



# EX-TRACK<sup>®</sup> CNC

## Portable CNC Cutting System For firmware 3.0 – 1.3.4

Operating Instructions - EX-0-902-001/N-22063 -CE

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

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## 1 Identification

The EX-TRACK® CNC is a portable high-precision, and programmable cutting system. It uses oxy fuel or plasma and can be equipped with an oxy fuel and/or a plasma cutting torch. It is also equipped with a 7-inch high-resolution LCD display.

The EX-TRACK® CNC can either be programmed manually or use programs loaded through the USB port. AutoCAD drawings are stored directly in DXF format.

The CNC function enables the cutting of complex shapes with high accuracy and repeatability. The manual cutting function serves for simpler applications.

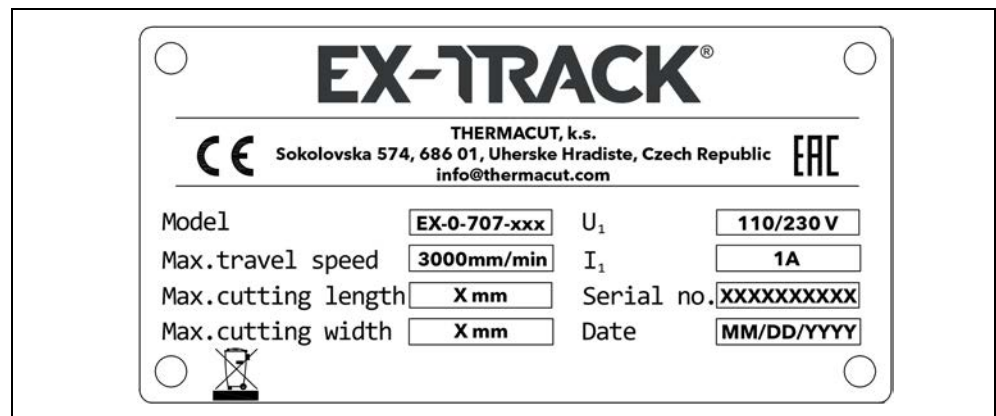
The EX-TRACK® CNC may be operated only with original parts. This documentation exclusively describes the EX-TRACK® CNC.

### 1.1 Labeling

This product fulfills the requirements that apply to the market to which it has been introduced. Corresponding marking has been affixed to the product.

### 1.2 Identification plate

Fig. 1 EX-TRACK® CNC identification plate



The EX-TRACK® CNC is labeled by means of an identification plate on the housing.

➤ For inquiries, please have on hand the model number, serial number, and date per the identification plate.

The serial number is coded as follows:

Table 1 Serial number coding

Type	Year	Month	System no.	Certification
0 (3050x1525)	23	4	(001 - 999)	01 (CE)
1 (2000x1000)				02 (CSA)
9 (600x600)				
EXAMPLE: 0230701501				

### 1.3 Signs and symbols used

The following signs and symbols are used:

- General instructions.
- 1 Action(s) to be carried out in succession.
- Lists.
- ⇒ Cross-reference symbol refers to detailed, supplementary or further information.
- A Caption, item description.

### 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 potential 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.

### 2.1 Designated use

The EX-TRACK® CNC may be used only for the purpose and manner described. This product is used to cut complex shapes with high accuracy and repeatability. Available is also the manual cutting function for the simpler applications. Any other use is considered improper. Unauthorized modifications or changes to enhance the performance are not permitted.

- Do not exceed the maximum load specifications as defined by the document supplied. Overloads could lead to destruction.
- Do not make any modifications or changes to this product.
- Do not use or store the EX-TRACK® CNC in wet conditions or environments.
- Do not use the EX-TRACK® CNC for other purposes than the intended.

### 2.2 Responsibilities of the user

- Ensure that only qualified personnel are permitted to work on the EX-TRACK® CNC.

Suitably qualified 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 product;
  - 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 non-suitably qualified people out of the work area.
  - Observe the local occupational health and safety regulations and laws.

### 2.3 Warning and information signs

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



- Wear a respiratory mask.



- Wear your personal protective clothing.



- Wear protective gloves.



- Wear safety shoes.



- Wear ear protection.



- Wear safety goggles.



- Read and observe the operating instructions.



Warning against hot surfaces.



Warning against risk of slipping.

- Ensure a dry and clean base in the room where the device is to be installed.

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

## 2.4 Basic safety instructions

The product has been developed and manufactured in accordance with the latest technology and recognized safety standards and directives. Due to the product design, unavoidable technical residual risks exist to the user, third parties, products, and other material property. The manufacturer will accept no liability for damage caused by non-observance of the documentation.

- Please read the documentation carefully before using the product for the first time and comply with the instructions contained.
- Only operate the product in technically perfect condition and ensure compliance with all documentation.
- Read the documentation carefully before carrying out specific work, for example, commissioning, operation, transport, and maintenance.
- Use suitable means to protect yourself and bystanders from the hazards listed in the documentation.
- Store the documentation within easy reach of the product for reference and enclose all documents when passing on the product.
- Consult the documentation on additional welding components.
- Information about how to handle gas cylinders can be found in the instructions provided by the gas manufacturer and the relevant local regulations, e.g., compressed gas regulations.
- Observe the local accident prevention regulations.
- Only trained specialists should commission, operate, and service the device. Qualified personnel are persons who, based on their special training, knowledge, experience and due to their knowledge of the



relevant standards, are able to assess the tasks assigned to them and identify possible dangers.

- Keep the work area in order. Ensure good lighting of the work area.
- Switch off the power, gas, and compressed air supplies and unplug the mains plug for the entire duration of servicing, maintenance, and repair work.
- For disposal, observe the local regulations, laws, provisions, standards, and directives.

## 2.5 Product-specific safety instructions

The EX-TRACK® CNC system is fitted with an Emergency Stop or E-Stop button in case of an accident or emergency. This button is used to isolate the system from the input power source (120 V/220 V). The E-Stop button is visibly located on the top of the main unit. In order to operate it, push the button in. The power to the EX-TRACK® CNC and drive mechanisms is cut off, none of the system functions can operate. To restore power to the system, pull the E-Stop button upwards. The screen will illuminate and all of the system functions are restored.

- Only disassemble the EX-TRACK® CNC for maintenance and inspection purposes.
- The EX-TRACK® CNC is made from alloy. Do not drop it or subject it to heavy pressure.
- Mount and position the EX-TRACK® CNC correctly. Do not mount on soft or unstable ground.
- Do not damage or deform the rails.
- Keep the rail clean and free from debris.
- Never move or reposition the longitudinal guide rail when in use.
- Always check the correct and free motion of the EX-TRACK® CNC before starting the cutting operation.
- Do not use the EX-TRACK® CNC for welding purposes.
- Make sure to put the ON/OFF switch into OFF position before powering on the EX-TRACK® CNC.
- Always turn the input power off when not in use. Do not leave unattended.
- Do not open any valves by force.
- Do not touch moving parts while the EX-TRACK® CNC is running.
- Do not insert hands between the rails.
- Ensure correct connection of the oxygen and fuel gas hoses; ensure they are correctly tightened to prevent them becoming loose during operation.
- Wear gloves when handling the nozzle, torch, and mountings after cutting.
- If running the system in oxy fuel mode: when checking the functioning of the system (dry run), ensure that the preheat oxygen valve and the fuel gas valve are in the OFF position.

## 2.6 Safety instructions for the cutter

- Ensure that the hoses are not damaged, for example, by being driven over, crushed or torn.
- Check the hoses for damage and wear at regular intervals.
- If it is necessary to replace the input power cable or hoses, only models specified by the manufacturer may be used.

## 2.7 Safety instructions for cutting

- 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 (OELs).
- Ensure sufficient ventilation for gas cutting in order to prevent the air from being polluted.
- 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.
- Do not cut sealed containers or pressurized cylinders.
- Do not use defective or contaminated pressure regulators.
- Check for any leakage of gas from the distributor, the hoses, or the torch.

## 2.8 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 welding glasses or goggles (see table below), face protection, ear protectors, protective gloves, and safety shoes.

**Table 2** Lens shade selector for plasma cutting per ISO 4850:1979

Cutting current	Minimum shade
Up to 150 A	ISO (DIN) 11
150 A to 250 A	ISO (DIN) 12
250 A to 400 A	ISO (DIN) 13
Over 400 A	ISO (DIN) 14

## 2.9 Emergency information

- In the event of an emergency, immediately disconnect the following supplies:
  - Fuel gas supply
  - Oxygen supply

### 3 Scope of delivery

The following components are included in the scope of supply:

- 1 x main (CNC) unit
- 1 x transverse rail (aluminum)
- 1 x Longitudinal rail
- 1 x torch assembly
- 1 x power lead and plasma interface cable 3 m
- 1 x CNC cable 6 m
- 1 x operating manual
- 1 x programming software CD
- 1 x USB dongle for programming software
- 1 x certificate
- 3 x propane/natural gas cutting nozzle G02
- 1 x oxy fuel nozzle cleaning kit
- 1 x wrench

➤ The order data and ID numbers for the equipment parts and consumables can be found in this manual.

⇒ 17 Parts list on page EN-76

➤ For more information about points of contact, consultation, and orders, visit [www.ex-track.com](http://www.ex-track.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 immediately.
- Keep the packaging for possible inspection by the carrier.

#### Returns

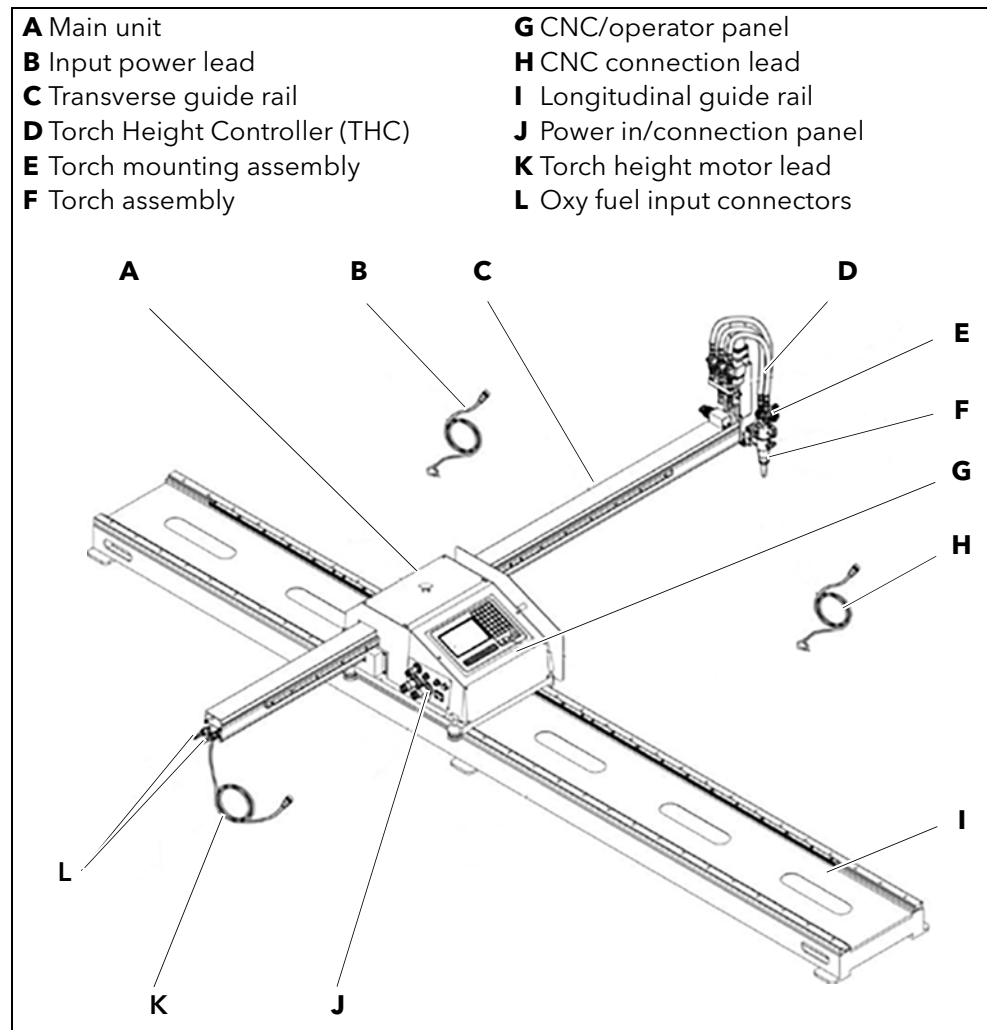
- Use original packaging and packing material for returns.
- If you have questions concerning the packaging or how to secure the device, contact your supplier, carrier, or transport company.

## 4 Product description

### 4.1 Assembly and use

The EX-TRACK® CNC consists of the following components:

**Fig. 2** Control elements and connections



<b>Torch height controller (D)</b>	Controls the standoff between torch and workpiece. Consists of the oxy fuel torch, plasma torch, torch lifting mechanism, and torch mounting assembly (E).
<b>Oxy fuel torch</b>	Comprises of torch body, two-way valve, gas supply hoses and fittings.
<b>Plasma torch</b>	Comprises of torch body, mounting tube, combined power cable/air hose lead set and consumables.
<b>Torch lifting mechanism</b>	Comprises of lifting motor, lifting screw, guide shaft and fittings.

<b>Torch mounting assembly (E)</b>	Comprises of connector, clamp, and manual lifting wheel. The torch height and vertical positioning can be adjusted manually, so as to ensure that the cut is square. For edge beveling, rotate the torch along the longitudinal or transverse direction to perform an angled cut.
<b>Gas supply (L)</b>	The system uses oxygen and fuel gas hoses for the delivery of gases to the torch. Gas ignition and flame adjustment are performed manually.

The portable CNC cutting system can be easily transported and assembled where it is needed to cut individual or multiple shapes, from easy to complex.

Precision dual side linear guide rails offer the required stability and accuracy in oxy-fuel or plasma cutting. It is quick and easy to position manually on a rack equipped with pinion drives and a motorized torch lifter. For the best cutting results the EX-TRACK® CNC has an arc voltage height control with initial touch sensing combined with a crash sensor designed for plasma cutting.

The EX-TRACK® CNC can operate both plasma and oxy-fuel cutting torches. The two types of torch holders allow to interchange the type of cutting based on the actual needs.

## 4.2 Technical data

**Table 3** Technical data

<b>Weight [kg]</b>	145 (EX-0-707-002) / 115 (EX-0-707-003)
<b>Dimensions [mm]</b>	3500 x 370 x 2200 (EX-0-707-002) 2500 x 370 x 1700 (EX-0-707-003)
<b>Cutting area [mm]</b>	1525 x 3050 (EX-0-707-002) 1000 x 2000 (EX-0-707-003)
<b>Cutting speed [mm/min]</b>	50 to 3000
<b>Maximum position speed [mm/min]</b>	3000
<b>Input power</b>	110 V AC/230 V - 50 Hz

**Table 4** Ambient conditions for transport and storage

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

**Table 5** Ambient conditions for operation

<b>Ambient temperature</b>	-10 °C to +40 °C
<b>Relative humidity</b>	< 50 % at +40 °C < 90 % at +20 °C
<b>Installation above sea level [m]</b>	Max. 2000

Table 6 Technical data CNC system

Processor	ARM processing chip
Display	7" color LCD, 800 x 480 resolution
Input/output	13 - 16 photoelectric isolation input, 8-way photoelectric isolation output, including four-way relay output
CNC controlled axes	X, Y and S (vertical) with height controller
Top speed [mm/min]	<3000
Pulse equivalent	Flexible adjustment
Operating temperature	0 °C to +40 °C
Storage temperature	-30 °C to +60 °C
Storage space	4 GB super program storage capacity

## 5 Transport and positioning

### **⚠ WARNING**

#### **Risk of injury due to improper transport and installation**

Improper transport and installation can cause the EX-TRACK® CNC to tip or fall. This may result in 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 EX-TRACK® CNC on a suitable base (flat, solid, dry) on which it will not topple over.
- Note the weight of the EX-TRACK® CNC when lifting it.  
⇒ 4.2 Technical data on page EN-13
- Use an appropriate lifting tool with load handling attachment or forklift for transporting and installing the product.
- Avoid abrupt lifting and setting down.
- Do not lift the EX-TRACK® CNC over individuals or other devices.
- Send bystanders out of the danger zone.
- At least two people should work together to mount the product.

### **NOTICE**

#### **Risk of material damage due to improper transport and installation**

The device is made from aluminum alloy. Improper transport or installation can therefore cause material and irreparable damage to the EX-TRACK® CNC.

- Protect the EX-TRACK® CNC against weather conditions, such as rain and direct sunlight.
- Do not drop the EX-TRACK® CNC.
- Do not drop anything on the EX-TRACK® CNC.
- Protect the EX-TRACK® CNC from spatter when cutting.
- Use the EX-TRACK® CNC only in dry, clean, and well-ventilated rooms.
- Maintain a minimum distance of 1 m from the wall when installing the product to ensure that it has sufficient ventilation.
- At least two people should work together to mount the product.

## Manual positioning



In the Off line position, the gear drives are not supplied with power so that the system can be manually positioned in either axis. In the ON position the drives are engaged for normal operation.

## 6 Commissioning

All references refer to Figure 2.

**Note:** The main rail MUST BE secured or fixed to a heavy table/construction which cannot tip over and is preferably also secured to the floor.

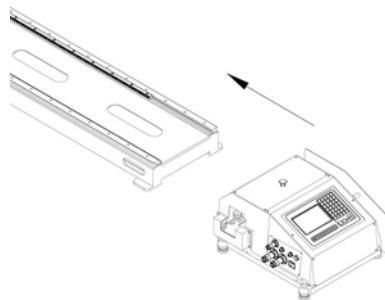
### 6.1 Fitting main unit onto longitudinal guide rail

#### **⚠ WARNING**

##### **Risk of personal injury or material damage**

Failure to fit/tighten the end stop could result in personal injury and or damage to the main unit.

➤ Always fit the end stop to the guide rail and tighten.

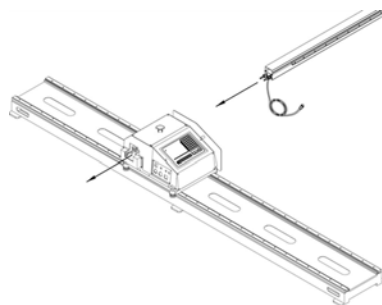


- 1 Fit the end stop to the longitudinal guide rail (**I**).
- 2 Carefully feed the main unit (**A**) on to the longitudinal guide rail (**I**) until the main unit drive assembly is fully engaged with the drive rack (it is recommended that this is done with two people).

The main unit will now travel freely on the guide rail.

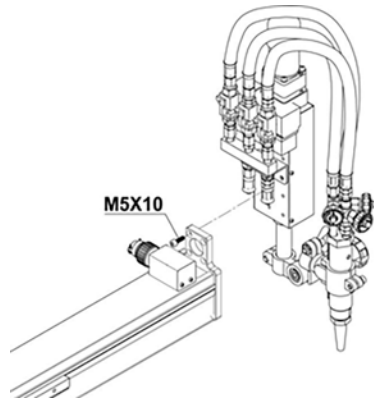
- 3 Fit and tighten the end stop.

### 6.2 Fitting the transverse guide rail



- 1 Pass the torch height motor lead (complete with plug) (**K**) through the main unit case (**A**).
- 2 Place the transverse guide rail (**C**) in the horizontal plane.
- 3 Gently feed the transverse guide rail (**C**) in through the main unit (**A**) until the rack engages with the drive gear in the main unit.

### 6.3 Fitting the Torch Height Controller (THC)



- 1 Fit the torch height controller (D) to the transverse guide rail (C) using the four M5 × 10 Allen screws and tighten.

### 6.4 Connecting to the gas supply

#### ⚠ WARNING

##### **Risk of injury due to explosion**

The use of defective or damaged gas cylinders or hoses can cause explosions. This can result in injury.

- Never use defective or leaking cylinders.
- Never use defective or leaking hoses.
- Use cylinders only for the purpose specified.
- Install cylinders in a place free from heat and open flame.
- Never cut pressurized cylinders or hermetically sealed containers.
- Ensure sufficient ventilation.

#### ⚠ CAUTION

##### **Risk of damage due to unregulated gas supply.**

The EX-TRACK® CNC requires a regulated supply of oxygen and fuel gas. An unregulated gas supply can cause damage to the system and lead to injury or death.

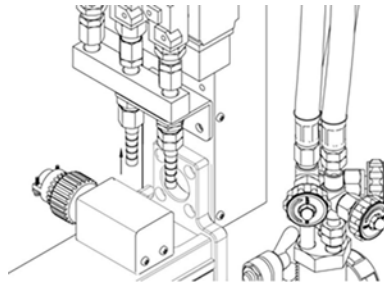
- Use regulators to control the gas flow.

The hoses are color coded: RED for fuel gas and BLUE for oxygen. The hose fittings have dissimilar threads: The fittings on the fuel gas hose (RED) are "Left hand or counterclockwise" threads. These fittings have a small groove on the external surface as an identification mark. The fittings on the oxygen hose (BLUE) are "Right hand or clockwise" threads.

Perform a full working pressure leak test after the connection of the gas cutting equipment. Use a suitable leak test product, ensure that there are no leaks prior to use.

The oxy fuel hoses fitted to this system are standard hoses with an internal diameter of Ø8 mm. Where possible, use the minimum length of hose between the gas supply point and the EX-TRACK® CNC, this reduces the risk of excess hose being damaged or causing a trip hazard. A shorter hose length may also improve gas flow.





- 1 Connect blue hose to oxygen outlet.
- 2 Connect red hose to preheat gas outlet.
- 3 Connect torch to hoses.

## 6.5 Electrical connection

### ⚠ 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.

- Use slow-blow fuses and/or circuit breakers and GFCI that comply with local regulations and electric codes.
- Ground the EX-TRACK® CNC according to the applicable regulations and laws.
- Do not ground the EX-TRACK® CNC together with other devices or machines.

### ⚠ 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.
- Have any damaged, deformed, or worn parts replaced by a certified electrician or trained personnel.

- 1 Check the input power voltage of the system before operation.  
The input power voltage should be in the range of  $\pm 10\%$  of the rated voltage. The system should not be operated outside of the range specified on left side panel.
- 2 Insert the plug for the torch height motor (four pins) into the socket on the side of the main unit **(A)**.
- 3 Connect the power lead to the main unit **(A)** (220 V AC).
- 4 Connect the oxygen and fuel gas supply hoses and tighten.
- 5 Plug the torch height motor control lead **(K)** into the corresponding input on the main unit side panel **(J)**.

## 6.6 Oxy fuel nozzle choice and cut charts

Select the correct size cutting nozzle according to the thickness of the steel plate. Select a larger size nozzle if the steel is heavily rusted, or for bevel cutting at angles greater than  $20^\circ$ .

⇒ Table 7 Oxy fuel cut charts on page EN-18.

The cut charts are a guide for the operator. Due to the varying types and quality of steel, climatic and atmospheric conditions, it is advisable to make the relevant setting and adjustments to suit the work in hand.

Table 7 Oxy fuel cut charts

Part no.	Nozzle type	Workpiece thickness [mm]	Torch height [mm]	Pressure [bar]			Consumption [NI/h]			Cutting speed [mm/min.]
				Preheat O <sup>2</sup>	Cutting O <sup>2</sup>	Fuel gas [propane]	Preheat O <sup>2</sup>	Cutting O <sup>2</sup>	Fuel gas [propane]	
EX-0-708-017	00	1-5 mm	8-10	1.5	2.0	0.2	1180	1200	310	750-550
EX-0-708-018	0	5-10 mm	8-10	1.5	2.3	0.2	1180	1200	310	600-450
EX-0-708-019	1	10-20 mm	8-10	1.5	2.5	0.2	1370	2300	310	480-380
EX-0-708-020	2	20-35 mm	8-10	1.5	3.0	0.25	1370	4300	360	400-320
EX-0-708-021	3	35-60 mm	8-10	1.5	3.5	0.3	1860	6500	490	350-280
EX-0-708-022	4	60-90 mm	8-10	1.5	4.5	0.3	1860	11000	490	300-240

## 6.7 Ignition and flame adjustment

The following information relates solely to Oxy Propane cutting. For alternative gases seek advice from your gas supplier. Use the cut chart data as a guide, adjust the gas flow pressure at the regulator. After ignition further adjustment to the flame may be required.

- 1 Unscrew the fuel gas valve on the torch a 1/4 turn.
- 2 Unscrew the oxygen preheating valve on the torch a 1/2 turn and ignite the gas flow at the torch tip.
- 3 Gradually unscrew the fuel gas valve and oxygen preheating valve on the torch, until the required neutral flame is achieved.
- 4 Position the torch at the correct distance.

The approximate standoff between the cutting nozzle face and the workpiece: Propane gas 8 to 10 mm.

**Note:** A neutral flame, correct nozzle size, travel speed, and torch height are required to achieve the desired profile cut finish. Removing slag on the workpiece is easy when all parameters are set correctly.

- 5 Ensure the nozzle size used is suited to the material thickness.

A nozzle that is too big in size for thin material will cause the material to distort and have a poor cut quality. Likewise, a nozzle that is too small for thick material will travel too slowly, cause edge damage and possible incomplete severance of the part. Flashbacks can occur from cutting with incorrect settings: Ensure "Flashback Arrestors" are fitted, used correctly, and maintained.

- 6 To maintain a constant cut quality, ensure settings are adjusted as required, use the supplied nozzle cleaning kit to keep the nozzle clean and free from dross and spatter.

### 6.7.1 Preheating time

The preheating time for edge starts or piercing depend on nozzle size, flame value, material type and thickness, and ambient temperature of the material. The chart below is intended as a guide to preheating times; actual times may vary.

Table 8 Preheating time

Average preheating time (in seconds min./max.)	
Workpiece thickness	Propane
Up to 20 mm	8/34
Up to 50 mm	10/53
Up to 100 mm	22/100

### 6.7.2 Turning off the torch

- 1 Close the oxygen preheating valve.
- 2 Close the fuel gas valve.
- 3 Close the oxygen cutting valve.

## 6.8 CNC connection

Control signals can be transmitted via the CNC interface. For signal types see Table 9 Signal and pin assignment for CNC interface on page EN-19. The control elements are located on the control panel.

**⚠ 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. 3 Signal and pin assignment for CNC interface

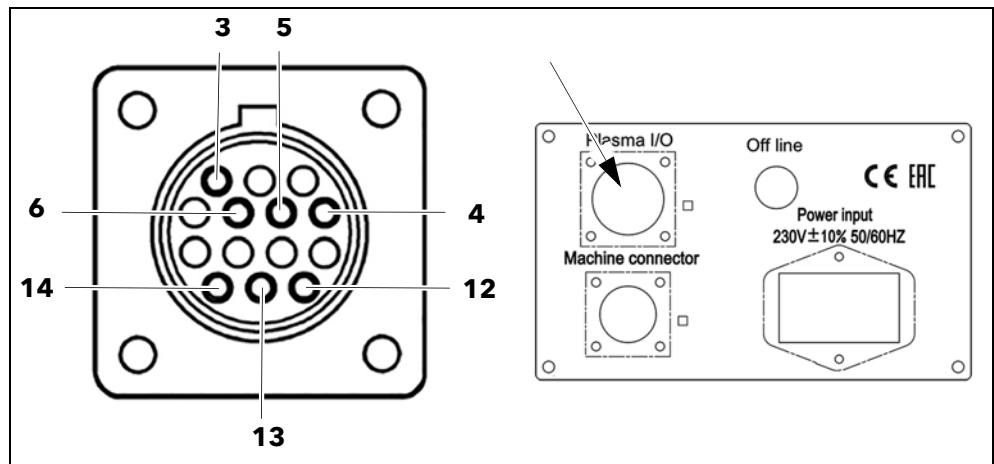


Table 9 Signal and pin assignment for CNC interface

Signal	START	Arc	PE	Voltage divider
Type	Output	Input	PE	Input
Notice	Open by default. Requires potential-free contact to close.	Open by default. Requires potential-free contact from plasma to close.		Arc divider voltage signal: 50:1 from plasma
PIN	3, 4	12, 14	13	6 (+), 5 (-)

## 7 Operating the device

### **⚠ WARNING**

#### **Risk of injury or damage due to backfire**

Backfires may cause serious accidents or fire. Backfires are caused by improper gas pressure, or incorrect oxygen/fuel gas mixture.

- When a backfire occurs, you should find the cause.
- Inspect and maintain the machine correctly before using the machine again.
- There are the following causes for backfire:
  - Incorrect gas pressure.
  - Cutting nozzle overheating.
  - Cutting nozzle blocked by spatter or slag.
  - Incorrect nozzle size.
  - Damage to nozzle seating area.

### **NOTICE**

#### **Material damage due to flashback**

Flashbacks can cause fire and damage to the EX-TRACK<sup>®</sup> CNC. If there is a hissing sound in the torch, proceed as follows:

- Close the preheating oxygen valve.
- Close the fuel gas valve.
- Close the cutting oxygen valve.
- Do not operate the system until a suitably qualified person has checked the system and found the reason for the flashback.

### **NOTICE**

#### **Bad cutting quality due to improper cutting speed**

Incorrect cutting speed will have a serious negative impact on the cutting surface.

- Perform a test cut prior to the production run.

### **NOTICE**

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

If the EX-TRACK<sup>®</sup> CNC is operated for longer than the maximum duty cycle, it may be overloaded and irreparably damaged.

