension of the mains power lead shall comply with local and national codes of practice and should be installed by a certified electrician. See the length requirements listed below.

		Recommended mains power lead extension depending on length (mm <sup>2</sup> )				
		< 3 m	3 - 7.5 m	7.5 - 15 m	15 - 30 m	30 - 45 m
Model CE	Phase	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>
400 VAC±15%	3	6	6	10	10	16

**Note:** The system was tested with a 3 meter mains power lead for compliance with EMC standards.

## Three-phases mains power lead

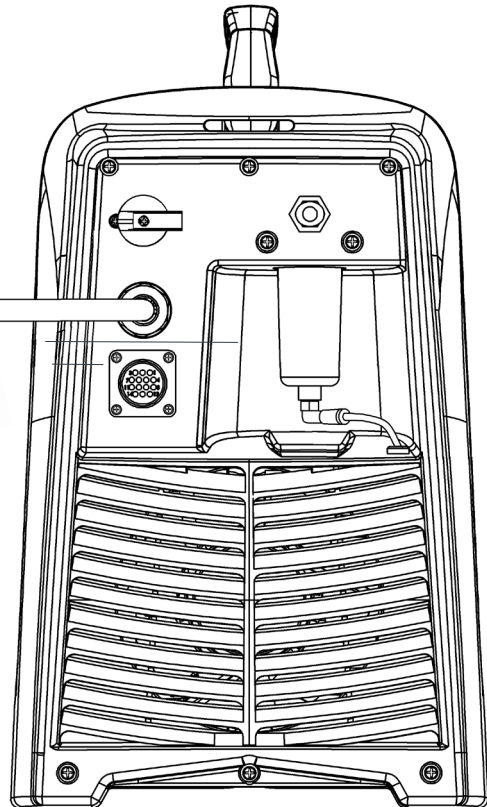
To operate the EX-TRAFIRE®100SD, use a plug that complies with national and local codes of practice. A certified electrician or electrotechnically competent person should connect the mains power lead to the plug.

## Installation of three-phases mains power lead

Strip and prepare the mains power lead as show below:

	UNIT CE
L1	Black (U)
L2	Brown (V)
L3	Grey (W)
Earth	Green-Yellow

Black  
Grey  
Brown  
Green-Yellow

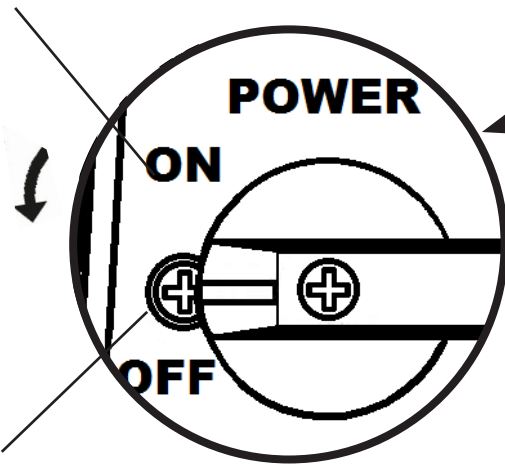
## The mains power lead connection

A certified electrician or electrotechnically competent person should connect the mains power lead to a plug or hard wire to a suitable supply according to national standards.

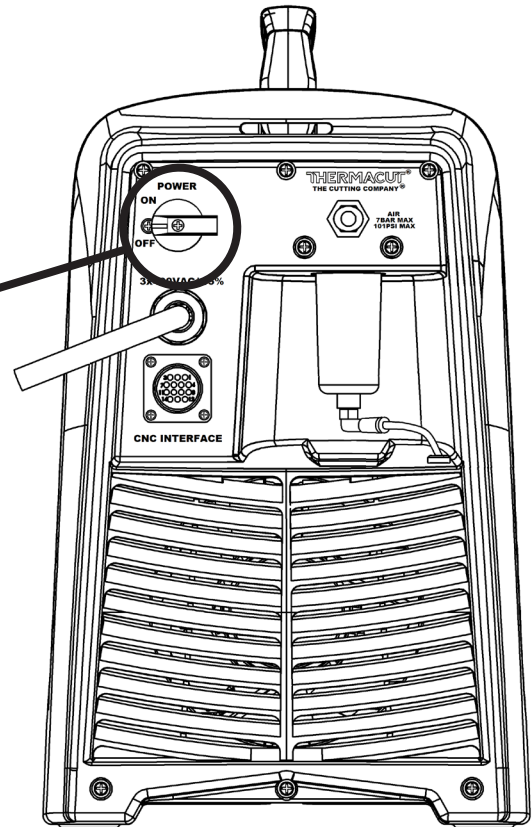
### Torch installation step by step

1. TURN "OFF" the power supply

ON / Turn ON

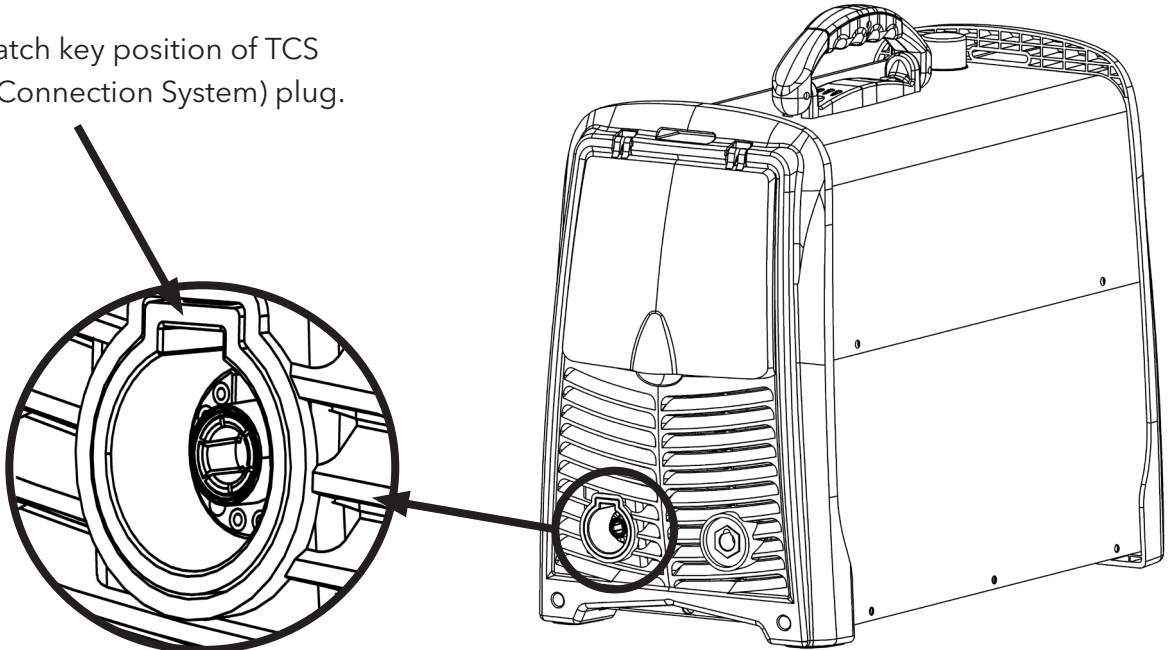


OFF / Turn OFF

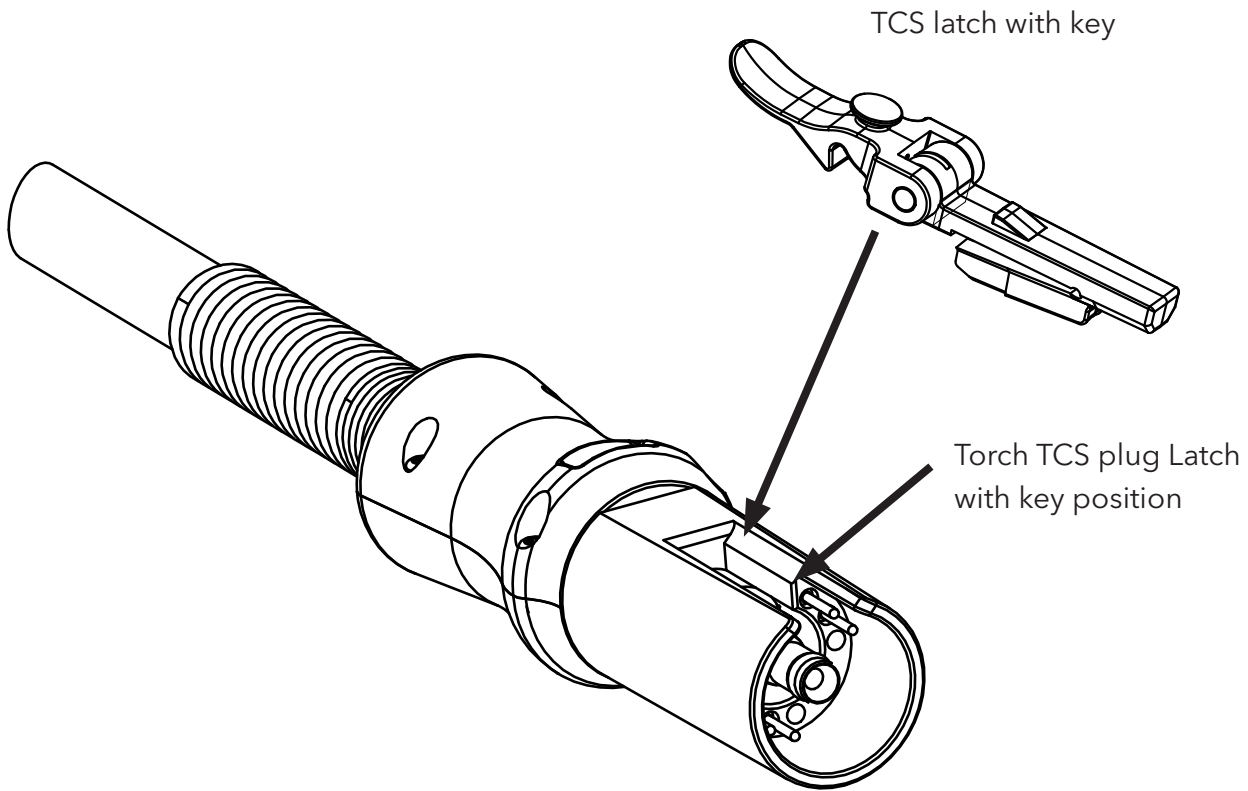


2. Torch connection - power supply location

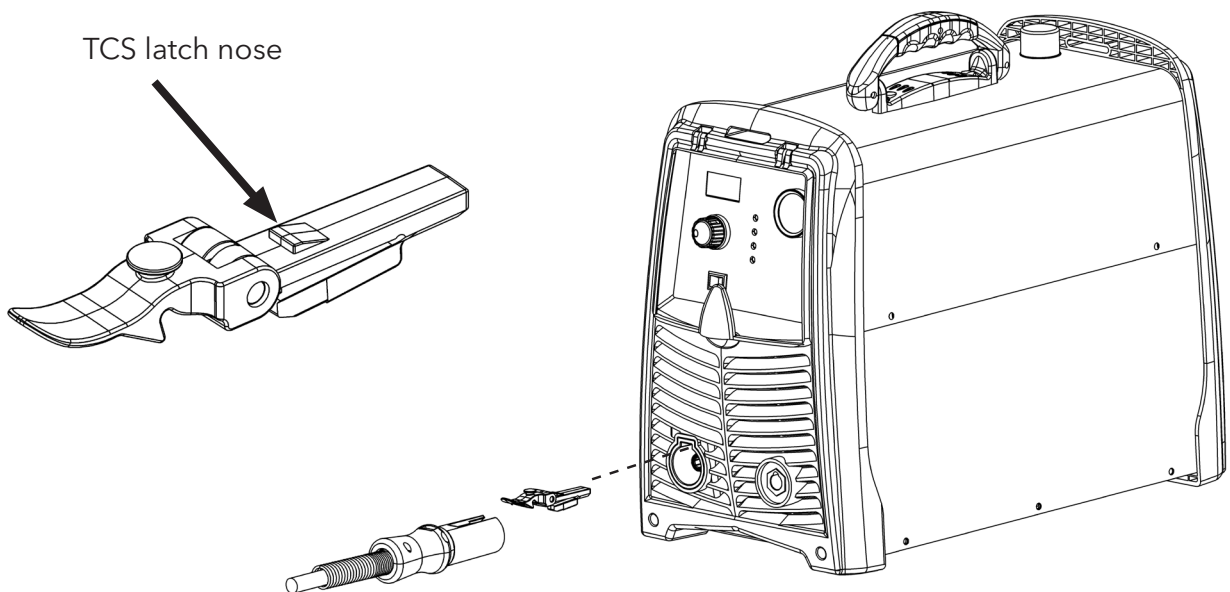
Torch latch key position of TCS  
(Torch Connection System) plug.



