

Kvara S 550 PC Touch

Numerical Control for Press Brake

Operator's guide

Valid for :

Product : S 550 PC

Product : SW 73 from version 29.2

EDITION : MAY 2013

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Notes

General information

The information contained in this document is only applicable to the software versions indicated on the cover page.

It may happen that not all the functions that can be performed by the product are described in this document; in this case Esautomation is not obliged to guarantee these functions or conserve them in future versions.

Scope

The scope of this document is to help the operator if the product described on the cover page and in the installation / use of the office software.

Users

This document contains information for the:

- Machine operator with no basic computer knowledge
- Operator/technical installer with knowledge of Windows ®

Use

The document is divided into chapters that describe the most common control functions and procedures for installing the Office Software.

Reporting problems

Should any problems arise during consultation of this document please contact Esautomation.

Explanation of the symbols

There may be graphic symbols alongside the text. These are used to highlight particularly relevant information.



Attention

This symbol is used when failure to observe the appropriate precautions **could cause slight damage to property or injury to persons**.



Danger

This symbol is used when failure to observe the appropriate precautions or the performing of incorrect manoeuvres **could cause serious damage to property or injury to persons**.



Important

This symbol is used in the document to indicate the presence of particularly important information. It means that it is essential to read and fully understand this section of the document.



Optional

This symbol is used to indicate sections of the document that describe functions or components that are only optional. The use of optional functions must be agreed upon with the machine manufacturer



Manufacturer

This symbol is used to indicate sections of the document reserved for the machine manufacturer.



Passwords

This symbol is used to indicate sections of the document that describe functions with access controlled by software access passwords.



CN

This symbol is used to indicate sections of the document that describe functions that are only available with NC and not on the PC.



PC

This symbol is used to indicate sections of the document that describe functions that are only available on the PC and not with NC.

Printing conventions

To facilitate the identification of the information in this document, use is made of special printing conventions as illustrated below.

Keypad and video

The following are used:

- The names of the screen-printed keys are highlighted in **bold print** and enclosed in square brackets. If the name of the key is preceded by "Pushbutton" it refers to a pushbutton on the pushbutton panel.
- **[ENTER]**. Identifies the pushbutton bearing the word **ENTER**.
- **[+]** indicates a key + of the keypad whereas pushbutton **[+]** indicates a pushbutton + of the pushbutton panel.
- The names of the function keys are highlighted in **bold print italics** and enclosed in square brackets.
- **[Menu Plc]**. Identifies the function key with the word Menu Plc.
- References to the fields and/or messages on the video are displayed in **bold print italics**.
- The specific text that has to be entered by the user is underscored.
- If the manual indicates "enter ok" the word "ok" must be entered.
- DIRECTION or DIRECTIONAL keys is the collective name of the UP, DOWN, LEFT and RIGHT arrows.
- The pressing in sequence of sets of keys is indicated by separating the identifiers of the key to press with the character ">".
- **[Manual] > [START]**. Describes the pressing in sequence of the keys **[Manual]** and **[START]**.
- The simultaneous pressing of several keys together is indicated by separating the identifiers of the keys themselves with the character "+".
- **[SHIFT] + [à]** Describes the simultaneous pressing of the keys **[SHIFT]** and **[à]**.

Text

The following agreements are used:

- **Italics** are used to highlight specialist terms.
- **Bold print** is used to highlight particularly important words.

Glossary

CNC

The abbreviation of *Computerised Numerical Control* which indicates the apparatus governing the machine, that is, the electronic device via which the work cycles are programmed, the axes are moved, etc...

It corresponds to one of the devices, the operation of which is described in this manual.

SSD

Solid State Disk, also known as Flash Hard Disk, is a data saving device without any components in movement, therefore particularly suited to industrial environments.

Menu selection

To select the menu that interest you must press the button and then select the desired menu using the number:

Setting Menu programmes and tools (0)

Parameter Menu Axes (1)

Menu Configure the Machine (2)

Diagnostics Menu (3)

Menu User Parameter (4)

Menu Turn Off (5)

Menu Esc (6)

Version Menu (7)

Logo Menu (8)

Monitor Menu Memory (9)

Glossary



Menu



Previous



Next



Save



Delete



Programme List

Glossary



Punches and Dies List



Corrections



Save/ Load from disk



Settings



Manual



Semiautomatic

Glossary



Automatic



Stop



Start



Main Menu



- Blue Arrow Main Menu



SubMenu



Keys for manual handling operations; on some versions replaced by a wheel on the front panel.

TOUCH ENVIROMENT

The new interface of the NC Kvara S 550 PC born with a new interactive graphics on which every function is achieved at the touch of your finger, not only because Esautomation Ltd. aligns well to the features most current PC environment but also want to speed up and facilitate the work of its end user.

Soft Keyboard

Whenever you have to set programmes to move data in the input fields, enter and correct data or units or to access to the drawing musk just type on the screen to edit the data directly with your finger and immediately you will see the Soft Keyboard as shown in the Figure.

The Soft Keyboard is a virtual keyboard and interactive that has all the functionality of a PC keyboard but with the advantage that being in touch environment, allows the user to have the keyboard directly on the screen so without losing the visual changes and / or entries made to their work, thus speeding up all the useful operations.

