



EX-TRAFIRE^{45HD}

Plasma Cutting System

Operating Instructions - EX-2-902-002/N21603 - CE

Revision 2, 24th February, 2023

THERMACUT[®]
THE CUTTING COMPANY[®]

Table of contents

1	Identification	EN-4
1.1	Marking.....	EN-4
1.2	Identification plate	EN-4
1.3	Signs and symbols used.....	EN-4
1.4	Classification of the warnings.....	EN-5
2	Safety.....	EN-5
2.1	Designated use.....	EN-5
2.2	Obligations of the operator	EN-6
2.3	Warning and notice signs.....	EN-6
2.4	Product-specific safety instructions.....	EN-6
2.5	Safety instructions for the electrical power supply	EN-7
2.6	Safety instructions for plasma cutting.....	EN-7
2.7	Personal protective equipment.....	EN-7
2.8	Emergency information.....	EN-7
3	Scope of delivery.....	EN-8
4	Product description	EN-9
4.1	Assembly and use	EN-9
4.2	Technical data	EN-11
4.2.1	EX-TRAFIRE® 45HD, Single-phase	EN-11
4.2.2	EX-TRAFIRE® 45HD, Three-phase	EN-12
4.3	Technical data for cutting torches FHT-EX® 45TTH and FHT-EX® 45TTM	EN-13
5	Transport and positioning	EN-15
6	Setting up the power supply	EN-16
6.1	Connecting to the gas supply.....	EN-16
6.2	Connecting the work lead.....	EN-16
6.3	Connecting the power supply cable	EN-17
6.3.1	Connecting the single-phase machine.....	EN-17
6.3.2	Connecting the three-phase machine.....	EN-17
6.4	Connecting the input power plug.....	EN-18
6.4.1	Connection to a generator (optional).....	EN-19
6.5	Connecting the cutting torch.....	EN-19
6.6	Connecting the CNC interface	EN-20
6.6.1	Setting the DIP switches	EN-21
6.6.2	Enabling the external DC coil with an external power supply ..	EN-21
6.6.3	Enabling the external AC coil with an external power supply..	EN-22
6.6.4	Enabling the industrially insulated module with an external power supply	EN-22
6.7	Installing consumables for the hand and machine cutting torches.....	EN-23
6.8	Aligning FHT-EX® 45TTM machine cutting torch	EN-25
7	Operation of the power supply	EN-25
7.1	LCD description.....	EN-26
7.1.1	Setting the parameters	EN-27
7.1.2	Selecting the cutting mode.....	EN-28
7.1.3	Connecting the work lead with the work lead clamp	EN-28
7.2	Powering on the machine	EN-29
7.3	Manual cutting process	EN-29

7.4	Manual grid cutting, gouging, marking process	EN-29
7.5	Cutting	EN-30
7.6	Piercing	EN-31
7.7	Gouging	EN-31
7.7.1	Table for FHT-EX®45TT material removal	EN-32
7.8	Stopping the cutting process	EN-33
8	Disconnecting the unit.....	EN-33
9	Maintenance and cleaning.....	EN-34
9.1	Maintenance and cleaning intervals	EN-35
10	Faults and troubleshooting.....	EN-36
11	Disassembly.....	EN-40
12	Disposal	EN-41
12.1	Disposal of materials.....	EN-41
12.2	Disposal of consumables	EN-41
12.3	Packaging	EN-41
13	Warranty	EN-42
14	Block diagram	EN-43
15	Accessories	EN-44
16	FHT-EX® 45TTH hand cutting torch unit.....	EN-45
16.1	FHT-EX® 45TTH hand cutting torch unit components.....	EN-45
16.2	FHT-EX® 45TTH consumables for hand cutting torch.....	EN-47
17	FHT-EX® 45TTM machine cutting torch unit.....	EN-48
17.1	FHT-EX® 45TTM machine cutting torch components	EN-48
17.2	FHT-EX® 45TTM consumables for standard machine cutting torch.....	EN-50
17.3	FHT-EX® 45TTM consumables for marking machine cutting torch	EN-51
18	Ordering information on bulk packs and starter kits	EN-52
18.1	EX-TRAFIRE® 45HD plasma power supply	EN-52
18.2	EX-TRAFIRE® 45HD manual plasma cutting systems	EN-52
18.3	EX-TRAFIRE® 45HD mechanized plasma cutting systems.....	EN-53
18.4	Bulk packs for FHT-EX® 45TTH and FHT-EX® 45TTM	EN-54
19	Cutting tables for mechanical cutting.....	EN-55
19.1	30 A cutting, shielded, with compressed air.....	EN-56
19.2	45 A cutting, shielded, with compressed air.....	EN-57
19.3	Tables for marking.....	EN-58
19.3.1	Marking, shielded, with compressed air or Argon.....	EN-58

1.4 Classification of the warnings

The warnings are divided into four different categories and are indicated prior to potentially dangerous work steps. The following signal words are used depending on the type of hazard:

DANGER

Describes an imminent threatening danger. If not avoided, it may cause severe injury or death.

WARNING

Describes a potentially dangerous situation. If not avoided, this may result in serious injury or death

CAUTION

Describes a potentially harmful situation. If not avoided, this may result in slight or minor injury.

NOTICE

Describes the risk of impairing work results or material damage and indicates irreparable damage to the device or equipment.

2 Safety

This chapter warns of residual hazards that should be kept in mind to operate the product safely. Non-observance of the safety instructions may result in risks to the life and health of personnel, environmental damage or material damage.

➤ Observe the document entitled "Safety Instructions".

2.1 Designated use

The device described in this document may be used only for the purpose and in the manner described. The device is used only for the generation and control of the output current required for plasma cutting, gouging, and marking. Any other use is considered improper. Unauthorized modifications or changes to enhance the performance are not permitted.

- Do not exceed the maximum load data as defined by the document supplied. Overloads lead to destruction.
- Do not make any modifications or changes to this product.
- Do not use the device to thaw pipes.
- Do not use or store the device outdoors where it is wet.

2.2 Obligations of the operator

- Ensure that only qualified personnel are permitted to work on the device or system.

Authorized personnel are:

- those who are familiar with the basic regulations on occupational safety and accident prevention;
 - those who have been instructed on how to handle the device;
 - those who have read and understood these operating instructions;
 - those who have been trained accordingly;
 - those who are able to recognize possible risks because of their special training, knowledge, and experience.
- Keep untrained persons out of the work area.
 - Each time the device's cover plates are opened, have Thermacut® or another authorized specialist perform a safety inspection in accordance with DIN IEC 60974 Part 4: "Periodic inspection and testing".

The device can produce electromagnetic fields that could impact the proper function of cardiac pacemakers and implanted defibrillators.

- Do not use the device if you have a pacemaker or an implanted defibrillator.

This Class A cutting device is not intended for use in residential areas with a public low-voltage power supply system. It can potentially be difficult to guarantee electromagnetic compatibility in these areas due to both conducted and emitted interference.

- The device may be used only in industrial zones according to DIN EN 61000-6-3.

2.3 Warning and notice signs

The following warning, notice and mandatory signs can be found on the product:



- Read and observe the operating instructions.

These markings must always be legible. They may not be covered, obscured, painted over, or removed.

2.4 Product-specific safety instructions

- Do not use or store the device outdoors where it is wet.
- Do not operate the device if the housing is open.

2.5 Safety instructions for the electrical power supply

- Ensure that the input power cable is not damaged, for example by being driven over, crushed or torn.
- Check the input power cable for damage and wear at regular intervals.
- If it is necessary to replace the input power cable, only models indicated by the manufacturer may be used.
- Only a qualified electrician should carry out work on the input power cable and the input power plug.
- Water protection and mechanical stability must be ensured when replacing the input power plug of the input power cable.

2.6 Safety instructions for plasma cutting

- Plasma cutting may cause damage to the eyes, skin, and hearing. Note that other hazards may arise when the device is used with other cutting components. Therefore, always wear the prescribed personal protective equipment as defined by local regulations.
- All metal vapors, especially lead, cadmium, copper, and beryllium, are harmful. Ensure sufficient ventilation or extraction. Do not exceed the current occupational exposure limits (OEL).
- To prevent the formation of phosgene gas, rinse workpieces that have been degreased with chlorinated solvents using clean water. Do not place degreasing baths containing chlorine in the vicinity of the cutting area.
- Adhere to the general fire protection regulations and remove flammable materials from the vicinity of the cutting work area prior to starting work. Provide appropriate fire extinguishing equipment in the workplace.

2.7 Personal protective equipment

- Wear your personal protective equipment (PPE).
- Ensure that others in close proximity are also wearing personal protective equipment.

Personal protective equipment consists of protective clothing, safety goggles, face protection, ear protectors, protective gloves, and safety shoes.

2.8 Emergency information

- In the event of an emergency, immediately disconnect the following supplies:
 - Electrical power supply
 - Gas supply

3 Scope of delivery

The following components are included in the scope of supply:

- 1 × EX-TRAFIRE® 45HD cutting power supply
- 1 × FHT-EX® 45TTH or FHT-EX® 45TTM cutting torch
- 1 × work lead incl. work lead clamp
- 1 × operating instructions
- 1 × “Safety Instructions” document
- 1 × “Warranty” document
- 1 × operating instructions for the cutting torch
- 1 × starter kit
- Order the equipment parts and consumables separately.
- The order data and ID numbers for the equipment parts and consumables can be found in the product catalog.
- For more information about points of contact, consultation, and orders, visit www.thermacut.com.

Although the items delivered are carefully checked and packaged, it is not possible to fully rule out the risk of transport damage.

Goods-in inspection

- Check for order completeness by checking the delivery note.
- Check the delivered goods for damage (visual inspection).

Claim process

- If goods are damaged, notify the final carrier.
- Keep the packaging for possible inspection by the carrier.

Returns

- Use original packaging and packing material for returns.
- If you have questions concerning the packaging or how to secure the device, contact your supplier, carrier or transport company.

4 Product description

4.1 Assembly and use

The control elements are located on the control panel. The connections are on the front and rear of the device.

Fig. 2 Control elements and connections, rear panel

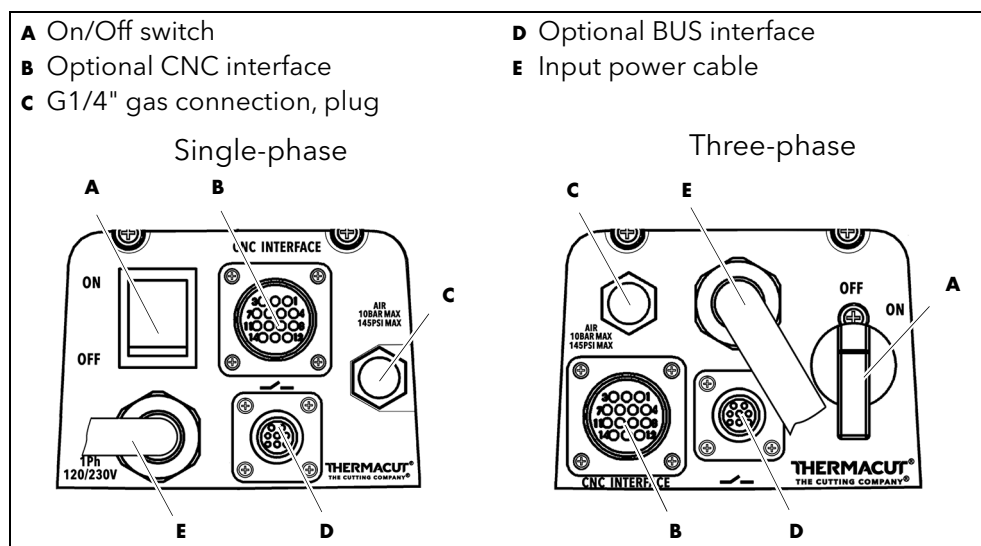
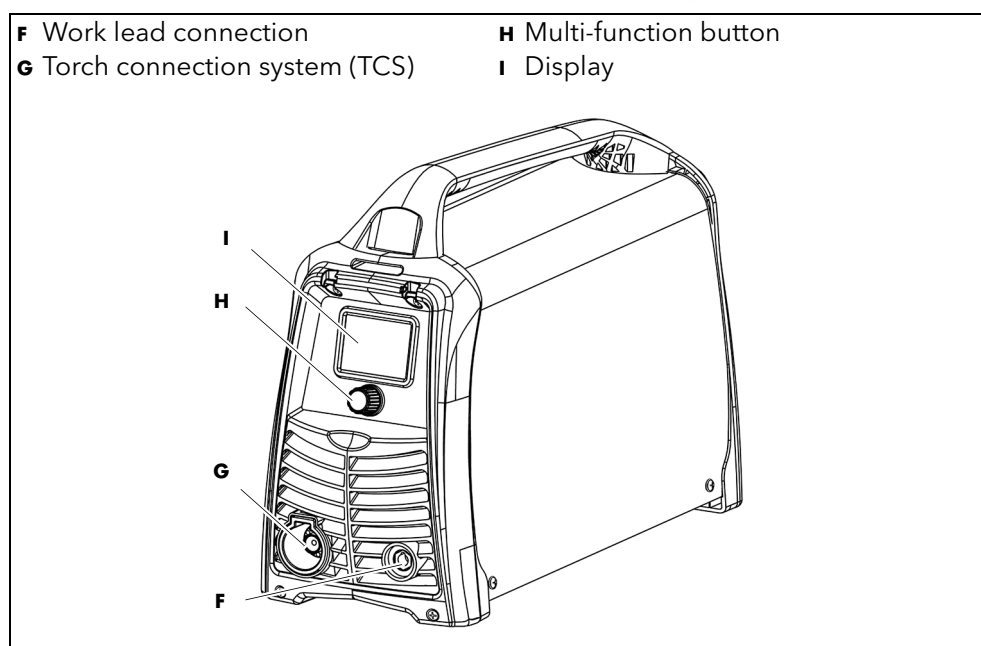


Fig. 3 Control elements and connections, front panel



ON/OFF switch (A)	Used to switch the device on and off.
CNC interface connection (B)	This optional interface is used to connect the device to an optional CNC cutting table or robot.
Gas connection (C)	This interface is used to connect a compressed air supply.
BUS interface (D)	This optional interface is used to connect the optional CAN BUS or RS485/422 BUS.
Multi-function button (H)	For toggling between two menus and setting the cutting parameters.
Digital display (I)	Displays the device status. A fault code is displayed if an error occurs.