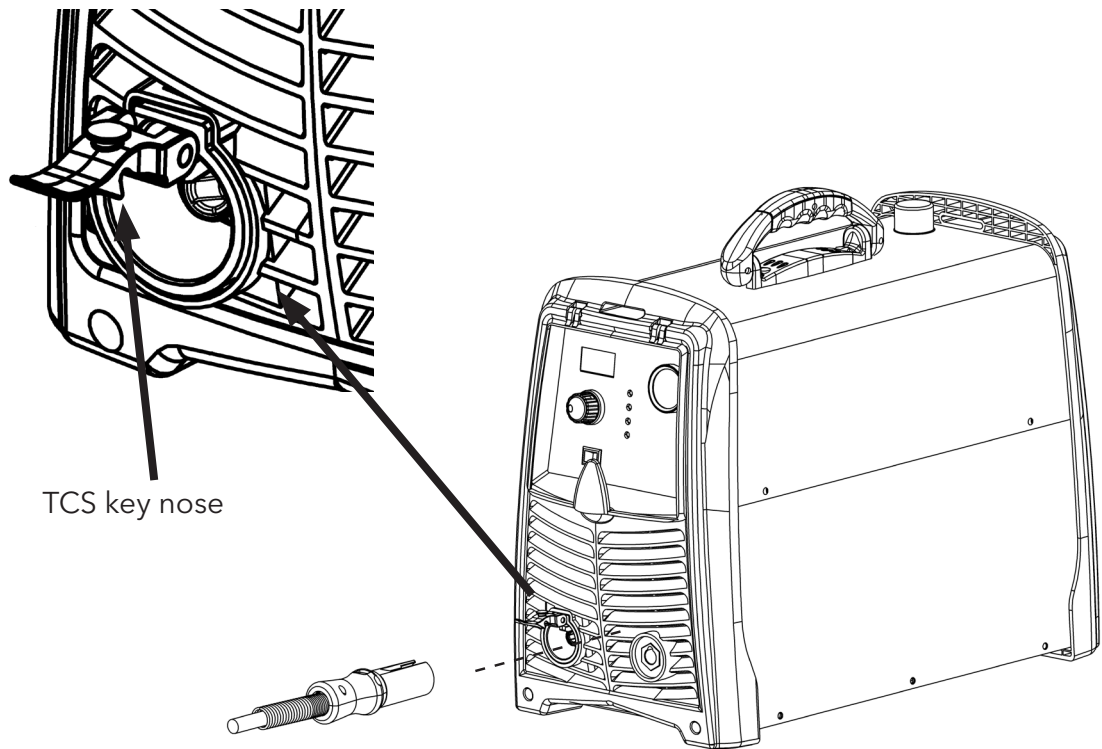
3. Torch connection - Torch TCS plug Latch with key position.



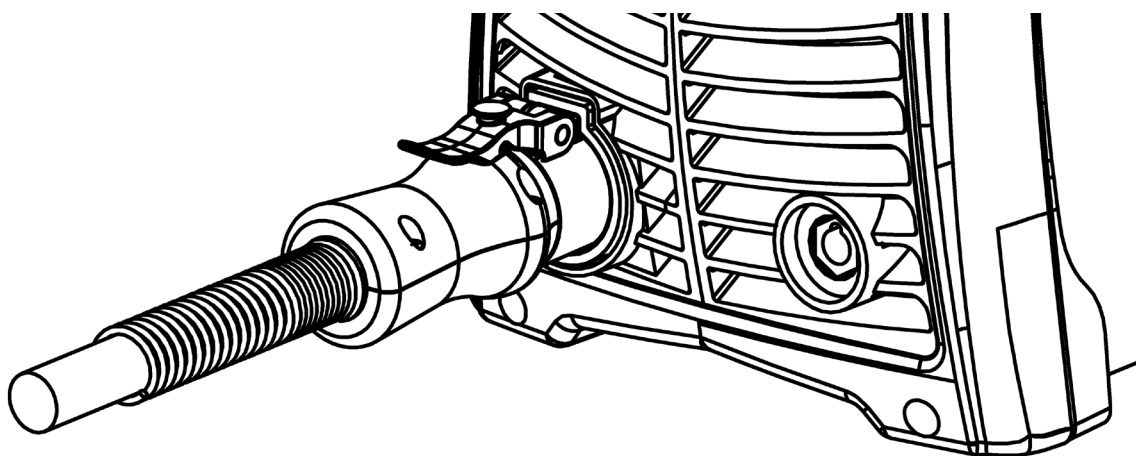
4. Torch connection - 1st step - place the TCS latch with key into the TCS power supply socket. The TCS latch with key must be locked in the TCS socket properly with the latch nose.



5. Torch connection - 2nd step - put TCS plug into the TCS socket.  
The torch TCS plug must be locked in the TCS socket properly with the key nose.



6. Torch connection - proper position of the TCS plug in the TCS socket.




## Plasma gas supply

The EX-TRAFIRE®100SD requires a compressed air supply from a compressor or cylinders, a high pressure regulator should be fitted to either form of supply and be capable of delivering gas to the filter on the system at a flow rate of 270 l/min at a pressure of 5.5 bar.


Gas type	Air	Nitrogen
Gas quality specification	Recommended Air quality: ISO 8573-1 Class 1.2.2. Air max. particle size: 0.1 microns, class 1 ref. to ISO 8573, Air max. oil: 0.1 mg / m3, class 2 ref.: ISO 8573, Air max. dewpoint: +3° C, class 4 ref. to ISO 8573	Purity ≥ 99.99%
Gas quality	Clean, moisture-free, without oil	

**Note:** A poor quality gas supply has a detrimental effect on cut speeds, cut quality, reduced thickness of material that can be cut and shorter consumable parts life.



### WARNING

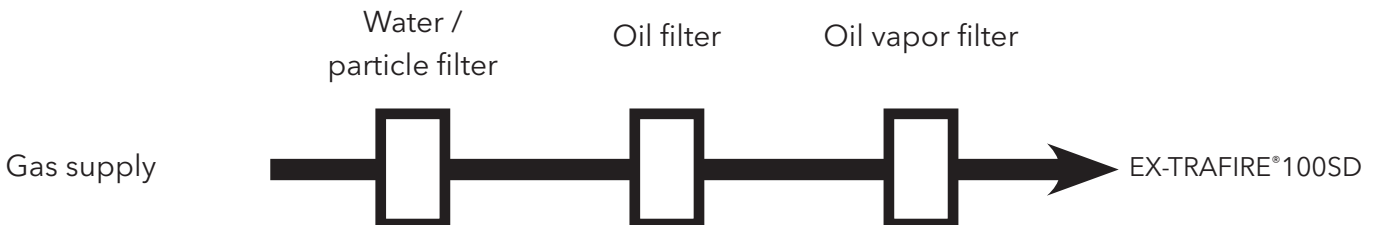
Do not allow the input gas pressure to exceed 10 bar/145 psi.  
The filter bowl could explode if the pressure is exceeded.



**Note:** EX-TRAFIRE®100SD is equipped with a built-in filtration system.

## Additional gas filtration

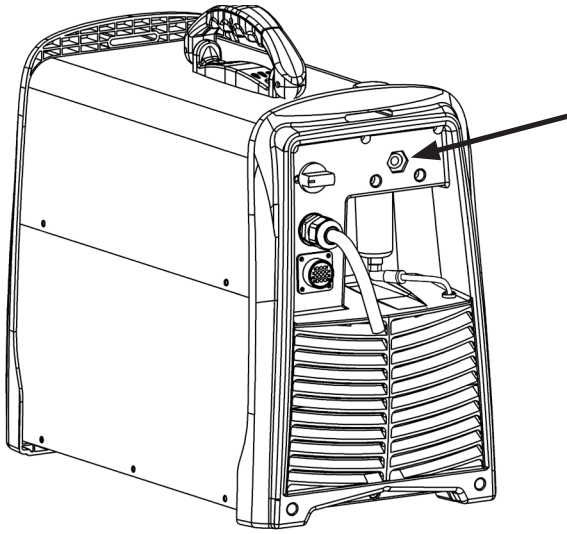
The Thermacut filtration system should be used when oil, moisture or other contaminants are found in the air supply. In more severe cases the 3-stage filtration system should be used.





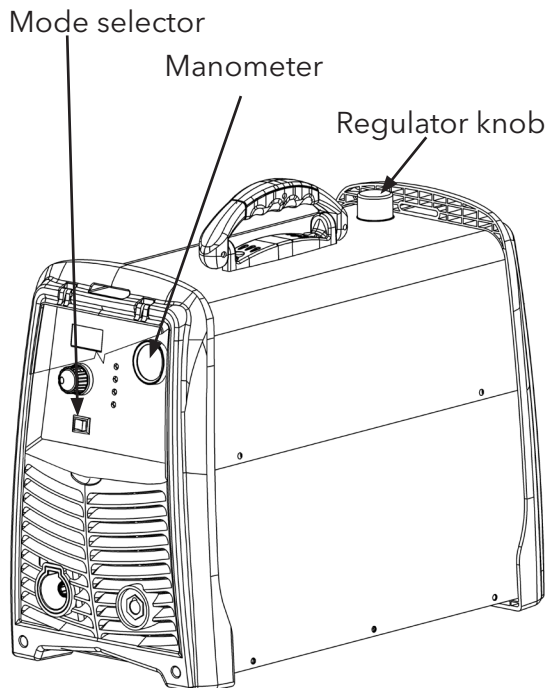
## Gas supply installation

Connect the air-line hose as follows:



1. Air-line hose connection.
  - Female G1/4" thread adapter.
2. Air-line hose.
  - Use an inert gas hose with a minimum internal diameter of 8 mm, make a direct attachment or use a quick disconnect fitting.

## Setting the gas pressure



### CUTTING

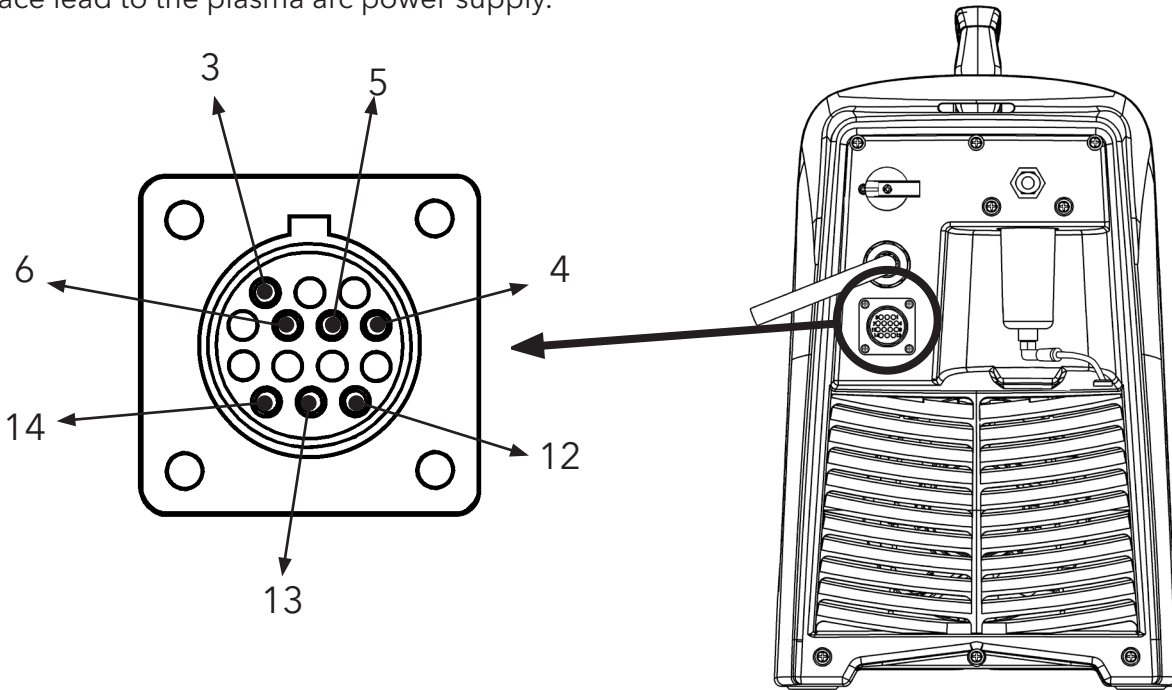
1. Switch from CUT to GOUGE by mode switch.
2. Set the cutting gas pressure by pulling up and turning the regulator knob to it's recommended value (5.5 bar - displayed on the manometer).
3. Push down the regulator knob after setting up the gas pressure.
4. Switch back from GOUGE to CUT by mode selector.
5. Power supply is prepared to cut.