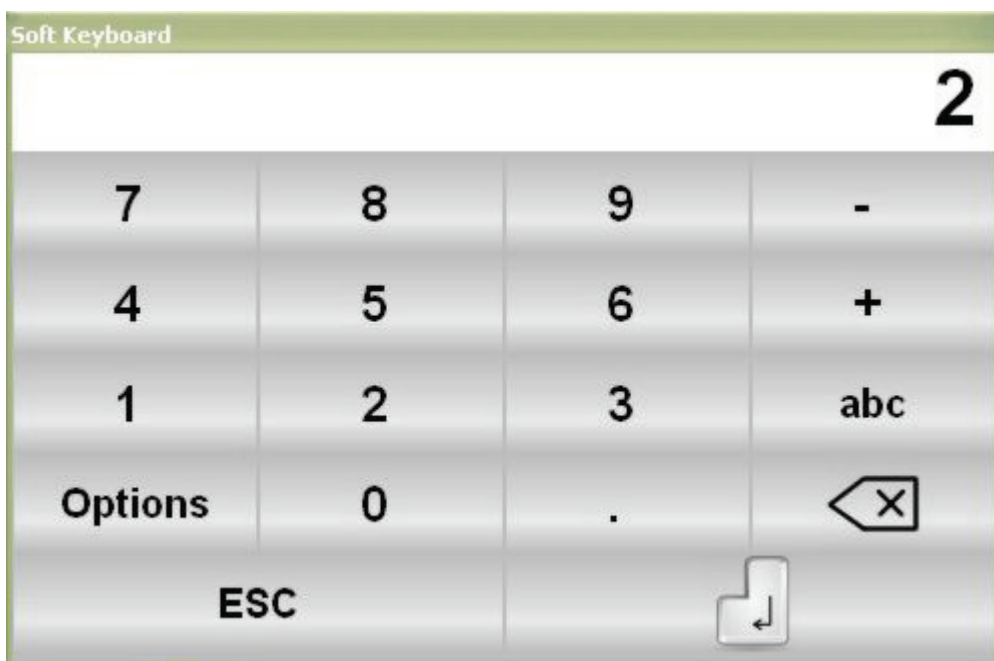



Figure a Soft Keyboard Numbers

The  key means Delete

The  key means Confirm - ENTER

When you confirm a given inserted, the Soft Keyboard normally closes.

TOUCH ENVIROMENT

- By pressing "Option" you can select the "pincushion" to keep the keyboard always on in the foreground, even after confirming the entered data:

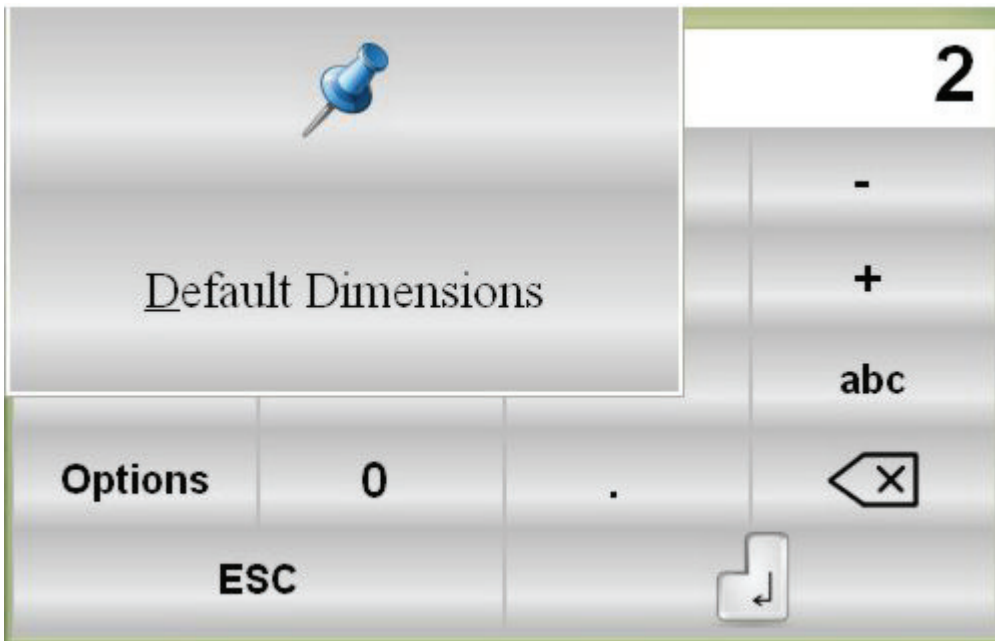


Figure b Soft Keyboard the "pincushion"

- pressing "Default Dimensions" the keyboard is resized to a standard size.
- pressing "abc" will appear in the literary characters to nominate programmes and tools chosen:



Figure c Soft Keyboard the literary characters

Characteristic of Document

Limitations

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Any changes to this document (in either electronic or printed form), even if authorised, shall invalidate the warranties specified hereunder.

Warranties

It is possible for the product to offer types of performance not described in this document. Esautomation does not undertake to conserve these functions in the new versions of the product or to guarantee assistance for the same. It has been verified that the contents of this document comply with the product described. Nevertheless, there may be some discrepancies. As a result, Esautomation cannot guarantee full compliance and completeness of the contents.

The information contained in this document is revised from time to time and when necessary, a new version is issued.

This document has been drafted in partial compliance with the ANSI/IEEE standard 1063-1987 "IEEE Standard for software User Documentation".

Editions

This document is subject to changes without notice. The changes may entail a re-edition or a revision of the document. The re-edition implies complete replacement of the document.

The revision entails the replacement/addition/elimination of pages of the document.

The bottom of every page is identified by the document code.

Notes

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Evolution of Document

The following table contains the documented list of editions of this document:

Evolution

1/05/2013		0	new document
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Change management

--	--	--

1. Machine Setup

Operations to carry out after powering




It is **obligatory** to size the ram in order to access the automatic phase and execute a work programme.

Sizing of the stop axes is **optional**. It is advisable to size them if there are doubts about the correctness of the current stop axes targets. The current targets may not be correct if an axis is moved manually when the numeric control is off.

1.1 Ram sizing

Comply with the following procedure to size the ram:



- press .
- if the ram is up, press the **down pedal** to move it down below the zero marks
- press the **up pedal**; this operation will activate manual re-ascent if the machine has been reset.

The ram will move upwards until it meets both the zero marks of the optic lines of the two cylinders where sizing takes place. It will now be possible to execute a programme in automatic mode.

To repeat the resetting procedure without turning off the NC:

- press [**Repeat Sizing**];
- press the re-ascent pedal.