- Only operate the EX-TRACK<sup>®</sup> CNC up to the maximum permissible duty cycle.
- Observe the maximum duty cycle for cutting components.

## 7.1 Oxy fuel cutting

### WARNING

#### **Risk of injury due to hot surfaces**

The torch becomes extremely hot.

➤ Wear gloves when turning off the gas supply at the torch.

- 1 Keep the material to be cut parallel to the longitudinal rail.
- 2 Select the correct nozzle size to suit the material being cut.
- 3 Check the torch alignment for squareness to the material being cut.
- 4 Enter the parameters for material thickness, set the preheat and cutting time, set the oxygen cut flow pressure and cut speeds in accordance with the relevant cut charts.
- 5 Ensure the flame is neutral.
- 6 Test the oxygen cutting jet: if the nozzle is dirty or damaged, either clean the nozzle using the cleaning kit provided, or fit a new nozzle.
- 7 If during the cutting process a flashback occurs, press the E-Stop button and proceed in the following order:
  - immediately turn off the fuel gas at the torch;
  - then close off the heating and cutting oxygen supply;
  - Close off ALL gas supply at cylinders or manifolds.

After cutting a profile, the torch should be raised to prevent a collision when moving to the next start point.

### **After work**

- 1 Ensure that the torch is in the home position.
- 2 Close all gas valves and isolate the system from the input power supply.
- 3 Clean the main unit, rails and rack, use lubricants as required, do not use excessive amounts of lubricant as this will attract contaminants.
- 4 Leave the work area clean and tidy, with tools correctly stored.

## 7.2 Plasma arc cutting

### **WARNING**

#### **Risk of injury due to hot and sharp surfaces**

The torch becomes extremely hot. There may also be sharp deposits of spatter and dross stuck to the consumables.

➤ Wear gloves when turning off the gas supply at the torch.

- 1** Fit the input power lead (**B**) into the left side of the Power in/Connection panel (**J**), and check for a secure fit.
- 2** Connect the plasma power supply to the EX-TRACK® CNC using the plasma interface cable. The cable plugs into the left side of the Power in/Connection panel (**J**).
- 3** Connect the torch height controller lead through the transverse rail to the left side of the Power in/Connection panel (**J**).
- 4** Feed the plasma torch lead set through the transverse rail (it may be necessary to remove the rail cover) and fit the torch into the torch mounting. Secure the torch after checking its alignment, check for free movement.
- 5** Inspect the consumables, replace as required and check fit.  
⇒ Refer to the plasma power supply Instruction Manual for additional setup guidance.
- 6** Keep the material to be cut parallel to the longitudinal rail.  
Refer to the plasma power supply cut charts to ensure they correspond with the values shown in the CNC system.
- 7** Adjust the cutting parameters through the CNC program.  
After cutting a profile, the torch should be raised to prevent a collision when moving to the next start point.

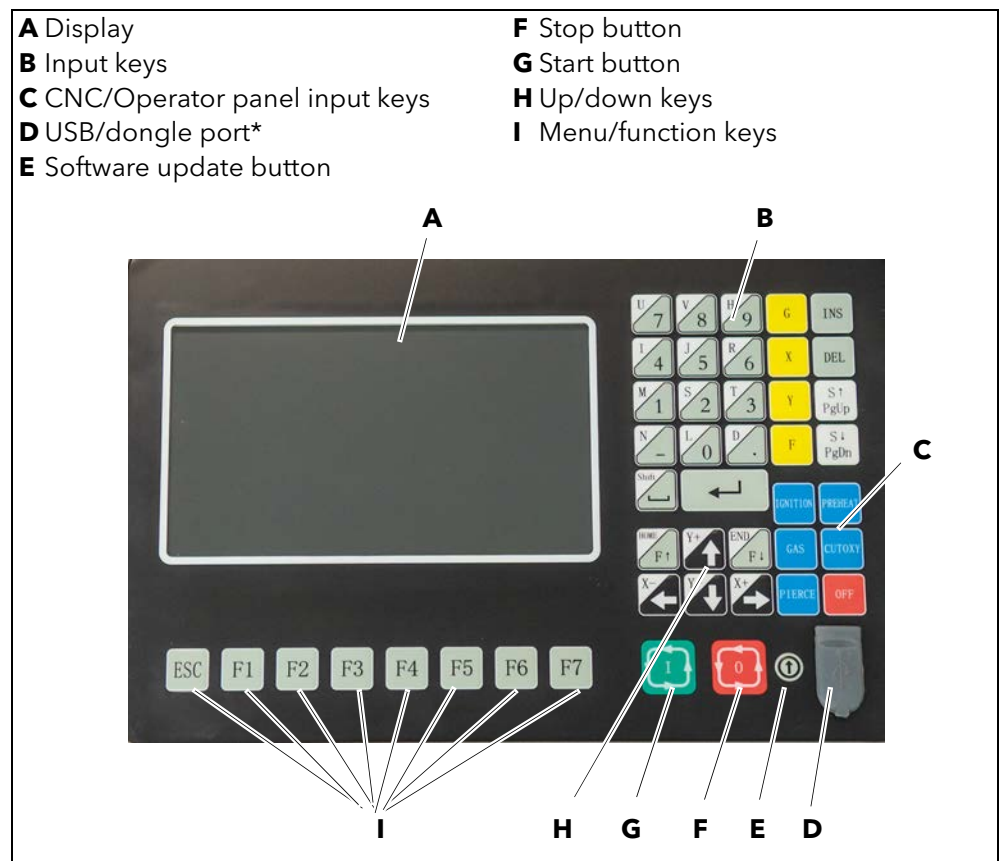
### **After work**

- 1** Ensure that the torch is in the home position.
- 2** Close all gas valves and isolate the system from the input power supply.
- 3** Clean the main unit, rails and rack, use lubricants as required, do not use excessive amounts of lubricant as this will attract contaminants.
- 4** Leave the work area clean and tidy, with tools correctly stored.

## 8 Control panel functions

The control panel looks as follows:

**Fig. 4** Control panel functions



\* NOT to be used for charging purposes.

Underneath the display there are eight touch-buttons labeled ESC, F1, F2,...F7. They are used to access the menus and sub-menus. If prompted to press an F-key, press the corresponding touch-button.

### 8.1 CNC system functions

- Versatile CNC cutting system, suitable for use with oxy fuel and plasma cutting processes.
- The system is reliable and protected against electrical interference from plasma cutting and fluctuation in the power input.
- Automatic height control and change of direction speed control, built-in kerf compensation and monitoring.
- “AVC” (Arc Voltage Control), maintains correct torch to workpiece standoff during plasma arc cutting process.
- No loss of program data through sudden power loss, re-start at last position.
- Dry run/trace capability, shape check and workpiece alignment/fit up.
- Quick program access to any line or pierce/start point in a single or nested program.
- Suited for use in a wide variety of applications in the metalworking industry.
- Internal library of 50 pre-programmed customizable patterns/shapes.

- STARCAM and FASTCAM nesting software are fully compatible. Interface conversion, in both English and Chinese language, customizable to other languages.
- Dynamic graphic display, 1x to 8x zoom, automatically follows torch position.
- USB port for loading software, updates, and CNC programs.

## 8.2 Display of system co-ordinates

The coordinates displayed can be in metric (mm) or imperial (inches) format.

## 8.3 Parameters

The CNC/Operator panel input keys (**C**) are used to control the functions below.

To switch between settings  
⇒ 9.5.6 Control parameters [F5] on page EN-50



[IGNITION] - Ignition function see M code M20

[PREHEAT] - open oxygen solenoid valve, see M code M24

[GAS] - open acetylene gas solenoid valve, see M code M10

[CUTOXY] - open cutting oxygen solenoid valve, see M code M12.

[PIERCE] - pierce process control key, see M codes M71, M72, M73

### 8.3.1 Oxy-fuel piercing process

⇒ 9.13 M - codes on page EN-59

TORCHUP time - M70: timed process for raising torch at the start of the oxy fuel cut.

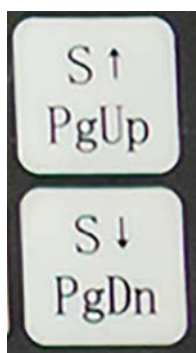
TORCHDN time - M71: timed process for lowering torch at the start of the oxy fuel cut.

PIERCEUP HIGH - M72: timed process for raising the torch at the start of the piercing.

PIERCEDN HIGH - M73: timed process for lowering the torch after piercing.

### 8.3.2 Plasma cutting process

⇒ 9.13 M - codes on page EN-59



M07 starts the plasma cutting process.

M08 stops the plasma cutting process.

[S↑] - TORCH UP.

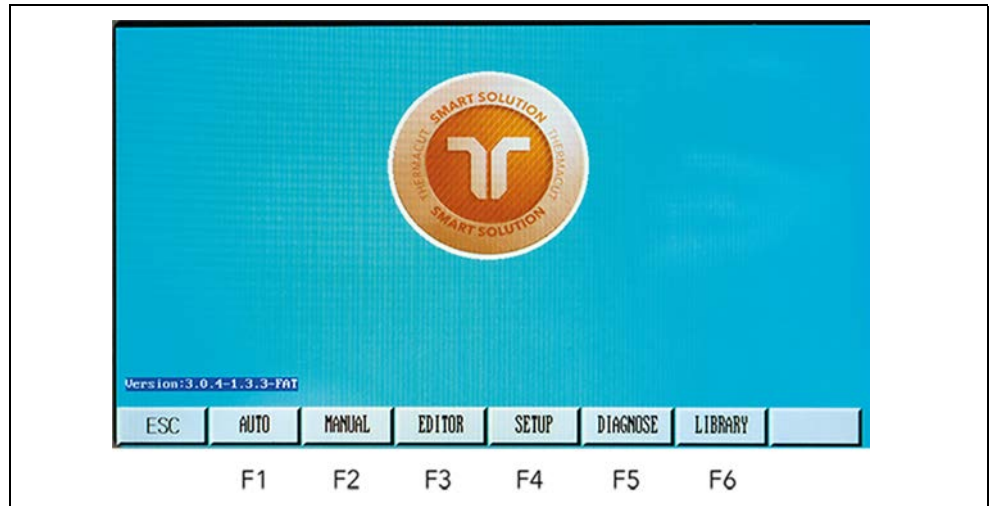
[S↓] - TORCH DOWN.



## 9 System main menu

The graphic user interface utilizes F-function keys, located underneath the screen on the console. The function keys [F1] to [F7] give access to the system control functions and further sub-menus. "ESC" returns to the previous menu level.

**Fig. 5** System main menu



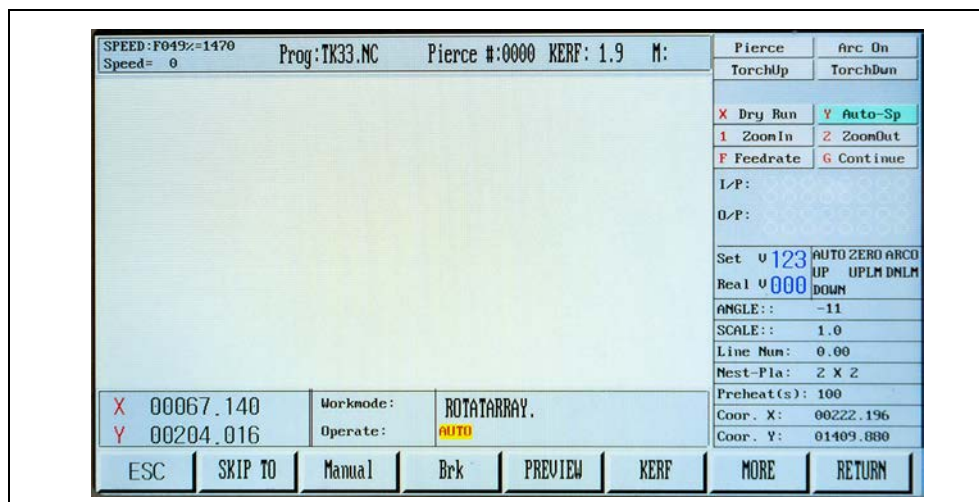
[F1] AUTO	Automatic CNC process control.
[F2] MANUAL	Manually position the cutting torch.
[F3] EDITOR	Edit/modify/USB input/USB output processing program.
[F4] SETUP	System parameter settings.
[F5] DIAGNOSE	Check machine input and output information.
[F6] LIBRARY	Access standard graphic shapes and settings. Software version appears on lower left corner of screen.

### 9.1 Automatic function [F1 AUTO]

A cutting program can be generated in the "Library" or by entering it while in "Edit" mode. A chosen program can be initiated in the "Auto" mode. The system can run programs directly from the USB stick. Programs do not need loading into the system memory.

Pressing AUTO [F1] opens the function screen "Automatic" with its sub-menus.

Fig. 6 Automatic function, Main menu



The parameters and keys shown have the following meanings:

### 9.1.1 Parameters

#### SPEED

SPEED: F049%=1470  
Speed= 0

**SPEED** shows the actual value either in metric or inch values. Changes can be made in "Setting-Parameters-Control, Metric/Inch". The feed rate is set by the [F↑] [F↓] keys.

**1** Press [F↑] [F↓] to set the feed rate speed directly on the screen, and press [Enter] to confirm.

**In automatic mode:** The left upper corner of the screen shows F % (automatic processing speed/feed rate). The actual cutting speed is calculated by taking the maximum cutting speed and multiplying it by the feed rate.

**In manual mode:** The left upper corner of the screen shows F % (the manual traverse feed rate as a percentage of max. traverse). The actual speed is calculated by taking the maximum speed and multiplying it by the feed rate.

**Speed** shows the actual value either in metric or inch values. Changes can be made in "Setting-Parameters-Control, Metric/Inch". The feed rate is set by the [F↑] [F↓] keys.

**2** Press [F↑] [F↓] to set the feed rate speed directly on the screen, and press [Enter] to confirm.

## Prog, Pierce, KERF

Prog:TK33.NC Pierce #:0000 KERF: 1.9

Prog: Shows the title of the actual program being run.

PIERCE shows the actual completed number of pierces in a running program.

KERF shows the kerf offset input value.

## Dry run

X Dry Run

**1** Press the X-Key to initiate the Dry Run function.

This allows to check the exact programmed torch path. The torch is not active during this process. Pressing the X-key again will cancel the dry run.

## Auto-Speed

Y Auto-Sp

The speed function indicates the actual speed in metric or inch format. The feed ratio can be manually adjusted using the [F↑] and [F↓] keys.

**1** To enter the speed manually, press the [F↑] [F↓] key in the screen.

**2** Enter a numerical value at the top of the screen using the keypad.

## ZOOM function

1 ZoomIn 2 ZoomOut

The zoom function is used to closely view the profile part cutting path.

**1** Press [1 ZoomIn] to magnify the part image.

**2** Press up to three times for a maximum of eight times magnification.

[2 ZoomOut] decreases the size.

## Input and output signals

I/P :  
O/P :

The EX-TRACK® CNC uses eight input and eight output ports. The display shows visual signals indicating the status of each input and output. The input/output port is used for system diagnostics.

## System parameters display

Set	U 123	AUTO ZERO ARCO
Real	U 000	UP UPLM DNLM
		DOWN
ANGLE::		-11
SCALE::		1.0
Line Num:		0.00
Nest-Pla:		2 X 2
Preheat(s):		100
Coor. X:		00222.196
Coor. Y:		01409.880

Indicate current parameter values.

## Work mode - running status

Workmode:	ROTATARRAY.
Operate:	AUTO

The work mode bar shows the current work status:

- CONTOUR,
- ROTATARRAY,
- MIRROR,
- SCALE,
- NEST,
- BRAKE.

The Operate bar shows:

- machine active or stopped,
- various system limit alarms,
- the dwell period.

### 9.1.2 Access to cutting parameters

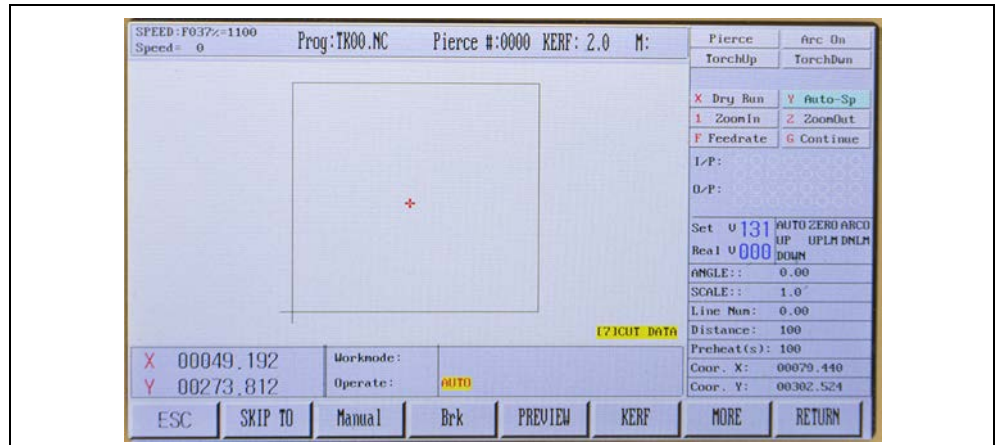
From the Main menu in the automatic function you can enter the cut charts and associated parameters for a selected shape.

- ⇒ Key Preview [F4] on page EN-31 and
- ⇒ 18 Graphics library on page EN-82

Proceed as follows:

- 1** Press LIBRARY [F6].  
The Library menu opens.
- 2** Select a shape using the Up-Down keys on the console.  
Alternatively load a drawing from USB stick or the internal memory.
- 3** Press [ENTER].
- 4** Set the dimensions and press [OK].  
The system returns to the Main menu.
- 5** Press AUTO [F1].  
The Auto menu opens.
- 6** Press PREVIEW [F4] key twice.  
The cut data are shown in the lower right-hand corner of the screen, high-lighted in yellow.

Fig. 7 Access to cut data



7 Press the number key "7" on the console.

The menu with the cut data opens.

Fig. 8 Cut data for selected shape

Material	Thickness	Kerf	Current	Voltage	Speed	Position Up Time(S)	Pierce Time (s)
MS	4.0	1.5	45	134	2200	5	0.4
MS	6.0	1.7	55	125	2244	5	0.5
MS	8.0	1.8	55	127	1496	5	0.5
MS	10.0	2.0	65	131	1100	6	0.7
MS	12.0	2.1	75	128	1126	6	0.7
MS	16.0	2.4	100	147	996	7	1.0
MS	20.0	2.6	100	150	733	7	1.0
SS	4.0	1.6	45	134	2000	5	0.5
SS	6.0	1.7	55	124	2107	5	0.5
SS	8.0	1.8	55	127	1290	5	0.7
SS	10.0	2.0	75	125	1333	6	0.5
SS	12.0	2.2	85	131	1100	6	0.7
SS	16.0	2.2	100	147	804	7	0.8
SS	20.0	2.5	100	152	614	8	1.2

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8 Select the parameters based on the thickness of the material and the cutting current using the Up-Down keys on the console.

9 Press OK [F1].

The selected parameters are accepted and shown in the header and in the parameters display on the right.

10 Press PREVIEW [F4].

The shape is displayed.

The keys in the cut data display have the following meaning:

<b>OK</b>	Confirms the thickness of the material. The parameters will be automatically loaded and cutting without other settings of the parameters is possible.
<b>EXPORT</b>	Exports stored parameters as a CSV file to USB stick.
<b>IMPORT</b>	Imports parameters from USB stick.
<b>DEFAULT</b>	Deletes all stored parameters from the database. ➤ Enter the password "1928".
<b>SAVE</b>	Saves all parameters adjusted by the user.

### 9.1.3 Keys

#### Key ESC



[ESC] returns to the previous menu level.

#### Key SKIP TO [F1 (Pierce point)]



The "Pierce point" function permits the operator to pick a pierce point from where the cutting process can be re-started.

- 1 Press function key [F5] and input the number of the chosen pierce point.
- 2 Press [ENTER].

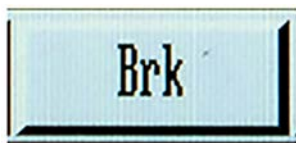
The system will automatically go to the chosen pierce point and stop thus enabling the process to be re-started.

#### Key MANUAL [F2 (Manual mode)]



The manual mode allows the defined input and control.

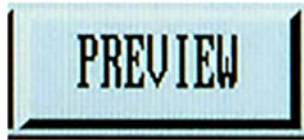
#### Key BRK [F3 (Break point)]



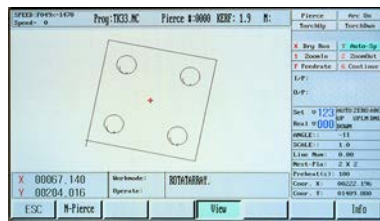
- 1 Press [START].

The system re-loads the last incomplete program. The on-screen image shows a green cursor at the point where the program stopped. When the break point is located, the Mode/Status changes from Break/Auto to Break/Break.

## Key Preview [F4]



Pressing this key opens the following sub-menu:



The on-screen graphics use a cursor to show a profile part or nest of profile parts to be cut, the cutting path of the torch, and the completed cut area.

- 1 Press key [1] to magnify the profile part image. Press up to three times for a maximum of eight times magnification.
- 2 Press key [2] to return the image to the original format.

## Key Kerf [F5]



This function is used to enter a kerf compensation value.

- 1 Use the keypad to enter the value. Where a kerf value is not required, a "0" value can be entered.

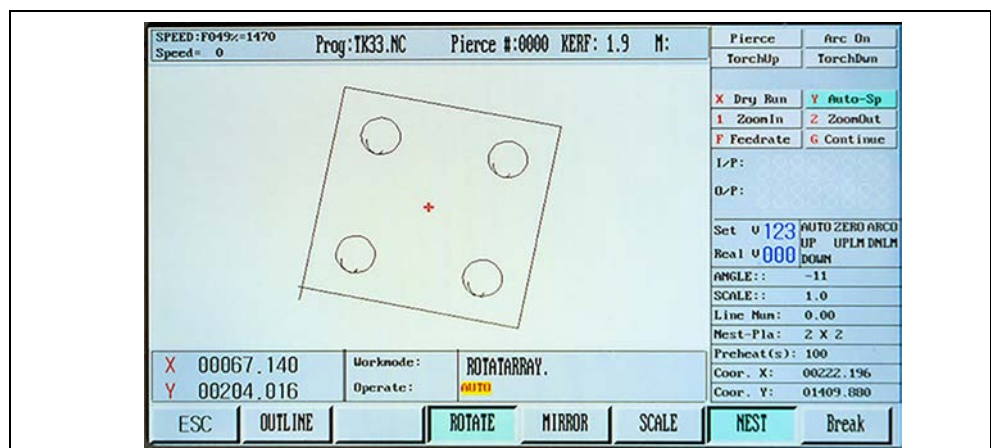
## Key More [F6]



Pressing MORE [F6] gives access to the sub-level programming in the Auto Mode menu.

Pressing the key MORE [F6] opens the following sub-menu:

Fig. 9 Sub-menu MORE



### Sub-menu Outline [F1]

The OUTLINE function is used to confirm the fit of a programmed profile part or nest on to a plate. The system performs a rapid perimeter check in the form of a rectangle; the torch movement can be observed for its travel within the perimeter of the plate.

To activate the perimeter function, press key [F1]. As soon as the system is in the program Zero position, it will immediately start to move. When the system is not located at the program Zero position, a screen prompt gives two options to choose from.

➤ Choose [START] or [ENTER].

START FROM HERE - The torch will start tracing the program from the current position.

FROM PROGRAM ZERO - The torch will return to the last fixed program Zero position, the torch will start tracing the program from there.

- 1 Press [STOP] when the torch is moving in the Perimeter mode and passes over the perimeter of the plate.
- 2 Reposition the torch to within the perimeter of the plate.
- 3 Press [START].

A screen prompt in the Mode/Status section requires an input for REPOSITION-YES/NO.

➤ Press [ENTER] to confirm repositioning of the torch or press [ESC] to cancel the move.

This process can be performed as needed to make the program fit within the perimeter of the plate.

### Sub-menu Rotate (re-orientation) [F3]

The purpose of the ROTATE function is to re-orientate a profile part or parts to better fit the plate. The extent of re-orientation is determined by the operator, the input values are in degrees.

- 1 Enter the required value.
- 2 Press [ENTER].

A screen prompt in the Mode/Status section shows ROTATE, the degree of re-orientation is shown on the screen.

**Note:** An increased re-orientation angle generates a counterclockwise program motion.

### Re-orientation angle processing

- 1 Press the [F3] key.
- 2 Enter the required value for the angle in the dialog field in the Mode/Status section.
- 3 Press [ENTER].

The Mode/Status section will show ROTATE and the degree of reorientation is also shown on screen.

- 4 Press the [F4] key to verify the re-orientated program.
- 5 Return to the Auto mode menu and press MORE [F6] to stop the re-orientation process.
- 6 Press the [F3] key.

The degree of re-orientation is logged in the system. This process can be repeated as required.



**Sub-menu MIRROR [F4]**

This function is used to invert a profile part, creating an exact opposite duplicate.

**1** Press MIRROR [F4] repeatedly.

The options for MIRROR X/Y are shown:

- Use the X-option to invert the image (Left/Right).
- Use the Y option to invert the image (Up/Down).

**Sub-menu SCALE [F5]**

The SCALE function allows to increase or decrease the size of a programmed profile part.

**1** Press SCALE [F5].

The dialog field requires an input value lower or higher than the actual size of 1 to 1, 1.000 = 100 %.

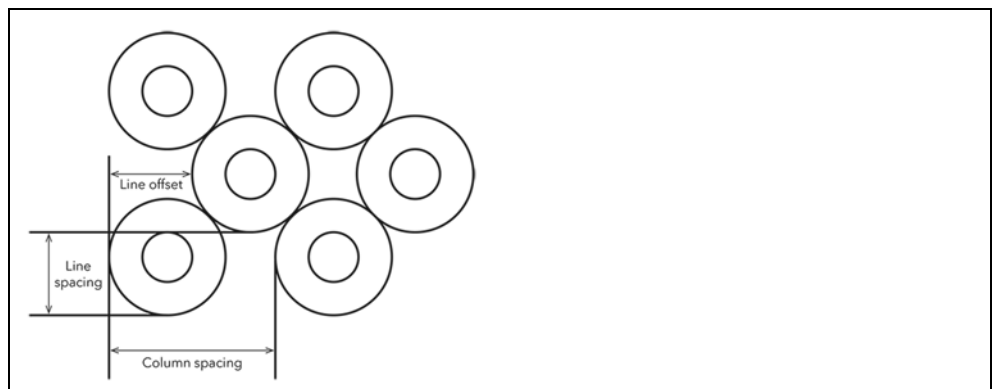
**2** Press the [F5] key to return to the Auto mode MORE menu.

The value for the size will be logged for re-use. The value can also be reset to zero in this process.

**Sub-menu NEST [F6]**

The Nest function allows to nest a profile part or multiple parts using the system software. NEST uses columns and rows to optimize positioning of the parts.

**Fig. 10** Sub-menu Nest



The process requires a program to be generated prior to the nesting process.

**1** Press NEST [F6] to start the process.

**2** Enter the total number of rows (stacked format) and columns (aligned left to right).

The system software automatically calculates the optimum spacing based on the profile part size. The Row-Offset feature optimizes the spacing of round or irregularly shaped profile parts.

**3** After entering the input values, press [ENTER].

The nest is then formed and the nest image is shown on the screen. In the Mode/Status section, ARRAY is shown to indicate the formation of a nest from a profile part.

**4** Press the [F6] key in the Auto mode MORE menu to stop the NEST feature.

### Sub-menu BREAK [F7 Tabbing - bridge function]

Tabbing or bridge cutting is performed by pre-determined stops in the cutting process. The size of tabs/bridges depends on the profile part size, thickness, and purpose of the tab/bridge. The process can be used to keep the profile part attached to the parent plate for a variety of purposes including minimizing the risk of the profile being distorted.

- 1 Press BREAK [F7] to start the Tabbing/Bridge mode.  
In the Mode/Status section BRIDGE is shown.
- 2 Press [F7] in the Auto mode MORE menu to stop the process.

### Key Return [F7]



The RETURN function enables the system to quickly return to the Zero point in a program or the system Zero point.

- 1 Press RETURN [F7] to initiate the return. The operator can choose the appropriate Zero point.

## 9.2 Automatic program mode

The system requires a profile part or nest program to be entered. Proceed as follows:

- 1 Press [ENTER] using the keypad.
- 2 Enter the program name.  
All programs must end with a (.) period/full stop. The system will search its file library for matching files in .TXT/CNC format and display them as a list.
- 3 Select the required program from the on-screen list using the USB port.  
New programs can be generated using the Shape Library. The library contains common shapes that can be altered dimensionally to produce a specified profile part.

### 9.2.1 Cutting speed

- 1 Before running a program, refer to the cut chart data for the process used: Oxy fuel or plasma, the material type and thickness.
- 2 Set the appropriate speed.
- 3 Start the Auto mode.
- 4 Press the [F↑] and [F↓] keys during the cutting process in order to adjust the feed rate.
- 5 Press the [F↑] [F↓] key in order to make a numerical value input using the keypad.  
The input data is logged and can be retrieved.

### 9.2.2 Process start point

The torch is positioned on the plate at the start point of the cutting path. Use the arrow keys to position the torch. Starting the program will reset the "X/Y" values to "0". There is no need to manually set the program Zero position.