### GOUGING

1. Switch from CUT to GOUGE by mode switch.
2. Set the cutting gas pressure by pulling up and turning the regulator knob to it's recommended value (3.5 bar - displayed on the manometer).
3. Push down the regulator knob after setting up the gas pressure.
4. Power supply is prepared to gouge.

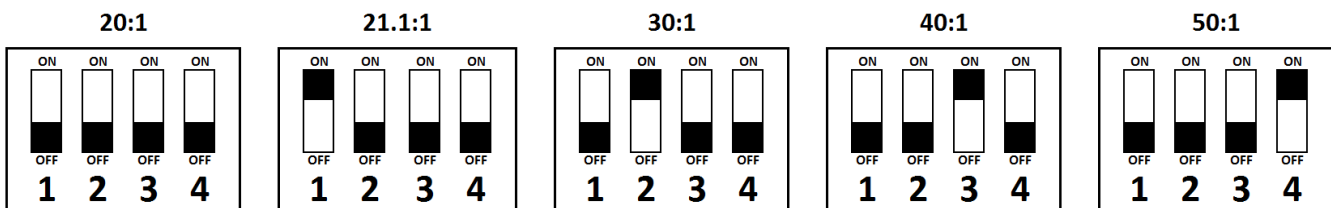
## System CNC interface connection

Each type of signal is available through the system CNC interface connector located on the rear control panel. Use the chart with details of each signal type below when connecting the system interface lead to the plasma arc power supply.



Signal:	START (start plasma cutting)	Arc transfer (start system motion)	Ground	Voltage divider
Type	Input	Output	Ground	Output
Note	Normally open. Open circuit voltage 12 VDC in the START terminals. Requires a dry contact to close it.	Normally open. Dry contact with maximum capacity of: 125 VAC / 10 A 250 VAC / 5 A 30 VDC / 5 A		Divider arc voltage signal of: 20:1 21.1:1 30:1 40:1 50:1 (provides a maximum 18 V)
Rear socket connection	3, 4	12, 14	13	6 (+), 5 (-)
Internal wire colours	white, white	yellow, yellow	green/ yellow	6 (red), 5 (black)

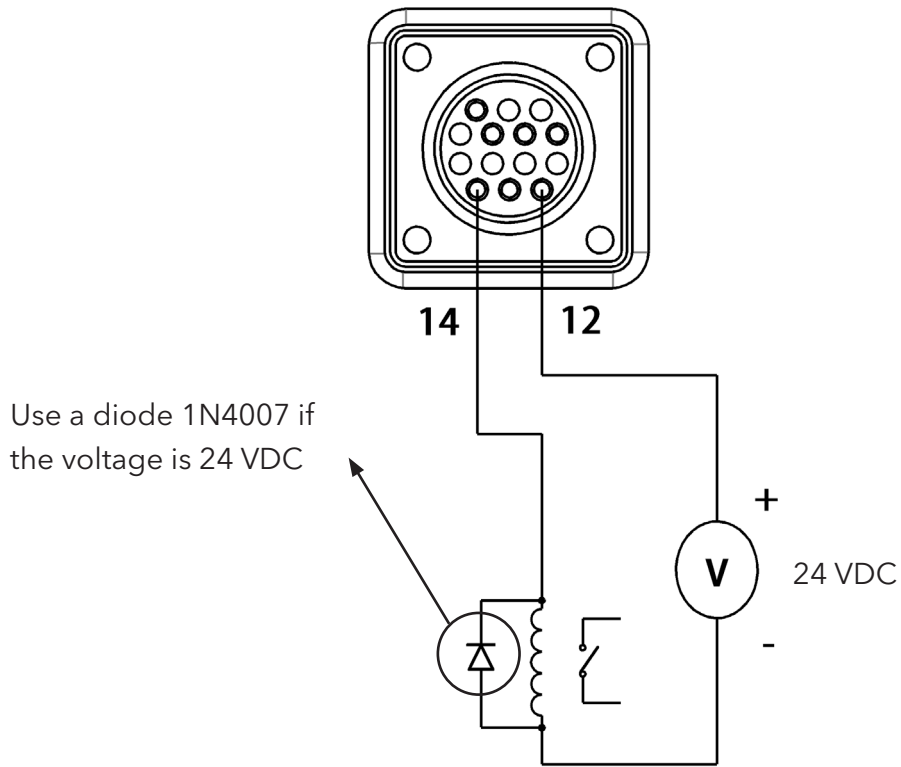
Set the DIP switches to one of the following settings. Pre-adjusted from the production 50:1.



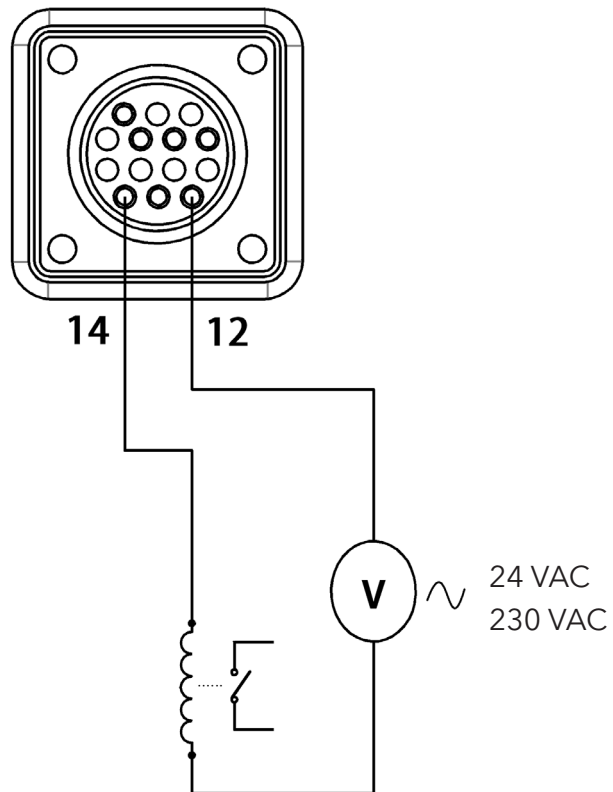
Turn OFF the power supply and disconnect the power lead prior opening the enclose.



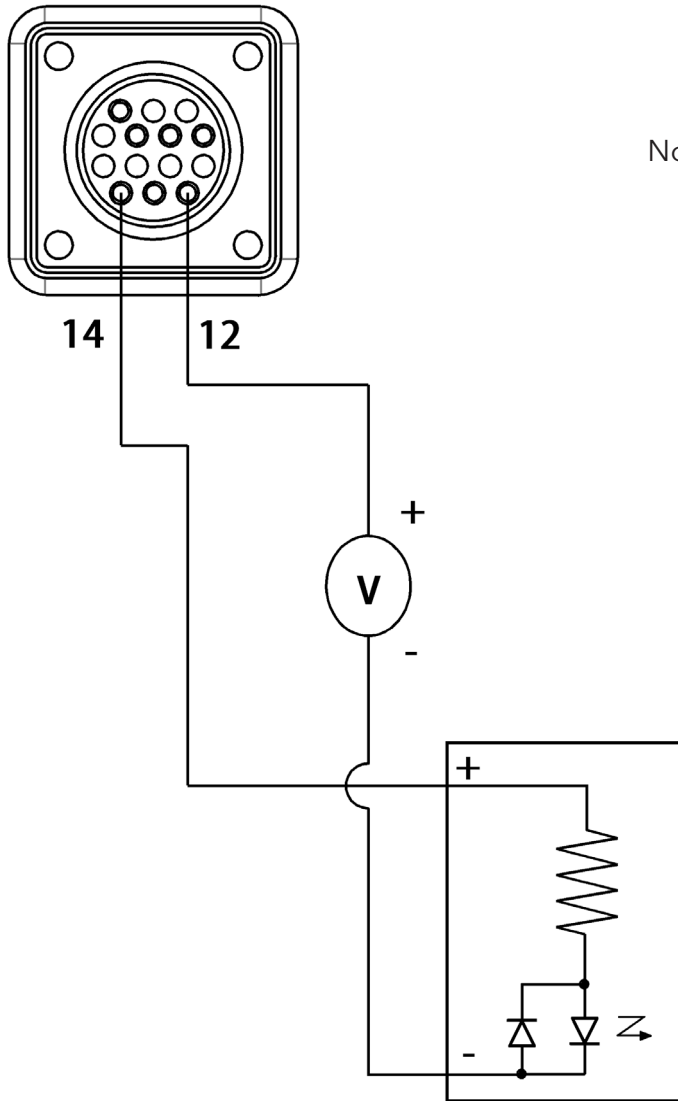
### Activating an external DC coil with an external power supply



### Activating an external AC coil with an external power supply



## Activating an industrial isolated module with an external power supply



Notes:

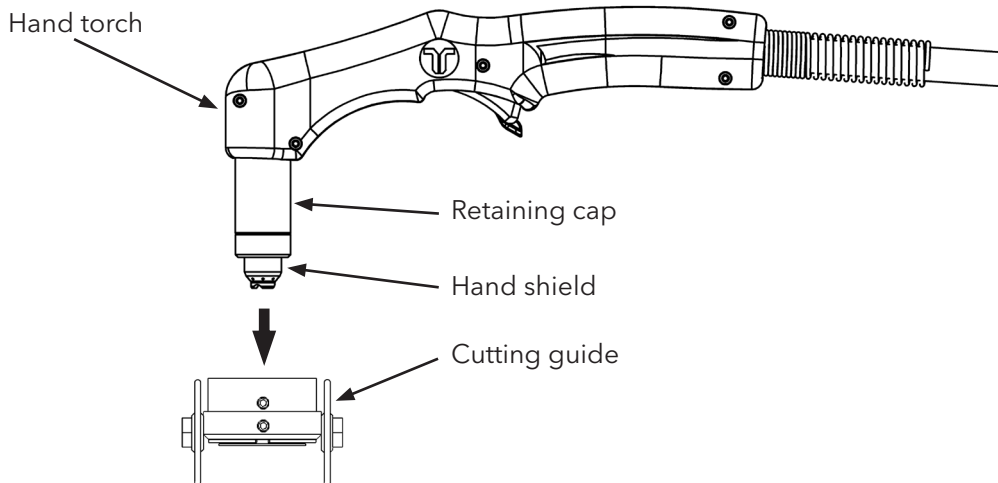
1. Isolated input module, provided by the user.
2. 24 VDC power supply to be provided by the user.



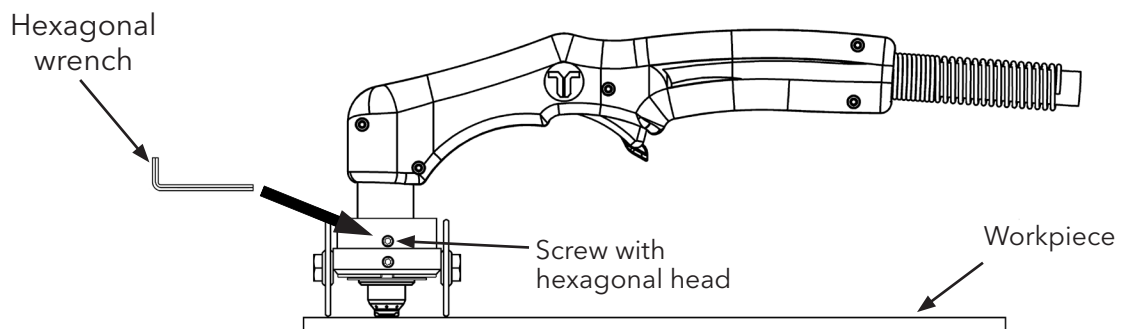
**Installation of the machine interface cable** must be performed by a certified electrician or competent person.