1.2 Sizing the stop axes

To calibrate the axes of the stop it is necessary to follow the steps below:



- press .




- press .

The stop axes move towards the sizing limit switch. Once the limit switch has been touched, they will reverse their direction and, after having released the limit switch, they will size to the first zero mark of the encoder.

2.Punches and Dies Setup

2.1 Punches and Dies List

Comply with the following procedure to access the tools list:

- press  ; to display the list of punches or list of dies

- if the list of dies appears, press again  to display the punches, or vice versa.

The following window will appear in the case of punches:

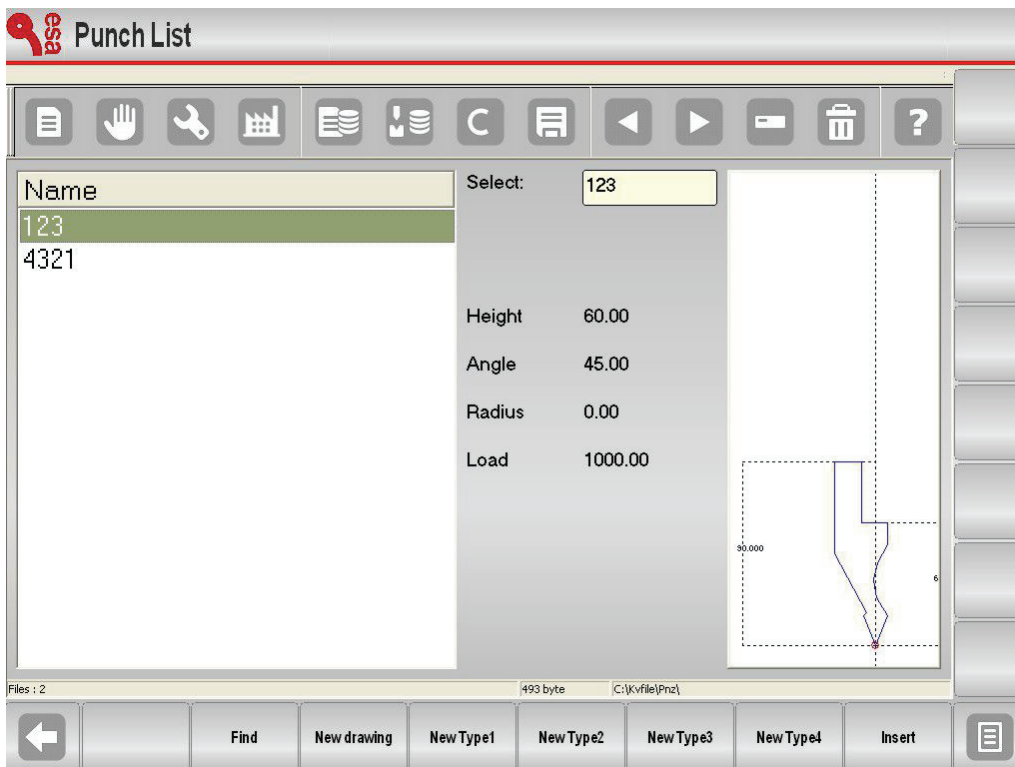


Figure 1 Punches list

The window on the left is the list window.

The central boxes give the data of the punch to which the cursor has set (in the list).

The window on the right gives a preview of the punch to which the cursor has set.

2.Punches and Dies Setup

2.1

The following window will appear in the case of dies:

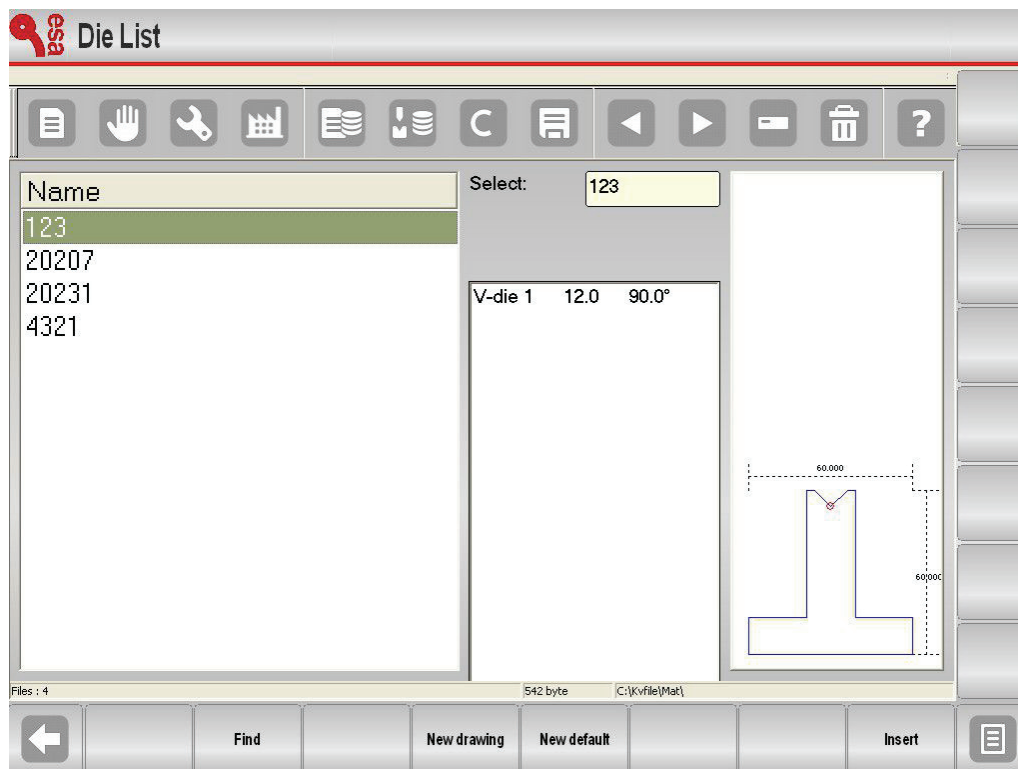


Figure 2 Dies list

The window on the left is the list window.