4.2 Technical data

4.2.1 EX-TRAFIRE® 45HD, Single-phase

Table 1 Power supply specifications, single-phase

	CE	
Idle voltage (U_0)	292 V DC	
Characteristic curve* * The curve is defined as output voltage versus output current	Drooping	
Output current (I_2)	10 - 45 A	
Nominal voltage (U_2)	145 V DC	
Output current at 100% duty cycle (I_2)	16 A	
Maximum power input	7.5 kVA	
Duty cycle (X^*) at 40°C under nominal conditions (U_1, I_1, U_2, I_2) * $X = t_{on}/t_{base}$ t_{on} = time, minutes t_{base} = 10 minutes	U_{1rms}	
	40%	
Ambient temperature	-10° to +40°C	
Input voltage (U_1)	240 V AC $\pm$ 15%	
Rated input current (I_{1rms}) and effective input current (I_{1eff}) at rated output voltage (U_2) and rated output current (I_2) - only for cutting mode. eff= effective rms= root mean square	I_{1rms}	I_{1eff}
	16.5 A	14.8 A
	Complies with standards IEC 60974-1, IEC 60974-10	
Insulation class	F	
Protection type	IP23S	
Tilt angle (with or without wheels)	Up to 15°	
Dimensions (L x H x W) [mm]	469.9 x 228.6 x 177.0	
Weight (kg)	12.7	

4.2.2 EX-TRAFIRE® 45HD, Three-phase

Table 2 Power supply specifications, Three-phase

	CE		
Idle voltage (U ₀)	308 V DC		
Characteristic curve* * The curve is defined as output voltage versus output current	Drooping		
Output current (I ₂)	10 - 45 A		
Nominal voltage (U ₂)	145 V DC		
Output current at 100% duty cycle (I ₂)	45 A		
Maximum power input	11.4 kVA		
Duty cycle (X*) at 40°C under nominal conditions (U ₁ , I ₁ , U ₂ , I ₂) *X = t _{on} /t _{base} t _{on} = time, minutes t _{base} = 10 minutes	U _{1rms}		
	80%		
Ambient temperature	-10° to +40° C		
Input voltage (U ₁)	400 V AC ± 15% 3 PH/50 - 60 Hz		
Rated input current (I _{1rms}) and effective input current (I _{1eff}) at rated output voltage (U ₂) and rated output current (I ₂) - only for cutting mode. eff= effective rms= root mean square	I _{1rms}	I _{1eff}	
	16.2 A	14.4 A	
	Complies with standards IEC 60974-1, IEC 60974-10		
Insulation class	F		
Protection type	IP23S		
Tilt angle (with or without wheels)	Up to15°		
Dimensions (L x H x W) [mm]	469.9 x 228.6 x 177.0		
Weight (kg)	12.7		

Table 3 Ambient conditions for transport and storage

Ambient temperature	-20 °C to +55 °C
Relative humidity	< 50 % at +40 °C < 90 % at +20 °C

Table 4 Ambient conditions for operation

Ambient temperature	-10 °C to +40 °C
Relative humidity	< 50 % at +40 °C < 90 % at +20 °C
Installation above sea level	max. 2000 m
Tilt angle	Up to 15°

Table 5 Gas data

Permissible gas	Compressed air/nitrogen/argon
Max. gas inlet pressure	10 bar
Recommended compressed air quality	ISO 8573-1 Class 1.2.2. Purity: $\geq 99,99\%$ clean, and free from moisture and oil
Max. flow rate	120 l/min at 10 bar

4.3 Technical data for cutting torches FHT-EX® 45TTH and FHT-EX® 45TTM

FHT-EX® cutting torches are used for manual and mechanical cutting, gouging, and marking. They use compressed air or nitrogen to cut mild steels, stainless steels, aluminum, and other electrically conductive metals. They are connected to the cutting power supply using the Torch Connection System (TCS).

➤ The values below refer to the torches!

Table 6 Technical data for FHT-EX® 45TTH and FHT-EX® 45TTM cutting torches

	FHT-EX® 45TTH / FHT-EX® 45TTM
Recommended cutting capacity [mm]	12
Max. cutting capacity [mm]	25
Piercing capacity [mm]	10
Permissible ambient temperature during operation	-10° C to +40° C
Permissible ambient temperature during transport and storage	-25° C to +55° C
Relative humidity	< 90 % at +20 °C
Sub-menu item	Plasma cutting, gouging, marking
Application type	Manual and mechanical
Rated current and duty cycle	45 A/100%
Permissible gas	Compressed air/nitrogen
Flow rate	90 l/min. at 4.8 bar
Maximum pressure	10 bar
(Dynamic) operating pressure	4.8 bar
Gas post-flow period delay	≥ 20 sec.
Type of voltage	DC
Voltage rating	500 V peak value
Protection type for device	IP3X (EN 60529)

Table 6 Technical data for FHT-EX® 45TTH and FHT-EX® 45TTM cutting torches

	FHT-EX® 45TTH / FHT-EX® 45TTM
Connection type	TCS (Torch Connection System) - 13 Pin
Standard lengths (other lengths available upon request)	5 m/8 m/15 m

Table 7 Cutting torch weights and cable lengths

Cutting torch	Weight and cable lengths
FHT-EX® 45TTH Standard hand cutting torch	5 m/ 1.5 kg 8 m / 2.2 kg 15 m/3.6 kg
FHT-EX® 45TTM Standard machine cutting torch	5 m / 1.5 kg 8 m / 2.2 kg 15 m / 3.6 kg

5 Transport and positioning

⚠ WARNING

Risk of injury due to improper transport and installation

Improper transport and installation can cause the device to tip or fall over. This may result in serious injury.

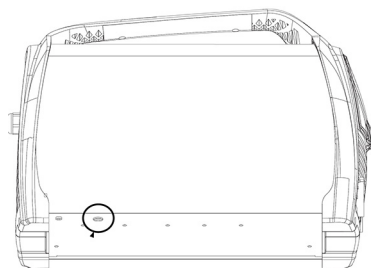
- Wear your personal protective equipment.
- Ensure that all supply lines and cables do not encroach into the area in which employees are working.
- Place the device on a suitable surface (flat, solid, and dry) on which it will not topple over, taking into account the max. tilt angle of 15°.
- Note the weight of the device when lifting it.
⇒ 4.2 Technical data on page EN-11
- Use an appropriate lifting tool with load handling equipment for transporting and installing the device.
- Avoid abrupt lifting and setting down.
- Do not lift the device over individuals or other devices.
- Use the attachment points provided.

NOTICE

Risk of material damage due to improper transport and installation

Improper transport or installation can cause the device to tip or fall over. This can result in material damage and irreparable damage to the device.

- Protect the device against weather conditions, such as rain and direct sunlight.
- Protect the device from spatter when cutting.
- Protect the device from direct exposure to sparks when grinding.
- Use the device only in dry, clean, and well-ventilated rooms.
- Maintain a minimum distance of 0.5 m from the wall when positioning the device to ensure that it has sufficient ventilation.

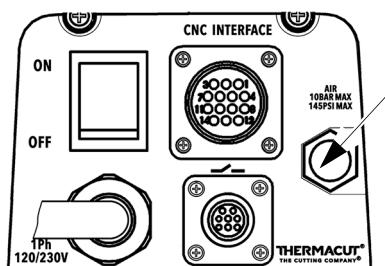


- When positioning the device, make sure that the water separator's drain opening is not covered.

6 Setting up the power supply

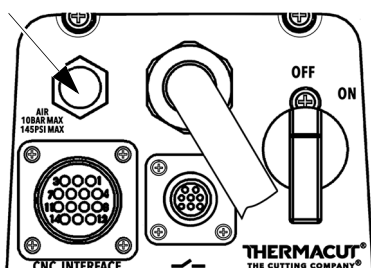
6.1 Connecting to the gas supply

Single-phase

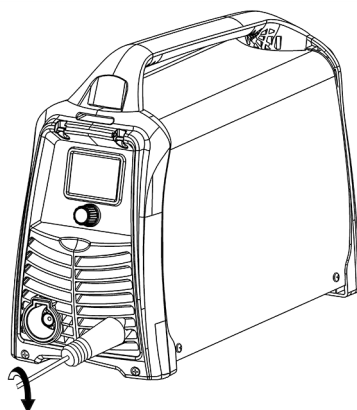


- Connect the gas hose with an inside diameter of at least 6 mm to the gas connection of the device.

Three-phase



6.2 Connecting the work lead

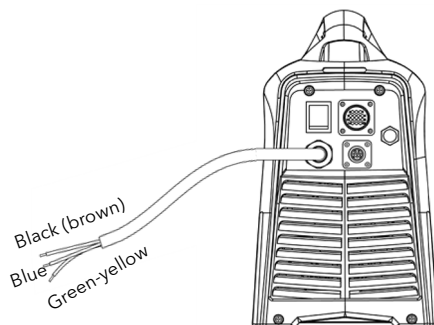


- Connect the work lead to the work lead connecting socket and secure it by rotating clockwise.

6.3 Connecting the power supply cable

6.3.1 Connecting the single-phase machine

Single -phase



➤ The power supply should be connected by a qualified electrician.

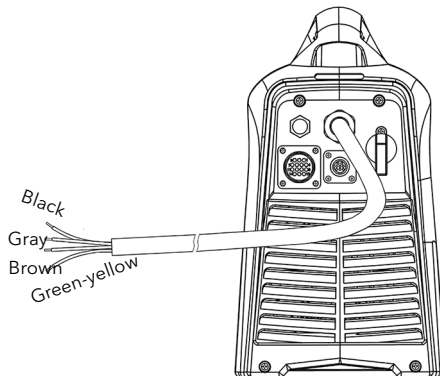
L -> black (brown)

N -> blue

PE grounding -> green-yellow

6.3.2 Connecting the three-phase machine

Three-phase



➤ The power supply should be connected by a qualified electrician.

L1 -> black (U)

L2 -> brown (V)

L3 -> gray (W)

PE grounding -> green-yellow

Table 8 Recommended cable extensions

Input voltage	Wire cross-sections	Length
200 - 240 V AC/1 Phase	6 mm ²	Up to 15 m
	16 mm ²	15 - 30 m
	25 mm ²	30 - 45 m
380 - 480 V AC/3 Phase	4 mm ²	Up to 15 m
	6 mm ²	15 - 45 m

6.4 Connecting the input power plug

- Note the safety instructions.
 - ⇒ 2.5 Safety instructions for the electrical power supply on page EN-7

WARNING

Electric shock due to improperly installed electrical power supply

If the electrical power supply and grounding are improperly installed, fatal electric shock may occur.

- If you want to operate the device in a very humid environment or on conductive material, install a ground fault circuit interrupter (GFCI) in the power supply.
- Use a slow-blow GFCI fuse.
- Protect the power supply line to the device with suitable fuses that comply with regulations.
- Ground the device according to the applicable regulations.
- Do not ground the device together with other devices or machines.

WARNING

Risk of electric shock due to improperly installed or defective cables

Damaged or improperly installed cables can lead to fatal electric shock.

- Check all live cables and connections for proper installation and damage.
- Damaged, deformed or worn parts should only be replaced by a qualified electrician.

WARNING

Risk of injury due to fire

Improper use or connection can result in fire. This may result in serious injury.

- Ensure that the operating voltage specified on the identification plate is suitable for the input voltage.

For the input voltage and the fuse protection, please refer to:

⇒ 4.2 Technical data on page EN-11

- If necessary, have a qualified electrician connect the input power cable extension in accordance with local regulations.
- Ensure that the power supply is adequately protected by a safety switch.
- Insert the input power plug of the input power cable into the corresponding socket.

6.4.1 Connection to a generator (optional)

- Set the generator to single-phase or three-phase alternating current.
- Plug the input power plug into the socket.
- Set the motor rating as shown in the following table.

Table 9 Connection to a generator

Generator motor rating	Output current (I ₂)	Arc voltage
6 kW	25 A	U ₂ = 200 V C
10 kW	45 A	
10 kW	45 A	

6.5 Connecting the cutting torch

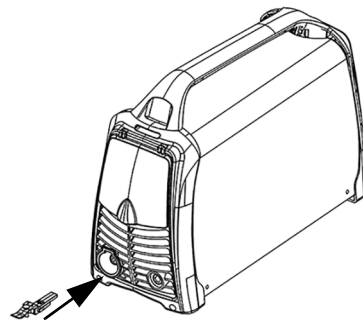
NOTICE

Risk of material damage if used without TCS Latch with Key Assembly

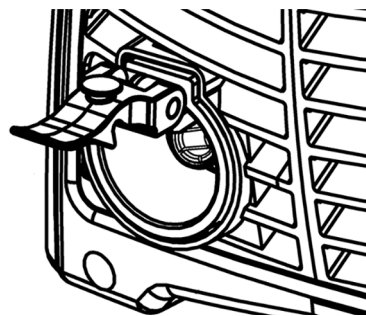
The TCS Latch with Key Assembly is important for the proper working of the machine. If used without, the connector pins may be damaged.

- Do not use the device without the TCS Latch with Key assembly installed and properly secured.

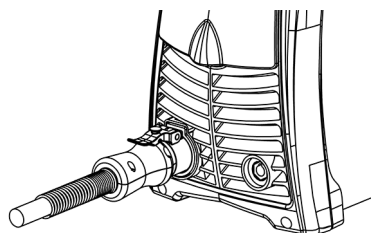
- Switch off the power supply.