➤ Press the GREEN [START] key on the console to start the cutting process.

### 9.2.3 Active key functions when running a program

During a program the available key functions are:

[F↑] and [F↓]	<p>– Feed Rate Increase/Decrease</p> <p>The incremental speed change is slow during the cutting process, giving greater control over the effect of speed change on the profile part. Making a significant speed change to the cutting process will require the process to be paused and then to input the revised values.</p>
[S↑] and [S↓]	<p>– Torch Up/Down</p> <p>Pressing the up/down keys in oxy fuel cutting mode will increase or decrease the torch to workpiece cutting height. In plasma cutting mode, the torch height is controlled automatically through the "AVC" (Arc Voltage Control) function.</p> <p>Press [S↑] or [S↓] shortly after start-up to manually increase or decrease the torch to workpiece height.</p> <p>The process will continue using the newest values; the values will remain as set until altered.</p>
[G]	<p>– Override Preheat Timer</p> <p>This function cancels the preheat process and activates the oxygen cut flow gas.</p> <p><b>Note:</b> This action will not change the preheat timer settings.</p>
[START]	<p>– Cancel and Record Preheat Timer</p> <p>Pressing [START] when the preheat timer is working causes the timer to stop, the cutting oxygen starts to flow, the piercing/cutting process begins. The actual preheat time is logged and used until altered.</p>

<b>[STOP]</b>	<p>– Preheat Timer Extend</p> <p>Pressing the [STOP] key during the preheat process increases the preheat process duration. The piercing process can be activated by pressing the [START] key; the timer will stop.</p>
	<p>– Program Pause</p> <p>Pressing the [STOP] key during the cutting process causes the system to ramp down to a halt.</p> <p>In the case of oxy fuel cutting, the oxygen cut flow gas is switched off.</p>
	<p>In the case of plasma arc cutting, the arc is switched off. The on-screen status shows PAUSE and the pause menu follows.</p>

#### 9.2.4 Active key functions in PAUSE mode

<b>[START]</b>	<p>– Re-start program</p> <p>Restarts the program after the PAUSE period.</p> <p>➤ Press the [START] key to re-activate the process sequence.</p> <p>A mid-stream pause in the cutting process will require a manual re-start.</p>
<b>[Jog Keys] [↑][↓][←][→]</b>	<p>Pausing the cutting process allows the torch to be positioned where consumable parts can be checked and/or changed, also to correct the cutting path, or to re-align the plate. The torch moves at a preset rate.</p>
<b>[ESC]</b>	<p>– Park Program</p> <p>Using the [ESC] key during a PAUSE period will result in the cancellation of the process. The system will default to the Auto Mode menu.</p>
<b>[F]</b>	<p>– Enter Feed Rate</p> <p>➤ Use the [F] key to alter the speed rate.</p> <p>By pressing the [F] key a dialog field opens and requires the input of the actual feed rate via the keypad.</p>

<b>[F]</b>	<p>– Feed Rate Increase/Decrease</p> <p>Using the [F↑] and [F↓] keys will gradually increase or decrease the Feed Rate Override percentage. This also affects the cutting speed. The value change rate is slower during the cutting process and quicker in PAUSE mode.</p> <p>➤ To enable greater changes to the feed rate, put the process in PAUSE mode and enter the modified feed rate.</p>
<b>[S↑] [S↓]</b>	<p>– Torch Up/Down</p> <p>The [S↑] and [S↓] keys are used to raise and lower the torch.</p>
<b>[CUTOXY]</b>	<p>– Restart</p> <p>Use this key to manually restart the cutting process.</p>
<b>[PIERCE]</b>	<p>– Restart</p> <p>Using this key starts the piercing process. The process defaults to Auto mode and the system starts to move at a pre-determined time.</p>
<b>[F↑], [F↓], [F] keys</b>	<p>These keys can be used during the cutting process to alter the speed.</p>
<b>PAUSE mode</b>	<p>An on-screen prompt requires the operator to make the appropriate speed adjustment.</p>
<b>Speed selection using [↑] [↓] (Up/Down) keys</b>	<p>These keys are used for re-positioning or altering the cutting speed in Manual/Automatic mode.</p> <p>➤ Select the required value and press [ENTER].</p>
<b>[F4]</b>	<p>– NEXT LINE</p> <p>Used to restart the cutting sequence at any position in the program. In NEXT LINE mode, the keys [F6] [F7] are used for scrolling through the program sequence. When a start point is chosen on-screen, a red cursor shows the new start position.</p> <p>➤ Press [START] to move the torch to the new start position. The cutting sequence can then be restarted</p>

<b>[F5]</b>	<p>– #-PIERCE</p> <p>When in PAUSE mode, this feature allows the restart of the cutting sequence from a chosen position. An on-screen prompt requires entry of the pierce point.</p> <p>➤ Press [ENTER].</p> <p>The torch travels to the pierce point and the cutting sequence can then be restarted.</p>
<b>[F6] [F7]</b>	<p>– REVERSE/FORWARD</p> <p>If the keys [F6]/[F7] are used in PAUSE mode, the torch can be moved backwards and forwards through the cutting sequence at a pre-determined speed.</p> <p>➤ Press [STOP] when the torch is at the desired position or the on-screen error code G00 is displayed.</p> <p>Pressing keys [F6] [F7] will override the error code.</p>
<b>RESTART</b>	<p>Repositions the torch after it has been moved off the cutting path to enable the change of consumables, to determine a new pierce point, to perform a dimensional part check, or to re-align the plate.</p> <p>➤ Press [START] to restart the cutting process.</p> <p>The on-screen prompts require an input.</p> <p>➤ Use the [↑] [↓] (Up/Down) keys to choose the required option and press [ENTER].</p>
<b>RETURN TO SEQUENCE</b>	<p>Allows to move the torch at speed to the last cutting point. A manual restart is required to initiate the cutting sequence.</p> <p>➤ Press [START].</p> <p>The torch will move along the cutting path. If the [PREHEAT] key is pressed in oxy fuel mode, the torch automatically moves along the cut path after the relevant dwell period for piercing.</p>

<b>RESUME CUTTING</b>	Allows to resume cutting along the cutting path after a break in the cutting sequence. A second pierce at the stop point, followed by a straight line cut to the point where the break in the cutting sequence occurred; the original cutting sequence is followed from this point.
<b>STEP OVERRIDE</b>	<p>Overrides the STEP process reverting the process back to the cut sequence.</p> <p>➤ Press [START] or [ENTER] to initiate the function.</p> <p>The torch will travel along the cutting path after pressing the [START] key once more.</p>

**Note:** When using the oxy fuel cutting process, ensure the preheat procedure is followed prior to piercing or torch movement.

### 9.2.5 Select program

This highly flexible system software allows to choose a cutting sequence start point from within a program.

- 1 To activate the process, press the [F1] key in the Auto mode main menu. The new dialog field requires the input of a program line or pierce number.

Before a cutting sequence is started, the actual pierce point positions can be viewed and the torch can be positioned at the chosen pierce point using the green cursor. An eight times magnifying zoom can be used to verify the position.

### 9.2.6 Edge start cutting

Edge start cutting is used to trim profile and plate edges and also to cut within a profile that has an already drilled or pierced hole. Edge starting can be used to cut thick and thin material.

The torch should be positioned at the plate edge for the following reasons:

- In oxy fuel cutting, too great a distance from the plate edge will result in insufficient preheat, leading to cutting issues.
- In plasma arc cutting, too great a distance from the plate edge will cause the arc to be stretched, causing damage to consumables, and the parent material.

Proceed as follows:

- 1 Start the Edge Start setting and enter the value "1".
- 2 Initiate a cut sequence in Auto mode.

When the torch reaches the pierce point, an on-screen prompt requires the entry of a pierce number.

- 3 Enter the pierce number.
- 4 Press the [START]/[ENTER] key.
- 5 Select from the following pierce options:

HOLE HERE - The pre-programmed cutting sequence pierces at this point.

MOVE HOLE POSITION - This feature allows to position the torch at the plate edge and to initiate the cutting sequence at that point. The system will cut to the pierce point and resume cutting along the cutting path.

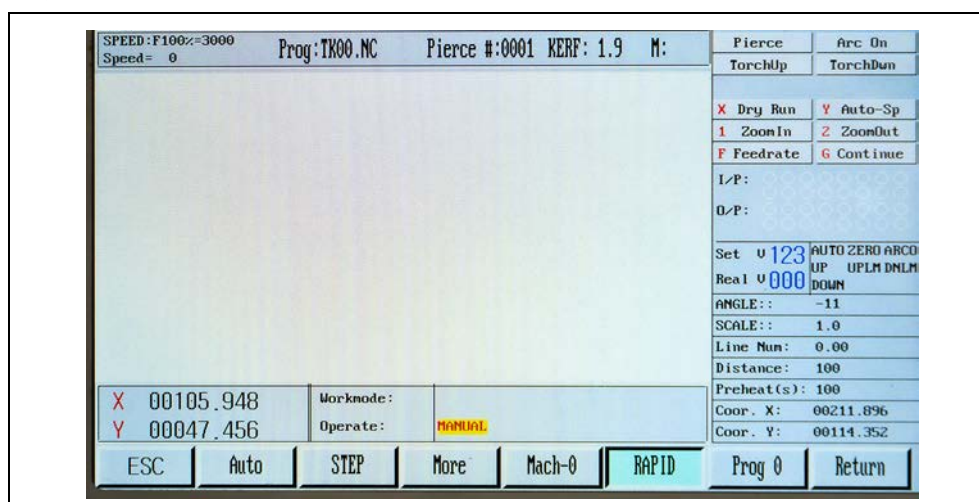
NO HOLE - This option is used when piercing is not required.

**Note:** With oxy-fuel cutting, remember to follow the full cutting cycle, ignition, preheat and cut.

### 9.3 Manual mode


The system can be manually controlled and input values altered using the menu function keys. The screen content is the same as in the Auto mode, with the default set to Manual. The manually entered feed rate override percentage and resulting speed shown relate to the manual Jog speed. The Manual mode is accessed through the main menu by pressing the [F2] key.

Fig. 11 Manual mode

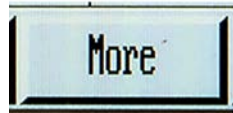




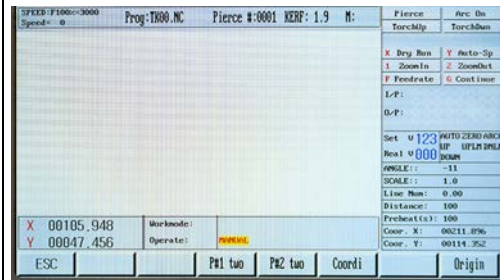
## 9.3.1 Manually controlled functions

<p>[↑][↓][←][→][UP][DOWN] [LEFT][RIGHT] directional control keys [G]</p>	<p>The directional control keys are used to position the torch; the speed of travel is faster than the cutting speed.</p> <p>Using the [G] key function allows the torch to move non-stop in the direction of the pressed arrow. The torch will move until the arrow is pressed again. Alternatively, pressing the [STOP] key also ends the movement.</p> <p>Pressing a combination of arrow keys simultaneously will cause the torch to move diagonally. The direction of travel can be changed by pressing an alternative arrow key.</p>
<p>Mode switching [F1] (AUTO/MANUAL)</p>	<p>The manual setting is used to reposition the torch or move the system for material re-alignment. Switching from Manual mode to Auto mode in the first menu level using the [F1] function key allows work in Auto mode.</p> <p>➤ Press [F1] to switch between Auto and Manual mode.</p>
<p>Step [F2]</p> 	<p>Moves the system automatically along the "X" or "Y" axis to a pre-determined point.</p> <ol style="list-style-type: none"> <li><b>1</b> Press the [F2] key to start the process. A dialog field opens that requires an input value for the distance.</li> <li><b>2</b> Press the [ENTER] key. The new travel distance is displayed on screen. The travel speed requires an entry.</li> </ol> <p>After pressing a directional arrow [↑][↓][←][→], the system will travel in that direction for the preset distance.</p> <ol style="list-style-type: none"> <li><b>3</b> Press the [STOP] key to interrupt the motion.</li> </ol>

## More [F3]



Pressing MORE [F3] takes the operator to the second level in the Manual mode menu.

**P#1TWO [F3] and P#2TWO [F4]**

This feature allows to check the correct alignment of the plate to the system. The torch is moved to two positions along the nearest edge of the plate, the system software compensates for the out-of-true orientation of the plate.

- 1 To activate the process, move the torch to the first position.
- 2 Press the [F3] key.
- 3 Move the torch to the second position.
- 4 Press the [F4] key.  
The system will self-adjust to produce a true cut.

The on-screen information shows ROTATE in the Mode Status section; the actual degree of offset is shown in the on-screen data.

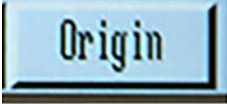




**Coordinates settings [F5]**

The coordinates are set by using the [F5] key.

- 5 Scroll up or down.
- 6 Select an option:
  - Zero all coordinates** - Resets ALL "X" and "Y" system and program coordinates back to zero.
  - Setup coordinates** - Allows the input of new program coordinates. The X and Y values can be entered in the Mode/Status section.
- 7 Press [ENTER] for the values to be stored.

**Setup reference** - Clears the settings of the program coordinates. The X and Y values for program coordinates are set to zero at the current machine position.

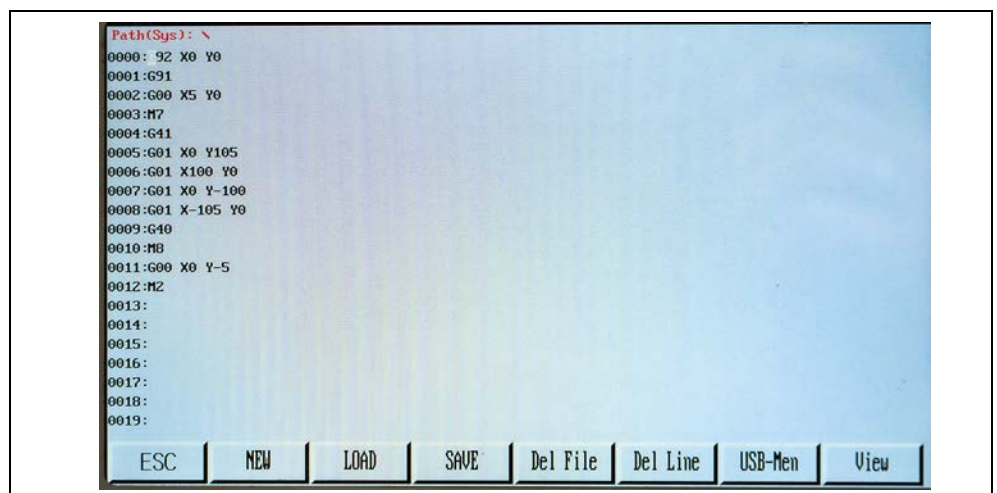
- 8 Press [ENTER] for the chosen option.

<p>Origin [F7]</p> 	<p>This key allows to go back to the Manual mode menu.</p>
<p>Mach-0 [F4]</p> 	<p>Pressing the Mach-0 [F4] key will set the "X" and "Y" coordinate values in the system to zero.</p>
<p>Rapid [F5]</p> 	<p>This key is used to enter a Feed rate override ratio from 80 % to 10 %.</p>
<p>Prog-0 [F6]</p> 	<p>Pressing Prog 0 [F6] sets the "X" and "Y" coordinate values at the actual stop point to zero.</p>
<p>Return [F7]</p> 	<p>Pressing RETURN [F7] will generate an on-screen prompt to speedily move the system or the program sequence back to its zero point.</p> <p>Pressing the [START] - [ENTER] key accepts the chosen zero point; the system moves to that position.</p>

## 9.4 Editing function

Press EDITOR [F3] in the system Main menu (Fig. 4 Control panel functions on page EN-23) to open the Editing menu.

Fig. 12 Editing menu

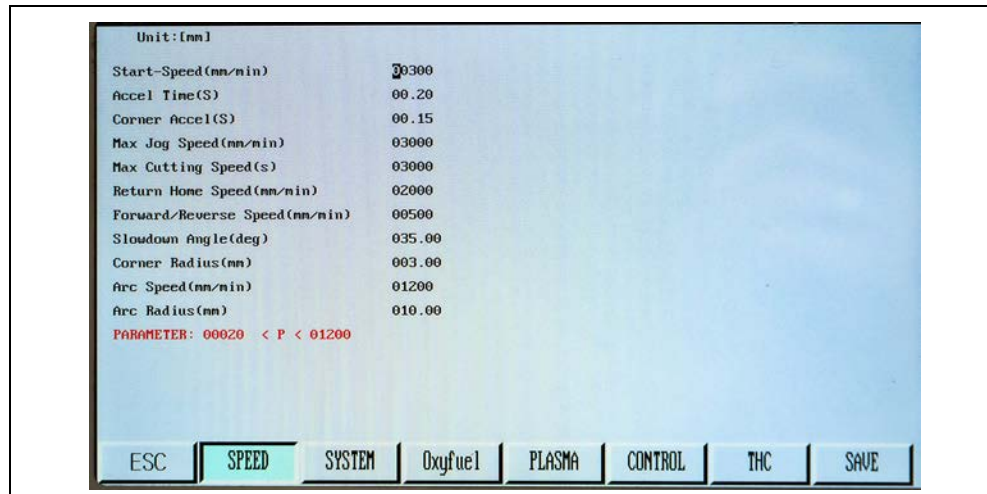


<b>New [F1]</b>	This feature creates a new file that can be edited using the keypad. Enter the program code manually.
<b>Load [F2]</b>	<p>This function enters a program into the live program memory. The program is shown in the program editor and can be accessed in Auto mode.</p> <ol style="list-style-type: none"> <li><b>1</b> Press the [F2] key to show the programs stored in the memory.</li> <li><b>2</b> Scroll through the stored programs.</li> <li><b>3</b> Press the [F7] key to PREVIEW the on-screen image of the chosen program.</li> <li><b>4</b> Press [ESC] to delete, and [ENTER] to store it in the program editor.</li> </ol>
<b>Save [F3]</b>	<p>Edited programs can be saved in the memory. They can be renamed using the keypad. A name can consist of a maximum of 12 characters.</p> <p>➤ Press [ENTER] to save changes and [ESC] to leave without change.</p>
<b>Del file [F4]</b>	<ol style="list-style-type: none"> <li><b>1</b> Press [F4] to show an on-screen list of files stored in the system memory.</li> <li><b>2</b> Press the [ENTER] key to remove a file.</li> </ol>
<b>Del line [F5]</b>	➤ Press [F5] to delete a line of input within a program.
<b>USB [F6]</b>	<p>The USB memory stick can be used in the OUTPUT mode to upload programs for storage or transfer.</p> <ol style="list-style-type: none"> <li><b>1</b> Press [F1] to display the available programs.</li> <li><b>2</b> Press [ENTER] to download the file into the editor.</li> <li><b>3</b> Run the program in Auto mode.</li> <li><b>4</b> Press [F3] to name and store the program in the system memory.</li> </ol> <p>The USB memory stick can be used to upload programs for storage or transfer in the OUTPUT mode.</p> <ol style="list-style-type: none"> <li><b>5</b> Press [F2] to store the data.</li> </ol>
<b>View [F7]</b>	Shows an on-screen image of the program accessed through the LOAD function in the program memory, or a USB stick.

## 9.5 Setup [F4 SETUP]

Press SETUP [F4] in the system main menu (Fig. 4 Control panel functions on page EN-23) to enter the SETUP menu.

Fig. 13 SETUP menu



### 9.5.1 Process definition - speed

<b>SPEED</b>	Serves for the adjustment to all speed-related settings.
<b>System</b>	Process and tolerance adjustment and control, software upper/lower limits.
<b>Oxy fuel</b>	Parameter settings for oxy fuel preheat and cutting.
<b>PLASMA</b>	Parameter settings for plasma piercing and cutting as well as Arc Voltage Control.
<b>CONTROL</b>	Process control options e.g. plasma-flame/inch-metric.

The actual list of parameters exceeds what is displayed on the first screen. Scroll to reveal more. New values can be entered using the keypad.

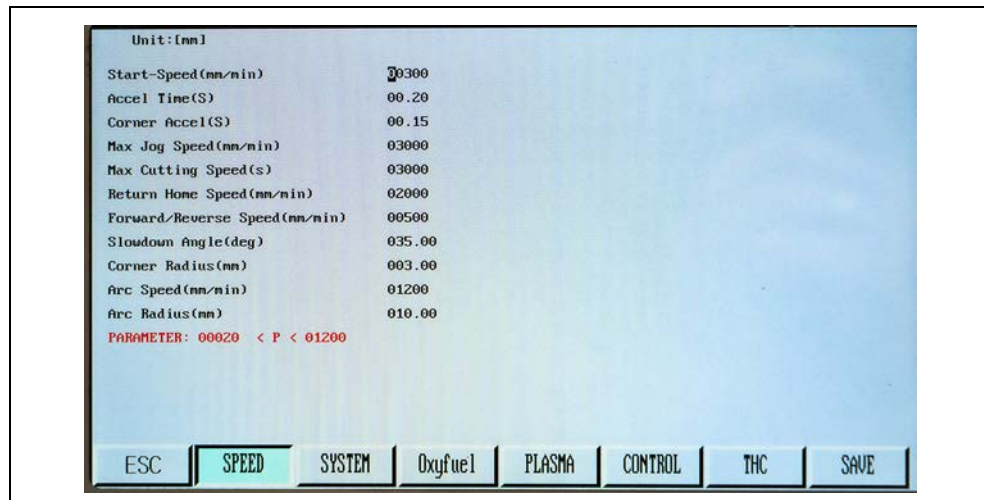
➤ Press the [F7] key to accept the changes.

If the changes have not been saved prior to pressing [ESC], they will be deleted.

## 9.5.2 Speed parameters [F1]

The speed parameters are accessed in the SETUP menu (Fig. 4 Control panel functions on page EN-23) by pressing the [F1] key. The following dialog is shown:

**Fig. 14** SPEED parameters



The parameters have the following meaning:

<b>START-SPEED [mm/min.]</b>	Shows the start-up speed of the "X"-"Y" drive motors prior to reaching full speed. A lower speed causes less backlash when starting and stopping. Speed values are shown in metric- mm/min or imperial- inches/min.
<b>ACCEL TIME [s]</b>	Shows the acceleration time in seconds. It measures the ramp-up speed time from start to the set cutting speed.
<b>CORNER ACCEL [s]</b>	Shows the adjusted ramp-down/up speed at corners or at change of direction.
<b>MAX JOG SPEED [mm/min.]</b>	This is the maximum speed the system will travel in manual step mode and reposition when in a program. "Program command G00 in mm/min or inch/min "
<b>MAX CUTTING SPEED [s]</b>	This is the fastest preset speed in a live cutting program. It is measured in mm/min or inch/min.
<b>RETURN HOME SPEED [mm/min.]</b>	This is the speed at which the system returns to the home point. It is measured in mm/min or inch/min.
<b>FORWARD/REVERSE SPEED [mm/min.]</b>	This is the backward/forward speed when on a cutting path in automatic mode after pausing. It is measured in mm/min or inch/min.
<b>SLOWDOWN ANGLE [deg.]</b>	This is the angle below which CNC will decelerate for cornering.

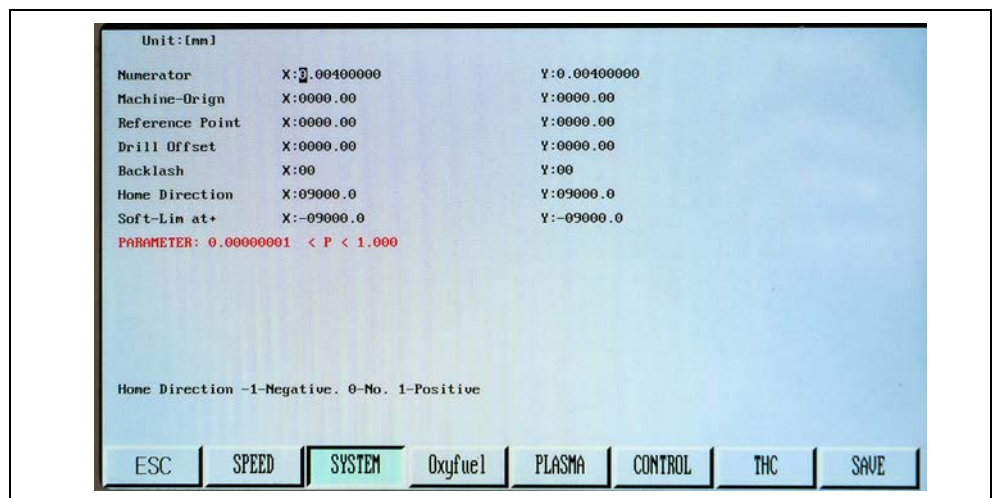
<b>CORNER RADIUS [mm]</b>	This is the radius to execute at corners in order to blend motion.
<b>ARC SPEED [mm/min.]</b>	This is the speed for cutting holes with a radius smaller than the small hole radius.
<b>ARC RADIUS [mm]</b>	Any holes with a radius smaller than this will be cut at small hole speed.

### 9.5.3 System parameters

The system parameters are accessed in the SETUP menu (Fig. 13 SETUP menu on page EN-45) by pressing the [F2] key.

These parameters are pre-set. Do not change except SOFT LIMIT parameters!

**Fig. 15** System parameters menu



The parameters have the following meaning:

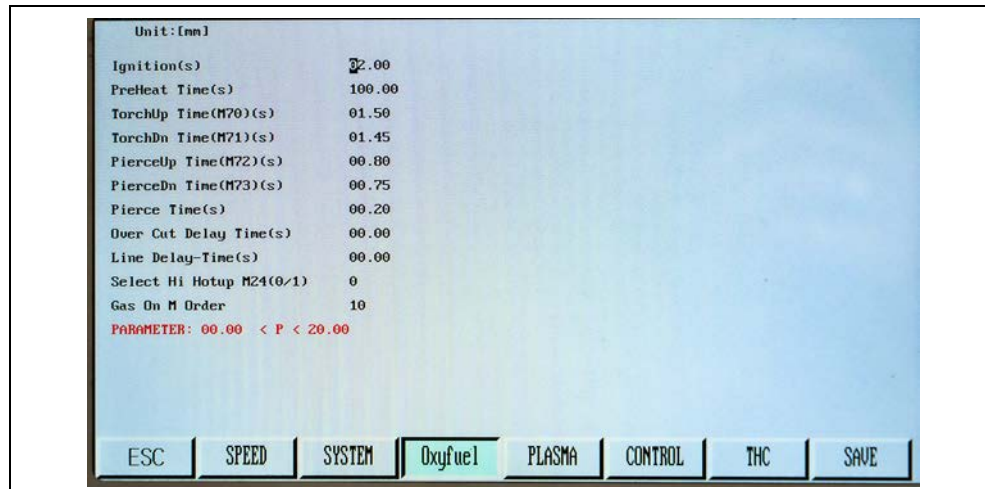
<b>NUMERATOR</b>	This is a numerical analysis used for positioning accuracy.
<b>MACHINE-ORIGIN</b>	This is the start point for the system coordinates.
<b>REFERENCE POINT</b>	This is the start point for the program coordinates.
<b>DRILL OFFSET</b>	Function not used with EX-TRACK® CNC.
<b>BACKLASH</b>	Function not used with EX-TRACK® CNC.
<b>HOME DIRECTION</b>	Indicates the travel direction when the system returns to the start point.
<b>SOFT LIMIT AT+</b>	This is the software-controlled limit in + direction. It indicates the maximal + length of the movement (cutting area limitation).

- For the activation of the SOFT LIMIT function go to CONTROL menu and set: SOFTWARE LIMITS EF - „1“.

### 9.5.4 OXYFUEL parameters

Press the [F3] key in the SETUP menu (Fig. 13 SETUP menu on page EN-45) in order to access the flame parameters.

**Fig. 16** Oxy-fuel parameters



The parameters have the following meaning:

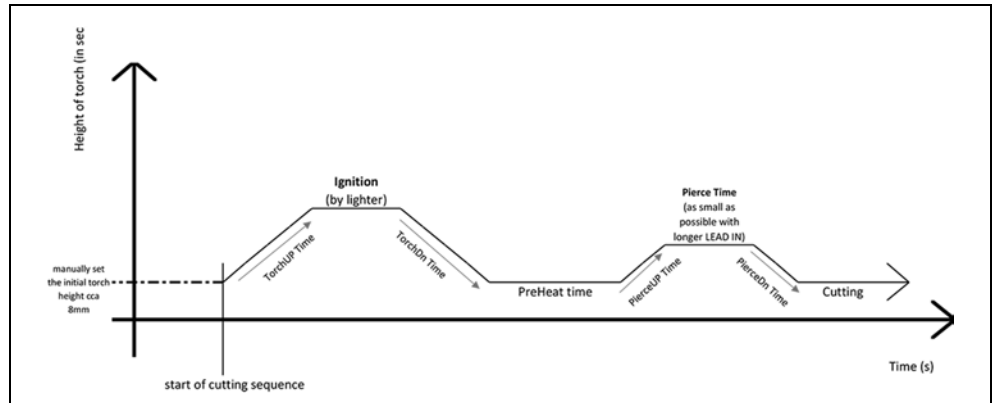
<b>IGNITION [s]</b>	Initial ignition height in seconds. Time of movement of the torch from this height to touching the plate.
<b>PREHEAT TIME [s]</b>	Enter a maximum preheat dwell period to suit the plate thickness prior to introducing the cutting oxygen.
<b>TORCHUP TIME (M70) [s]</b>	Indicates the time of the torch movement up (in seconds) from the cutting height to the height for manual ignition of the flame.
<b>TORCHDN TIME (M71) [s]</b>	Indicates the time of the torch movement down (in seconds) from TORCH UP height to cutting height. After this action the preheat is running.
<b>PIERCEUP TIME (M72) [s]</b>	Timer used to raise the torch at the start of the piercing process.
<b>PIERCEDN TIME (M73) [s]</b>	Timer used to lower the torch at end of the piercing process.
<b>PIERCE TIME [s]</b>	Time between actuating the cutting oxygen solenoid valve and starting the cutting motion. A longer dwell period is required for thicker material (like piercing delay time in plasma settings).
<b>OVER CUT DELAY-TIME [s]</b>	Dwell period at the finish of a cut in seconds. The cutting oxygen pressure is reduced to prevent damage to profile parts.
<b>LINE DELAY-TIME [s]</b>	Used for thick materials. Set this delay time for cutting in corners or when the torch changes direction.