The central boxes give the data of the die to which the cursor has set (in the list).

The window on the right gives a preview of the die to which the cursor has set.

2.Punches and Dies Setup

2.1

When the available tools are many, for fast choice, is enough to flow the wheel visualized on the panel, with own touch.

The function keys have the following meanings:


- **[List]** to shift the cursor to the list window
- **[Selection]** to move the cursor to the Select box and enter the name of the punch or die in manual mode

To view and use the function keys **[List]** and **[Selection]** must be pressed .

- **[New Drawing]** to completely draw the punch or **[New Drawing]** to completely draw the die
- **[New Type 1]** to use a type 1 preset punch or **[New Preset]** to draw a preset die
- **[New Type 2]** to use a type 2 preset punch
- **[New Type 3]** to use a type 3 preset punch
- **[New Type 4]** to use a type 4 preset punch (round punch).
- **[Insert]** to insert the punch or die selected in the work programme or in the selected bend

How to display the preview


Allows you to display the tool preview (to make it easier to identify). The preview function is normally enabled, but can be disabled if not required. Comply with the procedure below:

- press the  key to access the menu
- select the **[Preview]** item
- the preview item is disabled.

Repeat the operation to re-enable the item again.

How to copy a punch or die

This allows you to create a copy of a tool with another name so that it can then be modified. Move to the tool you wish to copy and then comply with the procedure below:

- press the  key to access the menu
- select the **[Copy]** item
- this accesses a window where the tool name must be entered.

After the name has been entered, move to the **[OK]** button and press **[ENTER]**.


2.Punches and Dies Setup

2.1

How to rename a punch or die

Allows you to change the name of a tool. Move to the tool you wish to rename and comply with the procedure below:




- press the  key to access the menu
- select the **[Rename]** item
- this accesses a window where the new tool name must be entered.

After the name has been entered, move to the **[OK]** button and press **[ENTER]**.

How to erase a punch or die

Allows you to eliminate a tool. Move to the tool you wish to eliminate and comply with the procedure below:



- press the  key
- press **[ENTER]**
- the selected tool will be erased.


Save all tools on USB

Allows you to save all the tools on USB so that they can then be transferred to another numeric control

(useful when backup copies must be created). Comply with the procedure below:

- insert into the USB port and a USB device formatted with enough space to hold the tools.




- press the  key to access the menu
- select the **[Save Tools]** item
- All the tools (dies and punches) will be saved on USB.

2.Punches and Dies Setup

2.1

Erase all tools


Used to erase all the tools. Comply with the procedure below:

- press the  key to access the menu
- select the **[Delete Tools]** item.

All the tools will be Deleted (confirmation is requested for each tool).



Tools list on USB device

Used to display the list of tools USB device. The possible operations are the same as the tool list, then you can copy, rename, delete all tools present on the USB device. Select the list punches and dies and perform the following steps:

- insert into the USB port a device containing tools (created by kvara S550 PC Touch)
- press the  key.
- the list of punches or dies on USB will be displayed
- proceed with the required operation.

How to save all tools from USB to NC

Allows you to save the tools from floppy disk to NC, so that they can be downloaded from another numeric control Comply with the following procedure:



- insert into the USB port a device containing tools (created by kvara S550 PC Touch)
- press the  key.
- list is displayed punches and dies of the USB device.
- press the  key to access the menu
- select the **[Save Tools]** menu.

All the tools (dies and punches) will be saved from USB to NC.

2.Punches and Dies Setup

2.1.1 How to enter a new punch

Comply with the following procedure to enter a new punch:

- press the  key ; the list of punches or list of dies will appear
- If you see the list dies press again the  key.

Select the desired type of punch. The punch can either be completely drawn or three types of preset punches with fixed measurements can be used. These measurements are varied in order to rescale and re-design the punch.

The following types of preset punch are available:

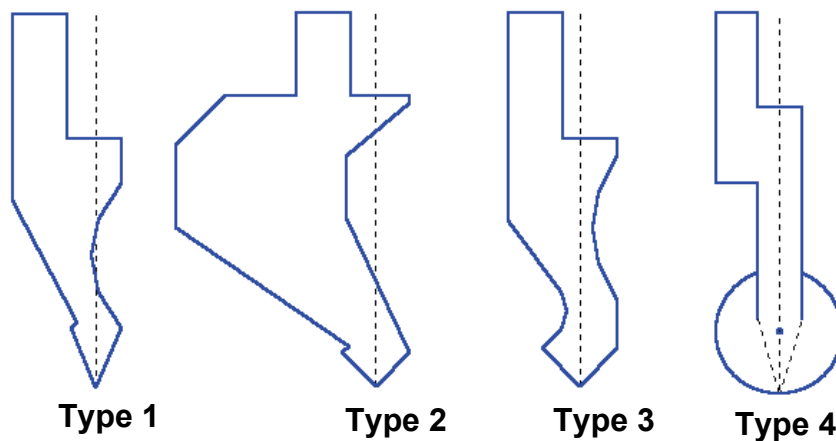


Figure 3 Types of preset punch

2.Punches and Dies Setup

2.1.1

It is advisable to use preset punches if the punch to be entered is similar to one of the proposed types (taken from the catalogues), since the drawing will be less difficult.

The punch must be completely drawn if it is not within the preset punch categories.

Note

Remember that the punch drawing is used to make anti-collision checks for the graphically designed work pieces, while the bending depth calculation is developed according to the punch dimension data. If there are difficulties in completely drawing a punch, the problem can be obviated by using a type of preset punch and attempting to adapt it to the real shape as much as possible by means of the pre-defined data.

- press

- **[New Drawing]** to completely design the punch;
- **[New Type 1]** to use a preset punch type 1;
- **[New Type 2]** to use a preset punch type 2;
- **[New Type 3]** to use a preset punch type 3.
- **[New Type 4]** to use a type 4 preset punch (round punch).