- 1 Insert the TCS Latch with Key Assembly into the TCS socket.



- The TCS Latch with Key Assembly must sit firmly in the TCS socket.



- 2 Push the cutting torch into the TCS and ensure the Latch with Key Assembly locks in place.

6.6 Connecting the CNC interface

The CNC interface is on the rear of the device. Control signals can be transmitted via the CNC interface. The signal types can be found in table 10. The control elements are located on the control panel. The connections are on the front and rear of the device.

⇒ 4.1 Assembly and use on page EN-9

⚠ WARNING

Electric shock due to live parts

Live parts are exposed when the housing is open. This can result in fatal electric shock.

- Set the <POWER> switch to <OFF> and disconnect the input power plug before opening the housing.

Fig. 4 Pin assignment for CNC interface

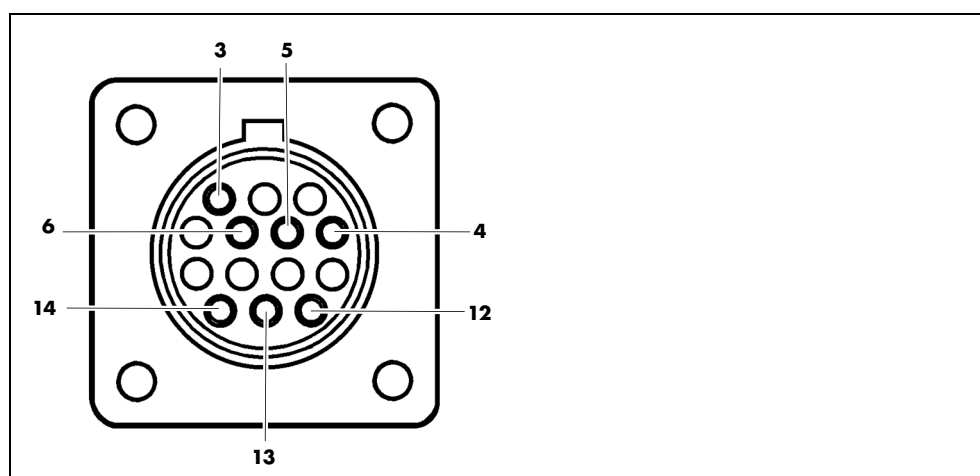


Table 10 Pin assignment

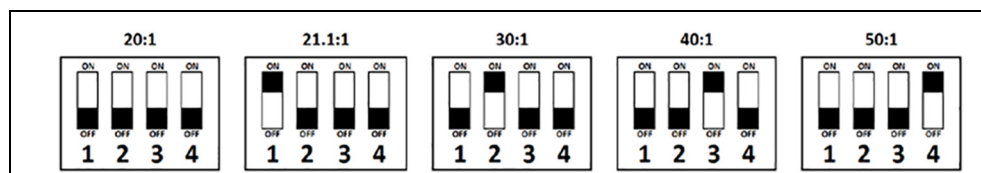
Signal	START Start plasma cutting	Arc Start feeding	PE	Voltage divider
Type	Input	Output	PE	Output
Notice	Open by default. Requires potential-free contact to close.	Open by default. Potential-free with max. capacity of: 120 V AC/1 A		Reduced arc signal: 20:1 21.1:1 30:1 40:1 50:1 (supplies max. 10 V)
PIN	3, 4	12, 14	13	6 (+), 5 (-)
Internal cable color	Yellow, yellow	White, white	Green/yellow	6 (red), 5 (white)

6.6.1 Setting the DIP switches

The DIP switches are preset to 50:1.

- 1 The housing must be opened only by a qualified electrician.
- 2 The DIP switches must be set only by a qualified electrician.
⇒ Fig. 5 DIP switch settings on page EN-21
- 3 The housing must be closed only by a qualified electrician.
- 4 Have a safety inspection performed in accordance with DIN IEC 60974 Part 4: "Periodic inspection and testing" by Thermacut® or another authorized specialist.

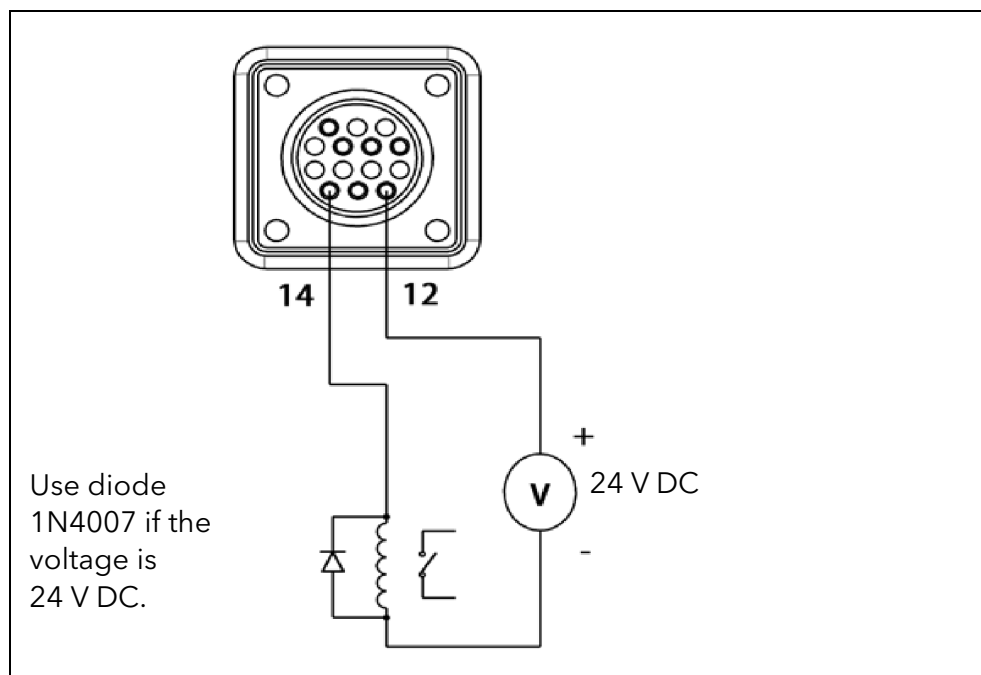
Fig. 5 DIP switch settings



6.6.2 Enabling the external DC coil with an external power supply

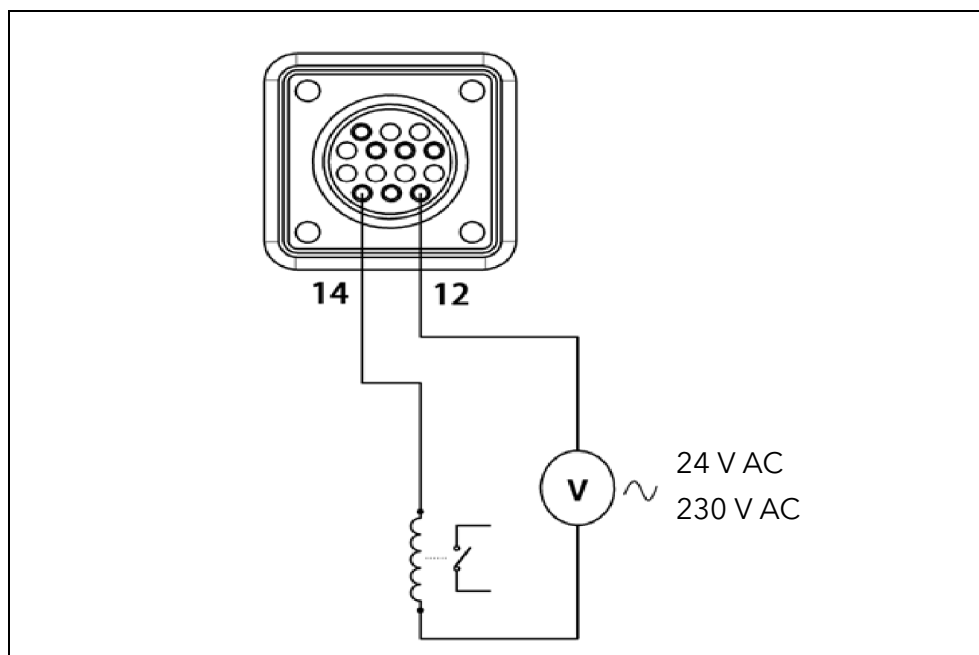
- For 24 V DC, use a 1N4007 diode.

Fig. 6 Enable the external DC coil with an external power supply.



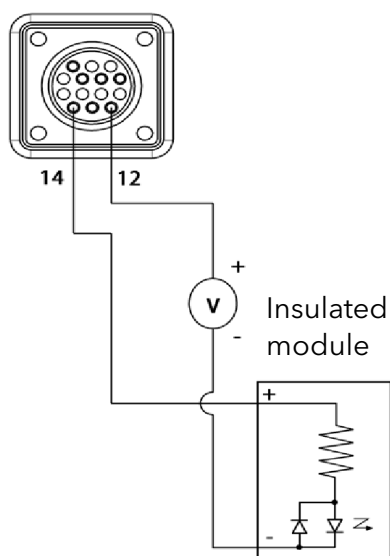
6.6.3 Enabling the external AC coil with an external power supply

Fig. 7 Enable the external AC coil with an external power supply.



6.6.4 Enabling the industrially insulated module with an external power supply

Industrial insulated user module with 24 V DC power supply.



- 1 Switch off the device.
- 2 Remove the interface cover.
- 3 Connect the interface cable with the cutting power supply.

6.7 Installing consumables for the hand and machine cutting torches

⚠ WARNING

Risk of injury due to unexpected ignition of the plasma arc

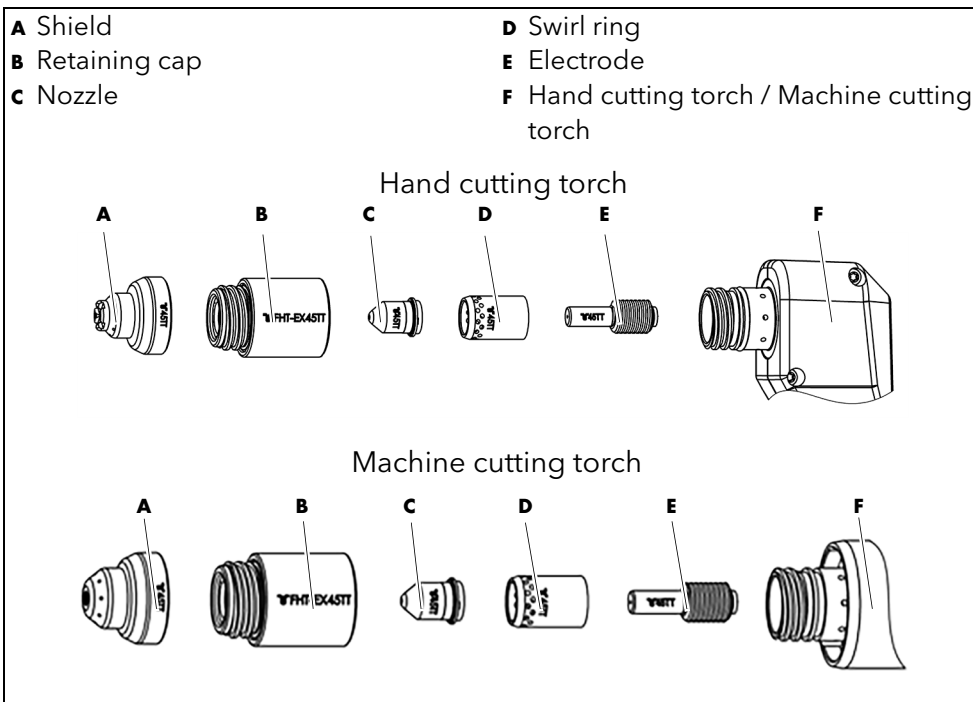
Hand cutting torch:

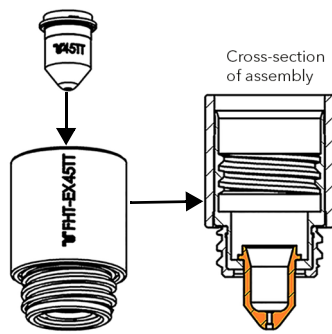
When the input power plug is plugged in, the plasma arc ignites immediately when the torch trigger is pressed. Individuals can be seriously injured if the arc ignites unexpectedly.

Machine cutting torch:

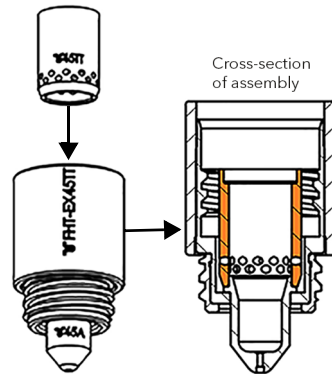
When the input power plug is plugged in, the plasma arc ignites immediately when the CNC start signal is ON. Individuals can be seriously injured if the arc ignites unexpectedly.

- Hold the tip of the torch away from you.
- Do not hold the workpiece to be cut tightly and keep your hands away from the cutting surface.
- Do not point the cutting torch at yourself or other individuals.
- Wear your personal protective equipment.

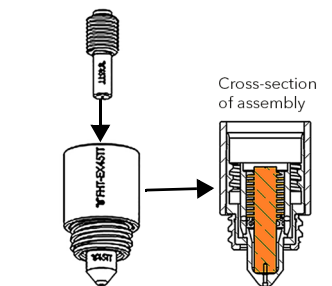




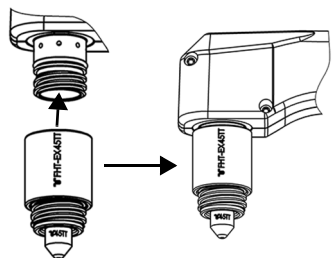
- 1 Insert the nozzle into the retaining cap.