## The circle cutting guide installation - for the FHT-EX®105RTXH/105TTH/45TTH

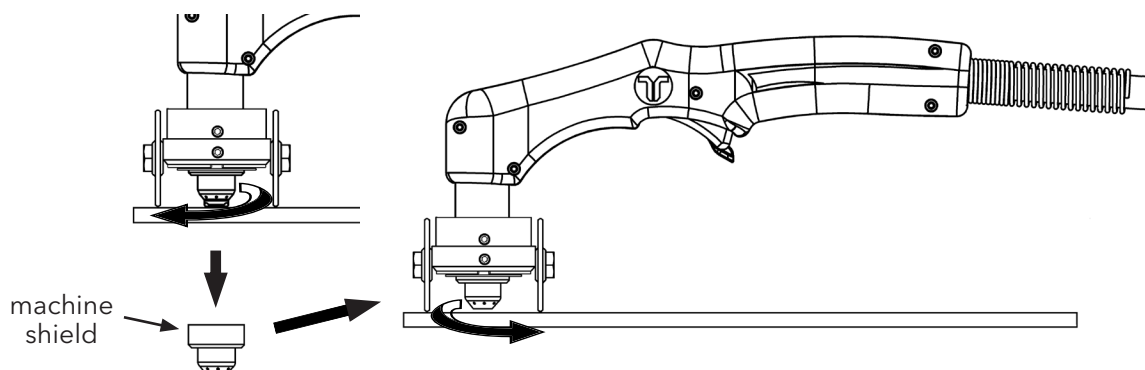
1. Disconnect the torch from the plasma power supply.
2. Insert the hand torch into the cutting guide.



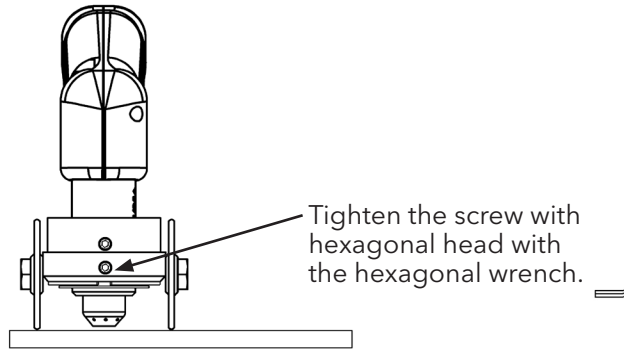
3. Secure the hand torch in the cutting guide with help of the screw with hexagonal head. Use the hexagonal wrench. Tighten by hand. The hand shield defines the required torch to workpiece distance.



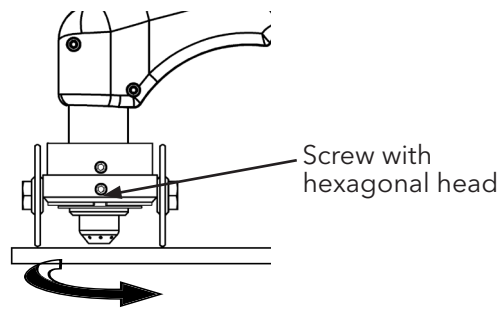
4. It's strictly recommended to use the machine shield in order to keep smooth cutting operation. Unscrew the hand shield and replace with the machine shield. The torch to workpiece distance remains the same because the hand torch is clamped in the cutting guide in the place of the retaining cap.



5. The hand torch clamped in the cutting guide can be used alone or with a radius bar. If you don't want use the radius bar, lock the cutting guide in a fixed position by using of the screw with hexagonal head so that the wheels of the cutting guide point in the same direction as the torch handle - see picture below. Now the torch with the cutting guide is ready to cut.

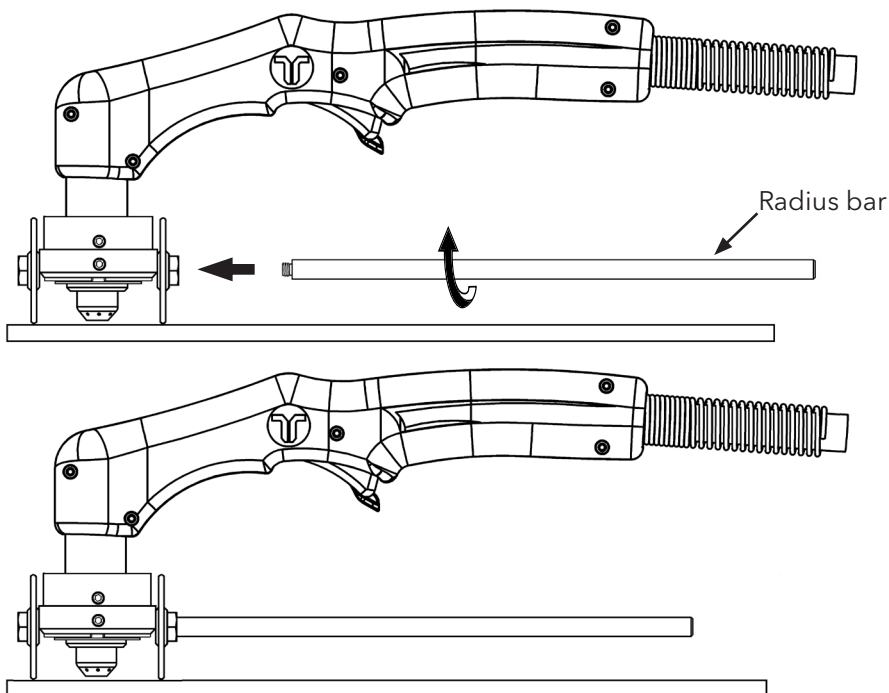


6. If you want use the radius bar, make sure the screw with hexagonal head isn't tightened so that the cutting guide can rotate freely.

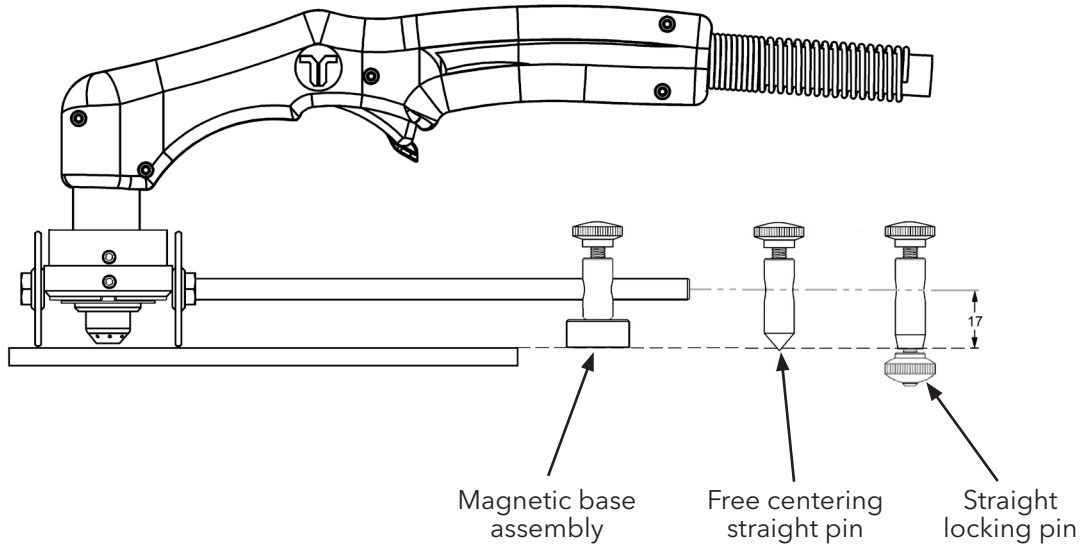


7. Screw in the radius bar\* into the threaded hole in the cutting guide.

\* Lengths of bars are 250 mm or 400 mm.



8. Use the following fasteners to anchor the radius bar to the center of the circle:



## SECTION 4.

### OPERATION:

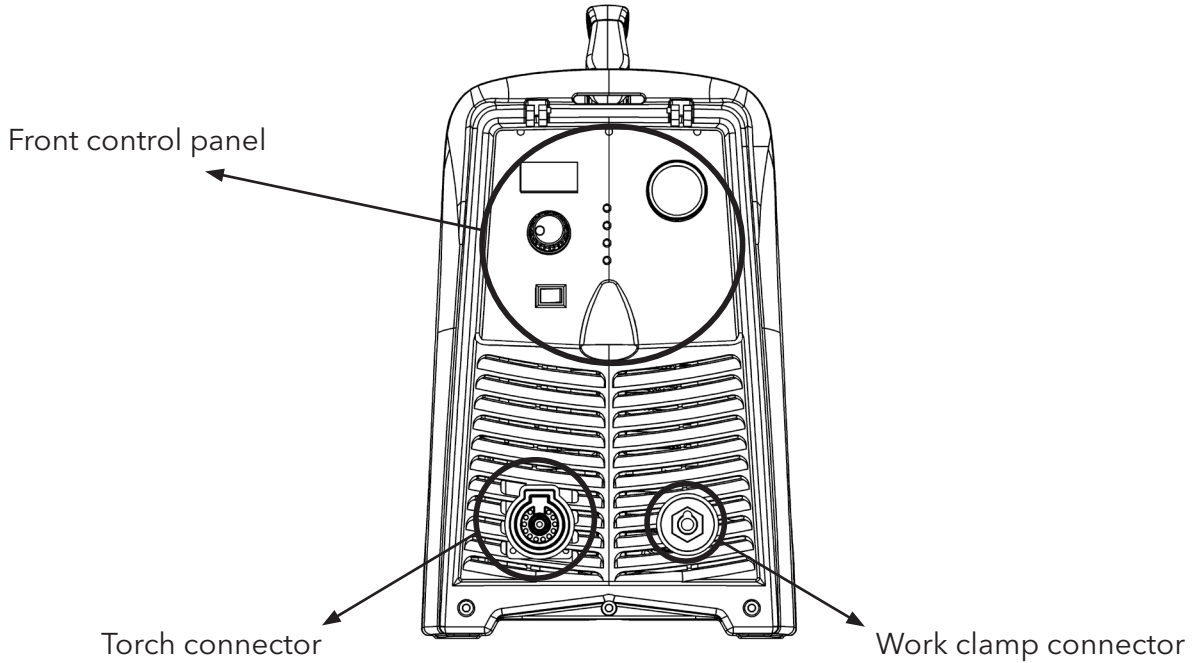
---

Front view.....	4-33
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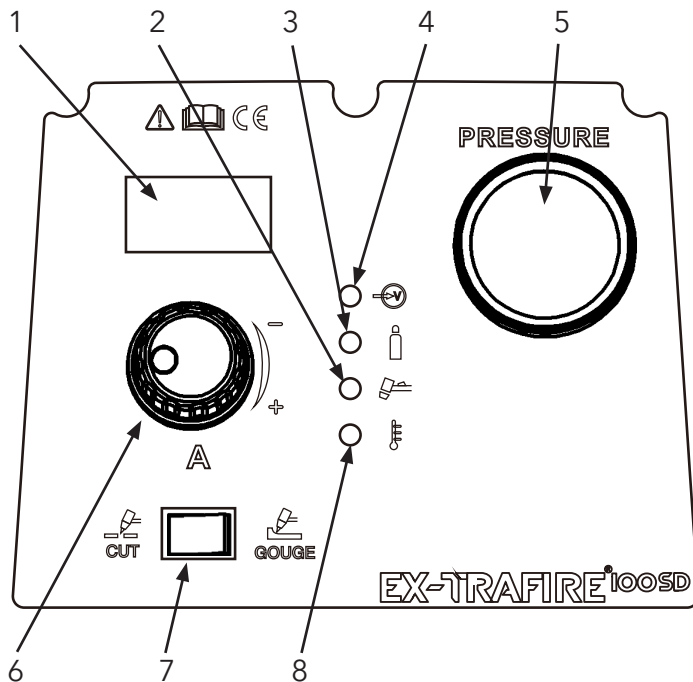