A window will be opened requesting entry of the punch dimensions:

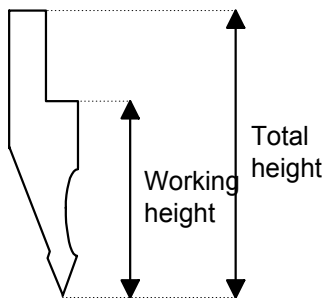


Figure 4 Punch dimensions

Enter the total height and working height as indicated in the figure.

2.Punches and Dies Setup

2.1.1

Access to the drawing mask

Access the drawing mask once the punch dimensions have been entered and the type of punch selected. The drawing mask changes, depending on the type of punch selected:

- move to the [**Confirm**] button and press [**ENTER**].

2.1.2 Punches to draw

The punches to draw mask is obtained by means of the drawing function (see relative chapter in the operator manual).

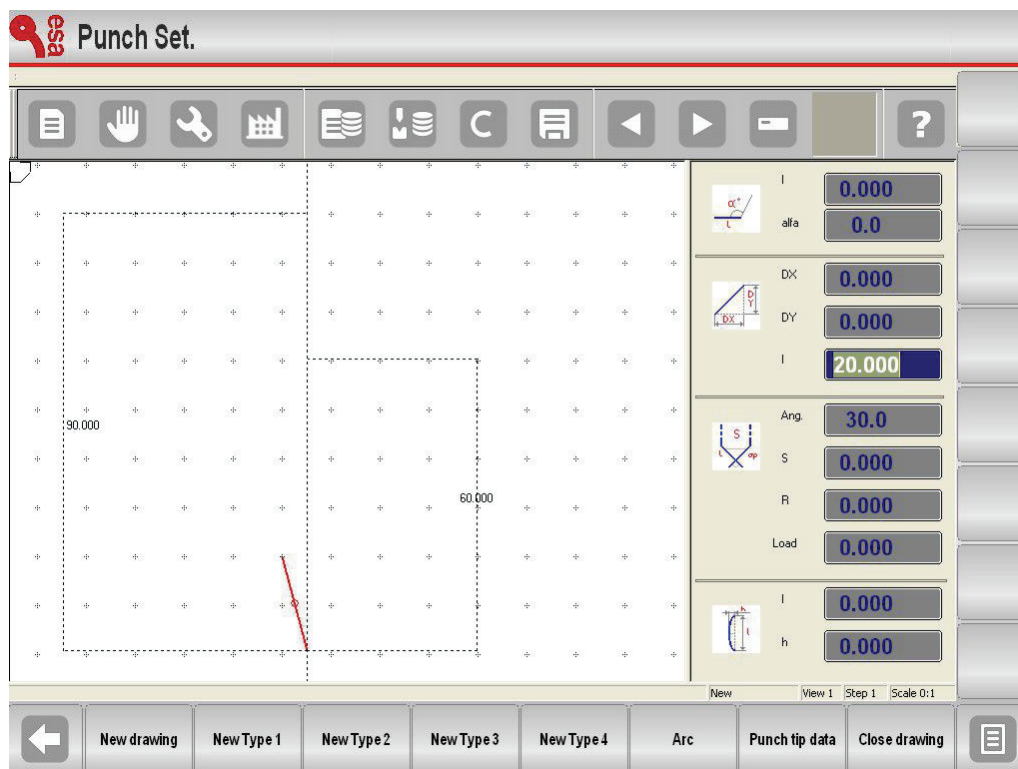


Figure 5 Punch drawing mask

2.Punches and Dies Setup

2.1.2

The left-hand window is the drawing window.

The four right-hand windows are drawing data entry windows and respectively represent:

- The polar drawing data
- The Cartesian drawing data
- The vertex drawing data
- The arc drawing data

Drawing conventions

The punch must be drawn in an anticlockwise direction, remembering that the stop is on the right-hand side of the punch itself.

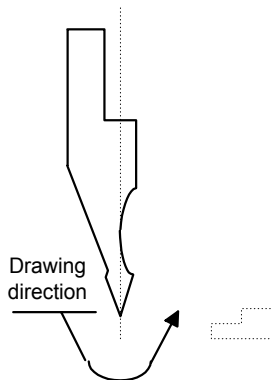


Figure 6 Punch drawing direction

Vertex entry

The tip must be defined in order to use the punch drawing. When the drawing is commenced, the marked line represents one of the two sides of the tip. Proceed in the following way to define the tip:

- enter the length l (section l);
- press **[ENTER]**;
- Enter the tip angle (ang. angle);
- press **[ENTER]**;
- Enter the chamfer (S data item)
- press **[ENTER]**;
- enter the tip radius (R data item);
- press **[ENTER]**;
- enter the punch load (maximum tons for meter);
- press **[ENTER]**.

The tip will be drawn and the next section will be automatically drawn with the same length as entered in section 1.

2.Punches and Dies Setup

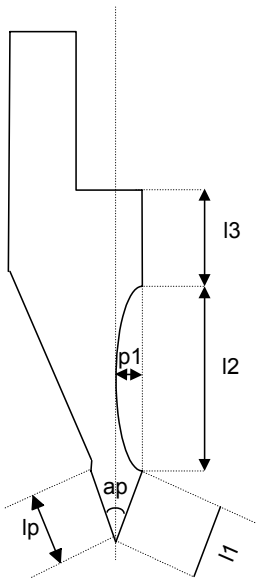
2.1.2

How to do the drawing

Supposing that the following punch must be drawn:

The cursor is in Field 1 of the data entry window of the drawn tip data:

- enter the tip data as previously described
- enter the length of the second side of the tip (section I1)
- press **[ENTER]**: the cursor will set to the **alpha** Field where the angle is entered in relation to the next section
- Press on the display to move to the design, using own touch (touch environment)
- press **[ENTER]**: the next section will be drawn in automatic mode. The section to which the data refer will be marked, the cursor will move to Field 1 where the length of the section is entered
- press **[Arc]**
- enter the length corresponding to section I2 in Field 1
- enter the depth corresponding to section p1 in Field h
- press **[ENTER]**
- enter the length corresponding to section I3 in Field 1
- press **[ENTER]**: the cursor will move to the **alpha** Field where the angle is entered in relation to the next section
- enter value 90.0 in the **alpha** field
- press **[ENTER]**: the next section will be drawn in automatic mode. The section to which the data refer will be marked, the cursor will move to Field 1 where the section length can be entered. The punch drawing will form by continuing to alternatively enter the lengths and angles. The more the entered measurements and angles correspond to reality, the more the drawing will be correct. Figure 7 Example of a punch to be drawn



2.Punches and Dies Setup

2.1.2

Graphic helps

In relation to sections whose measurements may cause difficulties, the operator can use graphic helps allowing the angle value to be varied by $\pm 1^\circ$ and the length to be varied by $\pm 1\text{mm}$ each time. This achieves a visual correspondence between the drawing and the real punch. To enable this feature, only valid for settings punches:

- press the  key to access the menu
- select the **3&DYNAMIC**





The angle value is increased by 1° by pressing the right arrow and is diminished by one degree at a time by pressing the left arrow. The length value is increased by pressing the up arrow and decreased by pressing the down arrow.

Drawing curved sections

As shown in the example, the drawing function can be used to draw curved sections. Press the **[Arc]** key and the cursor will move to the arc data entry window. Enter length l and depth h of the arc and the curve corresponding to the entered data will be automatically plotted.

Entered data correction

Incorrect entries may be made during drawing entry. Correct these entries and move amongst the various drawn

- sections by means of the  and  keys and by modifying the values of the fields.
- use the  key to switch to the immediately previous entry Field and then alternatively pass to a section entry Field (1) and an angle entry Field (alpha)
- the  key immediately passes to the next section and, thus, always to the section entry Field (1)
- press **[ENTER]** to pass to the immediately following entry Field and to then alternatively pass to a section entry Field (1) and an angle entry Field (alpha).

2.Punches and Dies Setup

2.1.2

Error correction

A very frequent error (particularly if the arrows are used to enter the angles) is that of forgetting to press **[ENTER]** after having entered an angle. At this point, the length of the section will be entered in the angle entry field, thus creating an error in the drawing.



if the key to move back to the angle entry Field and re-enter the correct value.

Saving the drawing



At the end of the drawing, press the key to memorize it. Enter the name of the punch in the window that appears. After the name has been entered, move to the **[Confirm]** button and press **[ENTER]**.

Tolerated name characters

The entered name can be formed by a combination of numbers and letters (e.g. the code of the punch in the catalogue can be used).

2.Punches and Dies Setup

2.1.3

Saving the drawing



At the end of the drawing, press the key to memorize it. Enter the name of the punch in the window that appears.

After having entered the name, move to the **[Confirm]** button and press **[ENTER]**.

Tolerated name characters

The entered name can be formed by a combination of numbers and letters (e.g. the code of the punch in the catalogue can be used).

2.2 How to enter a new die

Comply with the following procedure to enter a new die:



- press the key; the list of punches or list of dies will appear



- if the list of punches appears, press the key again.
- select the required type of die. The die can be completely drawn or the preset die with fixed dimensions can be used.
These measurements can be varied in order to rescale and de-design the die:

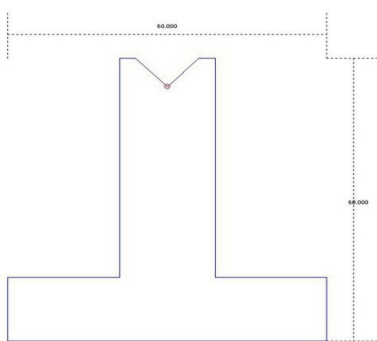


Figure 9 Available types of preset die

2.Punches and Dies Setup

2.2

It is advisable to use preset dies if the die to be entered is similar to one of the proposed types (both square and overturned T dies can be drawn), since the drawing will be less difficult.

The die must be completely drawn if it is not within the preset die categories, if a die with several cavities must be drawn or if square or pressing cavities must be used.

Note

Remember that the die drawing is used to make anti-collision checks for the graphically designed work pieces, while the bending depth calculation is developed according to the die dimension data. If there are difficulties in completely drawing a die, the problem can be obviated by using a type of preset die and attempting to adapt it to the real shape as much as possible by means of the pre-defined data:

press:

- **[New Drawing]** to completely design the die;
- **[New Predefined]** to use the data of the preset die.

A window will be opened requesting entry of the die dimensions:

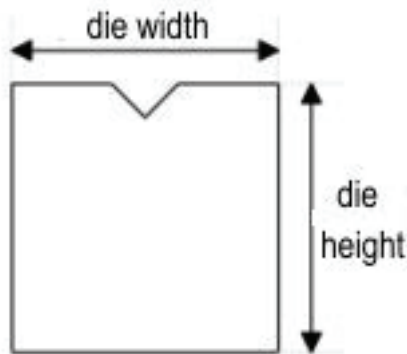


Figure 10 Die dimensions

Enter the die height and width as indicated in Figure 10

Access to the drawing mask

Access the drawing mask once the die dimensions have been entered and the type of die selected. The drawing mask changes, depending on the type of die selected:

Move to the **[Confirm]** button and press **[ENTER]**.

2.Punches and Dies Setup

2.2.1 Dies to draw

The dies to draw mask is obtained by means of the drawing function (see relative chapter in the operator manual).