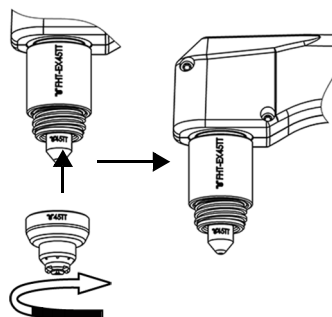
- 2 Insert the swirl ring into retaining cap and nozzle.



- 3 Insert the electrode.



- 4 Screw the entire assembly onto the hand cutting torch.
 - Do not overtighten.
 - The nozzle must be firmly in place and must not move.

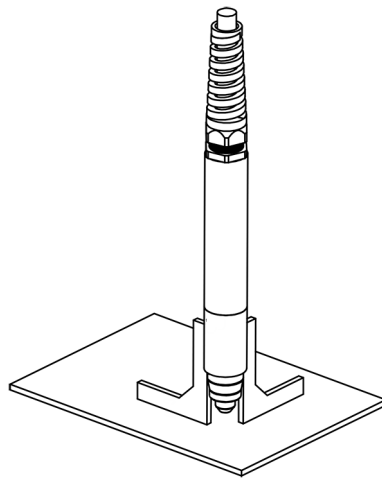


- 5 Screw on the shield and tighten it by hand.

6.8 Aligning FHT-EX® 45TTM machine cutting torch

For the setup of the torch and the cutting process see

⇒ 6 Setting up the power supply on page 17



- 1 Position the cutting torch perpendicular to the workpiece.
- 2 Use an angle gauge to align the machine cutting torch at 0° and 90°.

7 Operation of the power supply

⚠ WARNING

Risk of injury due to unexpected ignition of the plasma arc

Hand cutting torch:

When the input power plug is plugged in, the plasma arc ignites immediately when the torch trigger is pressed. Individuals can be seriously injured if the arc ignites unexpectedly.

Machine cutting torch:

When the input power plug is plugged in, the plasma arc ignites immediately when the CNC start signal is ON. Individuals can be seriously injured if the arc ignites unexpectedly.

- Hold the tip of the cutting torch away from you.
- Do not hold the workpiece to be cut tightly and keep your hands away from the cutting surface.
- Do not point the cutting torch at yourself or other individuals.
- Wear your personal protective equipment.

⚠ CAUTION

Risk of burns due to flying sparks when angling the cutting torch

When the cutting torch is angled during cutting or piercing, molten metal (sparks) will escape in the direction in which the cutting torch is pointed. This may result in burns.

- Do not point the cutting torch at yourself or other individuals when angling it.
- Wear your personal protective equipment.

NOTICE**Material damage due to exceeding the maximum duty cycle**

If the device is operated for longer than the maximum duty cycle, it may be overloaded and irreparably damaged.

- Only operate the device up to the maximum permissible duty cycle.
⇒ 4.2 Technical data on page EN-11
- Observe the maximum duty cycle for cutting components.

NOTICE**Material damage caused by unplugging the input power plug during operation**

If the input power plug is unplugged during operation, the device may be irreparably damaged.

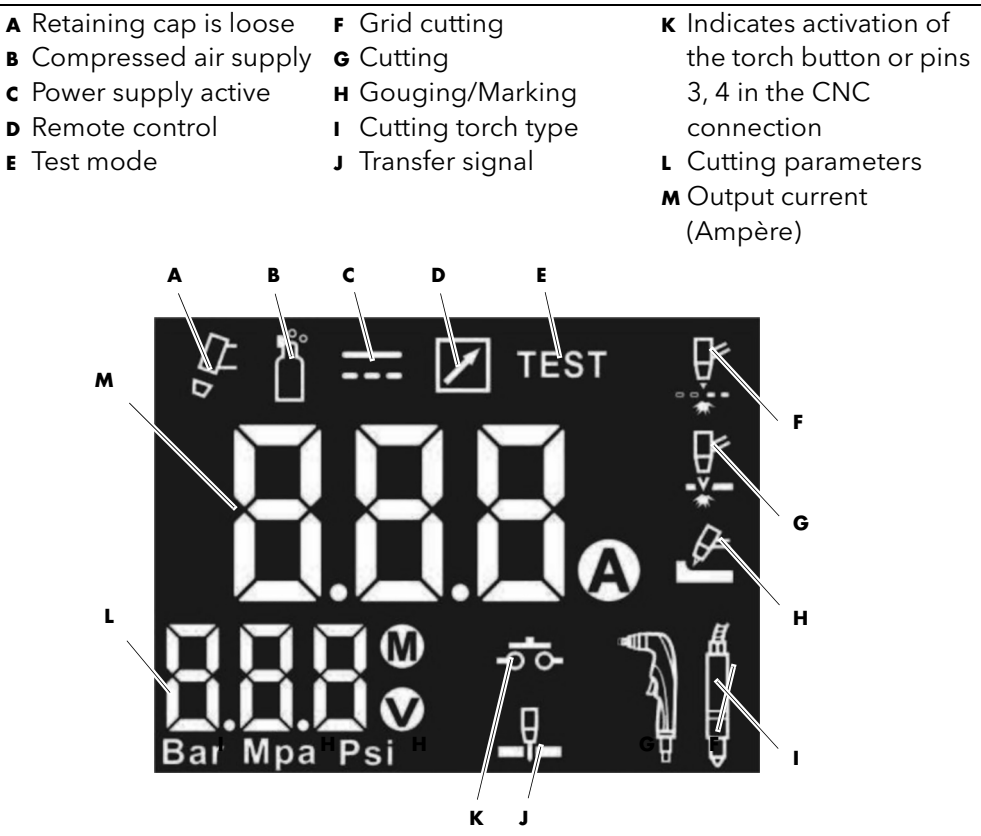
- Do not unplug the input power plug during operation and ensure a constant power supply.

NOTICE**Material damage due to switching the output current strength during operation**

If the output current strength is switched during operation, the unit may be damaged.

- Set the output current strength before starting operation and do not switch it during the cutting process.

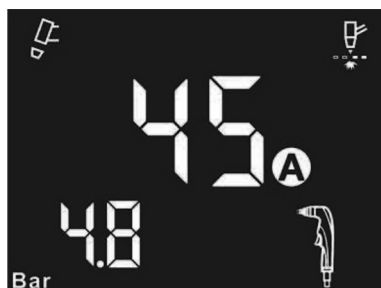
7.1 LCD description



7.1.1 Setting the parameters

The LCD display contains two menus:

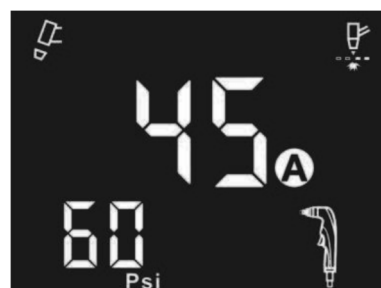
The output current (Amperage) and the cutting modes are set in the first menu. In the second menu, the pressure in Bar, Mpa or Psi can be set. In addition, the torch type, torch length, and operating voltage are displayed.



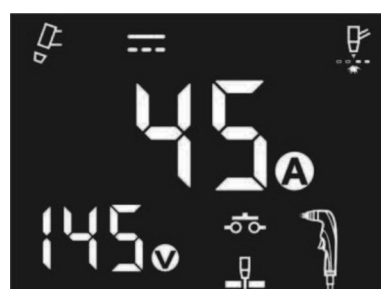
- 1 Press the multi-function button for one second.
- The cutting parameters light up.
- 2 Press the multi-function knob briefly to set bar.



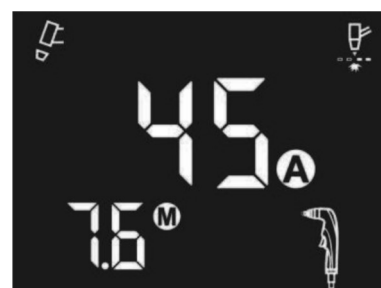
- 3 Press the multi-function knob briefly to set MPa.



- 4 Press the multi-function knob briefly to set psi.
- Turn the multifunction knob to the left or right to set the cutting current.



- 5 Briefly press the multifunction knob to display the output voltage.



- 6 Briefly press the multifunction knob to display the length of the cutting torch.

NOTICE

All individual settings will be restored to the factory settings when the system is switched off.

7.1.2 Selecting the cutting mode

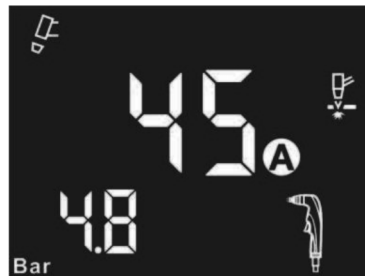


Grid cutting

- Briefly press the multifunction button to activate the cutting mode.

The current is 20 – 45 A.

The pressure of the cutting gas is 4.2 – 5.6 bar.



Cutting

- Briefly press the multifunction button to activate the cutting mode.

The current is 20 – 45 A.

The pressure of the cutting gas is 4.2 – 5.6 bar.



Gouging/Marking

- Briefly press the multifunction button to activate the cutting mode.

Gouging:

The current is 20 – 45 A.

The pressure of the cutting gas is 2.3 – 4.5 bar.

Marking:

The current is 10 – 16 A.

The pressure of the cutting gas is 2.4 bar.

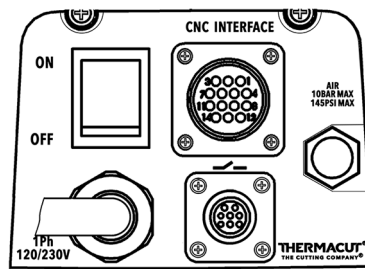
7.1.3 Connecting the work lead with the work lead clamp

- 1 Remove contamination from the workpiece.
- 2 Clamp the work lead with the work lead clamp to the workpiece in order to allow maximum electrical connection.
- 3 Do not clamp the work lead clamp to the material to be cut off.
- 4 Clamp the work lead with the work lead clamp as close as possible to the cutting area in order to minimize electromagnetic fields.

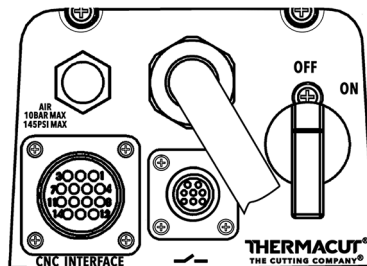
7.2 Powering on the machine

Single-phase

➤ Set switch to <ON>.



Three-phase



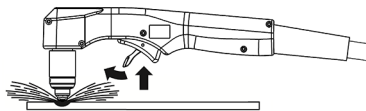
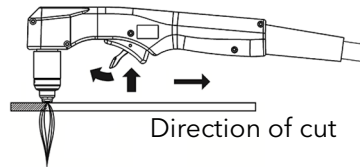
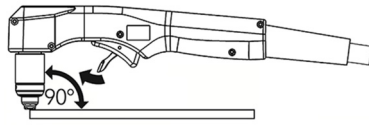
7.3 Manual cutting process

- 1 Switch on the power supply.
- 2 Automatic gas test (5 seconds).
- 3 Automatic system test (5 seconds).
- 4 Press torch trigger.
- 5 Generate a pilot arc.
- 6 Once the workpiece is detected, the pilot arc changes to a cutting arc.
- 7 The cutting process starts.
- 8 Extinguish the arc by releasing the cutting torch trigger.
- 9 Gas post-flow period 10 - 45 seconds depending on the output current

7.4 Manual grid cutting, gouging, marking process

- 1 Switch on the power supply.
- 2 Automatic gas test (5 seconds)
- 3 Automatic system test (5 seconds)
- 4 Press torch trigger.
- 5 Generate a pilot arc.
- 6 Once the workpiece is detected, the pilot arc changes to a cutting arc.
- 7 Grid cutting, gouging, or marking starts depending on the selected process.
- 8 Extinguish the arc by releasing the cutting torch trigger.
- 9 Gas post-flow period 10 - 45 seconds depending on the output current.

7.5 Cutting



- 1 Start the cutting process at the edge of the workpiece.
- 2 Do not move the cutting torch until the material has been cut through completely.
- 3 Place the cutting torch upright on the edge of the workpiece.

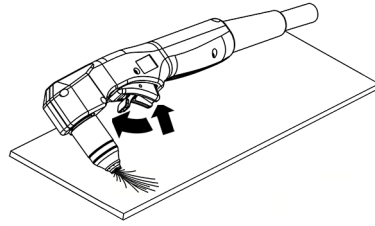
- 4 Pull the cutting torch in the cutting direction. Sparks must emerge from the underside of the workpiece.
- 5 Pay attention to the following when cutting:

- Hold the cutting torch vertically and observe the arc while cutting.
- Make light contact between the shield and the workpiece and pull the cutting torch in the cutting direction at a constant speed.
- For cutting thin workpieces, reduce output current strength to a minimum to achieve the highest cutting quality.
- For cutting straight lines/bevels, use a straight edge as a guide.
- For cutting circles, use a template or circle cutting device.

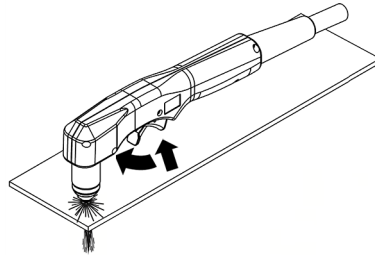
If sparks escape upwards during cutting, the material has not yet been completely severed. Proceed as follows:

- Reduce the speed at which the cutting torch is pulled.
- Check the setting for the output current.
- Check the compressed air settings.
- Check consumables for wear/damage.