SELECT HI HOTUP M24 (0/1)	Function not used with EX-TRACK® CNC.
GAS ON M ORDER	Function not used with EX-TRACK® CNC.

The parameter sequence is as follows:

**Fig. 17** Oxy fuel parameter sequence



### 9.5.5 Plasma parameters

Press the [F4] key in the SETUP menu (Fig. 13 SETUP menu on page EN-45) in order to access the plasma parameters.

**Fig. 18** Plasma parameters

Unit:[mm]	
TorchUp Time(M70)(s)	01.00
TorchDn Time(M71)(s)	01.00
Use Arcn Sig from Plasmasystem(0/1)	1
Pierce Time(s)	00.50
Water Injection(0/1):	0
Dis.Cor. Off AHCS(mm)	00005
Speed for Off AHCS(mm/min)	00000
Anticip Off Arc(mm)	04.0
AHCS Auto Sig Delay(s)	00.1
Arc On M Order	32
Arc Off M Order	33
PARAMETER: 00.00 < P < 10.00	
Hone Direction -1-Negative, 0-No, 1-Positive	
ESC	SPEED
SYSTEM	Oxyfuel
PLASMA	CONTROL
THC	SAVE

The parameters have the following meaning:

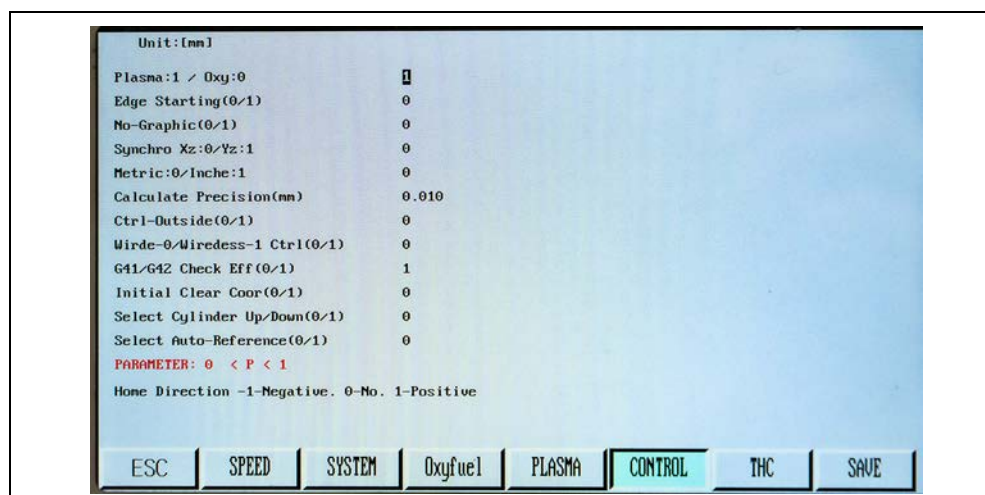
<b>TORCHUP TIME (M70) [s]</b>	Torch retracts for short period of time prior to starting the IHS sequence.
<b>TORCHDN TIME (M71) [s]</b>	Timer used to lower the torch at the end of the pierce sequence.
<b>USE ARC ON SIG FROM PLASMASYSTEM</b>	Receive arc-on signal from the plasma power supply prior to activating travel.
<b>PIERCE TIME [s]</b>	Travel dwell period after arc-on signal is received, starts the plasma piercing sequence. A longer dwell period is required for thicker material.

<b>WATER INJECTION (0/1)</b>	While the main arc is on, the water cooler cycle is on: This function for water cooled torches is NOT USED here.
<b>DIS.COR OFF AHCS [mm]</b>	The corner distance to shut off the height controller: While the torch is running the corner to the set distance, the height controller will be shut off.
<b>SPEED FOR OFF AHCS [mm/min.]</b>	Indicates the speed to shut off the height controller: If the cutting speed is lower than this set parameter, the height controller will be deactivated. This function is mainly for cutting small holes.
<b>ANTICIP OFF ARC [mm]</b>	Distance in "mm" before and after a corner, when the THC will be turned off. Serves for better cutting quality in corners.
<b>AHCS AUTO SIG DELAY [s]</b>	Delay after cutting start. This time is needed to stabilize the arc. After this delay THC will start.
<b>ARC ON M ORDER</b>	Internal M-Code Order. Must be set to 32. Do not change.
<b>ARC OFF M ORDER</b>	Internal M-Code Order. Must be set to 33. Do not change.

### 9.5.6 Control parameters [F5]

Press the [F5] key in the SETUP menu (Fig. 13 SETUP menu on page EN-45) in order to access the control parameters. Scroll down for more parameters.

**Fig. 19** Control parameters



The parameters have the following meaning:

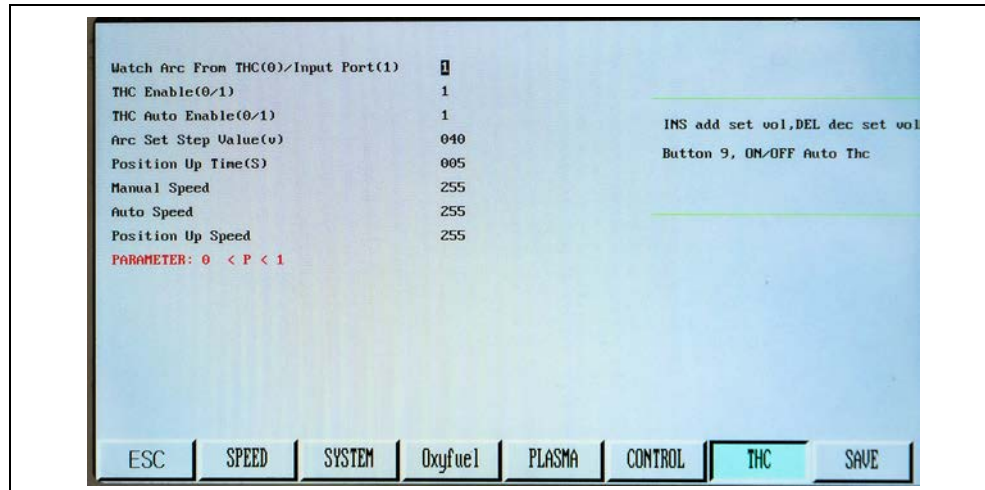
<b>PLASMA:1 / OXY:0</b>	In the modes Auto/Manual select 0 for oxy fuel and 1 for plasma.
<b>EDGE STARTING</b>	This function is used to trim profile or plate edges. It is also used to cut within a profile that has a drilled/pierced hole. Edge start can be used to cut thick and thin materials.
<b>NO-GRAPHIC</b>	In Auto mode this function stops the on-screen display of the program parts. This saves time when cutting a large nest or program.
<b>SYNCHRO XZ:0 / YZ:1</b>	Function not used with EX-TRACK® CNC.
<b>METRIC:0 / INCH:1</b>	The system can be operated using metric "0" or inch "1" values. The length/speed in the chosen value are displayed. The (G20)/mm (G21)/inch input code can be used to run programs in different formats.
<b>CALCULATION PRECISION</b>	The default value is 0.1 mm. Decrease this value in order to minimize the rounding-up effect in nesting programs.
<b>CTRL OUTSIDE</b>	Function not used with EX-TRACK® CNC.
<b>WIRED/WIRELESS CTRL</b>	Function not used with EX-TRACK® CNC.
<b>G41 /G42 CHECK EFFECT (0/1)</b>	Checks for kerf faults. No/0; Yes/1.
<b>INITIAL CLEAR DOOR</b>	The program coordinates are automatically reset to zero when a program starts.
<b>SELECT CYLINDER UP/DOWN</b>	Function not used with EX-TRACK® CNC.
<b>SELECT AUTO-REFERENCE</b>	The torch can be automatically repositioned to the program zero point when the program ends. NO-"0", YES-"1".
<b>LIMIT POSI EFFECT</b>	Activates position limits. NO-"0", YES-"1".
<b>SOFTWARE LIMITS EFFECT</b>	Activates software limits. NO-"0", YES-"1".
<b>CRASH DETECT</b>	System/torch crash detection. NO-"0", YES-"1".
<b>COLLIDE-LOCATE SAME POINT (0/1)</b>	For plasma systems that use torch tip contact for crash and IHS sensing.
<b>CRASH PAUSE/TORCHUP</b>	System pause. The torch lifts on crash detection.
<b>TORCH UP ON PAUSE</b>	The torch lifts when program is paused.
<b>CUTTING LINE</b>	Distance between bridge or tab points.
<b>BRIDGE LENGTH</b>	Length of bridge or tab.

<b>DISPLAY CO</b>	DO NOT change this parameter.
<b>SHOW KERF</b>	Displays the kerf offset when cutting in Auto mode. YES-"0".

### 9.5.7 THC [F6]

Press THC [F6] in the SETUP menu (Fig. 13 SETUP menu on page EN-45) in order to access the THC parameters.

**Fig. 20** THC parameters



The parameters have the following meaning:

<b>WATCH ARC FROM THC</b>	Supplies the "OK to move" signal from THC or plasma power source (arc transfer signal).
<b>THC ENABLE</b>	Enables automatic torch height control: 0 = off; 1 = on.
<b>THC AUTO ENABLE</b>	Automatic start and stop during cutting: 0 = off; 1 = on.
<b>ARC SET STEP VALUE</b>	Threshold value when the THC will react to the change of cutting voltage. Indicates the precision of the THC adjustment.
<b>POSITION UP TIME [s]</b>	Indicates the piercing and cutting height in seconds. Indicates the time of lifting up the torch after IHS touches the plate. ⇒ Table 10 Position Up time parameters on page EN-66
<b>MANUAL SPEED</b>	Indicates the torch up/down speed for manual lift (up down manual speed).
<b>AUTO SPEED</b>	Indicates the torch up/down speed for automatic lift.
<b>POSITION SPEED</b>	Indicates the torch up/down speed for the initial position.

### 9.5.8 Save [F7]

Pressing this key saves all adjusted parameters to the internal memory of the EX-TRACK® CNC.

### 9.5.9 DIAGNOSE [F5]

This menu serves for service purposes only Do not touch!

## 9.6 Graphics library

The library contains 50 geometrical shapes that can be dimensionally altered.

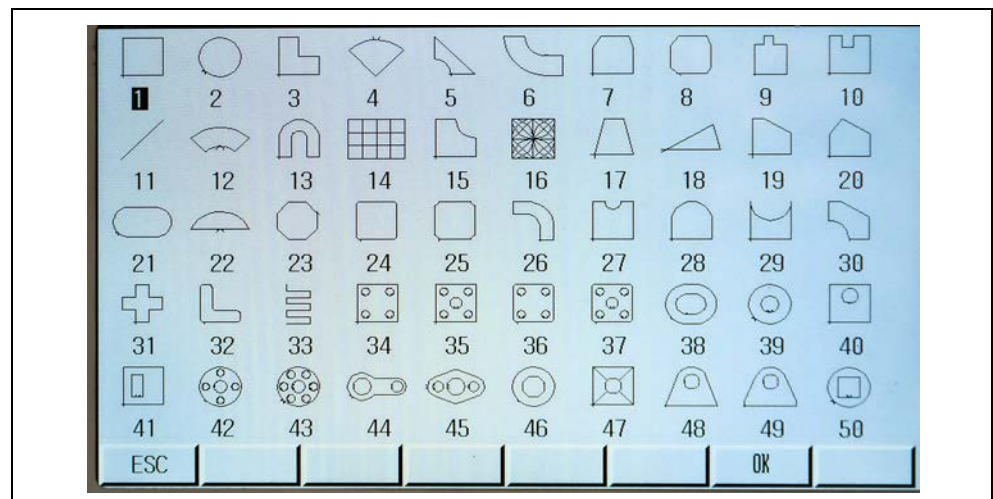
1 Use the arrow keys [←][→][↑][↓] to locate a shape.

2 Press [ENTER] to select the required shape.

⇒ 18 Graphics library on page EN-82.

The library function is accessed in the main menu by pressing LIBRARY [F6].

Fig. 21 Shape library



### Graphics library (shape development)

Proceed as follows:

- 1 Select a shape from the graphics library.
- 2 Enter the required dimensions into the Shape Evaluation screen.  
Nesting data can be added, if needed.
- 3 Validate all data and dimensional inputs using the OK key [F6].
- 4 Press [ESC] to exit the Shape Evaluation screen.  
The shape is provisionally stored in the memory.  
Pressing [ESC] returns to the Main menu with access to the following functions.
- 5 Press EDITOR [F3] and the new program is displayed in the Edit screen.
- 6 Press VIEW [F7] to display the shape.
- 7 Press the [F3] key to open the SAVE function.
- 8 Enter a program filename and save it to the program storage memory.  
The saved file can be started in the Auto mode.

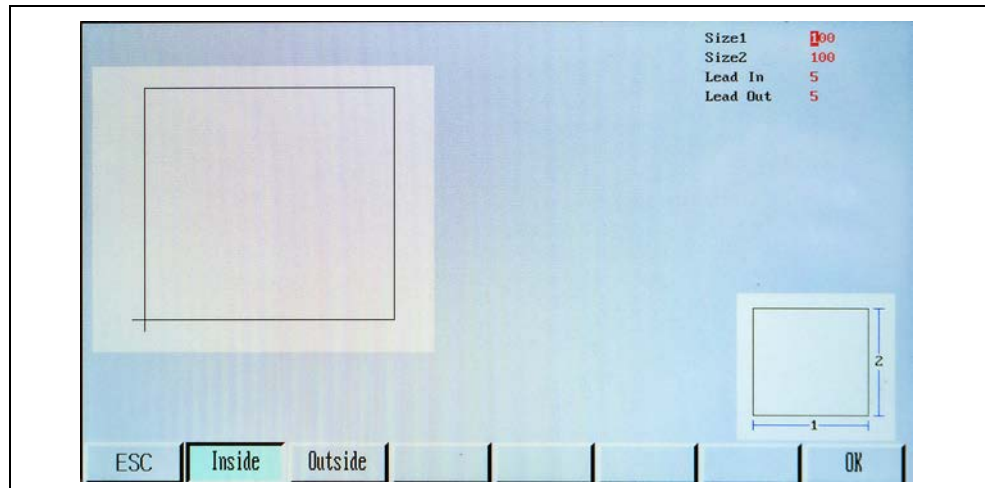
## Shape check

This function is used to verify that the input values for a shape are correct. Entered values are added by using the arrow keys [↑][↓] and the [ENTER] key.

### Inside diameter cut [F1] and Outside diameter cut [F2]

This function is used to cut an outside diameter. This would normally be on a desired profile part. However, it is also possible to make an inside diameter cut which would normally be discarded.

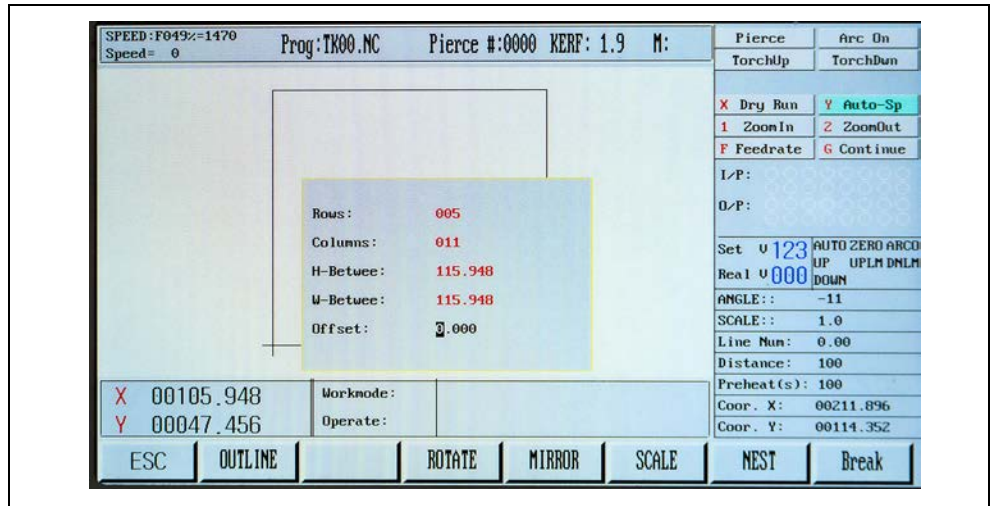
**Fig. 22** Inside - Outside diameter cut



#### 9.6.1 Graphics library (nest function)

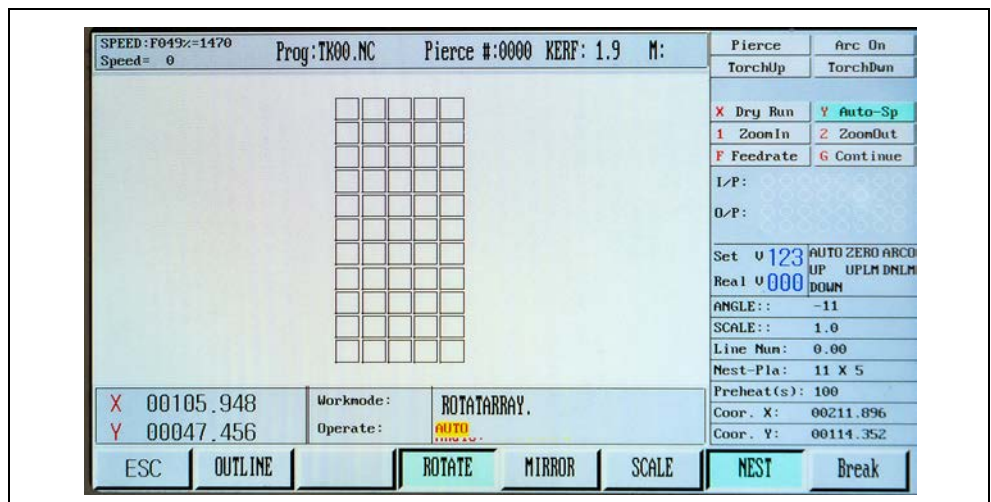
- 1** Enter the required values for the number of rows and columns.  
The system software automatically calculates the row height and column width relative to the part size. Manual adjustment is permitted to improve the layout.  
Use the Row-Offset function when a staggered fit gives better results.
- 2** After choosing the shape in the graphics library and adjusting the dimensions, press [ESC] for access to the Main menu.
- 3** Press AUTO [F1] in the Main menu.
- 4** Press PREVIEW [F4].
- 5** Press [ESC].
- 6** Press MORE [F6].
- 7** Press NEST [F6].

Fig. 23 Graphics library nest function



8 Adjust the nesting parameters and press [ENTER].

Fig. 24 Graphics library nest function, view



## 9.7 Program function

### 9.7.1 CNC program symbols (G - codes)

CNC systems require instructions that tell the drive motors where to move, how fast to move, and which path to follow. Programs are made up of command lines using G-codes with specific values.

<b>N</b>	Numbering. Can be used on all or just some lines; operator aid.
<b>G</b>	Motion, rapid feed, circular feed, or offset value.
<b>M</b>	Machine function, action code, auxiliary command.
<b>T</b>	Tool selection, used in this system for "Flame" value.
<b>L</b>	Fixed cycle loop count, tool offsets, radius offsets, length offsets, etc.
<b>X</b>	X-axis, absolute or incremental position of "X".
<b>Y</b>	Y-axis, absolute or incremental position of "Y".
<b>I</b>	Defines the arc center in "X" axis.
<b>J</b>	Defines the arc center in "Y" axis.
<b>R</b>	Defines the size of the arc radius, may be used to replace I or J.
<b>H</b>	Defines length offset.
<b>A</b>	Absolute or incremental position of "A" axis.
<b>F</b>	Defines feed rate, inches per minute/mm per minute used for G01, G02, G03.

## 9.8 File types

It is possible to create/edit programs that can be saved to a hard disk or copied to a USB stick. The ASCII file format is commonly used.

### 9.8.1 File names

File names can be created within the system for easy recall. A file name consists of a maximum of eight alpha-numeric characters, a period or decimal point, and three file-type extension characters. Preference is given to numeric only file names

The recognized file extension types are: "TXT", "CNC", or "NC".

## 9.9 Units of measurement

The system can read program files generated in inch or metric increments. When a program is written using metric dimensions on a system that is setup for inch dimensions, the G-code G21 is entered at the start of the program. For programs written in inches, the G-code G20 is entered at the start of the program in order to convert to metric.

## 9.10 Programming

Programs can be generated in ABSOLUTE or INCREMENTAL modes. If code G90 is entered at the start of a program, the system defaults to ABSOLUTE programming. If code G91 is entered, the system defaults to INCREMENTAL programming.



## 9.11 System axes

The system X-Y axes are shown below in the left bottom corner in the Auto or Manual screen. The longitudinal guide rail represents the "Y" axis. The transverse guide rail represents the "X" axis.

## 9.12 G-codes

Motion codes are used to define the system's programmed motions such as rapid feed, circular feed, offset value, etc. The default program input values are positive (+), therefore only a negative (-) value requires input when programming.

<b>G92</b> <b>Program zero point</b>	Code G92 is used to show the system where the absolute zero point is. It is usually followed by a X, Y, and Z coordinate which is measured beforehand. If no X, Y value is entered, the system's current position is accepted as absolute zero. It is important that the G92 code is read while the system is running to ensure the system knows where the start point is. Every time [RESET] is pressed, it clears the G92 value from the system memory.
<b>G90</b> <b>Absolute commands</b>	The G90 code means that the system is working from an absolute datum/zero point. Every position or movement is a measurement from the datum. The G90 code must be used at the start of a program. The code remains active until changed. <b>Format:</b> G90
<b>G91</b> <b>Incremental commands</b>	The G91 code means that the system is working from the current position. By entering the movement X20, the system moves 20 mm from the current position in a positive (+) direction. Each position is measured from the last one, the incremental distance moves irrespective of the current position. The G91 code must be used at the start of a program. <b>Format:</b> G91
<b>G20 - Imperial mode</b>	The G20 code is for program input to the controller in imperial (inch) format. The G20 code must be used at the start of a program.
<b>G21 - Metric mode</b>	The G21 code is for program input to the controller in metric (mm) format. The G21 code must be used at the start of a program.

<b>G00 - Rapid travel</b>	The G00 code is used for rapid travel between parts or positions in the program. It is also used for torch and consumable changes or inspection. This action is performed at maximum speed. <b>Format:</b> G00 Xn Yn.
<b>G01 Linear interpolation (motion in a straight line)</b>	During interpolation commands the control will precisely and automatically calculate a series of very tiny single axis departures keeping the torch as close to the linear path as possible. The F command may be used to program the feed rate. <b>Format:</b> G01 Xn Yn or G01 Xn Yn Fn.
<b>G02- G03 Circular interpolation (motion along a circular arc)</b>	Circular interpolation requires the system to precisely coordinate two axes. G02 establishes a mode for clockwise circular arcs. G03 establishes a mode for counterclockwise circular arcs. The center of an arc is identified by I, J or K to establish relative offsets from the starting point of the arc to the center. The code R may be used to replace I and J. R represents the radius of the arc, it is a positive value and can be used to give the radius of an arc up to 180°. <b>Format:</b> G02[03] Xn Yn In Jn or G02[03] Xn Yn Rn.
<b>G04 Pause/dwell</b>	This is the dwell command. It causes the system to stop for a specified length of time. The input value is L in seconds. <b>Format:</b> G04 Ln
<b>G40 - kerf off (compensation factor)</b>	The G40 code cancels the kerf compensation factor that is switched on by entering G41 or G42. The system should be stationary when code changes are made.
<b>G41 - kerf left</b>	This turns on the kerf compensation factor to the left of the cutting path.
<b>G42 - kerf right</b>	This turns on the kerf compensation factor to the right of the cutting path. <b>Note:</b> Enter command code G00 "Rapid travel" for a short distance so as to check that the kerf compensation G41 G42 has been activated. The same process applies when canceling the G40 function. <b>Format:</b> G41 or G42.

<b>G28 - return to reference point (zero position)</b>	This function returns the torch to the system's reference position, also called zero position. The torch travels in the X - Y axes at the G00 maximum speed. <b>Format:</b> G28 // Return to reference point.
<b>G22 / G80 - cycle command (loop function)</b>	The G22 code starts a cycle. The input values L show the number of cycles to be executed. G80 ends the cycle. <b>Format:</b> G22 Ln // Loop for L cycles

### 9.13 M - codes

<b>M00 - stop</b>	The M00 code creates a stop point within a program. If the stop function is activated, [START] must be pressed to continue with the program.
<b>M02 - program end</b>	The M02 code stops an auto run or ends a program. G02 needs to be in the last line of the program.
<b>M07 - cutting sequence start</b>	The M07 code starts an automatic cutting sequence with the following functions for oxy fuel and plasma. The sequence for oxy fuel cutting is: – pause system travel, – start preheat timer, – turn on the cutting oxygen and start the pierce timer, – system travel starts. The sequence for plasma cutting is: – pause system travel, – implement height sensing function, – plasma arc ignition. When the arc-on signal has been received the system starts to travel.
<b>M08 - cutting sequence stop</b>	The M08 code shuts down the oxy fuel and plasma cutting processes. The sequence for oxy fuel cutting is: – pause system travel, – shut the cutting oxygen valve, – start the bleed-down timer, – pause ends so the system can travel. The sequence for plasma cutting is: – pause system travel, – switch off the plasma arc, – raise torch. When the arc-on signal has been received the system starts to travel.

<b>Additional M-codes</b>	M10 / M11 oxy fuel - fuel gas valve switch M12 / M13 oxy fuel - cutting oxygen valve switch, M12 (open)/M13 (off) M14 / M15 cutting torch switch, M14 (open)/M15 (off) M16 / M17 cutting torch switch, M16 (open)/M17 (closed) M20 / M21 ignition switch, M20 (open)/M21 (closed) M24 / M25 standby switch, M24 (open)/M25 (closed)
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## 10 Decommissioning

- 1 Disconnect the EX-TRACK<sup>®</sup> CNC from the preheating oxygen supply.
- 2 Disconnect the EX-TRACK<sup>®</sup> CNC from the fuel gas supply.
- 3 Disconnect the EX-TRACK<sup>®</sup> CNC from the cutting oxygen supply.

## 11 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 maintenance intervals of the EX-TRACK<sup>®</sup> CNC. If it is operated for more than eight hours a day, the maintenance intervals should be changed as needed. 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 certified electrician or trained personnel for maintenance and cleaning work.
- Verify the grounding has been established correctly.

### 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.
- After disconnecting the EX-TRACK<sup>®</sup> CNC from the input power supply, wait at least five minutes before carrying out any maintenance and cleaning work, especially opening the EX-TRACK<sup>®</sup> CNC.

**⚠ 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 certified electrician or trained personnel.

**⚠ CAUTION****Fire hazard due to contamination**

Dust deposits inside the EX-TRACK® CNC 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.

**11.1 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.

<b>Daily/during and after the cutting process</b>	➤ Clean the longitudinal and transverse rail with a clean cloth or soft brush.
	➤ Use a soft brush, cloth, or clean dry compressed air to remove any contaminants from the track and the rack.
	➤ Lubricate the rack sparingly with machine oil.
	➤ Check the consumables for wear.
	➤ Clean the main unit with a soft cloth.
<b>Monthly</b>	➤ Lubricate the drive mechanisms.
	➤ Adjust the drive motors in order to re-align the system.
	➤ Inspect the nozzle for wear. If necessary, clean the nozzle using the nozzle kit.
<b>Annually and after each time the housing is opened</b>	➤ Replace worn parts.
	➤ Have a safety inspection performed in accordance with IEC 60974 Part 4: "Periodic inspection and testing" by an authorized specialist.

## 11.2 Software service instructions - Boot menu

The Boot menu is activated from the Main menu. The Boot menu offers three options for servicing the system.

- 1 Press [ESC] (repeatedly, if required) to return to the home screen.
- 2 Press keys [G][G][3] in this order. The Boot menu will be shown as below

**Fig. 25** Boot menu



The boot menu provides the following three options:

<b>Parameter</b>	Load factory settings. This function erases all settings and drawings from the CNC unit.
<b>File format</b>	This function erases all drawings saved in the CNC unit. The CNC unit setting will remain.
<b>Language</b>	This option allows to switch between the two available languages.