# OPERATION

## Front view

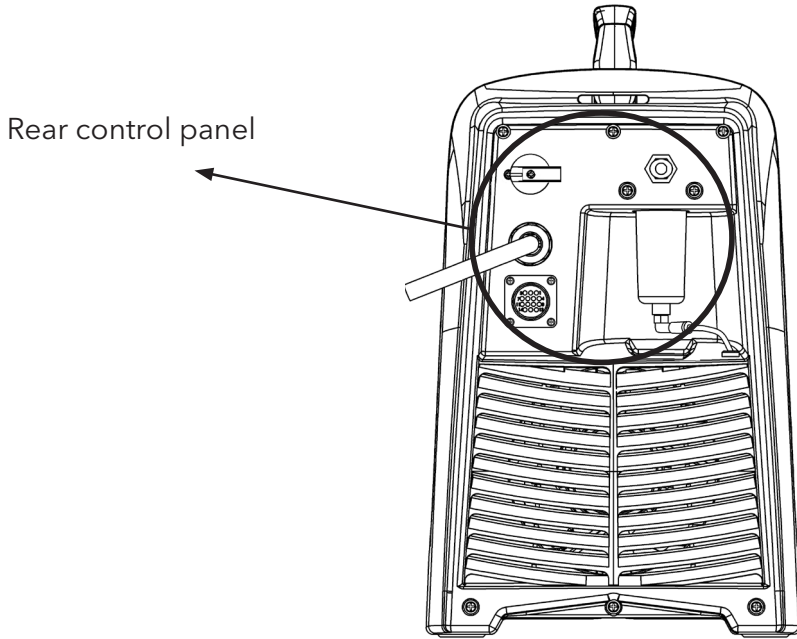


## Front control panel

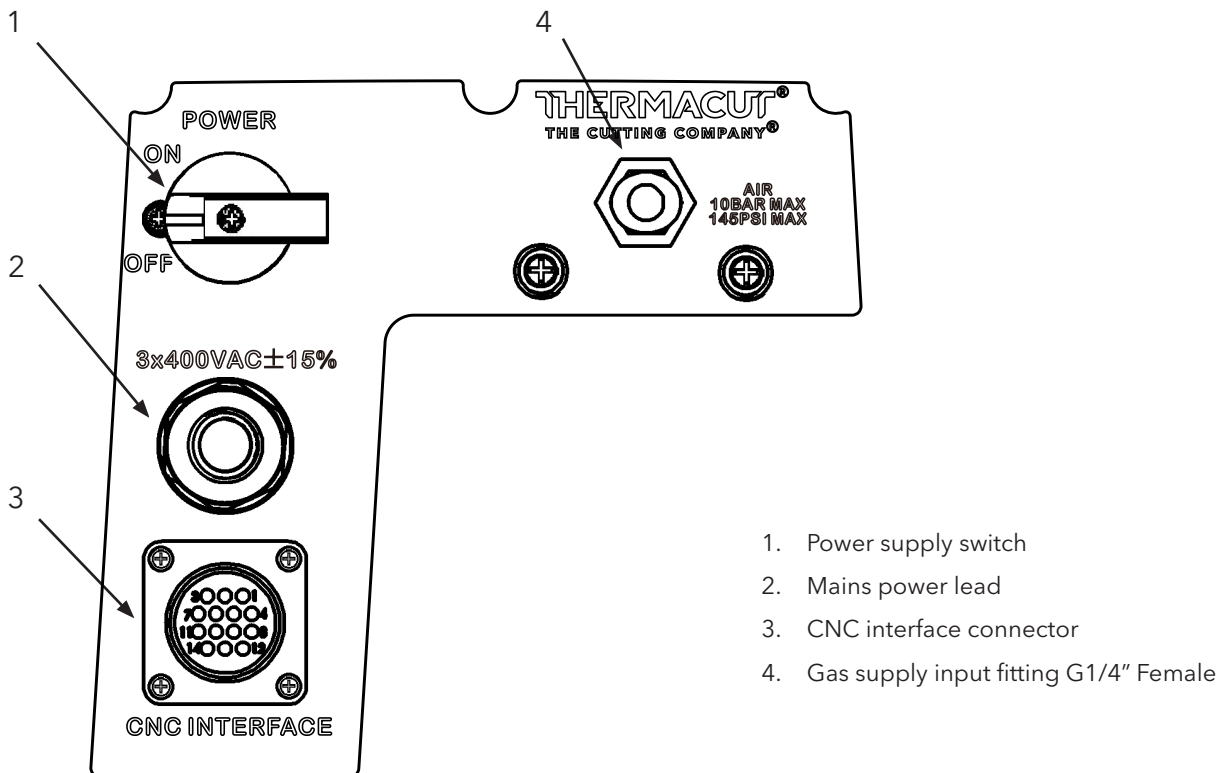


1. Display - Cutting current display. When fault occurs, error code will display.
2. Torch control - LED illuminates when consumables are loose, improperly installed or missing.
3. Gas indicator - LED illuminates when the gas pressure is lower than 2.4 bar.
4. Power ON/OFF indicator - LED1 illuminates when the power supply is turned ON.
5. Pressure indicator.
6. Cutting current regulator knob.
7. CUT/GOUGE - mode switch.
8. Over-Temperature (OT) alarm indicator.

## Rear view



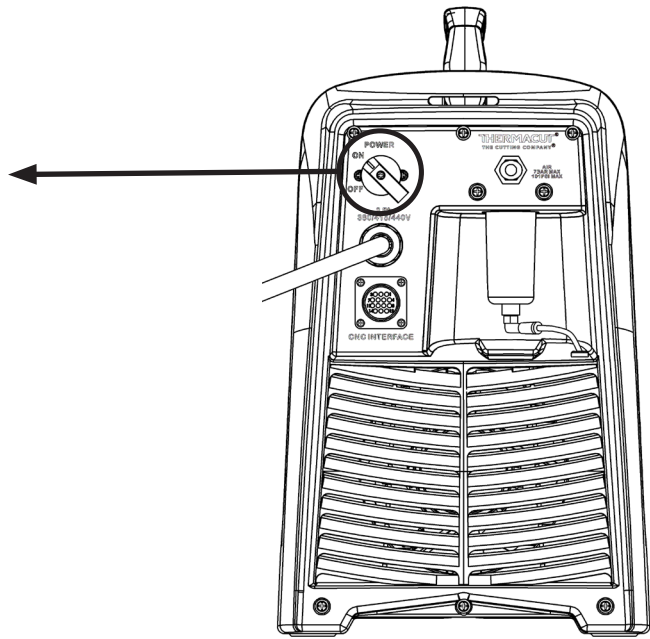
## Rear control panel detail



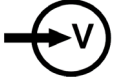
## Turn ON

Switch ON (I)

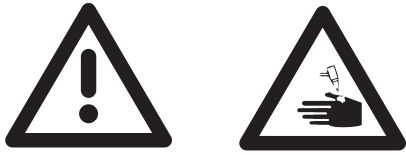
**Note:** The cooling fan will only run when needed.



## Check the LED indicators

Check that LED1  is illuminated and LED2, LED3 and LED4 are not illuminated before cutting.

## Operating the hand torch



**WARNING**  
**Plasma arc is generated immediately when the torch trigger is depressed.**

The plasma arc will cut quickly through gloves and skin.

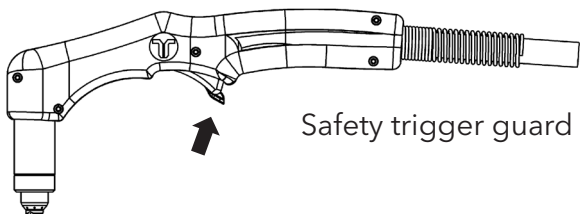
Make sure the power supply is switched off before changing consumables.

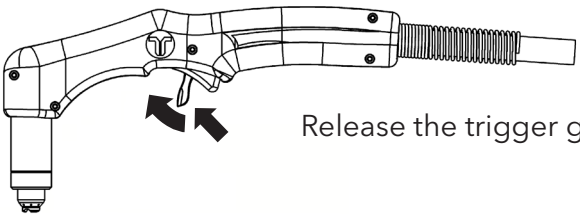
- Keep away from the torch tip.
- Do not hold the piece that is to be cut and keep your hands away from the cutting path.
- Never point the torch toward yourself or toward others.
- Never use with the pendant control switch.

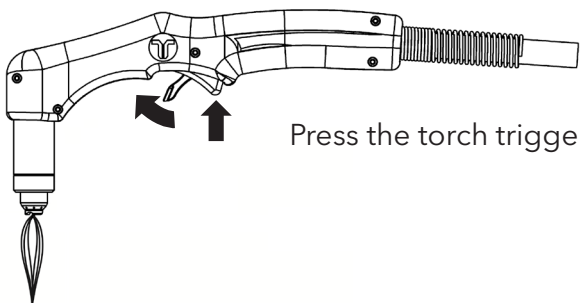
### Important:

In case of operation of the power supply equipped with 23 m long hand torch you have to increase dynamic gas pressure to value 6.5 bar. To refire the arc during post-flow it's necessary to press the trigger button once to stop the flow of the air or wait until the post-flow stops automatically. Then wait approx. 2 s until the air escapes from the torch. Afterwards the pilot arc can be initiated by pressing the trigger button again.

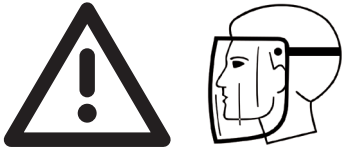
## Operating the torch safety trigger

- 

1. Safety trigger guard position.
- 

2. Release the trigger guard.
- 

3. Press the torch trigger for ignition of the arc.
4. Release the torch trigger to stop cutting.

	<p style="text-align: center;"><b>WARNING</b> <b>SPARKS AND HOT METAL CAN</b> <b>BURN THE SKIN AND EYES</b></p>
<p>When angling the torch for cutting or piercing, molten metal (Arc Spray) will occur in the direction that the torch is aimed. Aim the torch away from yourself and others.</p>	

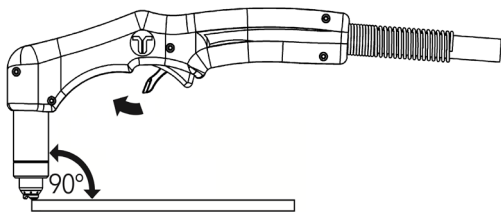
### Fit the work clamp

Secure the work clamp to the workpiece, ensure good contact, and remove surface contaminants. DO NOT fit the work clamp to the material that will be severed/scrap.

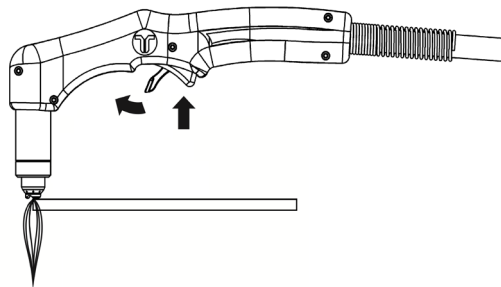
Fit the work clamp as close as possible to the cutting area to minimise exposure to electromagnetic fields (EMF).

Do not hold the material that is to be severed/scrap.

### Edge start cutting

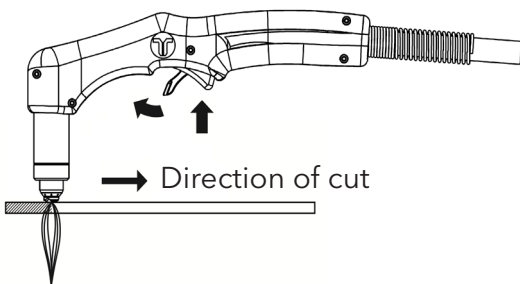


Keep the nozzle of the torch upright at the edge of the workpiece.



Start cutting from the edge of the workpiece.

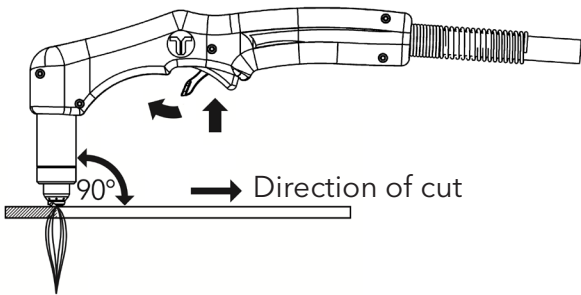
DO NOT start the travel motion until the material has been completely cut through.



Then continue with the cut.