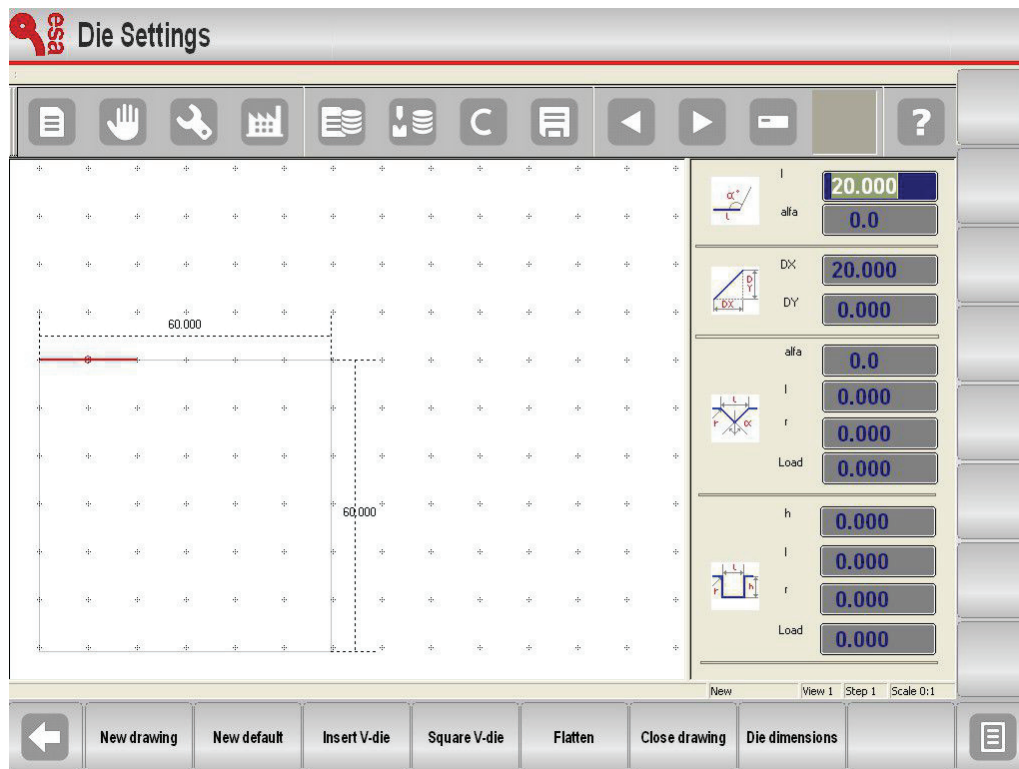


Figure 11 Die drawing mask

The left-hand window is the drawing window.

The four right-hand windows are drawing data entry windows and respectively represent:

- 1) The polar drawing data;
- 2) The Cartesian drawing data;
- 3) The v cavity drawing data;
- 4) The square cavity drawing data.

2.Punches and Dies Setup

2.2.1

Drawing conventions

The die must be drawn in a clockwise direction, remembering that the stop is on the right-hand side of the die itself.

Drawing direction

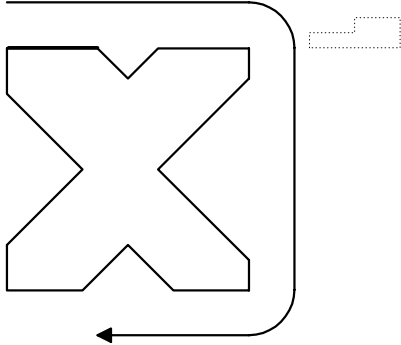


Figure 12 Die drawing direction

The marked line represents the line initially proposed in the drawing mask.

How to do the drawing

Supposing that the following die must be drawn:

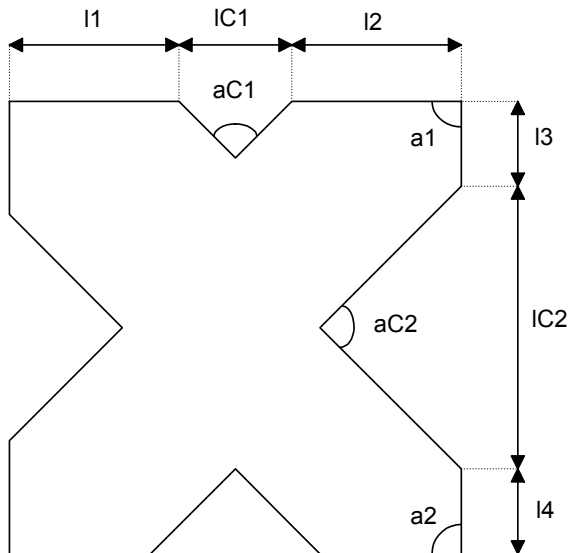


Figure 13 Example of a die to be drawn

2.Punches and Dies Setup

2.2.1

The cursor is in Field 1 of the polar drawing data entry window:

- enter the length corresponding to section I1 in Field 1;
- press **[ENTER]**: the cursor will set to the α Field where the angle is entered in relation to the next section. Now define the first cavity of the die.

Cavity entry

Comply with the following procedure:

- press **[(Insert Cavity)]**; the data entry window will automatically switch to the cavity data where it is necessary to:
- enter the cavity angle (angle aC1);
- press **[ENTER]**;
- enter width I of the cavities (section IC1);
- press **[ENTER]**;
- enter radius R of the cavity.
- press **[ENTER]**;
- enter the cavity load (maximum tons for meter);
- press **[ENTER]**; the cavity will be drawn and the next section automatically entered. The cursor will return to the polar data entry window;
- enter the length corresponding to section I2 in Field I;
- press **[ENTER]**;
- enter the value of angle a1;
- press **[ENTER]**; the next section will be drawn in automatic mode. The section to which the data refer will be marked, the cursor will move to Field I where the length of the section is entered;
- enter the length corresponding to section I3 in Field I;
- press **[ENTER]**; the cursor will move to the α Field where the angle is entered in relation to the next section.