### 11.2.1 Backup and restore parameters

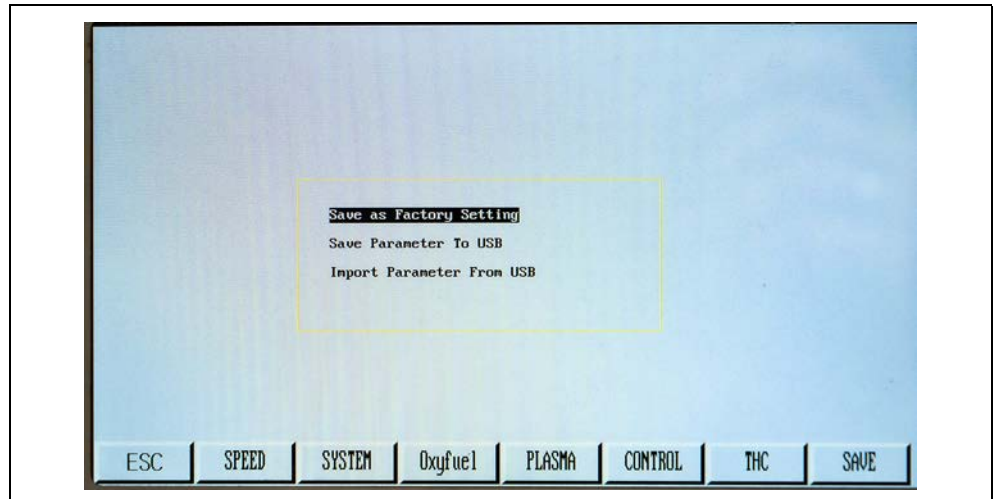
All system parameters can be backed up to, or restored from, a USB stick. They can also be saved in a permanent memory as factory settings although that procedure is not recommended for use by end users.

In order to access this feature proceed as follows:

- 1 Open the boot menu.
- 2 Select "Parameter".
- 3 Enter the password "1928" on the keypad.

The following dialog opens:

Fig. 26 Backup and restore parameters



The parameter backup menu offers three options:

<b>Save as Factory Setting</b>	When this mode is selected, the [F7] key changes to show "FACTORY" in each of the parameter groups. All changes will be saved as "Factory Settings" when the [F7] key is pressed.
<b>Save Parameters To USB</b>	This option will store parameters to the USB stick. <b>4</b> Insert a USB stick. <b>5</b> Select this option and press [ENTER]. A file named "PARA.DAT" is written to the USB stick.
<b>Import Parameters From USB</b>	This option will read-in a set of stored parameters from the USB stick. <b>6</b> Insert a USB stick which has the file "PARA.DAT" present. <b>7</b> Select this option and press [ENTER]. The "PARA.DAT" file is read from the USB stick and all parameters are overwritten.

### 11.2.2 System update

The system firmware of the controller can be updated through a USB stick. The USB stick must have FAT or FAT32 format. In case a system software update is supplied by Thermacut® and needs to be installed, carefully follow this procedure:

- 1** Copy the update file titled STARTCNC.EXE to a USB stick.  
The STARTCNC.EXE file should be the only file on the USB stick.
- 2** Press and hold the software update button (E in Fig. 4 Control panel functions on page EN-23) while the system power is switched on.
- 3** Continue to hold the button until the upgrading window appears on the display screen.
- 4** Plug the USB stick into the port and press the [F1] key to select UPDATE.

The system will automatically start the update operation. If the update is successful, the system will display "PLEASE REBOOT" and sound two beeps.

If the update fails, the system will display "UPDATE FAILED" and sound a continuous beep.

**5** Power the system off and unplug the USB stick.

**6** Reboot the system to start up the updated system.

The version number of the updated system software will appear on the screen after boot-up.

If no prompt appears during the updating process and the display returns to the main updating window or updating fails due to any other interruption, first verify the name of the update file and the USB formatting. If these two factors are confirmed, attempt the update again following the above procedure. If the update fails again, contact Thermacut® Technical Support for assistance.

### 11.2.3 Changing the system name

The system name displayed on the Main menu can be changed, if necessary. The standard text is "THERMACUT THE CUTTING COMPANY", and "EX-TRACK® CNC". Proceed as follows:

**1** Enter the name into a text file called "NAME.TXT" supplied by Thermacut®.

**2** Copy this file onto a USB stick.

**3** Insert this USB stick into the USB port (D in Fig. 4 Control panel functions on page EN-23).

**4** Open the Main menu.

**5** Press these keys in the following order: [G] [G] [8]

A prompt will appear, asking you to press [ENTER] to confirm changing the name text, or to press [ESC] to abort changing the name text.

**6** Press [ENTER].

The new text appears on the main menu.

## 11.3 Hardware service instructions

### 11.3.1 Replacing the main fuse

#### **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.

- Use slow-blow fuses and/or circuit breakers and GFCI that comply with local regulations and electric codes.
- Ground the EX-TRACK® CNC according to the applicable regulations and laws.
- Do not ground the EX-TRACK® CNC together with other devices or machines.



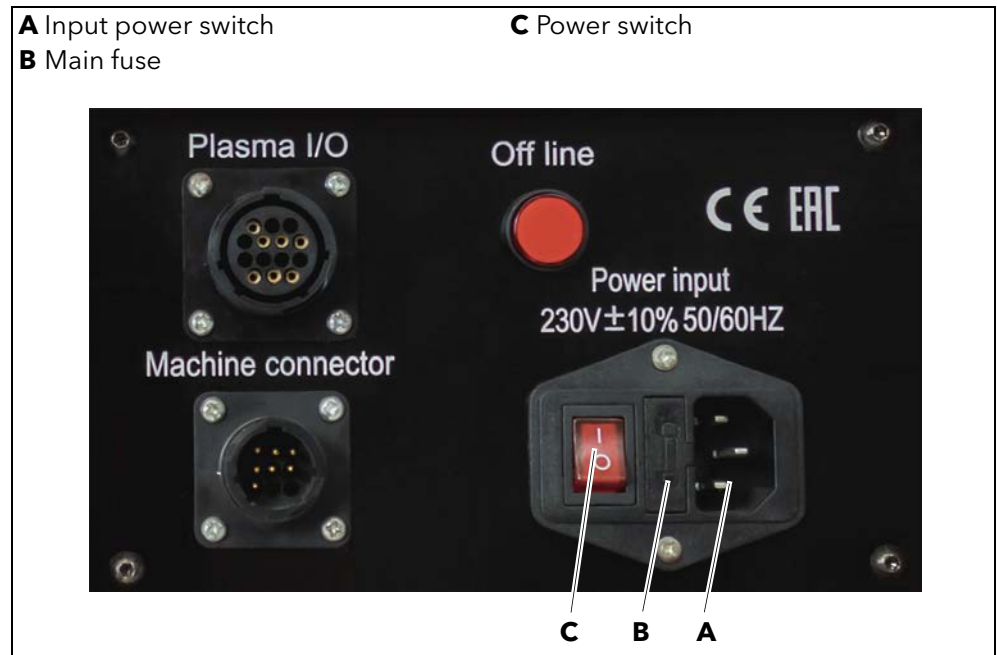
**⚠ WARNING****Electric shock due to defective cables**

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

- Check all live cables and connections for proper installation and damage.
- Have any damaged, deformed, or worn parts replaced by a certified electrician or trained personnel.

The main fuse is located beside the main ON/OFF switch that is on the left side panel of the main unit.

**Fig. 27** Replacing the main fuse



- 1** Unplug the input power lead.
- 2** Use a small flat-head screwdriver and open the flap (B).
- 3** Remove the fuse.
- 4** Fit a new fuse of the same type and value.  
Using a fuse of a higher value could cause serious damage to the system or lead to personal injury.
- 5** Close the flap.

### 11.3.2 Converting table for "Position Up Time" parameter

The values can be different on the different EX-TRACK® CNC systems.

In order to find the exact pierce height turn off the plasma power source and start the cutting sequence without plasma.

When the torch finds the initial zero height of the material it will rise to the adjusted "Position Up time" height and stop the cutting sequence automatically. Then it is possible to measure the piercing height of the torch.

**Table 10** Position Up time parameters

Position Up Time [s]	Initial piercing height [mm]
003	0
004	2
005	3.5
006	5
007	6.8
008	8

## 12 Faults and troubleshooting

Fault	Possible cause	Measures	Troubleshooting
System does not move but the drive power indicator lamp is ON	Off-line pushbutton may be pressed.	Check Off-line pushbutton.	➤ Press Off-line pushbutton until it pops out.
	Power switch is OFF.	Check power switch.	➤ Make sure that the power switch is ON.
Torch lifter won't move up or down because the up and down relays on CNC are activated.	Cable unplugged or damaged.	Check plugs and cables at both ends of transverse guide rail.	➤ Repair or replace the cables.
		Check plug on connector panel on rear of main unit and inspect cable for damage.	➤ Replace the plug. ➤ Repair or replace the cable.
	Lift motor or micro switch failed.	Check for 24 V DC at motor cable plug.	➤ Replace fuse, motor, or micro switches, if necessary.
Torch lifter won't move up or down because the up and down relays on CNC are not activated.	24 V power missing.	Check output of 24 V power supply.	➤ Repair or replace cables.
		Check 24 V fuse on left side panel.	➤ Replace fuse.
		Check connections to side of CNC unit.	➤ Tighten connections.

Fault	Possible cause	Measures	Troubleshooting
<b>Initial Height Sensing does not work.</b>	Plug may be loose or damaged.	Check the IHS cable plug on connector panel at side of main unit.	➤ Tighten or repair plug.
	Cables may be broken.	Check the positions of the pins and the wires in both parts of IHS connector on the torch lifter.	➤ Replace cables.
	Connection may be loose or disconnected. Plate may not have sufficient electrical contact with table.	Check connection of black ground wire to plate/ ground.	➤ Fix or tighten ground connection. Ground directly to the plate, if necessary.
	Connection may be loose or damaged.	Check connection of red torch wire at the shield cap.	➤ Fix or tighten torch shield connection.
<b>System will not power on.</b>	Fuse may be blown.	Check main fuse.	➤ Replace fuse with the same type, voltage and amperage rating.
<b>System starts moving before plasma fires.</b>	Parameter may be set incorrectly, or parameters may be corrupted.	Check parameter settings.	➤ Verify plasma parameter for "Use Arc On Signal" is set to 1 (ON).
<b>Parts come out wrong size.</b>	Parameters for Numerator and Denominator may have been changed.	Check parameter settings.	➤ Verify Numerator and Denominator settings are correct, as this will affect dimensional accuracy.
	Value for Kerf may be wrong.	Check Kerf setting.	➤ Set the correct Kerf value in Auto mode.
	Inch/metric parameters may be incorrectly set.	Check inch/metric parameters.	➤ Verify correct setting of parameters.
<b>On-screen graphics look wrong.</b>	Parameter may be set incorrectly, or may be corrupted.	Check parameter settings.	➤ Verify the control parameter for display density is set to 0.
<b>Graphics not shown while running a part.</b>	Parameter may be set incorrectly, or may be corrupted.	Check parameter settings.	➤ Verify control parameter for No-Graphics is set to 0 (OFF).

Fault	Possible cause	Measures	Troubleshooting
<b>System suddenly stops in the middle of normal cutting operations.</b>	Part program may have problem.		➤ Send the part program to the programmer or to Thermacut® for evaluation.
	Drive motor is jammed, or drive has failed.	Check drive motor.	➤ Verify the system is level. ➤ Check the motors.
	The CNC may be "locked-up".	Check the input power cable to ensure power is not being momentarily interrupted.	➤ Verify the plasma system is properly grounded. ➤ Disconnect from input power and re-boot the control.
<b>One of the motors does not turn.</b>	Loose connection.	Check wiring from drive amp to motor.	➤ Secure all wiring connections.
	Incorrect drive amplifier settings.	Check the drive amplifier.	➤ Correct settings of drive amp.
		Check for any alarms or if the settings are incorrect.	
	Incorrect parameter settings.	Check settings of SYSTEM parameters (Start speed, Acceleration time, Numerator, Denominator).	➤ Set the parameters to the appropriate settings. Record the original parameters before making any modification.
Motor may be damaged.	Check motor to make sure it is not frozen or jammed.	➤ Replace motor, if damaged.	
<b>CNC is slow to respond.</b>	Output voltage may be below the allowable range.	Check the input power supply.	➤ Adjust the output voltage on the switching power supply to 24 V DC inside the CNC or replace the input power supply.
	Corrupt or incorrect parameters may cause CNC operating issues.	Check settings of SYSTEM parameters.	➤ Set the parameters to the appropriate settings. ➤ Reset to factory settings, if necessary. ➤ Record the original parameters before making any modification.

Fault	Possible cause	Measures	Troubleshooting
<b>Travel limit alarm at power-on.</b>	Machine position may be outside settings for Soft Limits.	Check settings of SYSTEM parameters.	<ul style="list-style-type: none"> <li>➤ Press Off Line button and manually move torch head to normal cut area, try to run again.</li> <li>➤ Increase settings for Soft Limits, if necessary.</li> </ul>
<b>The system is locked up in Manual or Automatic mode.</b>	Incorrect parameter setting.	Check settings of SYSTEM parameters.	<ul style="list-style-type: none"> <li>➤ Record the settings for Numerator and Denominator in the SYSTEM Parameters. Then reset the factory parameters.</li> <li>➤ Reboot the system and then re-enter the recorded values for Numerator and Denominator.</li> <li>➤ Save the parameters and test the system performance.</li> </ul>
<b>No input/output.</b>	Loose connection or broken wires.	Check the cables connected to the rear of the central unit.	<ul style="list-style-type: none"> <li>➤ Secure the connection or replace cables, if necessary.</li> </ul>
	Faulty 24 V input power supply.	Check for low or missing 24 V input power. Check the voltage of 25-pin port between pin 24 and pin 25.	<ul style="list-style-type: none"> <li>➤ •Adjust or replace the 24 V power supply.</li> <li>➤ Check the 24 V fuse on left side of the panel. Replace with same value, if blown.</li> </ul>
	Loose/broken connection.	Check all cable and wiring connections inside the central unit.	<ul style="list-style-type: none"> <li>➤ Secure the connections or replace wires, if necessary.</li> </ul>

Fault	Possible cause	Measures	Troubleshooting
<b>USB stick cannot be read.</b>	The USB stick may not be compatible with this CNC.	Try a different brand of USB stick.	➤ Use only compatible USB sticks.
	The USB stick may be formatted incorrectly. This CNC only supports FAT or FAT32 file systems.	Check the file system format on the USB stick.	➤ Reformat the USB stick to FAT or FAT32 format using a PC.
	Metallic dust may cause short signals.	Check the USB port and USB stick connector for any accumulation of dust or soot.	<ul style="list-style-type: none"> <li>➤ Switch off the input power.</li> <li>➤ Clean the USB port and the USB stick connector using non-conductive tool and vacuum.</li> <li>➤ Keep cover closed over USB port.</li> </ul>
	Damaged or broken pins/contacts can disrupt operation.	Inspect condition of USB port and USB stick connector.	<ul style="list-style-type: none"> <li>➤ Discard and replace any damaged USB stick.</li> <li>➤ Replace the USB port, if damaged.</li> </ul>
<b>The system returns to the main menu after a program is started.</b>	There is a problem with the original program.	Check the program.	➤ Select a different program and test the system.
	If no program will run, there may be a problem with the parameter settings.	Select a different program and test the system.	<ul style="list-style-type: none"> <li>➤ Record the settings for Numerator and Denominator in the SYSTEM Parameters.</li> <li>➤ Reset the factory parameters.</li> <li>➤ Reboot the system and then re-enter the recorded values for Numerator and Denominator.</li> <li>➤ Save the parameters and test the system performance.</li> </ul>

Fault	Possible cause	Measures	Troubleshooting
<p><b>The system will only cut a straight line, it will not cut a circle</b></p>	<p>There is a problem with the original program.</p>	<p>Check the program.</p>	<ul style="list-style-type: none"> <li>➤ Select a different program and test the system.</li> </ul>
	<p>If no program will run, there may be a problem with the parameter settings.</p>	<p>Select a different program and test the system.</p>	<ul style="list-style-type: none"> <li>➤ Record the settings for Numerator and Denominator in the SYSTEM Parameters.</li> <li>➤ Reset the factory parameters.</li> <li>➤ Reboot the system and then re-enter the recorded values for Numerator and Denominator.</li> <li>➤ Save the parameters and test the system performance.</li> </ul>
<p><b>Screen blinks when the cutting oxygen solenoid valve opens, or when plasma arc starts.</b></p>	<p>Electrical noise, loose ground connection.</p>	<p>Check ground (work/table) connection of the Initial Height Sensing cable.</p>	<ul style="list-style-type: none"> <li>➤ Verify ground connection is tight and is making good electrical contact.</li> <li>➤ Verify all cables are connected properly and are in good condition.</li> </ul>
<p><b>Outputs do not turn on when indicated on screen (cutting oxygen solenoid opens or plasma arc starts).</b></p>	<p>No 24 V DC, power supply may have failed.</p>	<p>Check 24 V power supply. Measure voltage between wires labeled 24 V and 24 G at the power supply.</p>	<ul style="list-style-type: none"> <li>➤ Check and replace the power supply.</li> <li>➤ Check 24 V fuse first on left side panel. Replace with same value, if blown.</li> <li>➤ Check and replace the power supply, if faulty.</li> </ul>
	<p>Relay may be loose or un-seated in socket or may be faulty.</p>	<p>Check the six relays inside the CNC Unit.</p>	<ul style="list-style-type: none"> <li>➤ Re-seat or replace relays.</li> <li>➤ Disconnect input power.</li> </ul>

## 13 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.
  - ⇒ 13 Disposal on page EN-72
- 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.

### 13.1 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.

### 13.2 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.

### 13.3 Packaging

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

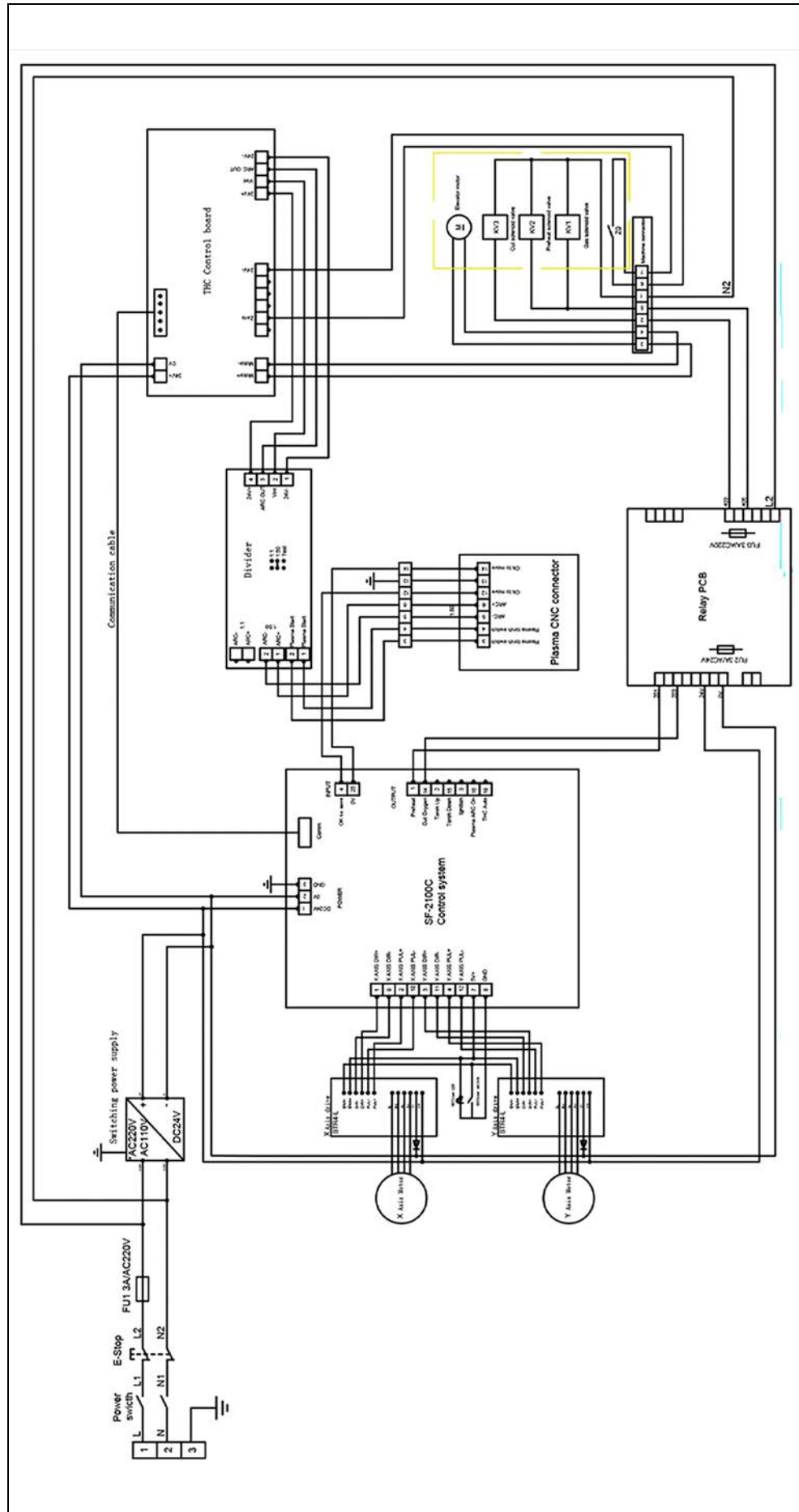


## 14 Warranty

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:
  - One (1) year for EX-TRACK® 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.

# 15 Wiring diagram



## 16 Accessories

**Item****Ref. no.****Contents**

- EX-0-717-001 EX-TRACK® oxy fuel upgrade kit
- EX-TRAFLAMER PRO torch for EX-TRACK® CNC
  - 5pcs cutting nozzle 25-40 mm
  - 1pc heating nozzle 3-100 mm,
  - Operator manual

- EX-0-717-002 Display protection cover polycarbonate 3 mm



## 17 Parts list

### 17.1 Exploded view A

Fig. 28 Exploded view A

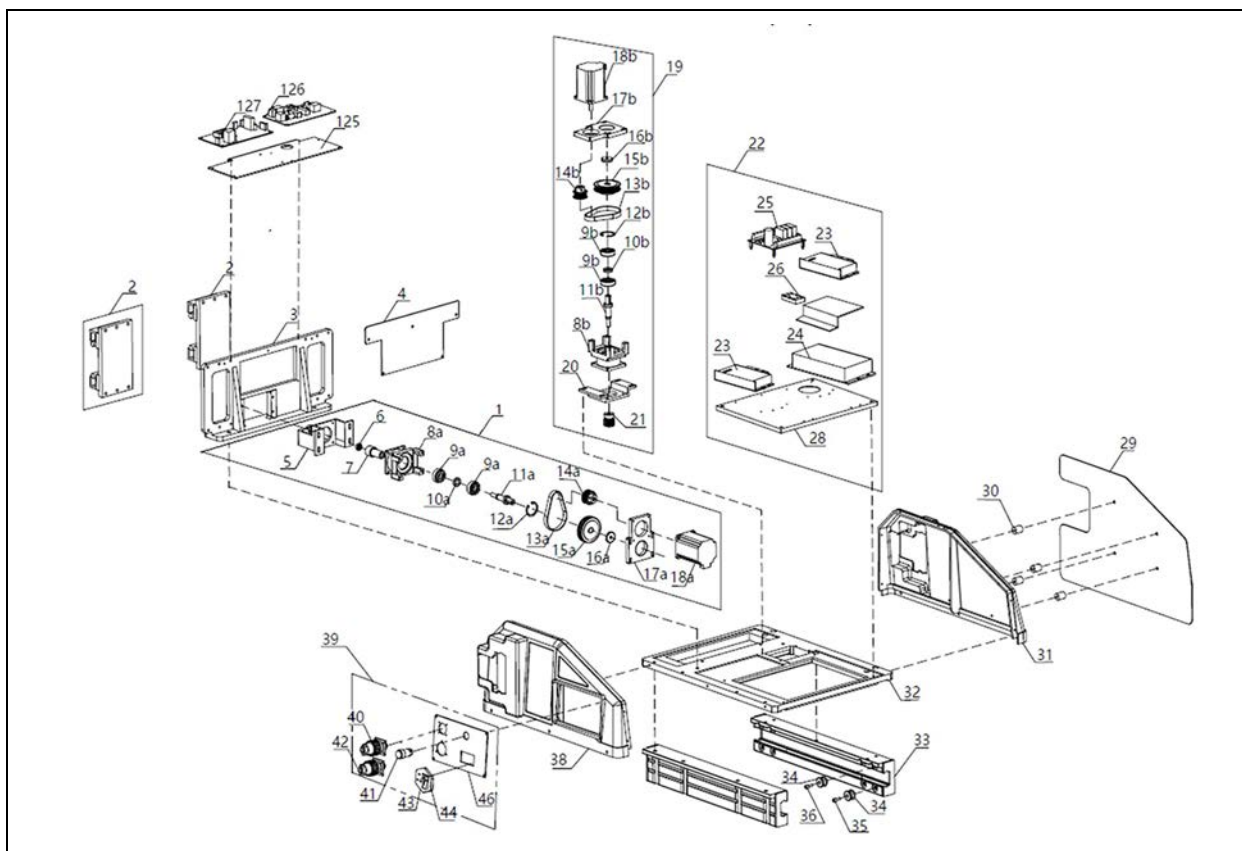


Table 11 Parts description Exploded view A

Item	Part no.	Description
1	EX-0-706-001	X-motion (Transverse) motor assembly
2	EX-0-706-002	Sliding block (AL 450*51*82)
3	EX-0-706-003	Mount. panel (AL 396*57*185.5)
4	EX-0-706-004	Cover board
5	EX-0-706-005	Horizontal motor mount. plate
6	EX-0-706-006	Bearing (628/Ø16)
7	EX-0-706-007	Horizontal output pinion gear (Ø23*28)
8a 8b	EX-0-706-008	Gear box (AL 57*77*62)
9a 9b	EX-0-706-009	Bearing (6201/Ø32)
10a 10b	EX-0-706-010	Bearing cover (Ø20*5 mm)
11a 11b	EX-0-706-011	Transmission shaft (Ø20*76 mm)
12a 12b	EX-0-706-012	Inner retaining ring (Ø34.4)
13a 13b	EX-0-706-013	Belt (90XL)

**Table 11** Parts description Exploded view A

Item	Part no.	Description
14a 14b	EX-0-706-014	Small belt wheel (AL Ø32*25)
15a 15b	EX-0-706-015	Large belt wheel (AL Ø61*20)
16a 16b	EX-0-706-016	Bearing cover (Ø25*5 mm)
17a 17b	EX-0-706-017	Motor mount. plate (106*77*9.5)
18a 18b	EX-0-706-018	Stepper motor (24V/3A/57 steps)
19	EX-0-706-019	Y-motion motor assembly
20	EX-0-706-020	Lifter motor mount. plate (Ø23*54)
21	EX-0-706-021	Pinion gear
22	EX-0-706-022	Stepper motor P.S. block assy
23	EX-0-706-023	Stepper motor driver (DM556D)
24	EX-0-706-024	Power supply 110/230 V
25	EX-0-706-025	Relay PCB
26	EX-0-706-026	Connector (TB1503 600 V/15 A)
28	EX-0-706-028	Stepper motor P.S. mount. plate
29	EX-0-706-029	Heat shield
30	EX-0-706-030	Spacer element
31	EX-0-706-031	Right-side plate
32	EX-0-706-032	Base plate
33	EX-0-706-033	Right slide block (46*28*458)
34	EX-0-706-034	V-type wheel
35	EX-0-706-035	Eccentric screw (M6)
36	EX-0-706-036	Fixing screw (M8)
37	EX-0-706-037	Left slide block (46*28*458)
38	EX-0-706-038	Left-side plate
39	EX-0-706-039	Connector panel assembly
40	EX-0-706-040	CNC Interface 14-pin socket
41	EX-0-706-041	Off-Line switch (Ø18 mm)
42	EX-0-706-042	Machine Control 10-pin socket (Ø44)
43	EX-0-706-043	Flat-plug power socket
44	EX-0-706-114	Glass fuse (250 V AC/3 A)
45	EX-0-706-115	Emergency Stop button
46	EX-0-706-044	Connector panel
47	EX-0-706-045	Rear cover
48	EX-0-706-046	Controller mounting plate
49	EX-0-706-047	Controller (SF-2100C)
125	EX-0-706-110	THC mounting plate
126	EX-0-706-111	Pressing board THC
127	EX-0-706-112	Control board THC