## Hand torch cutting technique

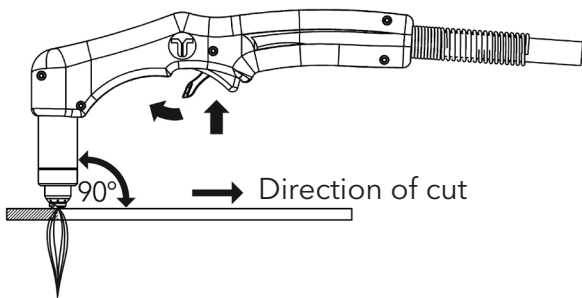
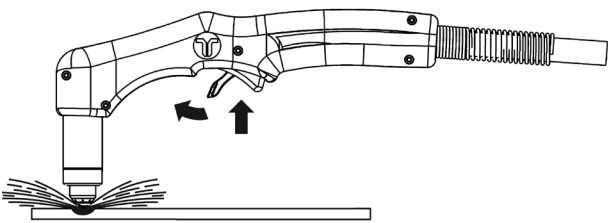
Avoid unnecessary firing of the torch, each firing of the torch reduces the lifetime of the electrode and nozzle.



When cutting, ensure the arc spray exits the underside of the workpiece.

Incomplete severance is indicated by an upward arc spray. This can be caused by the following:

- Excessive travel speed
- Incorrect power settings
- Incorrect gas pressure settings
- Worn/damaged consumables
- or by combination of any of the above



Hold the torch vertically and watch the arc while cutting along the line.

**Shielded consumables.** Make light contact between the shield and the workpiece, pull the torch at a steady travel speed.

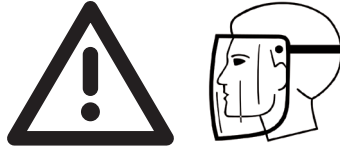
- Pulling the torch gives better control compared to pushing.
- For cutting thin material, reduce the amperage to the optimum to achieve the highest cut quality.
- For straight line/bevel cutting, use a straight edge as a guide. To cut circles, use a template or a circle cutting attachment.
- **Gas Post flow** - After the torch trigger is released, the gas will continue to flow up to 100 seconds (according to adjusted cutting current and used power supply) to cool the torch and consumables.

**Note:** The torch will be ready to restart by depressing the torch trigger during the post flow period. To stop the post flow, depress the torch trigger quickly and release.



**DANGER!** Consumables can remain hot after the post-flow period.

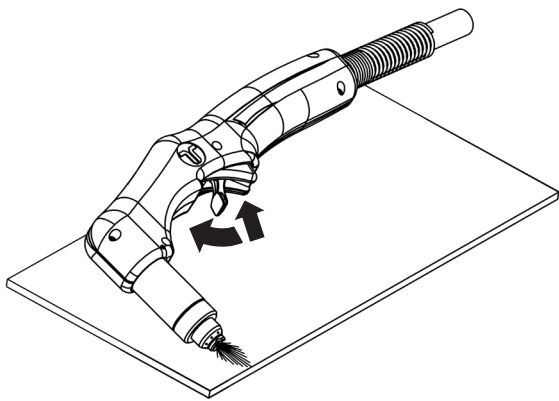
### Piercing



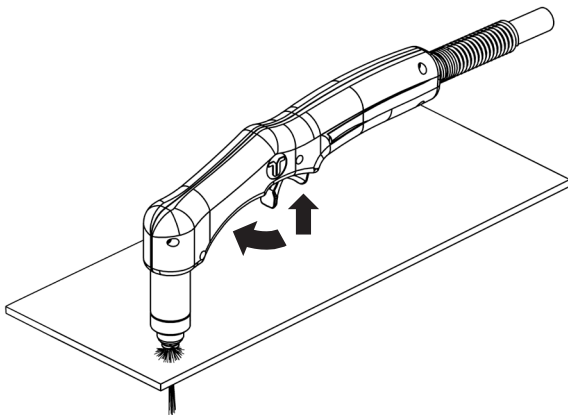
**WARNING**  
**SPARKS AND HOT METAL CAN**  
**BURN THE SKIN AND EYES**

When angling the torch for cutting or piercing, molten metal (Arc Spray) will occur in the direction that the torch is aimed. Aim the torch away from yourself and others.

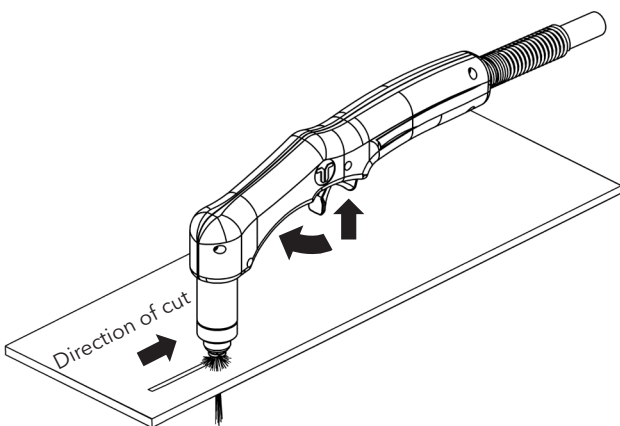
Hold the torch so that the nozzle is within 3 mm of the workpiece before firing.



Hold the torch at an angle to the workpiece, depress the torch trigger and slowly rotate the torch to a vertical position.



Arc spray exits the underside of the workpiece when the cut has achieved full thickness.



After the pierce, proceed with cutting.

## Gouging



**WARNING**  
**SPARKS AND HOT METAL CAN**  
**BURN THE SKIN AND EYES**

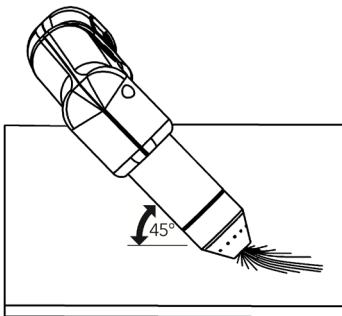
When angling the torch for cutting, piercing or gouging, molten metal (Arc Spray) will occur in the direction that the torch is aimed. Aim the torch away from yourself and others.

Gouging mode is used for the weld removal or achievement a controlled gouge profile.

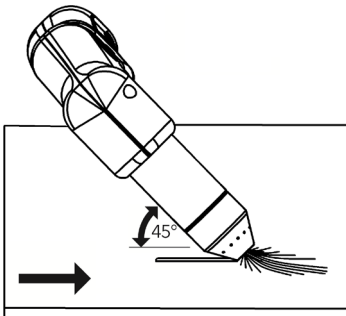
For gouging application must be set the gouging mode on the power supply.

Please use gouging consumables according to used plasma torch and according to set gouging amperage. See the operator manual of the appropriate torch - section Torches and Torch parts - Hand Torch Consumables.

Hold the torch orifice as close as possible to the workpiece before firing.



Hold the torch at an angle of 35° - 45° to the workpiece.  
 Depress the trigger to start the pilot arc.  
 Transfer the arc to the workpiece



Maintain an approximate angle of 35° - 45° to the workpiece.  
 Maintain travel in the direction of the material to be removed.

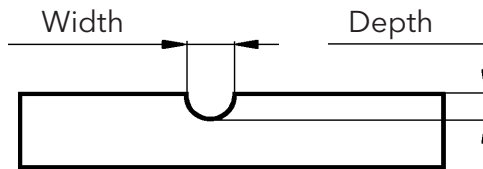
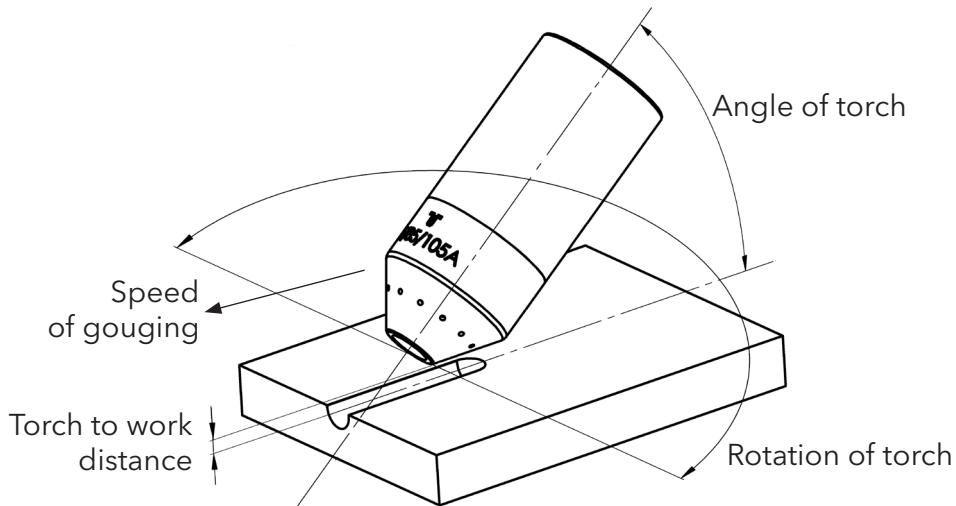
Direction of gouging

<b>Operating parameters of gouging</b>	
Operating (dynamic) air pressure	3.5 - 4.1 bar
Torch to workpiece distance	as close as possible (touch)
Torch to workpiece angle	35° - 45°
Gouging speed	0.6 m/min
Gouging amperage	45 - 100 A



## Gouge profile

The gouge profile can be modified by changing the speed of moving of the torch over the workpiece, changing the angle of the torch to the workpiece, changing the torch to workpiece distance or changing the gouging amperage (the output power) of the power supply.



## Modification of the gouge profile

The gouge profile		The actions which affected the gouge profile			
Width	Depth	Gouging amperage of the power supply	Gouging speed of the torch	Torch to workpiece distance	Torch to workpiece angle
decreasing ↓	decreasing ↓	decreasing ↓			
decreasing ↓	decreasing ↓		increasing ↑		
decreasing ↓	increasing ↑			decreasing ↓	
decreasing ↓	increasing ↑				increasing ↑
increasing ↑	increasing ↑	increasing ↑			
increasing ↑	increasing ↑		decreasing ↓		
increasing ↑	decreasing ↓			increasing ↑	
increasing ↑	decreasing ↓				decreasing ↓

## Operating the machine torch



**WARNING**  
**Plasma arc is generated immediately**  
**when the CNC start signal is ON.**

The plasma arc will cut quickly through gloves and skin.

Make sure the power supply is switched off before changing consumables.

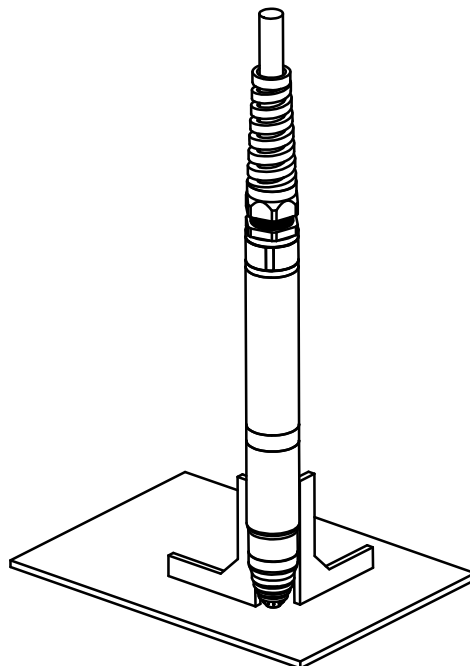
- Keep away from the torch tip.
- Do not hold the piece that is to be cut and keep your hands away from the cutting path.
- Never point the torch toward yourself or toward others.
- Never use with the pendant control switch.

**Important:**

In case of operation of the power supply equipped with 23 m long torch you have to increase dynamic gas pressure to value 6.5 bar.

## Alignment of the machine torch

Mount the machine torch perpendicular to the material to be cut, use a square to align the torch at 0 ° and 90 °, if torch alignment is not possible, check the cutting table for level to obtain a true vertical cut.