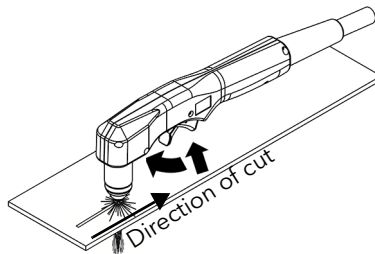
7.6 Piercing



1 Hold the cutting torch at an angle to the workpiece with a max. distance of 3 mm from the nozzle to the workpiece.



2 Press the torch trigger to ignite the arc.



3 Turn the cutting torch slowly in a vertical direction.

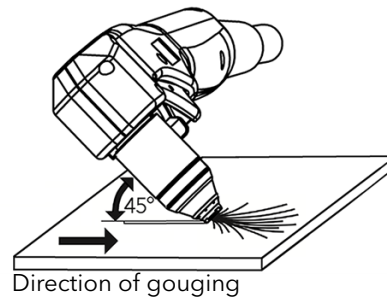
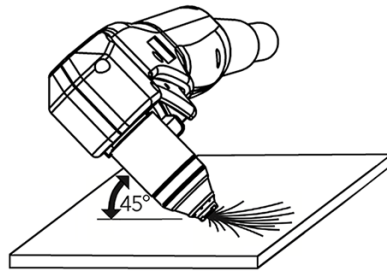
4 Hold the cutting torch until the arc emerges from the underside of the workpiece. Only then is the hole completely pierced through.

5 Move the cutting torch in the cutting direction. Sparks must emerge from the underside of the workpiece.

7.7 Gouging

Gouging can remove welding seams and achieve a controlled gouge profile. The gouge profile can be influenced by the actions in the following table:

Gouge profile	Actions
Narrower and flatter	➤ Reduce current or increase speed.
Narrower and deeper	➤ Reduce the distance between the torch and workpiece or hold the cutting torch at larger angle to workpiece.
Wider and deeper	➤ Increase current or reduce the speed.
Wider and shallower	➤ Increase the distance between the cutting torch and workpiece or hold the cutting torch at flatter angle to the workpiece.



- 1 Use gouging consumables suitable to the cutting torch being used.
- 2 Hold the cutting torch at an angle of 35 - 45° inclined to the workpiece.
- 3 Hold the nozzle close enough to the workpiece so that it touches the workpiece.
- 4 Press the torch trigger to ignite the arc.
- 5 Continue to hold the cutting torch at an angle of 35 - 45° to the workpiece and move it in the direction of the material to be removed.

7.7.1 Table for FHT-EX® 45TT material removal

Table 11 Table for FHT-EX® 45TT material removal

Gouging parameters	
(Dynamic) air pressure	3.5 - 4 bar
Distance between cutting torch and workpiece	As close as possible
Angle of cutting torch to workpiece	35 - 45 °
Speed	0.6 m/Min.
Current	20 - 45 A
Removal rate for mild steels	Approx. 3.2 kg/hr
Width of gouge	Approx. 6.3 mm
Depth of gouge	Approx. 3.0 mm

7.8 Stopping the cutting process

CAUTION

Risk of injury due to hot parts

Parts may still be hot after the gas post-flow period ends. There is a risk of burns.

- Wear your personal protective equipment.
- Allow the cutting torch to cool down for 5 - 10 minutes before touching the parts.

- Release the torch trigger to end the cutting process.

After releasing the torch trigger, the gas continues to flow for up to 45 seconds, depending on the set output current, in order to cool the cutting torch and the consumables.

- To end the gas post-flow period prematurely, briefly press and release the torch trigger.
- Press the torch trigger again to ignite the pilot arc.

8 Disconnecting the unit

- 1 Set the <POWER> switch to <OFF>.
- 2 Disconnect the device from the input power supply.
- 3 Disconnect the device from the gas supply.

9 Maintenance and cleaning

Scheduled maintenance and cleaning are prerequisites for a long service life and trouble-free operation. The maintenance cycle is determined by the work environment and the device's maintenance intervals. If the device is operated for more than 8 hours a day, the maintenance intervals should be changed as needed. When using plasma arc cutting equipment, always observe the provisions of EN 60974-4 Inspection and testing, as well as any local laws and regulations.

WARNING

Electric shock due to missing grounding

If the cover plates are improperly mounted, the grounding may not be properly established. There is a risk of life-threatening electric shock.

- The cover plates may be disassembled and assembled only by a qualified electrician for maintenance and cleaning work.
- Each time the cover plates are opened, have a safety inspection performed in accordance with DIN IEC 60974 Part 4: "Periodic inspection and testing" by Thermacut® or another authorized specialist.

WARNING

Electric shock due to live parts

Fatal electric shock can occur if components are live during maintenance and cleaning work.

- Set the <POWER> switch to <OFF> before maintenance and cleaning work.
- Disconnect the input power supply.

WARNING

Electric shock due to defective cables

Damaged or improperly installed cables can lead to fatal electric shock.

- Check all live cables and connections for proper installation and damage.
- Damaged, deformed or worn parts should only be replaced by a qualified electrician.

CAUTION

Fire hazard due to contamination

Dust deposits inside the device can lead to a reduction in insulation. This can cause short circuits or fires.

- Clean the device annually with dried compressed air to remove dust and cutting fume residue.

9.1 Maintenance and cleaning intervals

The specified intervals are standard values and refer to single-shift operation. We recommend recording the inspections. The date of the inspection, the detected defects and the name of the inspector should be documented.

Daily/every 6 hours of cutting	➤ Check the gas settings.
	➤ Check cables, connector hoses, and connections for tight fit and damage, and replace if necessary.
	➤ Check the work lead clamp for contamination.
	➤ Check the cutting torch's consumables for wear.
Weekly	➤ Check the cap sensor.
Every 3 months	➤ Check the cutting torch for signs of cracks in the torch body and exposed wires.
	➤ Check the gas hose, filter elements and connections for leaks.
	➤ Open the device body and have the inside of the device cleaned with a vacuum cleaner or dry, clean compressed air by Thermacut® or another authorized specialist.
Annually and after each time the housing is opened	➤ Have a safety inspection performed in accordance with DIN IEC 60974 Part 4: "Periodic inspection and testing" by Thermacut® or another authorized specialist.

Table 12 Parts inspection

Consumable	Check for	Action
Shield	➤ Orifice is not round.	➤ Replace the shield.
	➤ Spatter in the gap between the shield and the nozzle.	➤ Clean the shield and nozzle surface.
Retaining cap	➤ Heat damage, cracks, breaks, damaged threaded connections, clogged gas holes.	➤ Replace the retaining cap.
Nozzle	➤ Orifice is not round.	➤ Replace the nozzle.
Swirl ring	➤ Outer surface is damaged or dirty.	➤ Clean or replace the swirl ring.
	➤ Electrode restriction due to dirt, debris, or damage on interior surfaces.	
	➤ Clogged or damaged gas holes.	
Electrode	➤ Pit depth in hafnium is deeper than 1.6 mm.	➤ Replace the electrode.

Table 12 Parts inspection

Consumable	Check for	Action
Cutting torch	➤ Fire or arc damage inside.	➤ Replace the cutting torch.
	➤ Worn or damaged threaded connections.	
	➤ Burned or missing material.	
	➤ Cutting torch is damaged or dirty.	
	➤ Damaged O-ring.	➤ Replace the O-ring.
	➤ Dry O-ring.	➤ Apply a thin layer of silicone grease.

10 Faults and troubleshooting

Verify consumables selection according to:

- ⇒ 16.2 FHT-EX® 45TTH consumables for hand cutting torch on page EN-47
- ⇒ 17.2 FHT-EX® 45TTM consumables for standard machine cutting torch on page EN-50
- ⇒ 17.3 FHT-EX® 45TTM consumables for marking machine cutting torch on page EN-51
- Contact your retailer or Thermacut® in the event of questions or problems.

Table 13 Fault messages in the display

Error code	Cause	Trouble shooting
H03	➤ System operation failed	➤ Check everything.
H04	➤ No pilot arc established possibly due to a loss of current.	➤ Verify that the consumable is installed correctly and, if necessary, re-install it correctly or replace it.
H05	➤ The electrode is not separated from the nozzle during the pilot arc.	➤ Check for free movement of the electrode and clean or replace parts, if necessary.
H06 <Excess temperature>	➤ Fan is defective.	➤ Ensure that the fan is running freely. ➤ Replace the fan or fan motor.
	➤ Duty cycle has been exceeded.	➤ Switch off the device and allow it to cool down. ➤ Do not exceed the duty cycle.
	➤ Components defective.	➤ Contact service or your retailer.

Table 13 Fault messages in the display

Error code	Cause	Trouble shooting
H07 <Excess current>	➤ Inverter overcurrent.	➤ Have the output diodes, main transformer, and IGBT on the inverter board checked by an authorized professional.
H08 <Arc does not ignite when torch trigger is pressed or the CNC start signal is on> The following icon flashes: 	➤ The cutting torch is missing or not connected.	➤ Verify the proper cutting torch is connected.
	➤ Consumables are loose, incorrectly installed or missing.	➤ Verify that the consumables are installed correctly and, if necessary, re-install them correctly or replace them.
	➤ Retaining cap is incorrectly installed or has been tightened too tightly.	➤ Verify that the retaining cap is installed correctly, re-install correctly and tighten, if needed.
	➤ Consumables used are not Thermacut® original parts.	➤ Use only Thermacut® original consumables.
	➤ Dirt inside the torch.	➤ Remove all consumables, clean the inside of the torch, and re-assemble in correct order.
H11	➤ Missing phase.	➤ Have the issue checked by Thermacut® or a qualified electrician.
H13 <Air pressure alarm> L = too low H = too high	➤ Gas inlet pressure is below 2.1 bar/30.5 psi.	➤ Check the inlet gas pressure.
	➤ Defective torch cable.	➤ Replace the torch cable.
	➤ Pressure sensor is defective.	➤ Have the pressure switch checked and, if necessary, replaced by an authorized professional.
H14	➤ Incorrect cutting torch.	➤ Verify the proper cutting torch is connected.
H15	➤ No data communication at the BUS.	➤ Check the cable. ➤ Replace the CAN and BUS PCB. ➤ Replace the control PCB.
H16	➤ Data recording failed.	➤ Check the cable. ➤ Replace the CAN and BUS PCB. ➤ Replace the control PCB.
H17 <Insufficient plasma gas flow>	➤ Insufficient plasma gas flow.	➤ Check the gas pressure and flow. ➤ Verify the gas settings are correct.

Table 13 Fault messages in the display

Error code	Cause	Trouble shooting
H18	➤ Watchdog fault.	➤ Replace the control PCB.
H19	➤ Incorrect current setting.	➤ Verify the cutting power settings.
H20	➤ Incorrect cutting mode.	➤ Verify the cutting mode.
H21	➤ Gas pressure fault.	➤ Check the gas supply.

Table 14 General faults

Error	Description	Cause	Troubleshooting
Switch is set to ON, LCD does not illuminate.	➤ No/low input power voltage.	➤ Power supply is insufficient.	➤ Check the input power voltage.
		➤ Power cable is not connected.	➤ Plug the input power plug into the socket.
		➤ Switch is defective.	➤ Switch must be replaced by an authorized professional.
Gas does not flow when the torch trigger is pressed or the CNC start signal is switched on.	➤ Gas valve defective or missing power supply.	➤ Cable to gas valve loose or not connected.	➤ Contact your retailer.
		➤ Gas valve is defective.	
		➤ Torch trigger is defective.	
Arc does not ignite and there is no fault code when torch trigger is pressed or the CNC start signal is on.	➤ Incorrect cutting torch type is connected.	➤ Cutting torch type is incorrect.	➤ Verify the proper cutting torch is connected.
	➤ Incorrect gas pressure.	➤ Consumables are defective. ➤ Inlet gas pressure is too high	➤ Check consumables and replace, if necessary. ➤ Reduce pressure to 6 bar/87 psi.
No transfer between pilot arc and workpiece.	➤ Poor contact between work lead clamp and workpiece.	➤ No contact between work lead clamp and workpiece.	➤ Remove contamination and/or oxidation from the workpiece and the work lead clamp. ➤ Attach the work lead clamp to the workpiece in order to allow maximum electrical conduction.
		➤ Distance between cutting torch and workpiece is too great.	➤ Decrease the distance between cutting torch and workpiece.
		➤ Work lead is defective.	➤ Have the work lead checked and, if necessary, replaced by an authorized professional.

Table 14 General faults

Error	Description	Cause	Troubleshooting
Output current too low, unstable or inadequate.	➤ Poor contact between work lead clamp and workpiece.	➤ Connection fault in work lead or cutting torch cable.	➤ Ensure that all cable connections are correctly installed.
		➤ No contact between work lead clamp and workpiece.	➤ Remove contamination and/or oxidation from the workpiece and the work lead clamp. ➤ Attach the work lead clamp to the workpiece in order to allow maximum electrical conduction.
		➤ Distance between cutting torch and workpiece is too great.	➤ Decrease the distance between cutting torch and workpiece.
	➤ Voltage fault.	➤ Faulty input voltage.	➤ Verify the correct input voltage according to the identification plate. ➤ Check consumables and replace, if necessary.
Pilot arc ignites with difficulty and switches off.	➤ Consumables are defective.	➤ Consumables are worn or damaged.	➤ Check consumables and replace, if necessary.
	➤ Faulty gas flow.	➤ Gas flow too high. ➤ Gas flow too low.	➤ Check gas flow settings.
Output current cannot be controlled.	➤ Poor contact between work lead clamp and workpiece.	➤ Connection fault. ➤ Faulty cable connections.	➤ Ensure that all cable connections are correctly secured.
			➤ Attach the work lead clamp to the workpiece in order to allow maximum electrical conduction.