## 17.2 Exploded view B

Fig. 29 Parts description Exploded view B

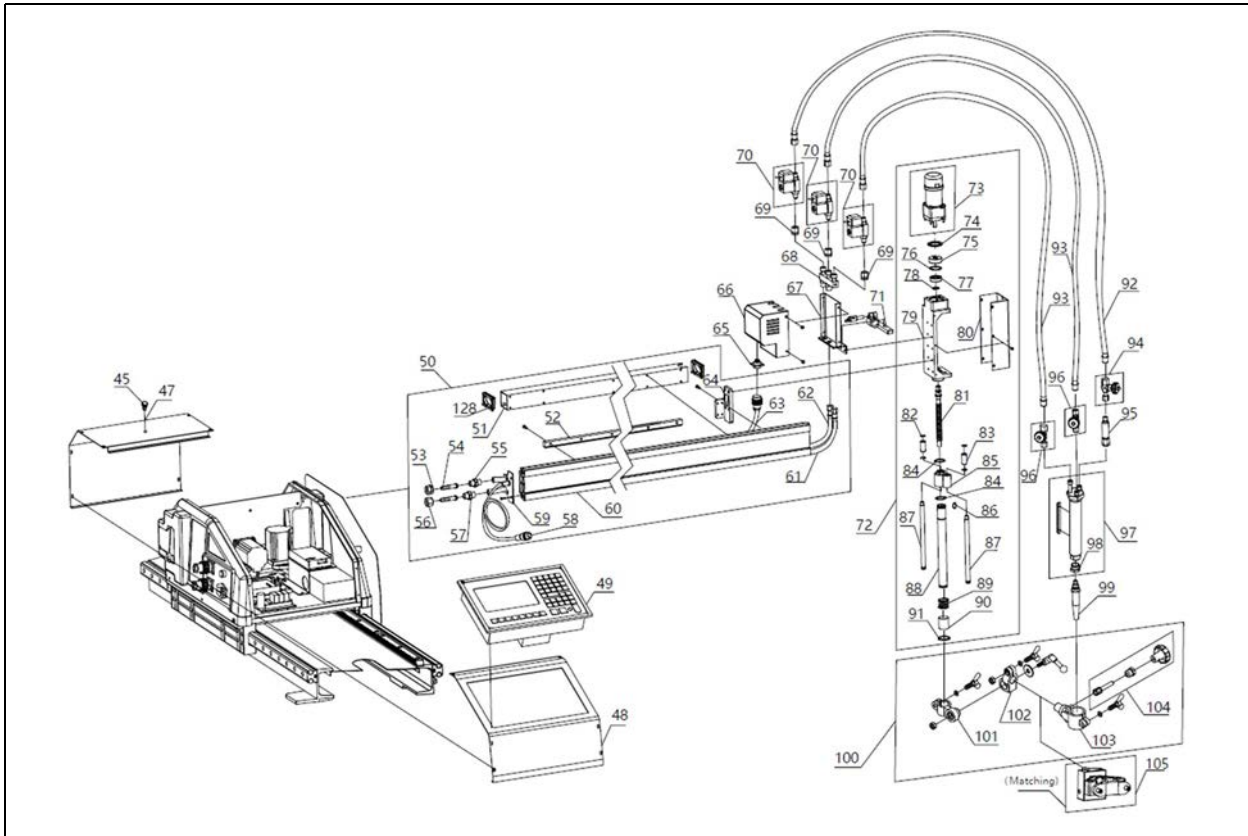


Table 12 Parts description Exploded view B

Item	Part no.	Description
50	EX-0-706-132	Crossbar assembly 1000 mm
50*	EX-0-706-124	Crossbar assembly 1525 mm
50**	EX-0-706-132	Crossbar assembly 1000 mm
51	EX-0-706-049	STL. steel sqr. tube (50*50*1)
51*	EX-0-706-125	STL. steel sqr. tube (50*50*1) 1525 mm
51**	EX-0-706-133	STL. steel sqr. tube (50*50*1) 1000 mm
52	EX-0-706-050	Gear rack (1.273M)
52*	EX-0-706-126	Gear rack (1.273M) 1525 mm
52**	EX-0-706-134	Gear rack (1.273M) 1000 mm
53	EX-0-708-001	Fuel gas nut (UNF 9/16"-18 LH)
54	EX-0-708-002	Hose nipple
55	EX-0-708-003	Fuel gas coupling (UNF9/16"-18LH)
56	EX-0-708-004	Oxygen nut (UNF 9/16"-18)
57	EX-0-708-005	Oxygen coupling (UNF 9/16"-18)
58	EX-0-706-056	Machine control 9-pin plug w/cable
59	EX-0-706-057	Coupling mounting plate
60	EX-0-706-058	Crossbar (aluminum)
60*	EX-0-706-127	Crossbar (aluminum) 1525 mm
60**	EX-0-706-135	Crossbar (aluminum) 1000 mm
61	EX-0-708-006	Crossbar Oxy hose (Øin 1/4")
61**	EX-0-708-025	Crossbar Oxy hose (Øin 1/4") 1000 mm

Table 12 Parts description Exploded view B

Item	Part no.	Description
62	EX-0-708-007	Crossbar fuel gas hose (Øin 1/4")
62**	EX-0-708-026	Crossbar fuel gas hose (Øin 1/4") 1000 mm
63	EX-0-706-061	Lifter cable plug 10-pin with cable (Ø31)
64	EX-0-706-062	Lifter holder
65	EX-0-706-064	Gas console 7-pin socket Ø21
66	EX-0-706-065	Gas console cover
67	EX-0-706-066	Gas console mounting plate
68	EX-0-708-008	Gas distributor (88*16*70)
69	EX-0-708-009	Right-left union nut
70	EX-0-706-051	Solenoid valve (24 V DC/3 W)
71	EX-0-706-070	Torch holder console
72	EX-0-706-071	Torch lifter assembly (THC)
73	EX-0-706-072	Lifter motor assembly
74	EX-0-706-073	Flange bushing
75	EX-0-706-074	Clamp ring (AL Ø31*11 mm)
76	EX-0-706-075	Inner retaining ring (Ø28 mm)
77	EX-0-706-076	Bearing (Ø28*12*8 mm (6001)
78	EX-0-706-077	Outer retaining ring (missing size)
79	EX-0-706-078	Lifter
80	EX-0-706-079	Lifter front cover 65*46.5*174
81	EX-0-706-080	Lifter screw rod (M12*3)
82	EX-0-706-081	Steel baffle ring (Ø13 mm)
83	EX-0-706-082	Bearing (Ø20)
84	EX-0-706-083	Retaining ring (Ø20)
85	EX-0-706-084	Guide holder
86	EX-0-706-085	Shaft square key (6*6*30)
87	EX-0-706-086	Guide axle (Ø10*174 mm)
88	EX-0-706-087	Lifter housing
89	EX-0-706-088	Spring (Ø24.5*2)
90	EX-0-706-089	Bearing (Øout 23/Øin 20 mm)
91	EX-0-706-090	Steel baffle ring (Ø25)
92	EX-0-708-010	Fuel gas hose (Øin 1/4")
93	EX-0-708-011	Oxygen hose (Øin 1/4")
94	EX-0-708-012	Fuel gas valve (UNF9/16"-18LH)
95	EX-0-708-013	Flashback arrestor UNF9/16"-18LH
96	EX-0-708-014	Oxygen valve (UNF 9/16"-18)
97	EX-0-708-015	Oxy-fuel torch assembly
98	EX-0-708-016	Cutting nozzle nut (CU Ø22*19)
99	EX-0-708-017	Cutting nozzle 00 (5-10 mm)
100	EX-0-706-099	Oxy-fuel torch holder assembly
101	EX-0-706-100	Vertical clamp holder
102	EX-0-706-101	Horizontal clamp holder
103	EX-0-706-102	Oxy-fuel torch holder

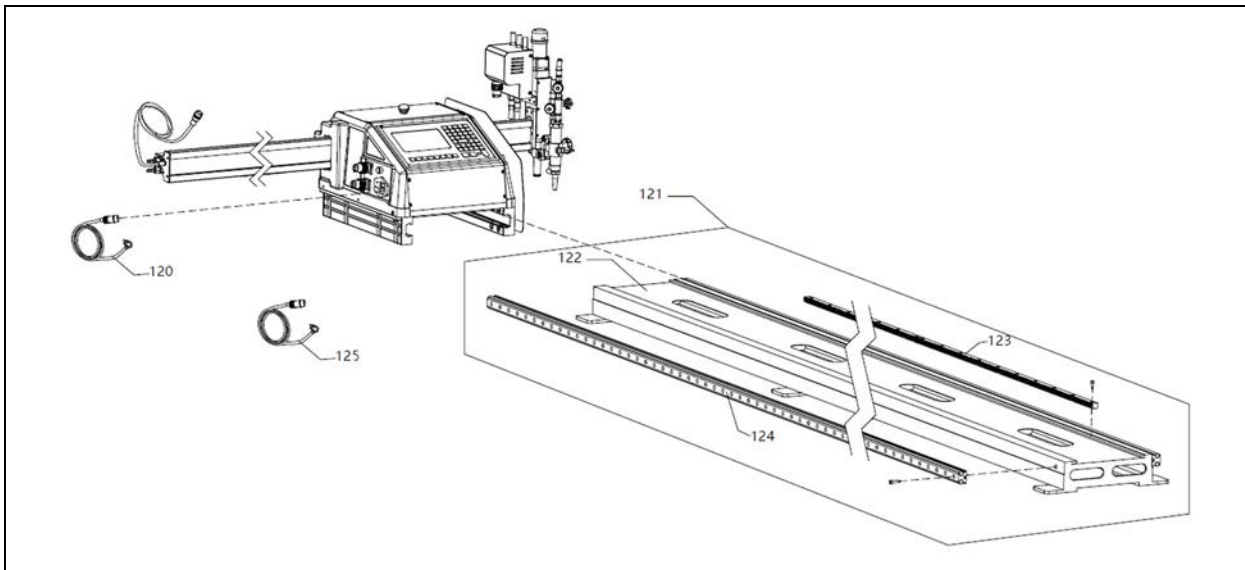
**Table 12** Parts description Exploded view B

Item	Part no.	Description
104	EX-0-706-103	Pinion assembly
105	EX-0-706-104	Plasma torch holder assembly
128	EX-0-706-063	Plastic housing edge cover

\* Enlarged (1525 mm and 3050 mm) version of EX-TRACK® CNC (actual selling items EX-0-707-002).

\*\* Enlarged (1000 mm and 2000 mm) version of EX-TRACK® CNC (actual selling items EX-0-707-003).

### 17.3 Exploded view C

**Fig. 30** Parts description Exploded view C**Table 13** Parts description Exploded view C

Item	Part no.	Description
120	EX-0-706-105	Input power cord
121	EX-0-706-106	Rail assembly
121*	EX-0-706-128	Rail assembly 3050 mm
121**	EX-0-706-136	Rail assembly 2000 mm
122	EX-0-706-107	Longitudinal guide console
122*	EX-0-706-129	Longitudinal guide console 3050 mm
122**	EX-0-706-137	Longitudinal guide console 2000 mm
123	EX-0-706-108	20x2 Gear Rack (M1.273)
123*	EX-0-706-130	20x2 Gear Rack (M1.273) 3050 mm
123**	EX-0-706-138	20x2 Gear Rack (M1.273) 2000 mm
124	EX-0-706-109	Double-shaft rail (Ø12)
124*	EX-0-706-131	Double-shaft rail (Ø12) 3050 mm
124**	EX-0-706-139	Double-shaft rail (Ø12) 2000 mm
125	EX-0-803-004	CNC Interface connection lead 6 m

\* Enlarged (1525 mm and 3050 mm) version of EX-TRACK® CNC (actual selling items EX-0-707-002).



\*\* Enlarged (1000 mm and 2000 mm) version of EX-TRACK® CNC (actual selling items EX-0-707-003).

For more information about accessories and spare parts , visit our website:  
[www.EX-TRACK.com](http://www.EX-TRACK.com).

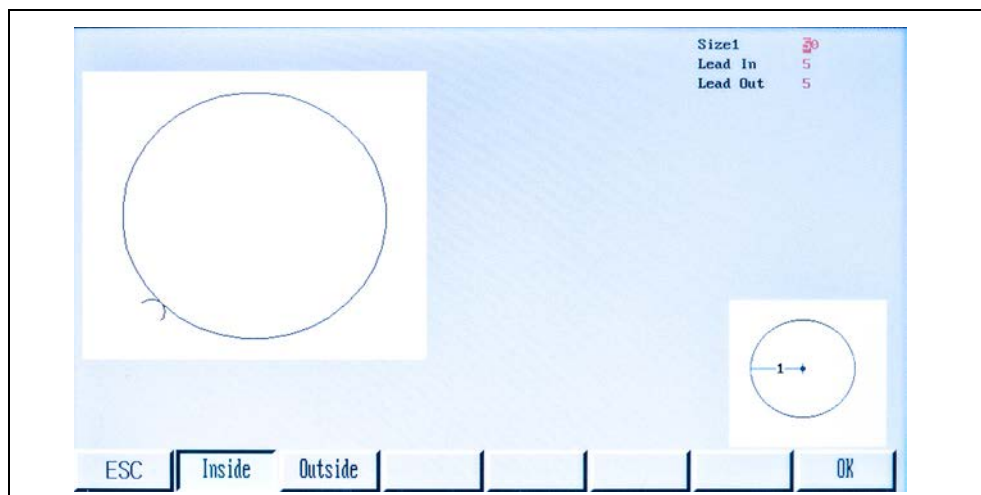
### 18 Graphics library

The library contains the following 50 geometrical shapes which can be dimensionally altered.

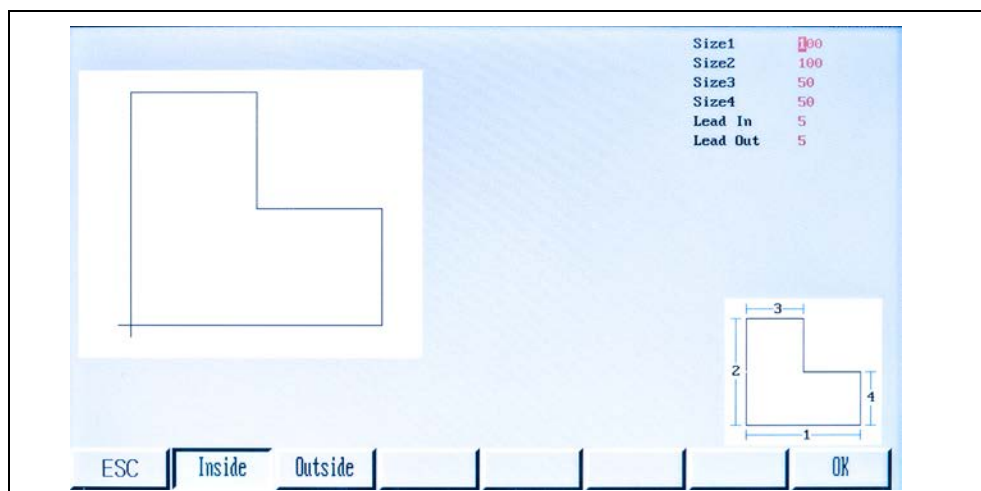
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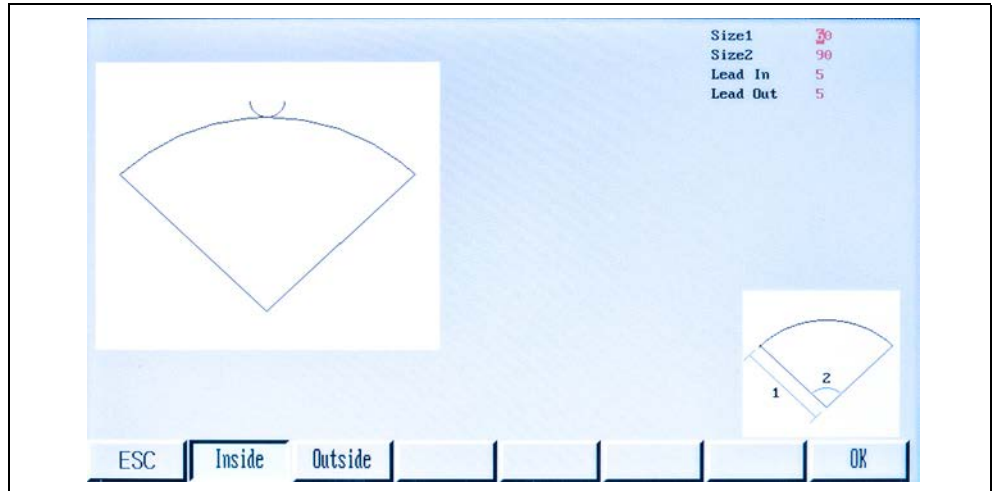
#### Shape 2



#### Shape 3



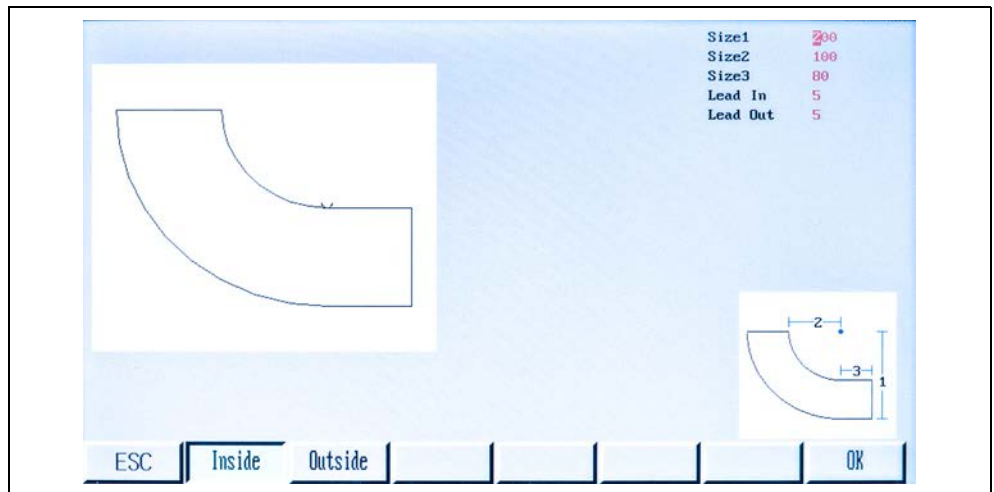
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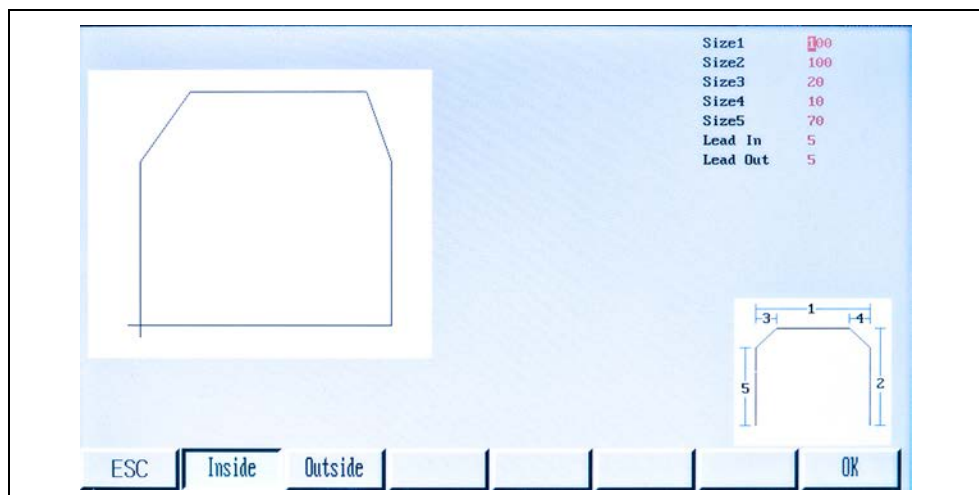
Shape 5



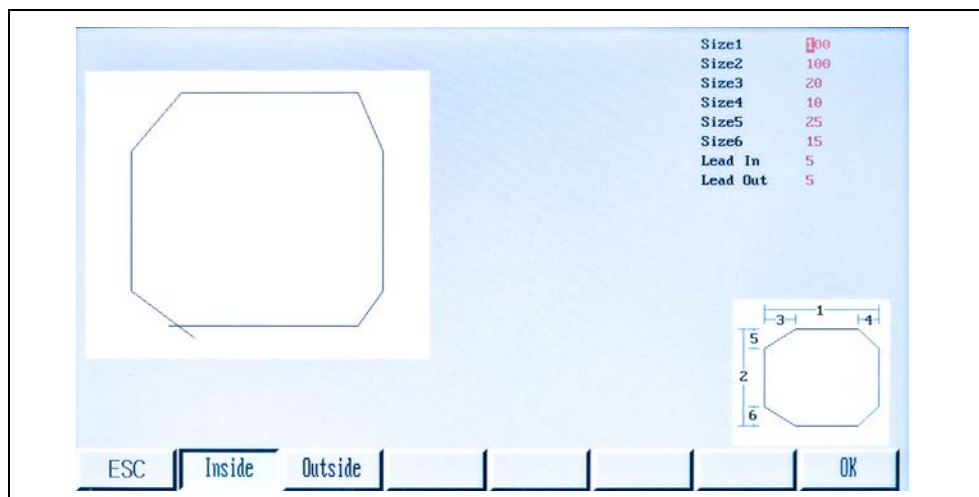
Shape 6



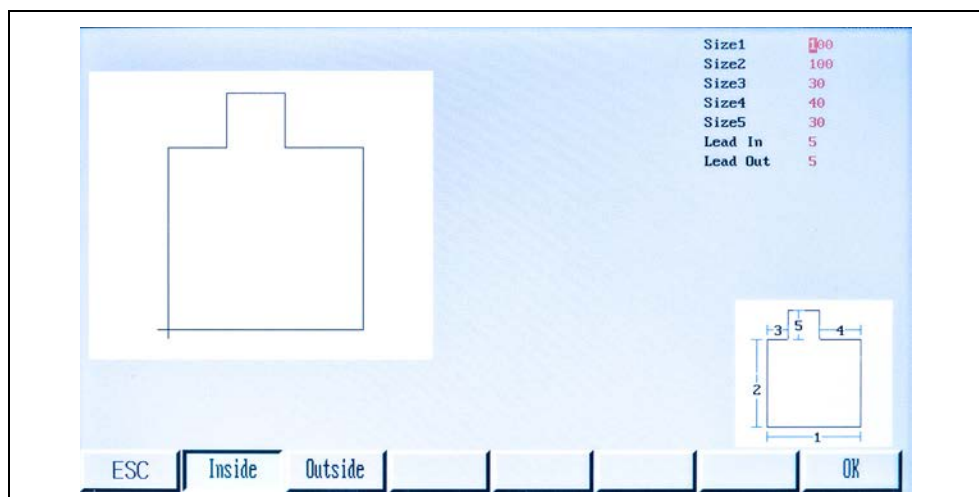
Shape 7



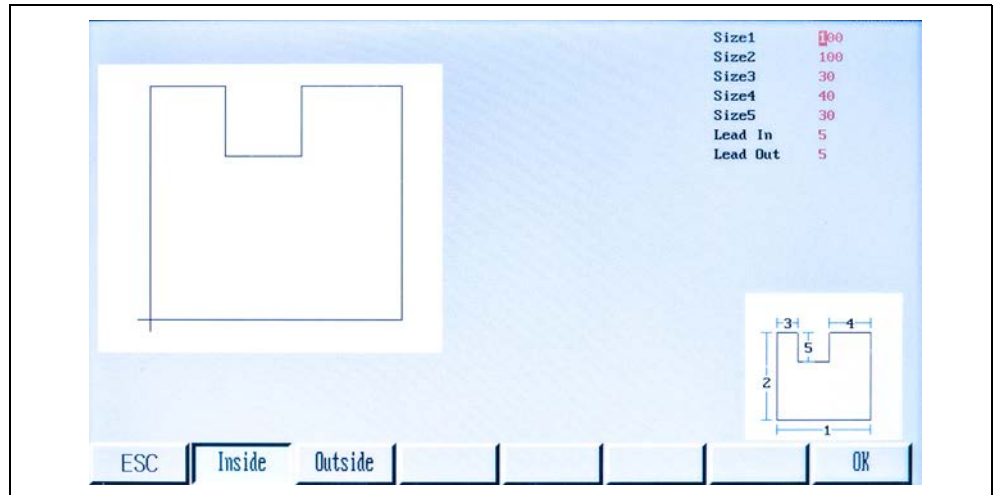
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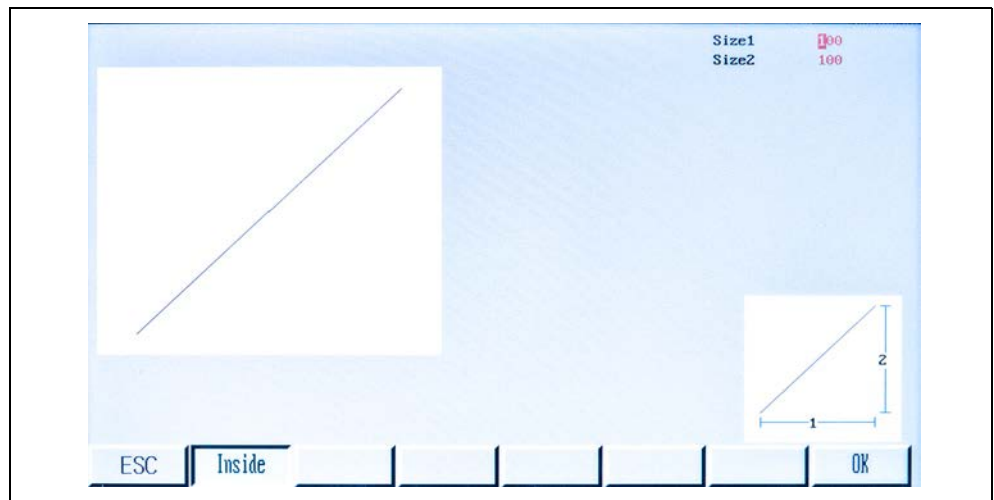
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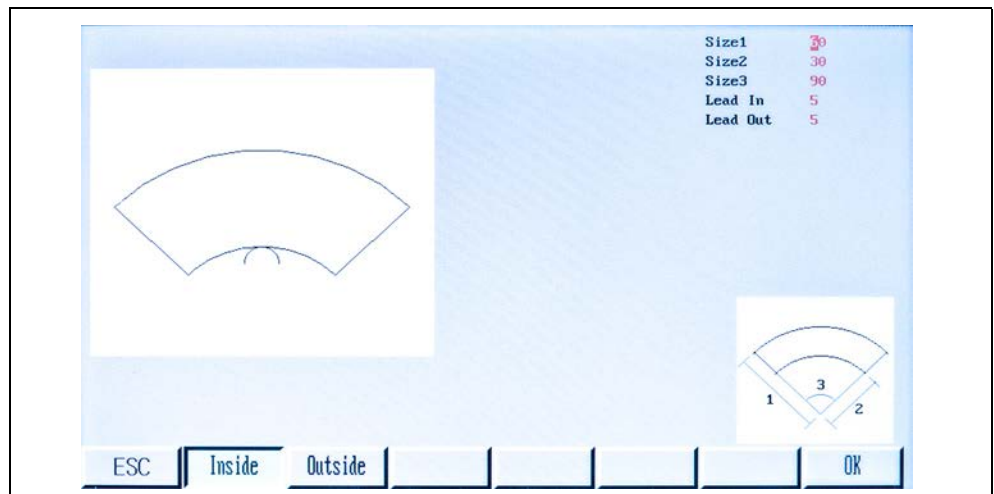
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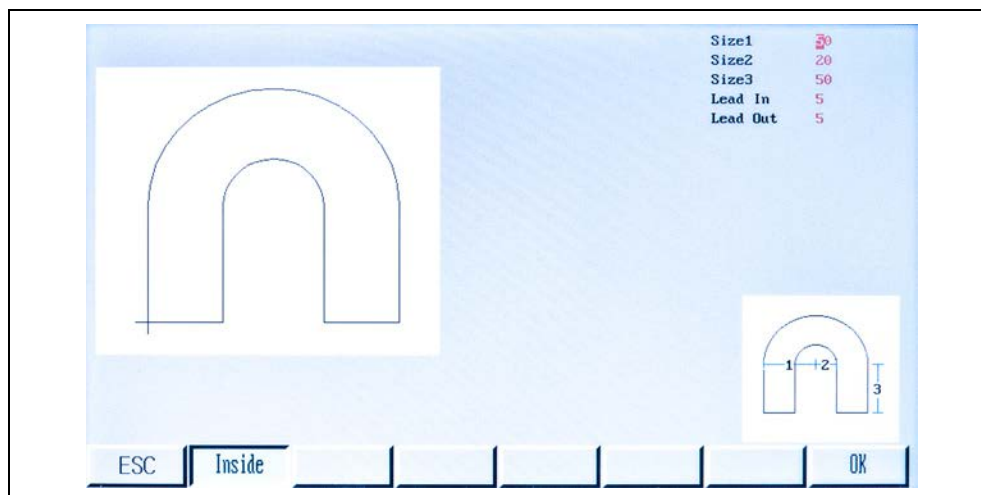
Shape 11