**SECTION 5.**

**MAINTENANCE:**

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Routine maintenance ..... 5-44  
Purging/draining of the built-in filter..... 5-45

# MAINTENANCE


## Routine maintenance



### WARNING ELECTRIC SHOCK CAN KILL

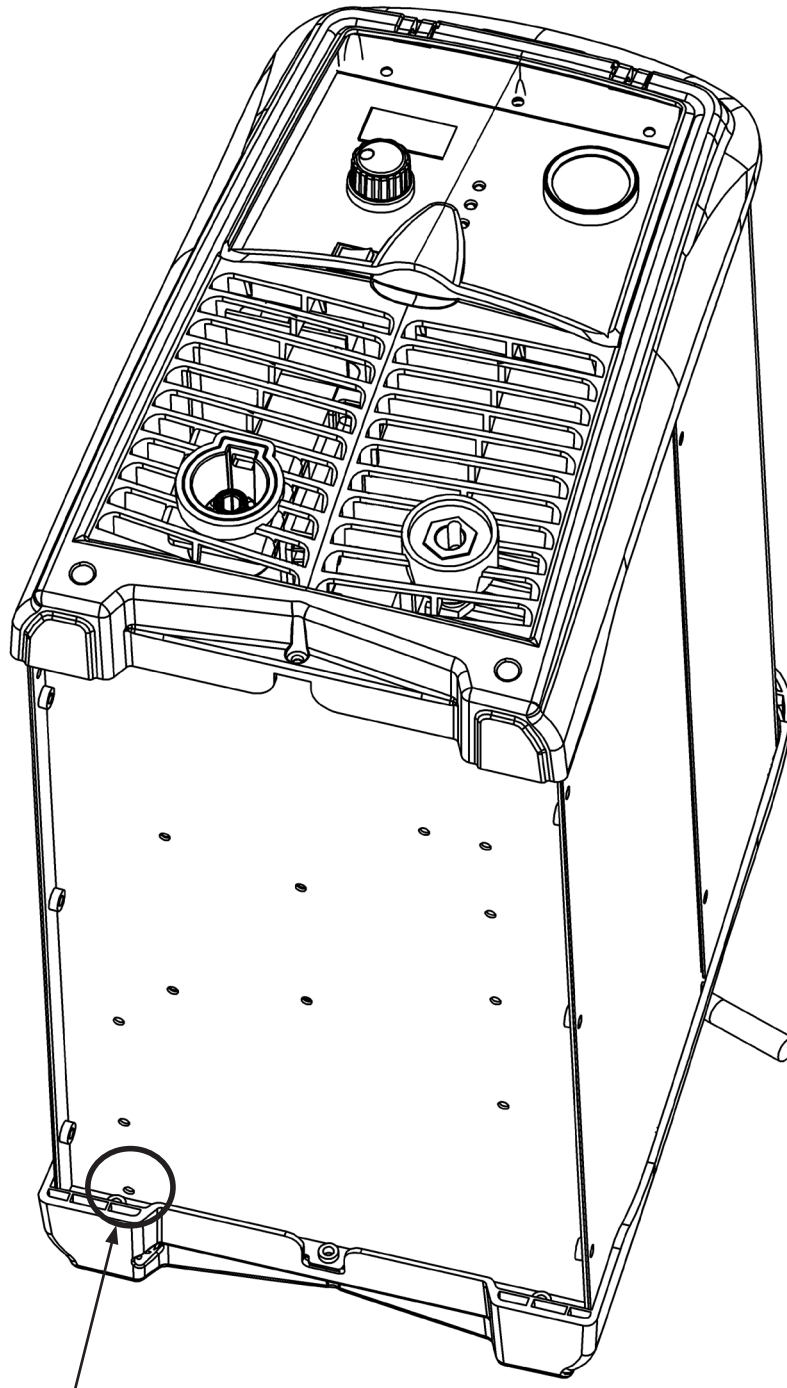


Disconnect mains power lead before servicing; Qualified technicians only should perform any work that requires removal of the system cover. Allow a period (minimum 5 min.) for electrical discharge before handling internal parts.

<b>Every usage</b>	Check the gas pressure. Check the consumables. Check the work clamp.	Ensure that consumables are installed correctly and are not worn.
<b>Every week</b>	Examine and check the torch retaining cap safety switch pins, ensure that the LED3  safety indicator which indicates a loose retaining cap is fully functional.	
<b>Every 3 months</b>	Clean the dust from inside of the power supply using clean dry compressed air.  <b>Advisory note: The dust can be harmful to health!</b>	Full examination of the torch, check the torch trigger safety mechanism, check for signs of cracking in the torch body or exposed wires.
Immediately replace the mains power lead/plug if damaged.	Immediately replace the torch lead if damaged.	Check air-line hose, filter elements, and connections for leaks.

## Purging/draining the built-in filter

This power supply is equipped with built-in float type auto drain filter. Do not cover outflow drain hole located on the bottom of the power supply (see the picture below).



Position of the outflow drain hole

**SECTION 6.****ADDITIONAL ORDERING INFORMATION**

<b>EX-TRAFIRE®100SD Power Supplies</b>	
<b>Part No.</b>	<b>DESCRIPTION</b>
EX-5-001-003	EX-TRAFIRE®100SD/CE/3x400V Power Supply Unit (fully-equipped)

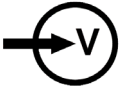


<b>EX-TRAFIRE®100SD Manual Plasma Cutting Systems</b>		
<b>Part No.</b>	<b>DESCRIPTION</b>	<b>Length</b>
EX-5-010-033	EX-TRAFIRE®100SD/CE/3x400V Hand System/FHTEX®105RTXH Torch 8m/H Starter Kit	8 m
EX-5-010-034	EX-TRAFIRE®100SD/CE/3x400V Hand System/FHTEX®105RTXH Torch 15m/H Starter Kit	15 m



<b>EX-TRAFIRE®100SD Mechanized Plasma Cutting Systems</b>		
<b>Part No.</b>	<b>DESCRIPTION</b>	<b>Length</b>
EX-5-011-030	EX-TRAFIRE®100SD/CE/3x400V M System/FHTEX®105RTXM-NR Torch 8m/M Starter Kit	8 m
EX-5-011-031	EX-TRAFIRE®100SD/CE/3x400V M System/FHTEX®105RTXM-NR Torch 15m/M Starter Kit	15 m

<b>Available Consumable Kits</b>		
<b>Part No.</b>	<b>DESCRIPTION</b>	<b>Pcs</b>
EX-3-443-001	Hand Torch FHTEX®105RTXH Consumable Kit 55/65A	1
EX-3-444-001	Machine Torch FHTEX®105RTXM Consumable Kit 55/65A	1
EX-4-443-001	Hand Torch FHTEX®105RTXH Consumable Kit 75/85A	1
EX-4-444-001	Machine Torch FHTEX®105RTXM Consumable Kit 75/85A	1
EX-5-443-001	Hand Torch FHTEX®105RTXH Consumable Kit 100/105A	1
EX-5-444-001	Machine Torch FHTEX®105RTXM Consumable Kit 100/105A	1

## SECTION 7.

## TROUBLESHOOTING

Fault	This may mean	Cause	Solution
<p><b>Main switch is ON and the AC power LED1 fails to illuminate.</b></p> 	<ul style="list-style-type: none"> <li>No / low voltage of mains power source.</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient mains power source.</li> <li>The mains power lead is not plugged in to a live socket.</li> <li>Main power switch is defective.</li> </ul>	<ul style="list-style-type: none"> <li>Check the mains input voltage <math>3 \times 400 \text{ VAC} \pm 15\%</math></li> <li>Check internal control board supply.</li> <li>Plug the mains power lead in to a live socket.</li> <li>Replace the main power switch.</li> </ul>
<p><b>Note: The fan turns ON and OFF automatically. The fan may not run when the plasma arc power supply is switched on.</b></p>			
<p><b>The LED4 illuminates.</b></p> 	<ul style="list-style-type: none"> <li>Over-temperature (OT)</li> <li>Over-current (OC)</li> </ul>	<ul style="list-style-type: none"> <li>Fan fault.</li> <li>Duty cycle over limit.</li> <li>Some of power supply inside component is over lifetime or burned out.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure fan is free running, correct condition.</li> <li>Allow the power supply to cool down and reset. Do not exceed the rated duty cycle.</li> <li>Contact your distributor.</li> </ul>
<p><b>The LED2 illuminates.</b></p> 	<ul style="list-style-type: none"> <li>Gas pressure fault.</li> <li>Pressure switch fault.</li> </ul>	<ul style="list-style-type: none"> <li>The gas input pressure is lower than 2.4 bar/35 psi.</li> <li>Damaged torch lead.</li> <li>Incorrect pressure.</li> </ul>	<ul style="list-style-type: none"> <li>Check gas supply input pressure.</li> <li>Replace the torch lead.</li> <li>Change the pressure switch inside the power supply.</li> </ul>

Fault	This may mean	Cause	Solution
<p><b>The LED3 blinks no arc output when the trigger is depressed or the CNC start is ON.</b></p> 	<ul style="list-style-type: none"> <li>• Consumables fault.</li> <li>• Short circuit inside the torch.</li> </ul>	<ul style="list-style-type: none"> <li>• Consumables are loose, improperly installed or missing.</li> <li>• The retaining cap is not installed or tightened correctly.</li> <li>• Non original consumables.</li> <li>• Consumables are incorrectly installed.</li> <li>• Dirt inside the torch.</li> </ul>	<ul style="list-style-type: none"> <li>• Install the consumables and fit the retaining cap.</li> <li>• Fit the retaining cap and correctly tighten.</li> <li>• Use original new consumables.</li> <li>• Install the consumables correctly.</li> <li>• Remove all consumables, clean the inside of the torch. Reassemble in correct order.</li> </ul>
<p><b>The LED3 illuminates.</b></p> 	<ul style="list-style-type: none"> <li>• Torch connection fault.</li> </ul>	<ul style="list-style-type: none"> <li>• Improperly installed torch or retaining cup is loose.</li> </ul>	<ul style="list-style-type: none"> <li>• Install torch properly or tighten retaining cup.</li> </ul>
<p><b>Press the torch trigger or the CNC signal is ON but no gas output.</b></p>	<ul style="list-style-type: none"> <li>• Gas valve or power supply fault.</li> </ul>	<ul style="list-style-type: none"> <li>• Cable to the gas valve disconnected.</li> <li>• Gas valve malfunction.</li> <li>• Switch or trigger malfunctioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact your distributor.</li> <li>• Contact your distributor.</li> <li>• Contact your distributor.</li> </ul>
<p><b>No arc output but no alarm light when torch trigger is depressed or the CNC start signal is ON.</b></p>	<ul style="list-style-type: none"> <li>• Torch fault.</li> <li>• Input gas pressure fault.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect type of the torch.</li> <li>• Torch components.</li> <li>• Input gas pressure is too high.</li> </ul>	<ul style="list-style-type: none"> <li>• Use the correct torch type which is suitable for the machine.</li> <li>• Check torch components, change parts if necessary.</li> <li>• Decrease input static pressure to 7 bar/101 psi</li> </ul>



Fault	This may mean	Cause	Solution
<b>No transfer between pilot arc and workpiece.</b>	<ul style="list-style-type: none"> <li>• Work clamp connection fault.</li> <li>• No connection to workpiece.</li> </ul>	<ul style="list-style-type: none"> <li>• Fluctuating connection between the clamp and workpiece.</li> <li>• Incorrect distance between the torch and workpiece.</li> <li>• Work cable is broken.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the surface of the clamp and material.</li> <li>• Maintain correct distance between the torch and workpiece.</li> <li>• Replace the work cable.</li> </ul>
<b>The output is too low, unstable or inadequate.</b>	<ul style="list-style-type: none"> <li>• Connection fault.</li> <li>• Voltage fault.</li> </ul>	<ul style="list-style-type: none"> <li>• Input and output connection leads.</li> <li>• Fluctuating connection between the clamp and workpiece.</li> <li>• Incorrect distance between the torch and the workpiece.</li> <li>• Incorrect input voltage.</li> </ul>	<ul style="list-style-type: none"> <li>• Check all input and output connection leads.</li> <li>• Make sure that work lead has a good connection to a clean and dry area of workpiece.</li> <li>• Maintain correct distance between the torch and the workpiece.</li> <li>• Use the correct input voltage, in accordance with specification.</li> </ul>
<b>The pilot arc is difficult to ignite and cuts out.</b>	<ul style="list-style-type: none"> <li>• Consumables fault.</li> <li>• Air pressure fault.</li> </ul>	<ul style="list-style-type: none"> <li>• Check for worn consumables.</li> <li>• The air pressure is too high.</li> </ul>	<ul style="list-style-type: none"> <li>• Change the consumable which may be worn.</li> <li>• Adjust the air pressure output.</li> </ul>
<b>Output is restricted and can not be controlled.</b>	<ul style="list-style-type: none"> <li>• Connection failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Input or output connection leads.</li> <li>• Fluctuating connection between the clamp and workpiece.</li> </ul>	<ul style="list-style-type: none"> <li>• Check all input and output connection cables.</li> <li>• Ensure that the work lead has a good connection to a clean and dry area of workpiece.</li> </ul>