Table 14 General faults

Error	Description	Cause	Troubleshooting
Insufficient cutting quality.	➤ Incorrect setting for output current.	➤ Output current (amps) too low/ material too thick.	➤ Adjust the output current strength to the thickness of the workpiece.
	➤ Consumables are defective.	➤ Consumables are worn.	➤ Inspect consumables in the cutting torch and replace, if necessary.
	➤ Poor cutting quality.	➤ Incorrect cutting parameters.	➤ Adjust the output current strength to the speed at which the cutting torch is pulled and the thickness of the workpiece. ➤ Verify the distance between cutting torch and workpiece. ⇒ 7.5 Cutting on page EN-30
	➤ Poor contact between work lead clamp and workpiece.	➤ Workpiece is dirty.	➤ Remove contamination and/or oxidation from the workpiece and the work lead clamp. ➤ Attach the work lead clamp to the workpiece in order to allow maximum electrical conduction.

11 Disassembly

WARNING

Electric shock due to live parts

Fatal electric shock can occur if components are live during maintenance and cleaning work.

- Set the <POWER> switch to <OFF> before maintenance and cleaning work.
- Disconnect the power supply.

- 1 Disconnect the power supply.
- 2 Disconnect all supply connections.
- 3 Remove the work lead.
- 4 Disassemble the cutting torch cable assembly.

12 Disposal



Equipment marked with this symbol is covered by European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

- Do not dispose of electrical and electronic equipment with household waste.
- Disassemble electrical equipment prior to proper disposal.
 - ⇒ 11 Disassembly on page EN-40
- Collect electrical components separately and recycle in an environmentally responsible manner.
- Observe local regulations, laws, provisions, standards and guidelines.
- Please consult the responsible local authority for information about collection and return of electrical devices.

12.1 Disposal of materials

This product is mainly made of metallic materials that can be melted in steel and iron works and are thus almost infinitely recyclable. The plastic materials used are labeled in preparation for their sorting and separation for later recycling.

12.2 Disposal of consumables

Oil, greases and cleaning agents must not contaminate the ground or enter the sewage system. These substances must be stored, transported and disposed of in suitable containers. Observe the relevant local regulations and disposal instructions in the safety data sheets specified by the manufacturer of the consumables. Contaminated cleaning tools (brushes, rags, etc.) must also be disposed of in accordance with the information provided by the consumables' manufacturer.

- Observe the relevant local regulations and disposal instructions in the safety data sheets specified by the manufacturer of the consumables.

12.3 Packaging

Thermacut® has reduced the packaging to the necessary minimum. The ability to recycle packaging materials is always considered during their selection.

13 Warranty

This warranty statement is an integral part of the Terms and Conditions ("T&C") of Thermacut® (hereinafter "Seller") and applies to deliveries of goods under the contract concluded between the Seller and the other party to the contract as the recipient of the goods (hereinafter "Buyer"); the terms used herein have the same meaning as attributed to them in the T&C.

- 1 The Seller warrants to the Buyer that during the warranty period specified below, the goods delivered under the contract shall retain the properties specified in the technical data sheet for the goods available on the Seller's websites at the time the binding offer is sent (Section 2.2 of the T&C), otherwise in the quality and design suitable for the purpose resulting from the contract, otherwise for the usual purpose.
- 2 The period begins on the day of delivery of the goods to the buyer (Section 5.1, 5.2 of the T&C).
- 3 For the notification (claim) of warranty defects, the assertion of rights arising from the defective performance and other rights and obligations of the Seller and the Buyer, Section 3.4 ff and the following provisions of the T&C apply.
- 4 The warranty period is:
 - Three (3) years for EX-TRAFIRE® brand power supplies.
 - One (1) year for cutting torches and cable assemblies
- 5 The warranty does not cover normal wear and tear of the goods or their parts as a result of their use, such as nozzles, electrodes, shields, O-rings, vortex rings, etc.
- 6 The Seller shall not be liable for damage to the goods caused by the Buyer or third parties as a result of incorrect or improper handling of the goods (in particular repair or modification by persons not authorized by the Seller) or their installation, improper use of the goods or insufficient maintenance, in particular use of the goods for a purpose other than the specified purpose or other non-compliance with the operating instructions, use of excessive force or use of unauthorized goods.

14 Block diagram

Fig. 8 Block diagram single-phase

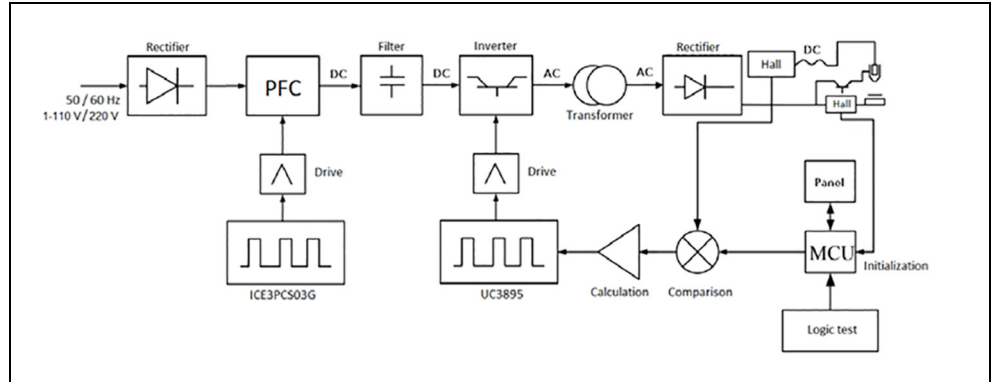
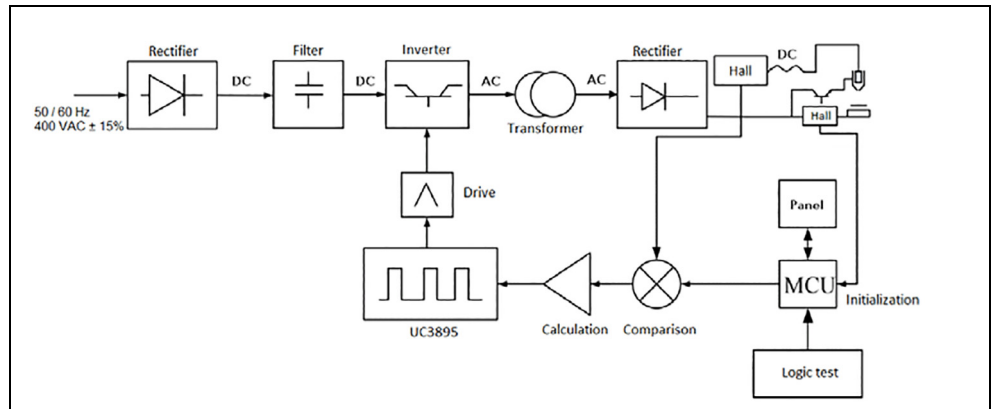


Fig. 9 Block diagram three-phase



15 Accessories

Table 15 Accessories

Accessories	Part number	Description
	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 socket with male thread G 1/4"
	EX-0-803-001	CNC interface plug 14-pin kit, incl. 7 pins
	EX-0-803-004	CNC interface connection cable 6 m
	EX-0-805-001	Grease, 25 ml
	EX-5-801-002	Circle cutting guide kit for FHT-X®105RTXH/105TTH/45TTH

For more information about accessories, visit our website:
www.thermacut.com.

16 FHT-EX® 45TTH hand cutting torch unit

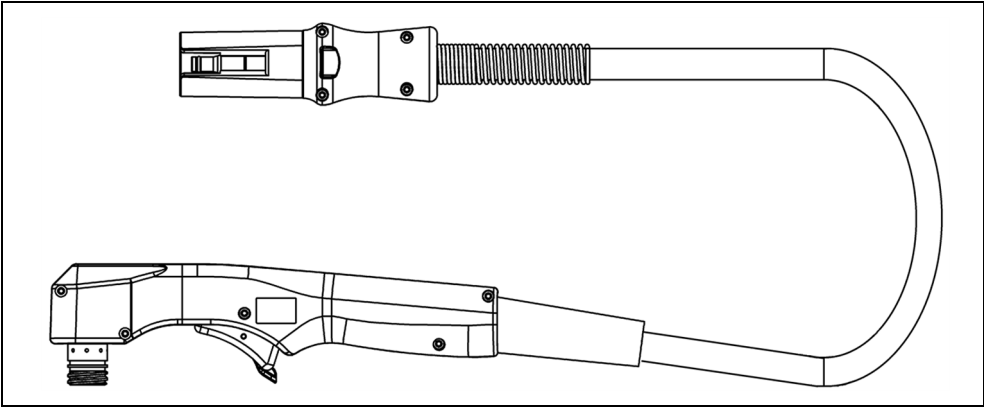


Table 16 FHT-EX® 45TTH hand cutting torch

Part number	Description
EX-2-101-001	FHT-EX® 45TTH hand cutting torch without consumables, with 5 m cable (16.5')/TCS13
EX-2-103-001	FHT-EX® 45TTH hand cutting torch without consumables, with 8 m cable (26')/TCS13
EX-2-106-001	FHT-EX® 45TTH hand cutting torch without consumables, with 15 m cable (50')/TCS13

16.1 FHT-EX® 45TTH hand cutting torch unit components

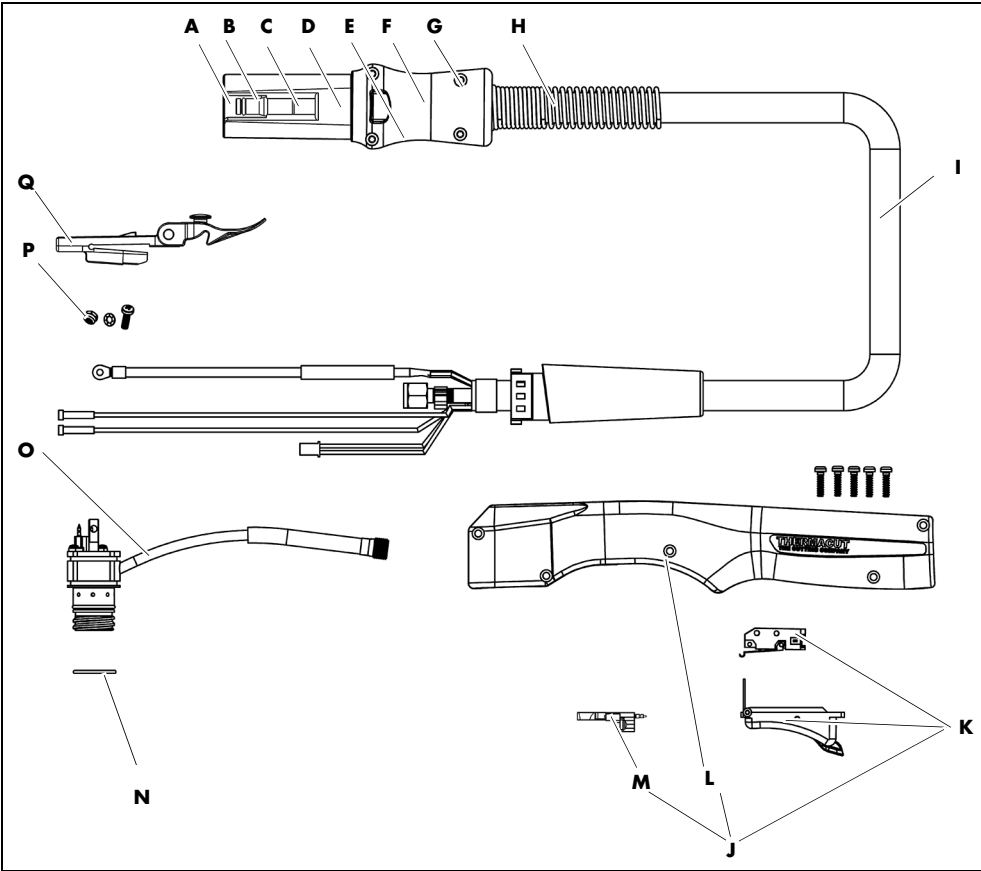
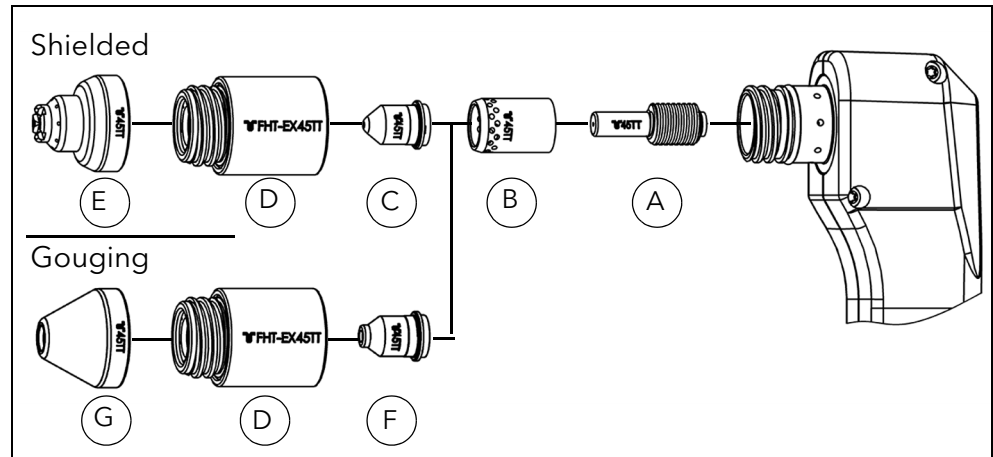