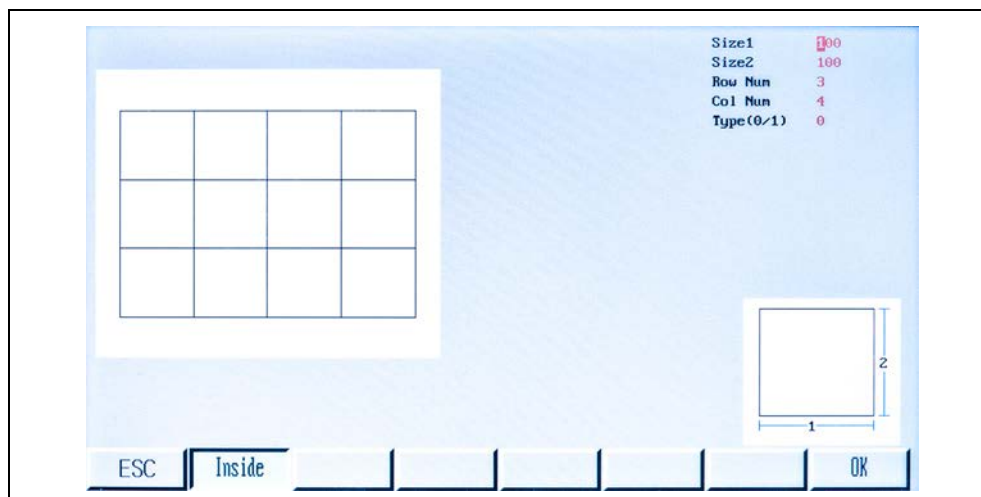
Shape 12



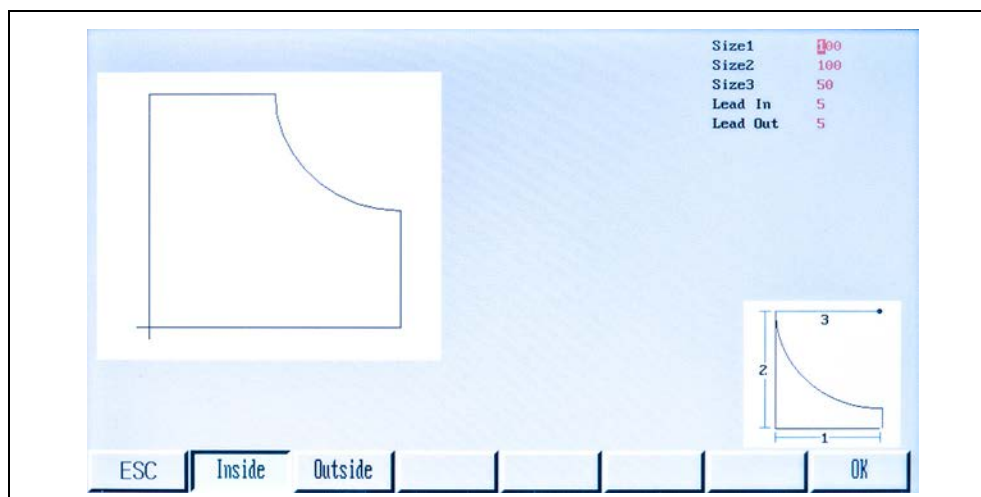
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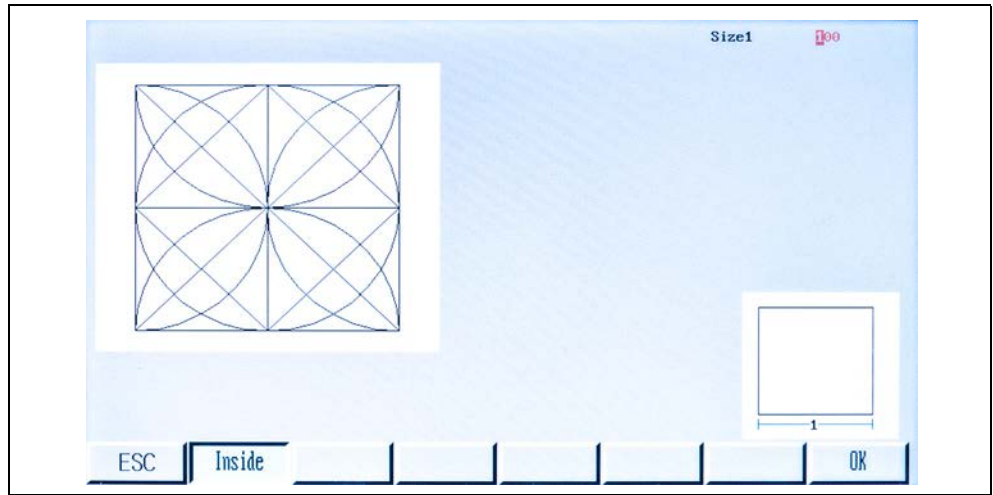
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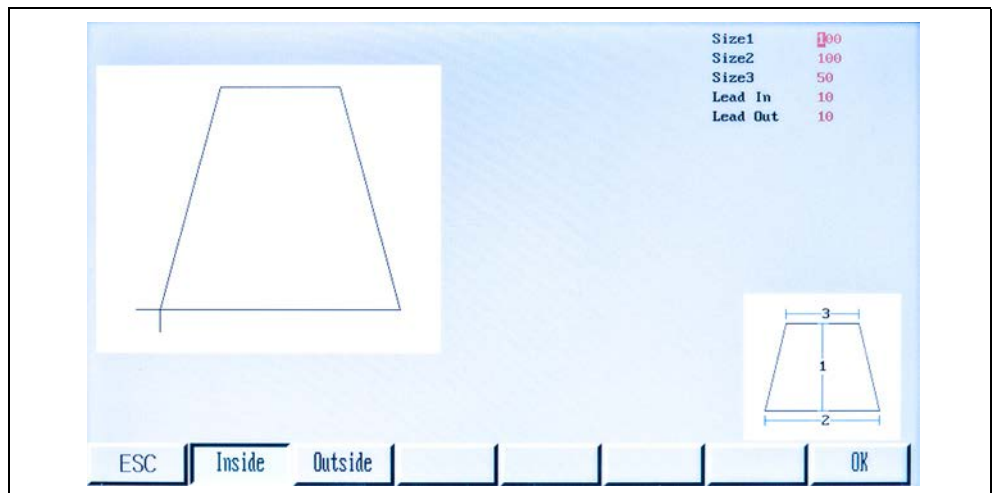
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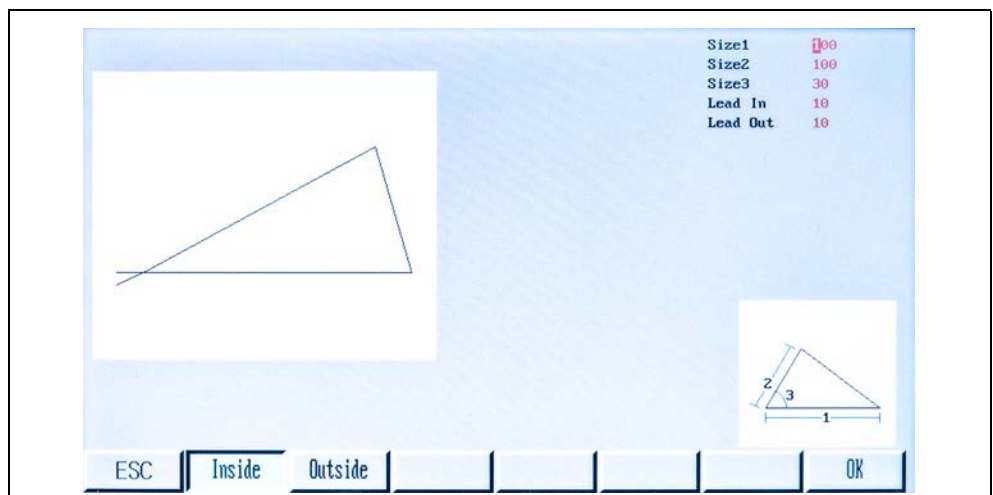
**Shape 16 (Simulation only)**



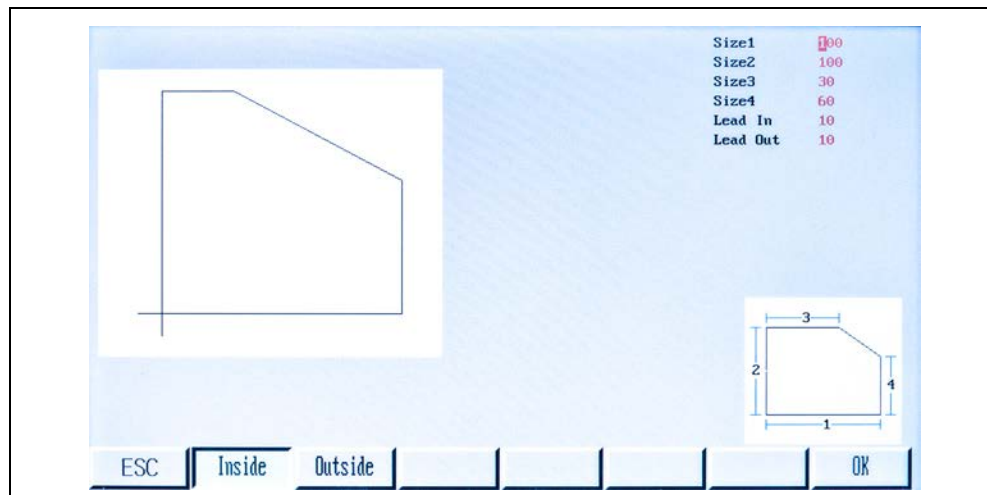
**Shape 17**



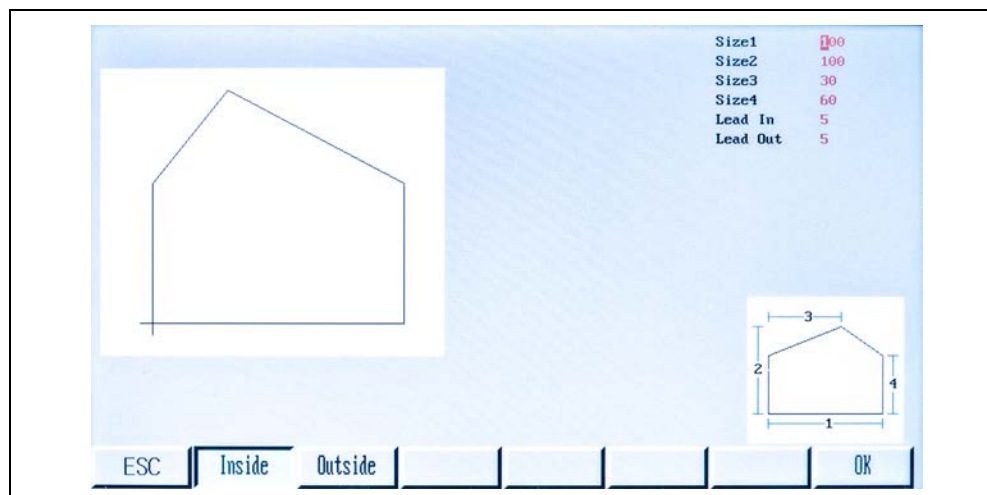
**Shape 18**



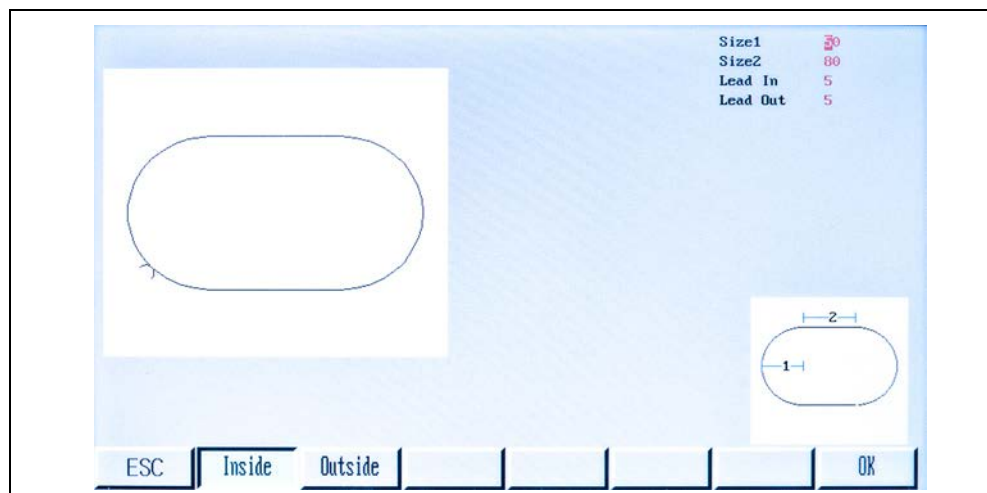
Shape 19



Shape 20

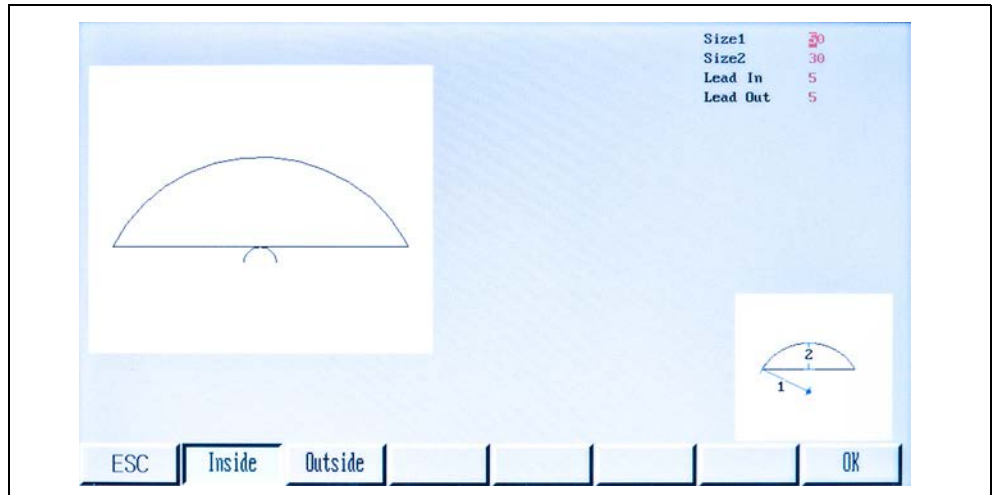


Shape 21

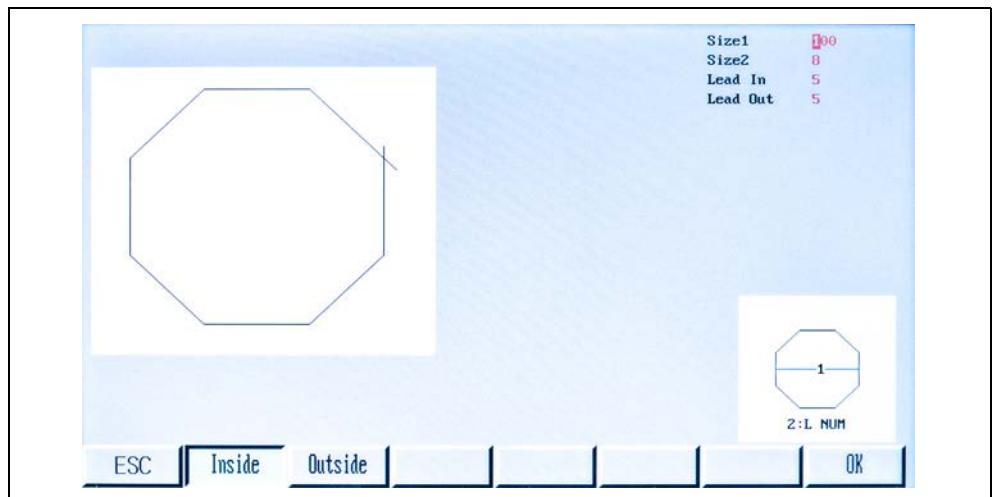




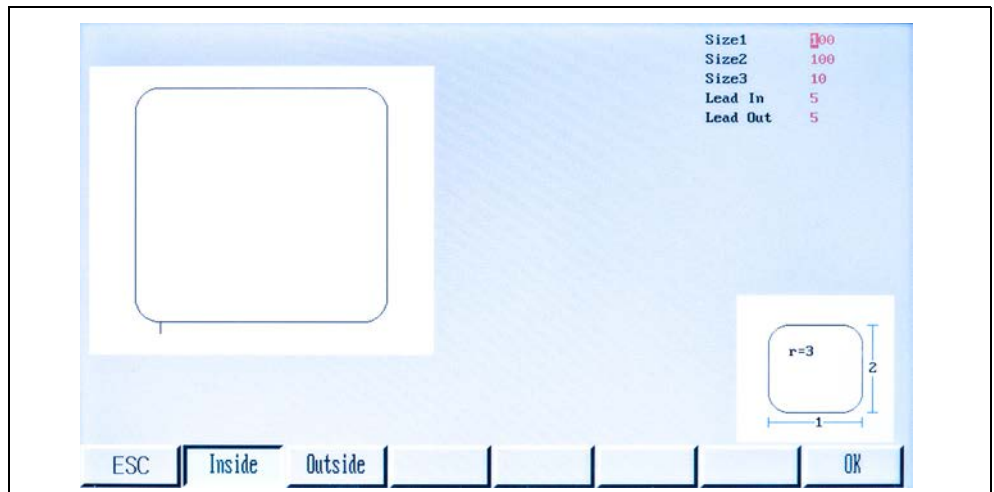
Shape 22



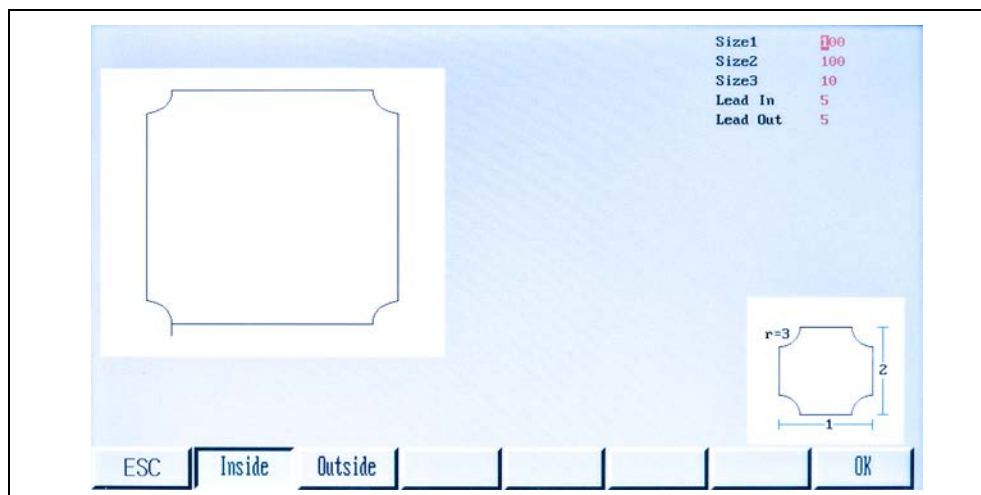
Shape 23



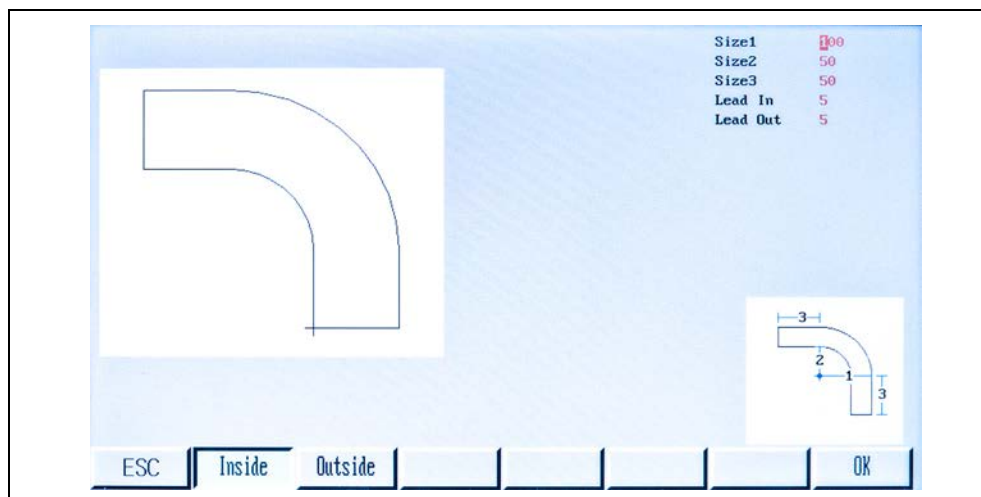
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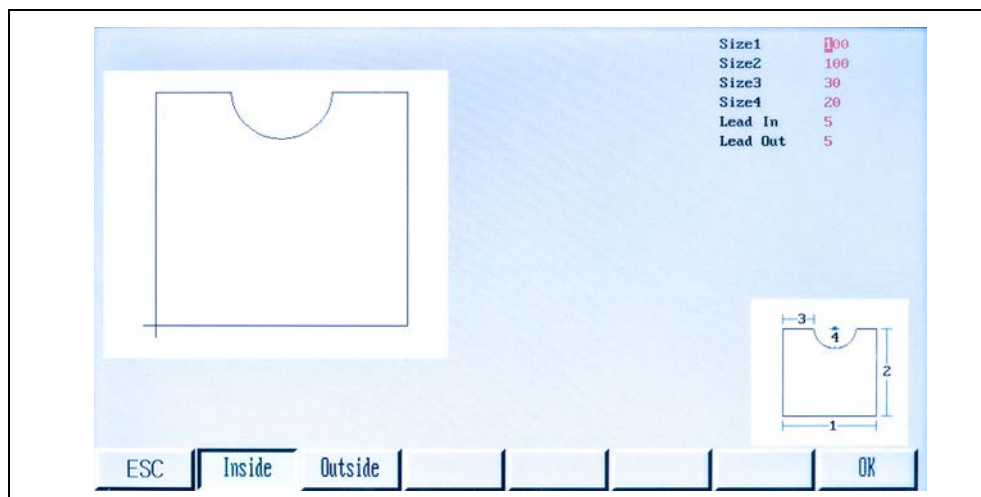
Shape 25



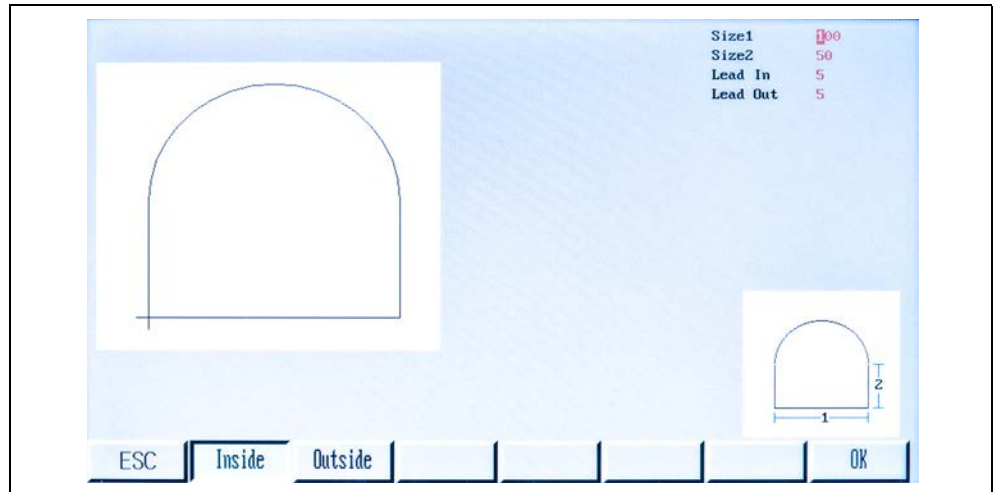
Shape 26



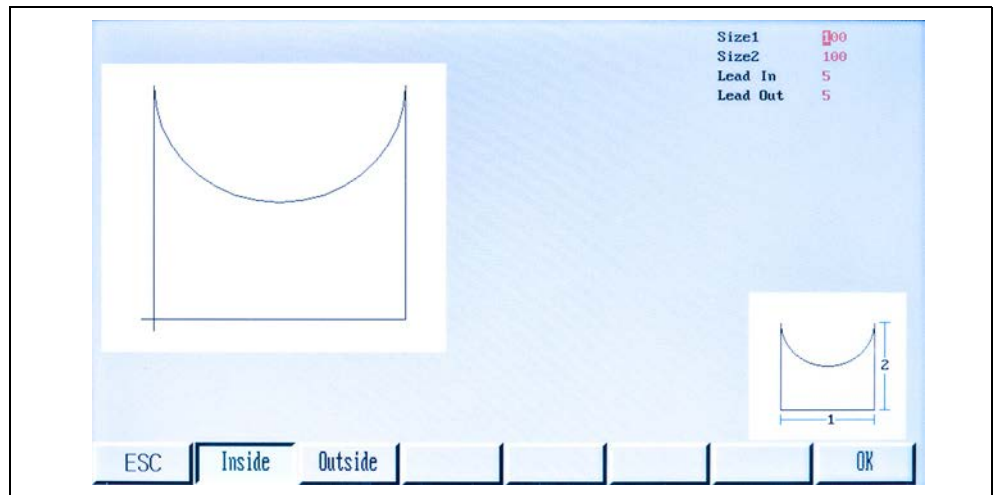
Shape 27



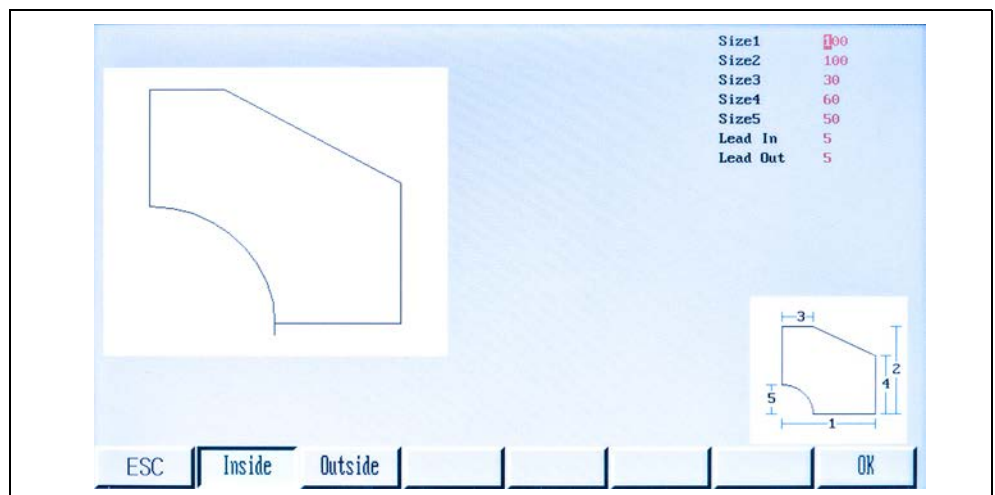
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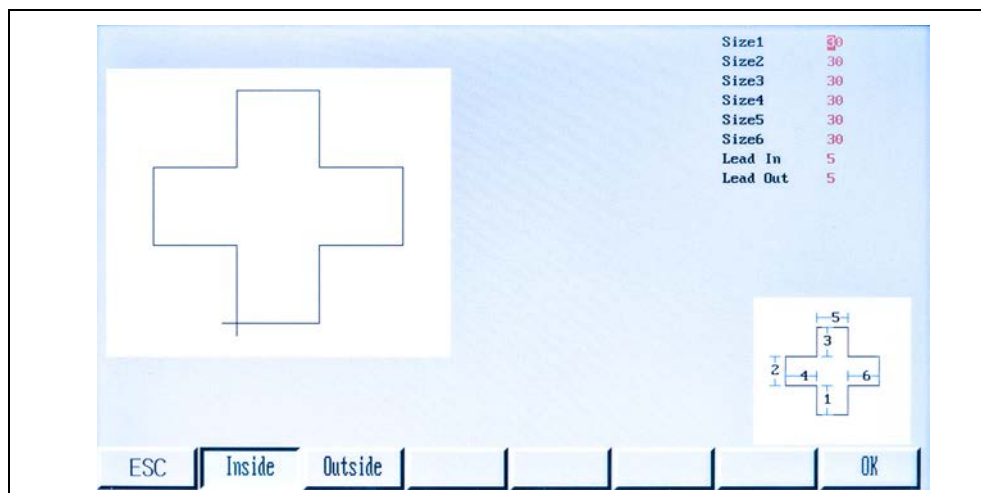
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### Shape 30