<b>Fault</b>	<b>This may mean</b>	<b>Cause</b>	<b>Solution</b>
<b>Cut quality issues.</b>	<ul style="list-style-type: none"><li>• Incorrect current setting.</li><li>• Consumables fault.</li><li>• Incorrect cutting technique.</li><li>• Poor connection.</li></ul>	<ul style="list-style-type: none"><li>• Poor quality.</li><li>• Consumables are worn.</li><li>• Poor cut quality.</li><li>• Workpiece is dirty / contaminated.</li></ul>	<ul style="list-style-type: none"><li>• Adjust the current to suit the thickness of material to be cut.</li><li>• Inspect consumables - see section Consumable part inspection.</li><li>• Adjust the current to suite the cutting speed and torch-to-workpiece distance according to the thickness of material to be cut.</li><li>• Clean the surface of the workpiece.</li></ul>

<b>ERROR CODES</b>	
<b>H01</b>	The power input voltage is too low
<b>H02</b>	The power input voltage is too high
<b>H03</b>	System operation failed (e.g.: no arc pressure)
<b>H04</b>	Missing nozzle or electrode
<b>H05</b>	During the pilot arc, the electrode is not separated from the nozzle (check the electrode free movement)
<b>H06</b>	Over-temperature alarm
<b>H07</b>	Over-current alarm
<b>H08</b>	Torch inspection / cap sensor
<b>H10</b>	Air pressure alarm
<b>H11</b>	Missing phase
<b>H14</b>	Torch trigger is depressed or CNC start signal is ON during initial periode

**For more detailed information see Service Manual**

## SECTION 8.

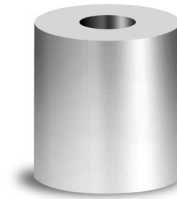
### ACCESSORIES

#### Filter-EX Compressed Air Filter with replacement filter cartridge

EX-0-804-001  
Filter-EX Compressed Air Filter  
(Standard package 1 piece)



EX-0-804-002  
Filter-EX Air Filter Cartridge  
(Standard package 8 pieces)



#### Technical specification

Filtering Degree:	0.01 μinch - 0.25 μm
Maximum Pressure:	125 PSI - 8.5 bar
Maximum Flow @ 80%:	2700 SCFH - 1250 l/min.
Temperature Range:	15 - 140F / -10 +60 °C
Size Pipe:	¼ NPT
Dimension:	Ø 5.2" × 7.9" - Ø 132 × 200 mm

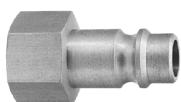
This filter does not fall under the specification of pressure equipment and requires no revision.

#### Advantages of using the Filter-EX Compressed Air Filter:

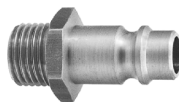
- Removes solid particles, aerosols, and moisture from the compressed air.
- Elimination of the negative effects caused by humidity during cutting.
- Extends the service life time of the torch, leads and consumables.
- Reduces the risk of torch and power supply damage.
- Positive effect on the quality of the cut.

#### Filter-EX Quick Connect Couplings

EX-0-802-000  
DN 7.2 ES Quick Connect Plug  
with female thread G 1/4"



EX-0-802-001  
DN 7.2 ES Quick Connect Plug  
with male thread G 1/4"



EX-0-802-002  
DN 7.2 ES Quick Connect Coupling  
with male thread G 1/4"



## CNC interface

EX-0-803-001

CNC Interface 14-pin Plug Kit, incl. 7 pins



EX-0-803-004

CNC Interface connection lead 6 m



## O-Ring lubricant



EX-0-805-001

Grease 25ml

## Circle cutting guide kit for FHT-EX® 105RTXH/105TTH/45TTH

EX-5-801-002

**This Circle cutting guide kit for hand-held cutting obtains:**

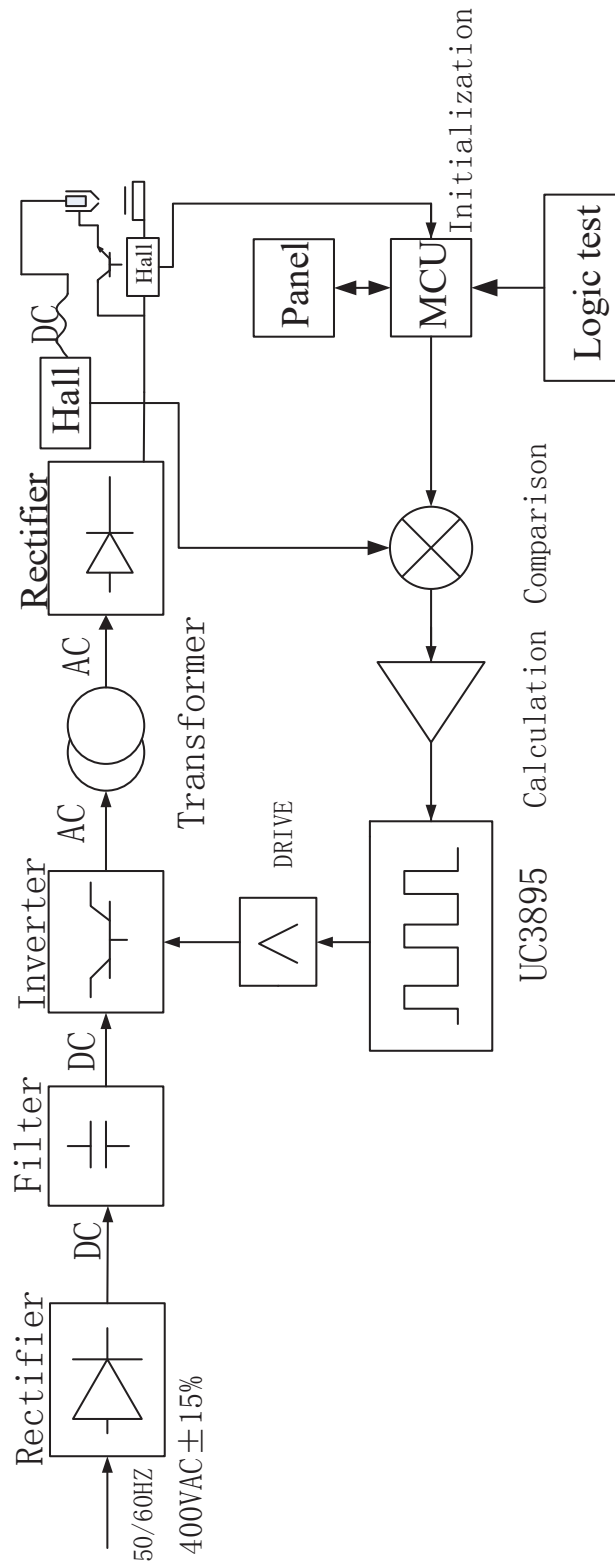
- Circle cutting attachment
- Cutting guide
- Radius bar mm. 250
- Radius bar mm. 400
- Magnetic base assembly
- Free centering straight pin
- Straight locking pin



**SECTION 9.**

**POWER SUPPLY BLOCK DIAGRAM**

**Power supply block diagram**



## SECTION 10.

### END OF LIFETIME PRODUCT DISPOSAL

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#### Use and disposal of waste

Wrapping paper and corrugated paperboard – place in paper recycling containers. Packing foil, PE bags, plastic elements – place in plastic recycling containers.

#### End of lifetime product disposal

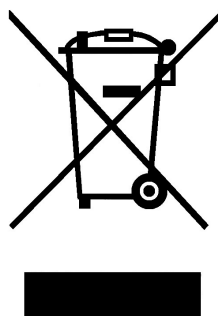
Disposal of electric and electronic equipment (valid in EU member countries and other European countries with an implemented recycling system).

It is not allowed to treat this product as domestic waste. Hand over the product to the specified location for recycling electric and electronic equipment. Prevent negative impact on human health and the environment by correctly recycling your product.

Recycling contributes to preserving natural resources. For more information on the recycling of this product, refer to manufacturer, who will be able to handle the disposal for you or refer to your local authority, domestic waste processing organization or store, where you purchased the product.

For local disposal, the local regulations for the disposal of electrical and electronic scrap as well as materials must be observed.

This product complies with EU directive requirements on electromagnetic compatibility and electrical safety.



#### RoHS statement

Hereby Thermacut, k.s. confirms that to its knowledge all Plasma Power supply models **EX-TRAFIRE H, SC, SD** and **HD** (unless otherwise expressly stated) sold by Thermacut, k.s. fulfill the requirements of the EU directive 2011/65/EU. These products are compatible with the current RoHS requirements for the 7 substances (max 0.1% by weight in homogeneous materials for lead, mercury, hexavalent chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE), Deca-BDE and max 0.01% for cadmium).

## SECTION 11.

### WARRANTY:

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#### WARRANTY

*This Warranty Certificate forms an integral part of General Business Conditions ("GBC") of THERMACUT, k.s. (the "Seller") and shall apply to supplies of Goods under Contract concluded between the Seller and the other contracting party as the recipient of the Goods (the "Buyer"); terms used herein have the same meaning as is ascribed to them in the GBC*

1. The Seller hereby provides to the Buyer a quality warranty (hereinafter referred to as the "Warranty") affirming that the below specified goods delivered under the Contract will, for the below specified warranty period, retain the characteristics stipulated in technical data sheet of the Goods available on Seller's webpages ([www.thermacut.cz](http://www.thermacut.cz), [www.ex-trafire.com](http://www.ex-trafire.com)) at the time of sending of Binding Offer (par. 2.2 of the GBC), otherwise in the quality and design suitable for the purpose arising out of the Contract, otherwise for usual purpose.
2. The warranty period is valid from the date the goods are delivered to the buyer (par. 5.1, 5.2 of the GBC).
3. Par. 3.4 and the following of the GBC shall apply to reporting (claiming) of Warranty defect, asserting rights from defective performance and other rights and obligation of the Seller and Buyer.
4. The warranty period is:
  - o Three (3) years for EX-TRAFIRE® brand power supplies
  - o One (1) year for torches and lead sets
5. The Warranty does not cover reasonable wear and tear of the Goods or associated parts, which include consumables such as: Electrodes, Nozzles, Swirl Rings, Retaining Caps, Shields and O-rings.
6. The Seller is not liable for damage of the Goods caused by the Buyer or third party by incorrect or unprofessional treatment of the Goods (in particular repair or alteration by persons not authorized by the Seller) or its installation, unprofessional usage of the Goods or insufficient maintenance, in particular using the Goods for other than the specified purpose or other failure to comply with operating instructions, application of excessive force or using unapproved consumables parts with the Goods.

Warranty terms and conditions vary to suit diverse markets and country directives.





## Revision history:

- 1. Revision T-1/2020 - 02/2020** - Official release
- 2. Revision T-2/2020 - 05/2020**
  - a) Page 2-12 - Specifications - new value of Max. input power and Rated input voltage
  - b) Page 11-52 - new page of Warranty added
- 3. Revision T-3/2020 - 07/2020**
  - a) Page 1 - the latest version of manual link added
  - b) Page 3-25 - new dimension of the minimum internal diameter of gas hose - 8 mm
- 4. Revision T-4/2020 - 09/2020**
  - a) Page 2-13 - new value of piercing capacity - from: 25 mm to: 20 mm
  - b) Pages 3-29 - 31 - new pages - The circle cutting guide installation - for the FHT-EX®105RTXH/105TTH/45TTH added
  - c) Page 6-45 - new items of additional ordering added
  - d) Pages 8-51, 52 - new items of accessories added - EX-0-802-000, EX-0-803-001, EX-0-803-004 and EX-5-801-002
- 5. Revision T-5/2021 - 07/2021**
  - a) Pages 3-20, 21, 25, 26, 4-34, 4-35 - new graphics of rear panel view
  - b) Page 4-40 - more info about gouging added
  - c) Page 4-41 - new page of gouge profile description, profile modification added

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