Table 17 Components for hand cutting torch 45 A and gouging

Hand cutting torch		
Item	Part number	Description
A	EX-0-325-005	Male crimp pin for TCS plug
B	EX-0-325-009	O-Ring (fitted in the TCS plug)
C	EX-0-325-010	Retaining ring (outer circlip ring)
D	EX-0-323-001	TCS13 plug body
E	EX-0-325-001	TCS clam shell lower
F	EX-0-325-002	TCS clam shell upper
G	EX-0-325-015	TCS clam shell screw
H	EX-5-318-001	TCS plug spring strain relief
I	EX-2-331-001	FHT-EX® 45TTH hand torch lead replacement kit 5 m lead/TCS13
	EX-2-333-001	FHT-EX® 45TTH hand torch lead replacement kit 8 m lead/TCS13
	EX-2-336-001	FHT-EX® 45TTH hand torch lead replacement kit 15 m lead/TCS13
J	EX-2-314-001	FHT-EX® 45TTH hand torch handle replacement kit consisting of components K, L, M
K	EX-2-313-001	Safety trigger with start switch
L	EX-2-308-001	Hand torch handle with screws
M	EX-2-305-001	Cap sensor replacement kit with screws/ hand torch
N	EX-5-431-050	O-ring (fitted on the torch body)
O	EX-2-302-001	Hand torch body FHT-EX® 45TTH
P	EX-5-372-010	Cathode mounting kit
Q	EX-0-321-003	Latch w/Key Assembly

16.2 FHT-EX® 45TTH consumables for hand cutting torch

**Table 18** Consumables for hand cutting torch FHT-EX® 45TTH

Item	Part number	Description
A	EX-2-401-201	Electrode
B	EX-2-404-201	Swirl ring
C	EX-2-409-201	Nozzle
D	EX-2-415-201	Retaining cap
E	EX-2-419-201	Shield, hand
F	EX-2-409-202	Nozzle, gouging
G	EX-2-419-202	Shield, gouging

17 FHT-EX® 45TTM machine cutting torch unit

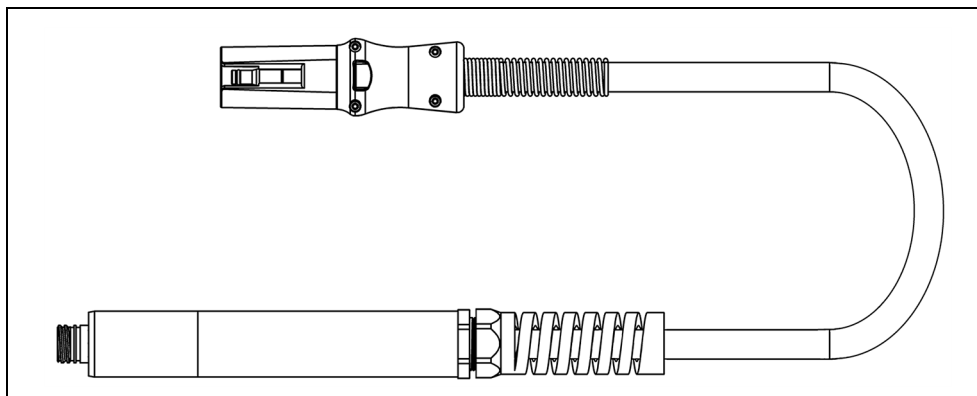


Table 19 FHT-EX® 45TTM machine cutting torch

Part number	Description
EX-2-233-001	FHT-EX® 45TTM DEMO machine cutting torch with consumables/TCS13
EX-2-202-001	FHT-EX® 45TTM machine cutting torch without consumables, with 5 m (16.5') lead/TCS13
EX-2-204-001	FHT-EX® 45TTM machine cutting torch without consumables, with 8 m (26') lead/TCS13
EX-2-207-001	FHT-EX® 45TTM machine cutting torch without consumables, with 15 m (50') lead/TCS13

17.1 FHT-EX® 45TTM machine cutting torch components

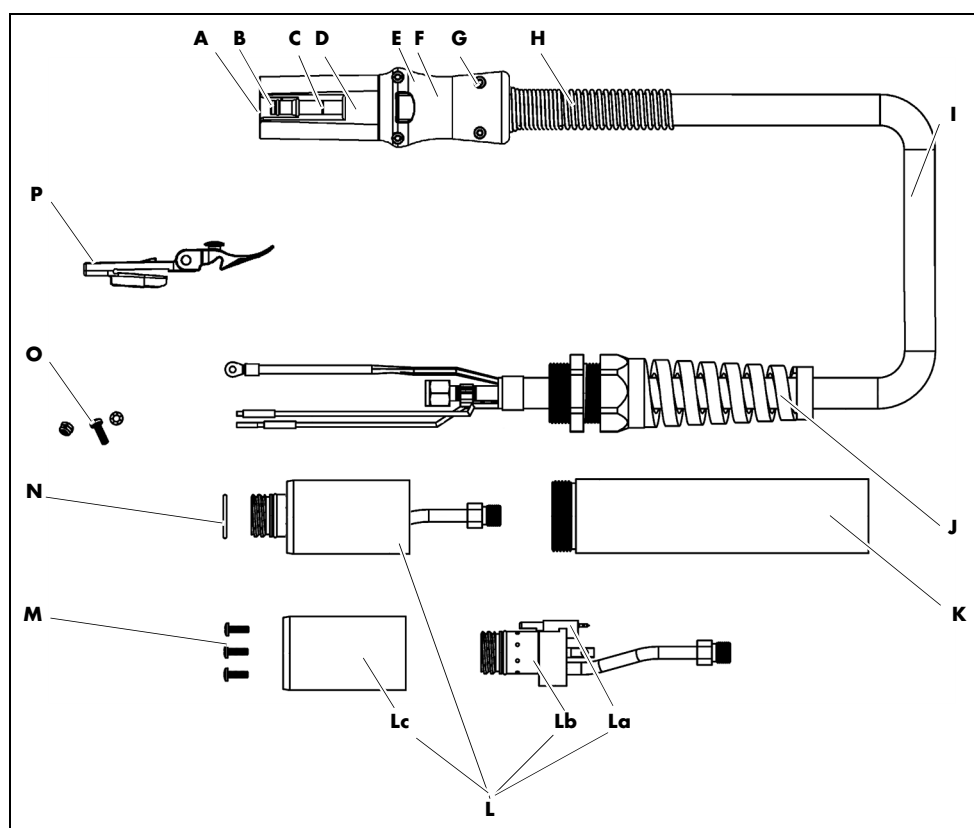


Table 20 Machine cutting torch components

Item	Part number	Description
A	EX-0-325-005	Male crimp pin for TCS plug
B	EX-0-325-009	O-ring (fitted in the TCS plug)
C	EX-0-325-010	Retaining ring (outer circlip ring)
D	EX-0-323-001	TCS13 plug body
E	EX-0-325-001	TCS clam shell lower
F	EX-0-325-002	TCS clam shell upper
G	EX-0-325-015	TCS clam shell screw
H	EX-5-318-001	TCS plug spring strain relief
I	EX-2-352-001	FHT-EX® 45TTM machine torch lead replacement kit 5 m lead/TCS13
	EX-2-354-001	FHT-EX® 45TTM machine torch lead replacement kit 8 m lead/TCS13
	EX-2-357-001	FHT-EX® 45TTM machine torch lead replacement kit 15 m lead/TCS13
J	EX-5-317-021	Machine torch strain relief
K	EX-2-306-001	FHT-EX® 45TTM standard mounting tube without rack
L	EX-2-301-001	Machine torch body assembly FHT-EX® 45TTM consisting of La, Lb, Lc
La	EX-2-301-002	Cap sensor replacement kit with screws/ machine torch
Lb	EX-5-304-001	Machine torch body FHT-EX® 45TTM
Lc	EX-5-306-002	Torch mounting sleeve (incl. 3 screws)
M	EX-5-372-005	Torch mounting screws kit (incl. 3 screws)
N	EX-5-431-050	O-ring (fitted on the torch body) - 2pcs per package
O	EX-5-372-010	Cathode mounting kit
P	EX-0-321-003	Latch w/Key Assembly

17.2 FHT-EX® 45TTM consumables for standard machine cutting torch

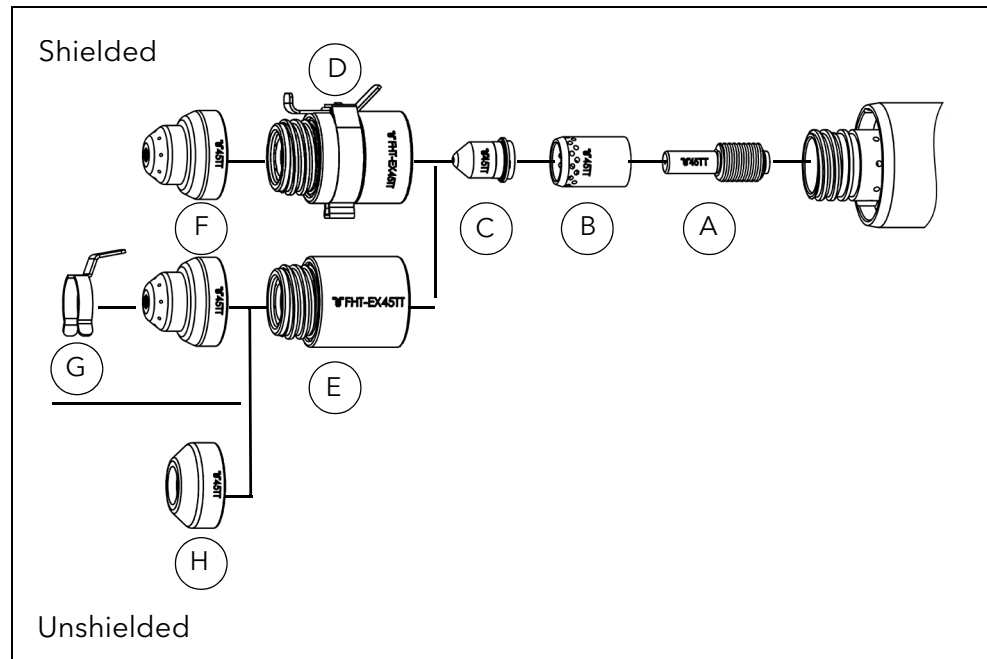


Table 21 FHT-EX® 45TTM consumables for standard machine cutting torch

Item	Part number	Description
A	EX-2-401-201	Electrode
B	EX-2-404-201	Swirl ring
C	EX-2-409-201	Nozzle
D	EX-2-415-202	Retaining cap with IHS Tab
E	EX-2-415-201	Retaining cap
F	EX-2-421-201	Shield, machine
G	EX-2-428-011	IHS ohmic clip
H	EX-2-423-211	Deflector

- If a torch height controller is used, a retaining cap with IHS (Initial Height Sensing) ohmic clip or a retaining cap with IHS tab must be used.

17.3 FHT-EX® 45TTM consumables for marking machine cutting torch

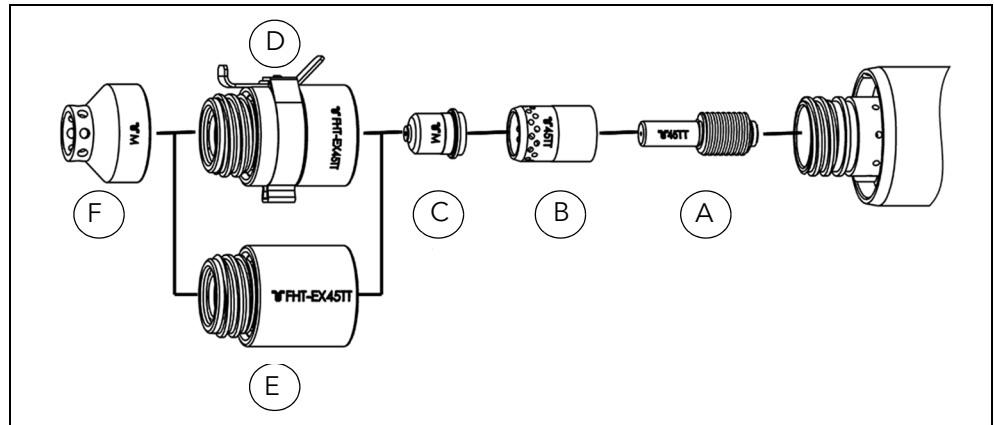


Table 22 FHT-EX® 45TTM consumables for marking machine cutting torch

Item	Part number	Description
A	EX-2-401-201	Electrode
B	EX-2-404-201	Swirl ring
C	EX-2-445-001	Nozzle, Marking
D	EX-2-415-202	Retaining cap with IHS tab
E	EX-2-415-201	Retaining cap
F	EX-2-445-002	Shield, Marking

- If a torch height controller is used, a retaining cap with IHS (Initial Height Sensing) ohmic clip or a retaining cap with IHS tab must be used.