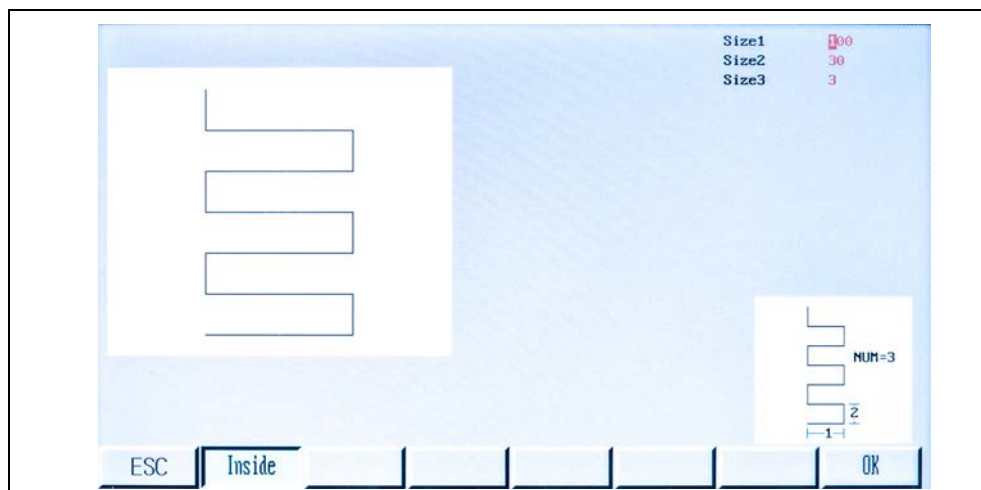
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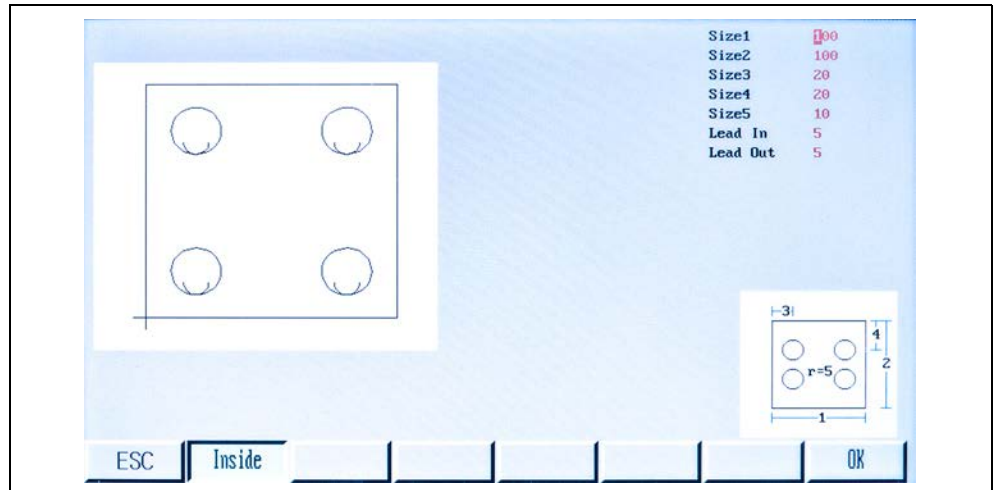
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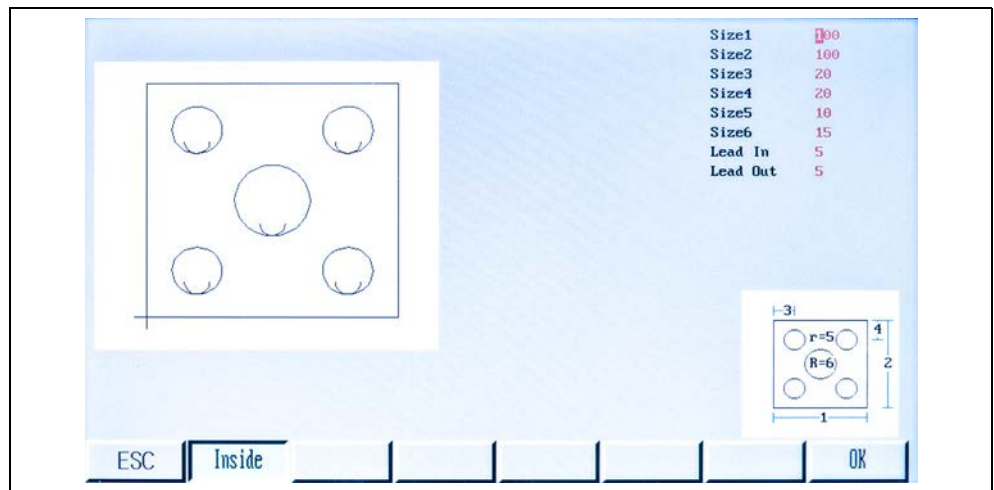
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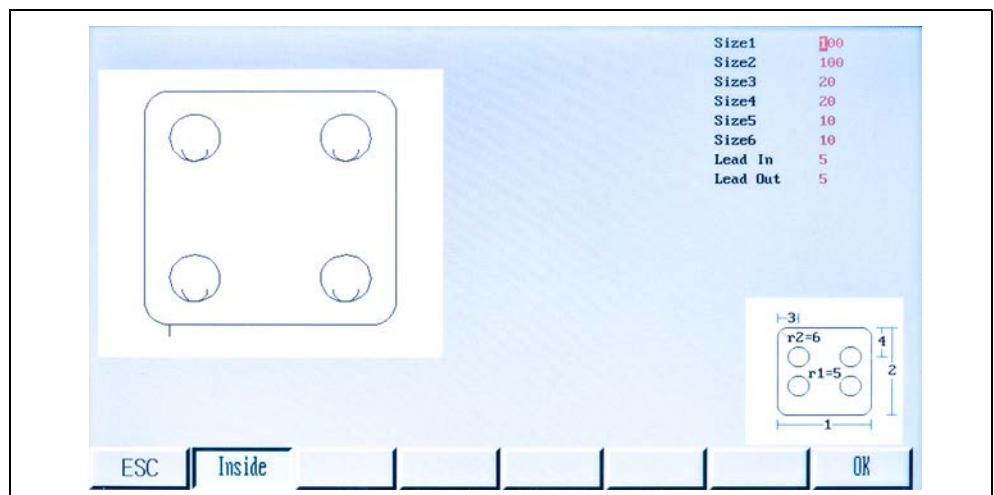
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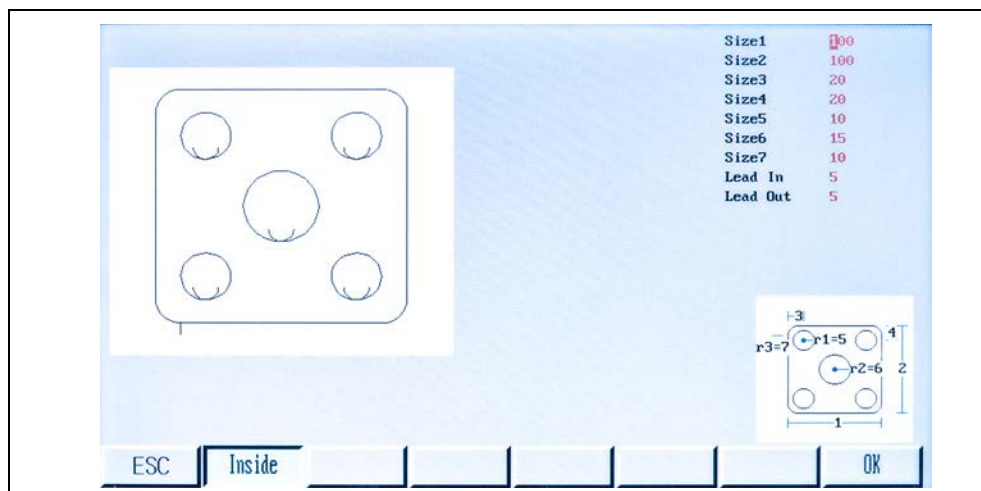
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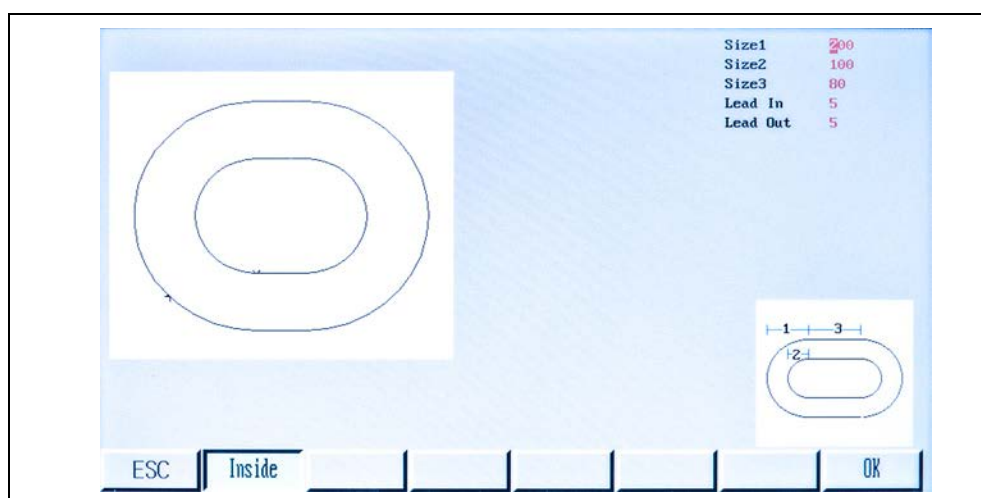
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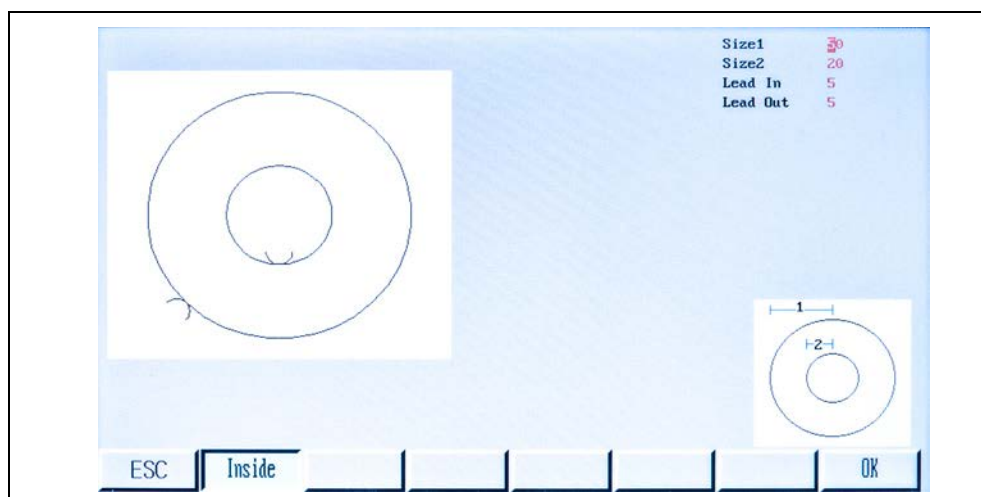
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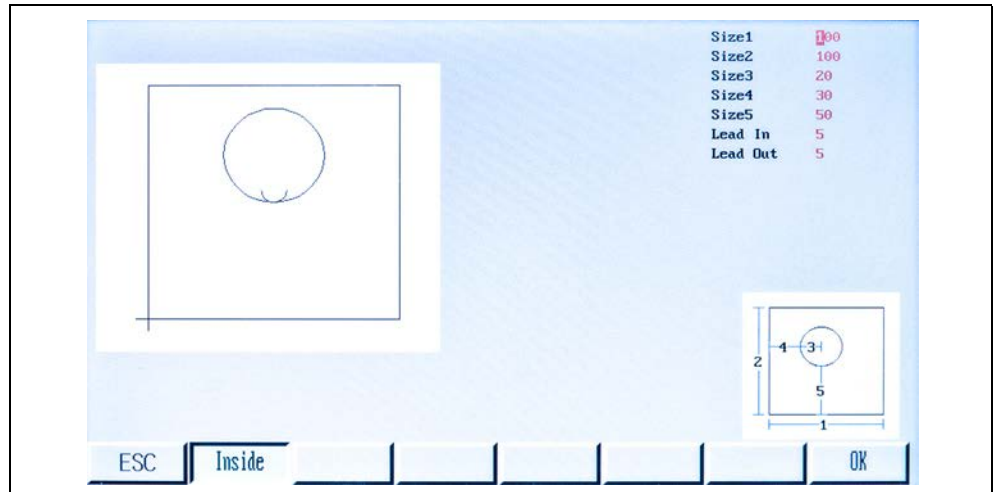
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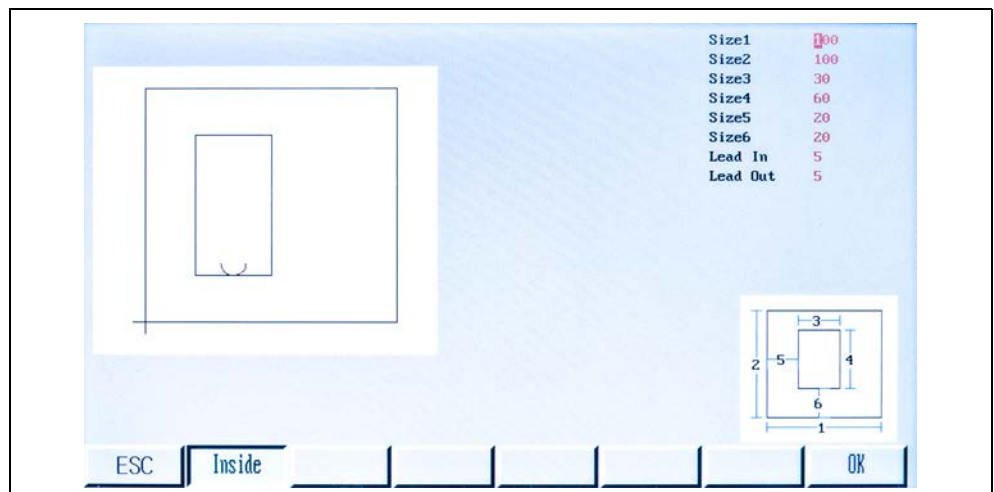
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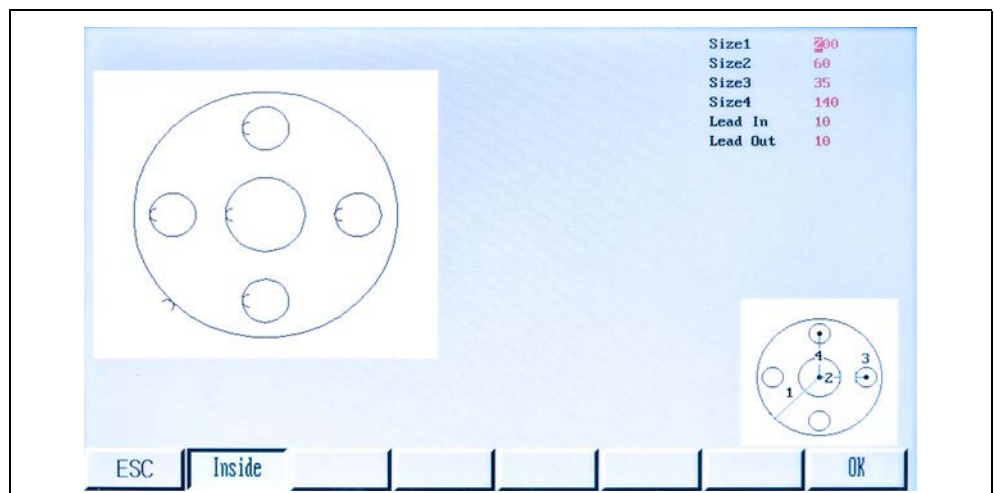
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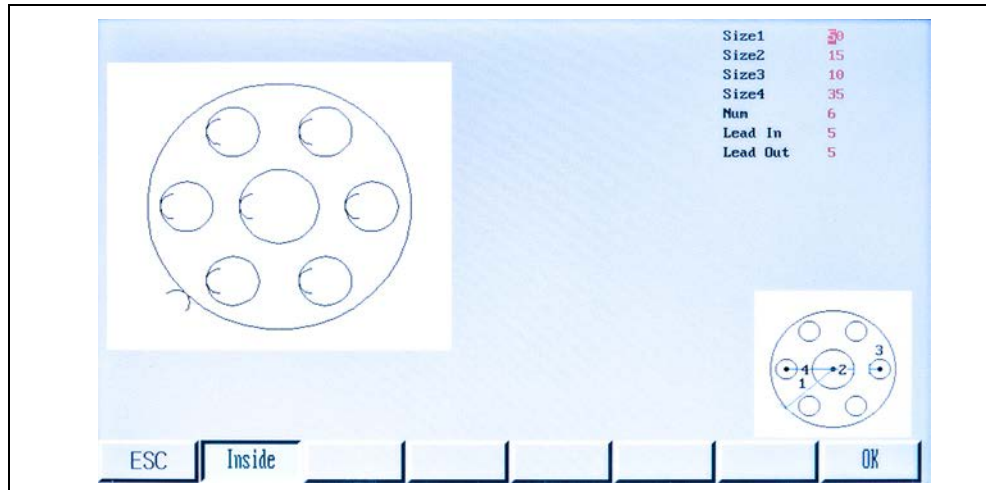
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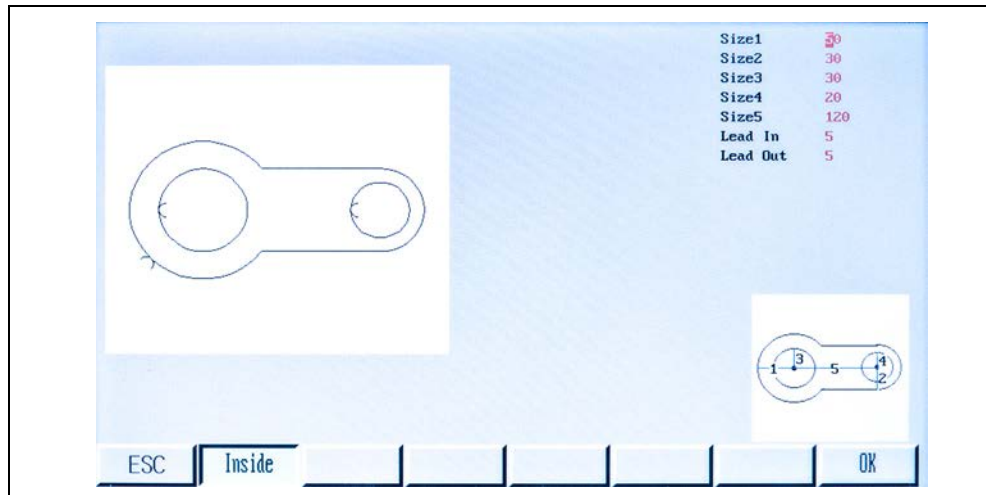
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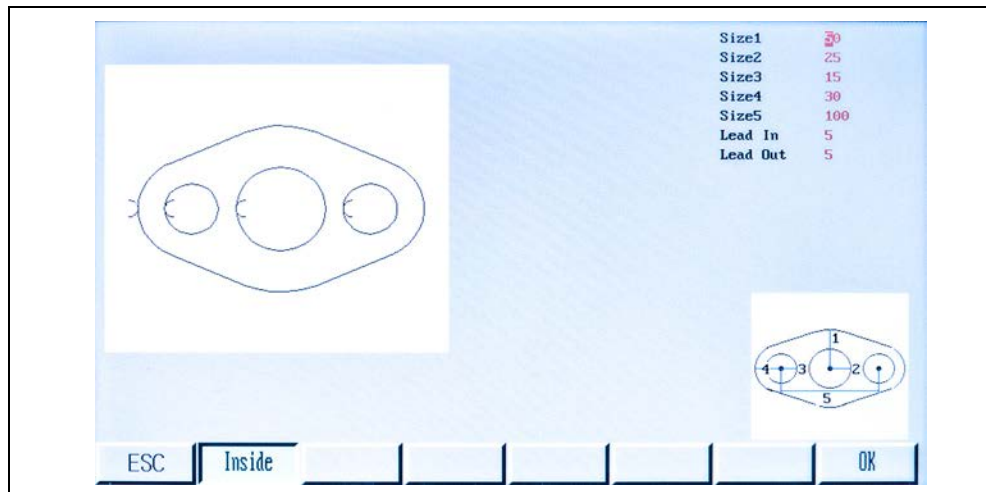
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Shape 44

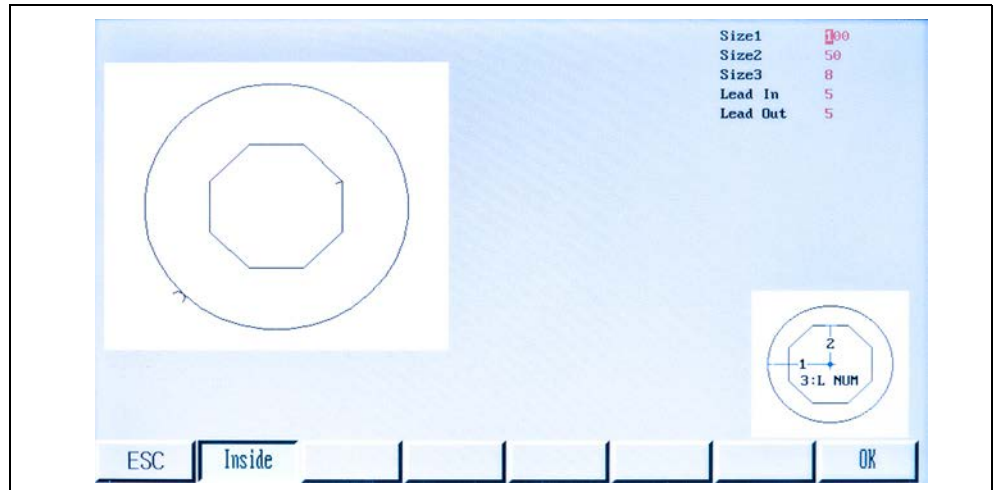


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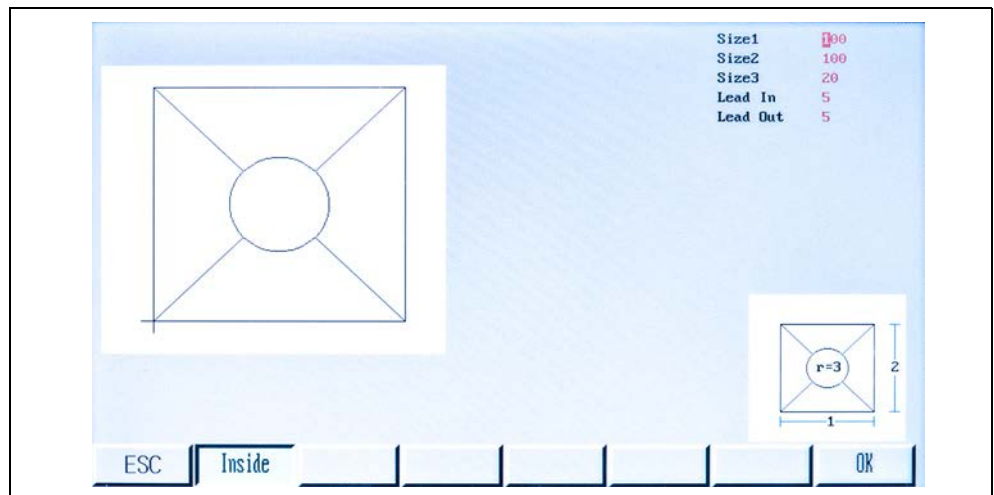




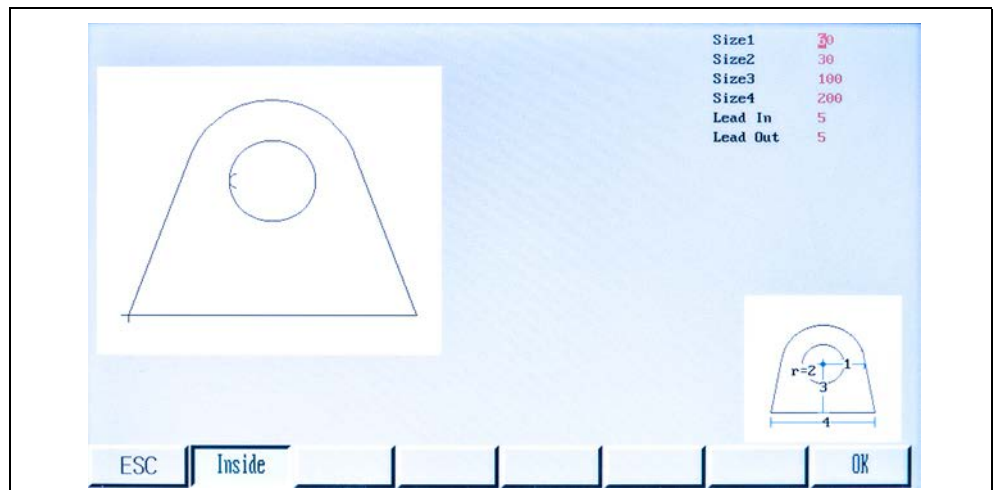
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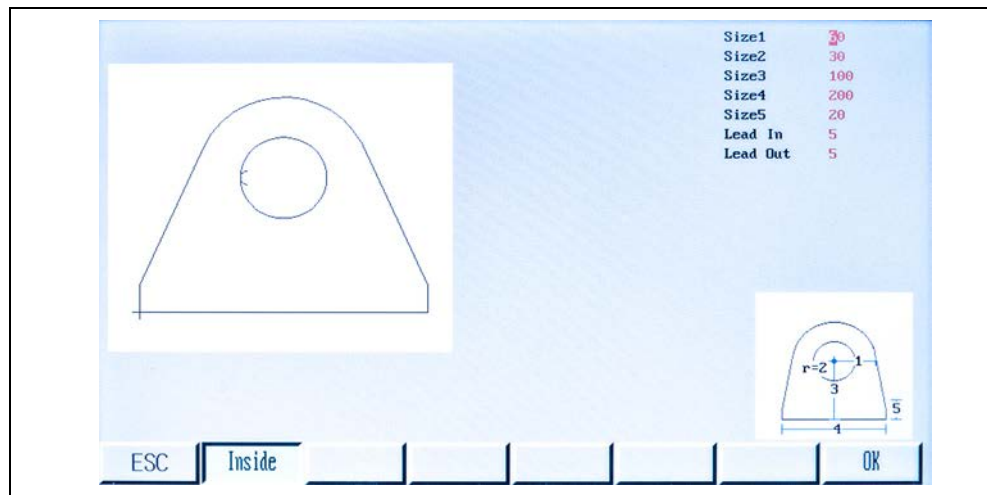
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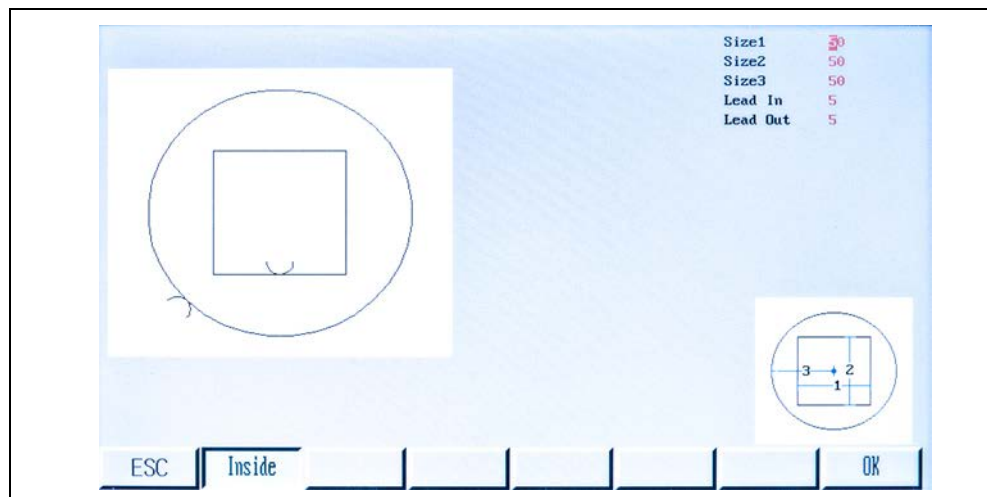
Shape 48



Shape 49



Shape 50



## 19 Appendix

### 19.1 Frequently asked questions

**Q: How do you continue operation after a cutting stoppage during automatic cutting?**

The following functions can be used after cutting is stopped in the automatic mode:

- 1 Press [STOP] and the system will stop.
- 2 The program can be continued immediately by pressing [START].
- 3 If necessary, use the arrow keys [↑] [↓] [←] [→] to adjust the torch position.
- 4 When the torch is at the required position, press [START] to continue cutting.
- 5 Use the [F↑] [F↓] keys to adjust the speed up or down by 1 % for each button press.
- 6 Use the [S↑] [S↓] keys to move the torch up or down.

**Q: How do you restart a cut if the plate did not pierce?**

The system can be sent back to the origin if this happens.

- 1 Press [STOP] to stop system motion.
- 2 Press the [F6] key to move backwards on the path.  
The torch will move backwards on the path until it reaches the piercing point.
- 3 Restart the cutting process and press [START] to begin cutting again.

**Q: If the input power is lost during cutting, or some other interruption causes the program to be abandoned, can the unfinished program be recovered?**

You can use the RESUME function to finish cutting a parked program:

If the program has been stopped and abandoned manually, follow the procedures in section Resuming Parked Programs.

If there is a loss of input power while cutting, the program can easily be recovered as long as the machine is not moved while the input power is off. Follow the procedures in section Resuming Parked Programs, but be sure to select the option 3) RELOCATE PATH so that the program will continue from the current system position.

**Q: Why can some part program files not be read by the CNC after they are copied to the USB stick using Windows Explorer?**

If the file type extension “.MPG” is used, Windows can include metadata in the file or on the disk. It is suggested that files only use the file type extensions “. CNC” or “.TXT” in order to avoid problems.

**Q: Why does the system lock-up when reading the USB stick?**

If the USB stick checks out OK, there may be two reasons:

1. There may be system or hidden files on the USB stick that the CNC is attempting to read. Some system files will cause the CNC to repeatedly attempt to read a file which cannot be understood by the CNC, so it appears to be locked up. It is suggested that the USB stick be freshly re-formatted and only the necessary part programs be stored on it. The USB stick must be formatted according to original instructions. This CNC only supports FAT or FAT32 file systems
2. Inspect the USB socket to see if it may be loose or if it may have become fouled with dirt or soot.

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## **Revision history**

You can find the latest version of the operator manual on our website:  
[www.ex-track.com](http://www.ex-track.com).



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