18 Ordering information on bulk packs and starter kits

18.1 EX-TRAFIRE® 45HD plasma power supply

Table 23 EX-TRAFIRE® 45HD plasma power supply

Part number	Description
EX-2-001-001	EX-TRAFIRE® 45HD/CE/1x110/230 V power supply (fully equipped = CNC interface & serial interface (CAN BUS))
EX-2-003-001	EX-TRAFIRE® 45HD/CE/1x110/230 V power supply (STD-equipped = CNC interface)
EX-2-002-001	EX-TRAFIRE® 45HD/CE/1x110/230 V power supply (CNC ready)*
EX-2-001-002	EX-TRAFIRE® 45HD/CE/3x400 V power supply (fully equipped = CNC interface & serial interface (CAN BUS))
EX-2-003-003	EX-TRAFIRE® 45HD/CE/3x400 V power supply (STD-equipped = CNC interface)
EX-2-002-003	EX-TRAFIRE® 45HD/CE/3x400 V power supply (CNC ready)*

* Available on request

18.2 EX-TRAFIRE® 45HD manual plasma cutting systems

Table 24 EX-TRAFIRE® 45HD manual plasma cutting systems (standard equipment)

Part number	Description	Length
EX-2-010-041	EX-TRAFIRE® 45HD/CE/1x110/230 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 5 m/H Starter Kit	5 m
EX-2-010-042	EX-TRAFIRE® 45HD/CE/1x110/230 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 8 m/H Starter Kit	8 m
EX-2-010-043	EX-TRAFIRE® 45HD/CE/1x110/230 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 15 m/H Starter Kit	15 m
EX-2-010-031	EX-TRAFIRE® 45HD/CE/3x400 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 5 m/H Starter Kit	5 m
EX-2-010-032	EX-TRAFIRE® 45HD/CE/3x400 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 8 m/H Starter Kit	8 m
EX-2-010-033	EX-TRAFIRE® 45HD/CE/3x400 V manual system (STD-equipped = CNC interface)/ FHT-EX® 45TTH 15 m/H Starter Kit	15 m

18.3 EX-TRAFIRE® 45HD mechanized plasma cutting systems

Table 25 EX-TRAFIRE® 45HD mechanized plasma cutting systems
(fully equipped)

Part number	Description	Length
EX-2-011-041	EX-TRAFIRE® 45HD/CE/1x110/230 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 5 m/M Starter Kit	5 m
EX-2-011-042	EX-TRAFIRE® 45HD/CE/1x110/230 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 8 m/M Starter Kit	8 m
EX-2-011-043	EX-TRAFIRE® 45HD/CE/1x110/230 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 15 m/M Starter Kit	15 m
EX-2-011-031	EX-TRAFIRE® 45HD/CE/3x400 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 5 m/M Starter Kit	5 m
EX-2-011-032	EX-TRAFIRE® 45HD/CE/3x400 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 8 m/M Starter Kit	8 m
EX-2-011-033	EX-TRAFIRE® 45HD/CE/3x400 V machine system (fully equipped = CNC & CAN BUS interface)/ FHT-EX® 45TTM 15 m/M Starter Kit	15 m

Table 26 EX-TRAFIRE® 45HD mechanized plasma cutting systems
(standard equipment)

Part number	Description	Length
EX-2-013-001	EX-TRAFIRE® 45HD/CE/1x110/230V machine system (STD-equipped = CNC & serial interface READY)/ FHT-EX® 45TTM 5 m/M Starter Kit	5 m
EX-2-013-002	EX-TRAFIRE® 45HD/CE/1x110/230V machine system (STD-equipped = CNC & serial interface READY)/ FHT-EX® 45TTM 8 m/M Starter Kit	8 m
EX-2-013-003	EX-TRAFIRE® 45HD/CE/1x110/230V machine system (STD-equipped = CNC & serial interface READY)/ /FHT-EX® 45TTM 15 m/M Starter Kit	15 m
EX-2-013-004	EX-TRAFIRE® 45HD/CE/3x400V machine system (STD-equipped = CNC & serial interface READY)/ FHT-EX® 45TTM 5 m/M Starter Kit	5 m
EX-2-013-005	EX-TRAFIRE® 45HD/CE/3x400V machine system (STD-equipped = CNC & serial interface READY)/ FHT-EX® 45TTM 8 m/M Starter Kit	8 m
EX-2-013-006	EX-TRAFIRE® 45HD/CE/3x400V machine system (STD-equipped = CNC & serial interface READY)/ FHT-EX® 45TTM 15 m/M Starter Kit	15 m

18.4 Bulk packs for FHT-EX® 45TTH and FHT-EX® 45TTM

Table 27 Bulk packs for FHT-EX® 45TTH and FHT-EX® 45TTM

Part number	Description	Pck.
EX-2-434-201	Bulk pack - Electrode - 25 pcs.	1
EX-2-435-201	Bulk pack - Nozzle - 25 pcs.	1
EX-2-436-201	Bulk pack - Hand- (contact) shield - 18 pcs.	1
EX-2-437-201	Bulk pack - Shield, machine - 18 pcs.	1

Each starter kit includes:

4 × Hand or machine shield

4 × nozzle

4 × electrode

1 × swirl ring

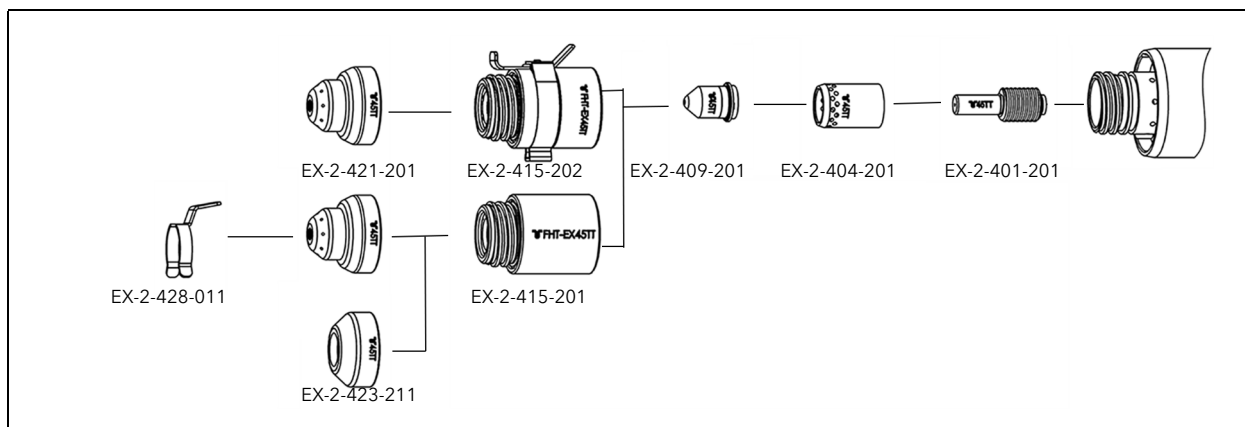
1 × O-ring - torch body

19 Cutting tables for mechanical cutting

Cutting tables serve as a guideline for mechanical cutting. Individual systems can be "fine tuned" to achieve optimum cutting quality.

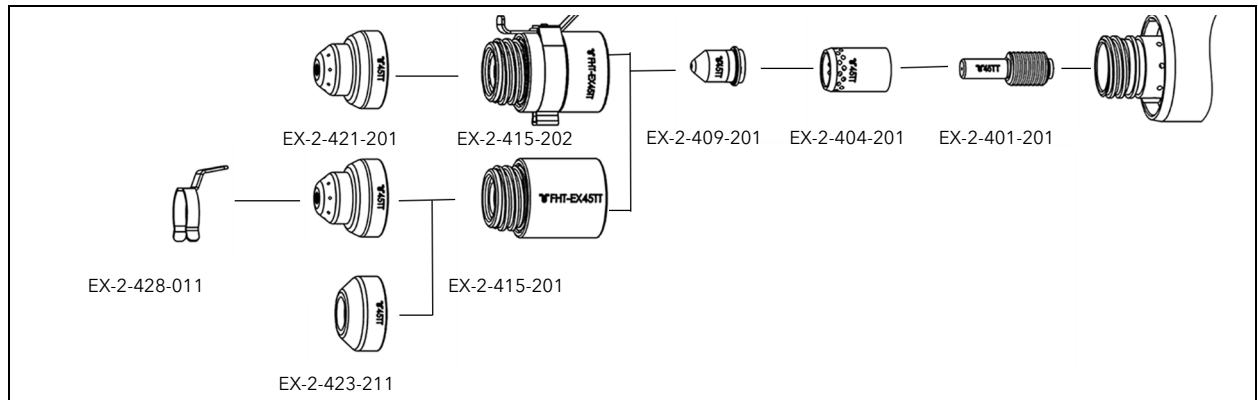
- Recommended speed:
Speeds adjusted for cutting capacity do not necessarily represent maximum speeds. They are the speeds that must be achieved for the specified material thickness.
- Maximum speed:
The maximum cutting speeds are the result of in-depth laboratory testing. Actual cutting speeds may vary due to different cutting applications.
- Configuration without protective cap:
If consumables are used without a shield, either the torch must be manually adjusted to the working height, or the arc voltage control (AVC) settings must be selected to achieve the desired cutting quality.

19.1 30 A cutting, shielded, with compressed air



Material thickness	Torch (shield) to workpiece distance	Pierce height (shield) to workpiece distance	Pierce delay time	Recommended speed		Maximum speed		Kerf width
				Settings for highest quality		Standard quality settings		
				Cutting speed	Voltage	Cutting speed	Voltage	
[mm]	[mm]	[mm]	[Seconds]	[mm/min]	[Volts]	[mm/min]	[Volts]	[mm]
Mild steel								
0.5	1.5	3.8	0	9150	117	10160	107	0.9
0.8				8650	116	10160	109	1
1				8100	115	10160	113	1
1.5			0.2	5650	111	7100	115	1.1
Stainless steel								
0.5	1.5	3.8	0	9150	119	10160	123	1
0.8				8650	117	10160	121	1
1				8100	115	10160	119	1.1
1.5			0.2	3750	113	4700	118	1.3
Aluminum								
1.2	1.5	3.8	0	9150	117	10160	120	1.2
1.5			0.2	8650	118	10160	121	1.2
2				5450	118	6860	121	1.3

19.2 45 A cutting, shielded, with compressed air

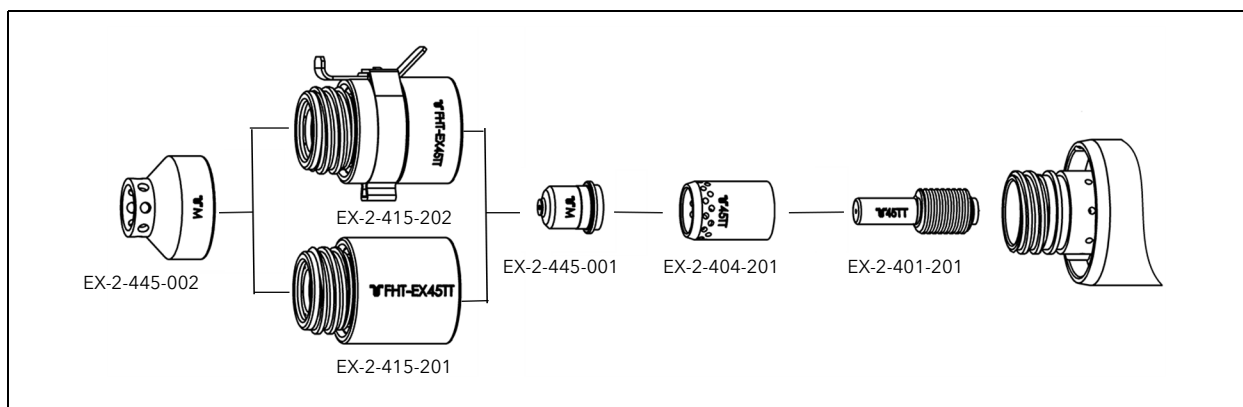


Material thickness	Torch (shield) to workpiece distance	Pierce height (shield) to workpiece distance	Pierce delay time	Recommended speed		Maximum speed		Kerf width
				Settings for highest quality		Standard quality settings		
				Cutting speed	Voltage	Cutting speed	Voltage	
[mm]	[mm]	[mm]	[Seconds]	[mm/min]	[Volts]	[mm/min]	[Volts]	[mm]
Mild steel								
1	1.5	3.8	0	9652	115	10160	112	0.9
1.5				8890	116	10160	115	0.9
2			0.1	7100	117	9144	115	1.1
3				3550	117	4445	115	1.1
5			0.5	2150	118	2794	115	1.3
6			0.6	1500	120	1905	116	1.5
10			0.9	810	122	1016	116	1.7
12		Edge start	510	132	635	125	1,7	
16			280	138	356	127	1.8	
20			200	140	254	131	1.9	
25			100	146	127	142	2	
Stainless steel								
1	1.5	3.8	0	7600	112	10160	109	1.3
1.5				8100	112	10160	125	1.4
2			0.1	7100	118	9144	115	1.4
3				3050	121	3810	118	1.5
5			0.5	1780	122	2159	118	1.6
6			0.6	1100	124	1397	120	1.6
10			0.8	760	126	813	121	1.7
12		Edge start	350	132	457	128	1.7	
20			175	136	229	131	2.2	
Aluminum								
1.5	1.5	3.8	0	9150	116	10160	114	1.4
2				8650	117	10160	116	1.5
3			0.1	5600	122	7112	120	1.5
5				2550	123	3302	120	1.6
6			0.3	2050	123	2540	120	1.6
10			0.5	840	130	1067	125	1.7
12		Edge start	510	134	635	130	1.9	
20			200	143	254	138	2	

➤ 45 A cutting charts and consumables can also be used for SmoothLine cutting up to a material thickness of 4 mm.

19.3 Tables for marking

19.3.1 Marking, shielded, with compressed air or Argon



With compressed air

Marking	Power supply	Torch (shield) to workpiece distance	Initial marking height	Delay	Marking speed	Arc voltage	Kerf width	Kerf depth
	[Amps]	[mm]	[mm]	[Seconds]	[mm/min.]	[Volts]	[mm]	[mm]
Mild steel								
Low	10	6.4	6.4	0	2540	134	2.79	<0.02
High	10	4.6	4.6	0	2540	111	2.79	0.09
Stainless steel								
Low	10	5.1	5.1	0	5080	123	2.03	<0.02
High	10	6.4	6.4	0	3175	133	2.54	0.08
Aluminum								
	11	2.5	5.1	0	5080	98	0.89	<0.02

With Argon

Marking	Power supply	Torch (shield) to workpiece distance	Initial marking height	Delay	Marking speed	Arc voltage	Kerf width	Kerf depth
	[Amps]	[mm]	[mm]	[Seconds]	[mm/min.]	[Volts]	[mm]	[mm]
Mild steel								
Low	10	2	2	0	3175	44	1.22	<0.02
High	15	1.5	1.5	0	3175	42	1.22	<0.02
Stainless steel								
Low	12	2.5	2.5	0	3175	46	1.40	<0.02
High	15	2.5	2.5	0	2540	46	2.16	0.02
Aluminum								
	16	0.5	0.5	0	4445	42	0.63	<0.02

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Revision history

You can find the latest version of the operator manual on our website:
www.thermacut.com.

Revision R1/10_2022

Revision R2/02_2023:

- 4.2 „Technical data“: Maximum input power changed to 7.5 kVA (single-phase) and 11.4 kVA (three-phase)



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