2.Punches and Dies Setup

2.2.1

The second die cavity must now be defined:


- press **[Insert Cavity]**; the data entry window will automatically switch to the cavity data where it is necessary to:
 - enter the cavity angle (angle $aC2$);
 - press **[ENTER]**;
 - enter length l of the cavities (section $lC2$);
 - press **[ENTER]**;
 - enter cavity radius R ;
 - press **[ENTER]**;
 - enter the cavity load (maximum tons for meter);
 - press **[ENTER]**; the cavity will be drawn and the next section automatically entered. The cursor will return to the polar data entry window;
 - enter the length corresponding to section $l4$ in Field l ;
 - press **[ENTER]**;
 - enter the value of angle $a2$;
 - press **[ENTER]**.


The die drawing will form by continuing to alternatively enter the lengths and angles. The more the entered measurements and angles correspond to reality, the more the drawing will be correct.

Entered data correction

Incorrect entries may be made during drawing entry. Correct these entries and move amongst the various drawn

sections by means of the  and  keys and by modifying the values of the fields.

- if the  key to switch to the immediately previous entry Field and then alternatively pass to a section entry Field (1) and an angle entry Field (alpha)

- the  key immediately passes to the next section and, thus, always to the section entry Field (1)

- press **[ENTER]** to pass to the immediately following entry Field and to then alternatively pass to a section entry Field (1) and an angle entry Field (alpha).

2.Punches and Dies Setup

2.2.1

Error correction

A very frequent error (particularly if the arrows are used to enter the angles) is that of forgetting to press **[ENTER]** after having entered an angle. At this point, the length of the section will be entered in the angle entry field, thus creating an error in the drawing.



Use the  key to move back to the angle entry Field and re-enter the correct value.

Square cavity entry

The die drawing mask can be used to enter square cavities. To enter one of these, carry out the following operations when on angle entry Field α of the section prior to the cavity itself:

- press **[Square cavity]**.

This accesses the square cavity data entry window.

- enter the depth of the cavity;
- press **[ENTER]**;
- enter width l of the cavity;
- press **[ENTER]**;
- enter radius R of the cavity;
- press **[ENTER]**;
- enter the cavity load (maximum tons for meter);
- press **[ENTER]**; the square cavity will be drawn with the newly entered data. The cursor will return to the polar data description window in order to describe the next die section.

Square cavity conventions

If a square cavity has been entered, the minimum bend angle that can be made is the angle corresponding to a v cavity of the entered width and depth.

Pressing cavity entry

The die drawing mask can be used to enter pressing cavities. To define one of these, it is necessary to indicate which are the sections that determine die closing by their movement and then draw a section squashed on both sides.

- draw the profile of the open die with the nook of the part to be squashed;
- draw the profile of the open die with the recess of the flattening part;
- set the cursor to the section to be defined (vertical section);
- press **[Press]**.
- the section defined as the flattening part will appear hatched on the drawing.

2.Punches and Dies Setup

2.2.1

The following figure shows an example of the bending flattening die.

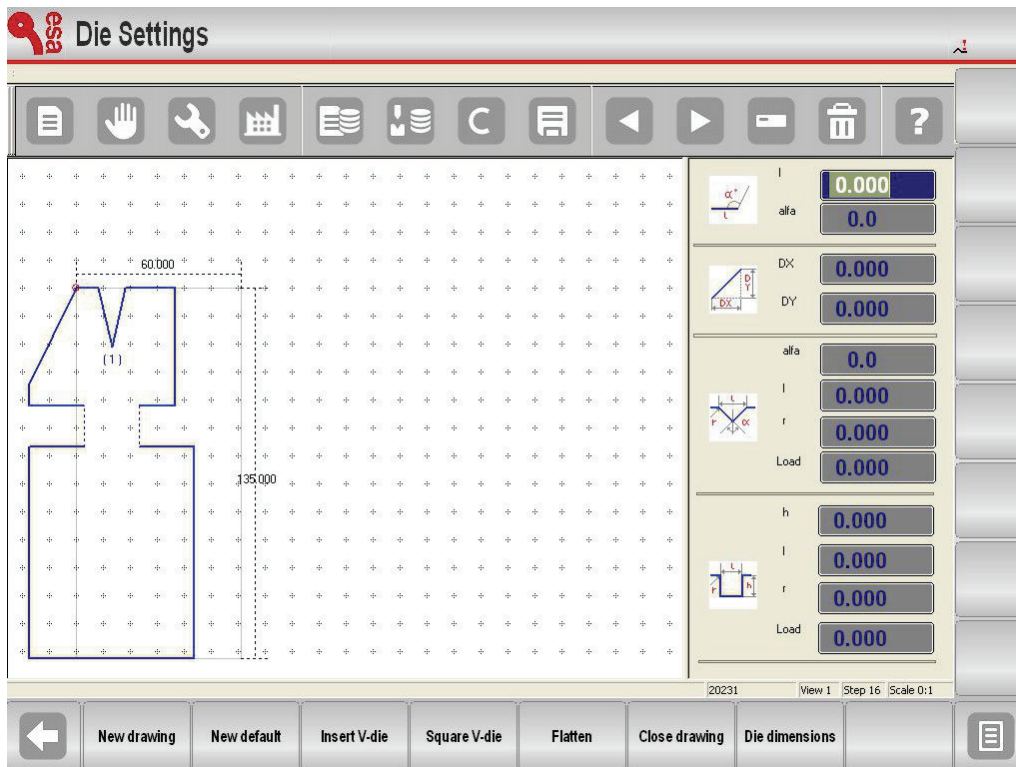


Figure 14 Drawing of the flattening die

How to enter cavities for squashing pneumatics

The die drawing mask can be used to enter cavities for squashing pneumatic.

To define one, two squash 0.001 mm length sections must be indicated on both sides of the die.

2.Punches and Dies Setup

2.2.1

- draw the profile of the open die with the recess of the flattening part, but enter 0.001 mm for this section (as though the die were closed);
- move the cursor to the section to be defined for squashing;
- press [**Squash**];
- the section defined as the flattening part will appear hatched in the drawing (even though it will be difficult to see);
- once the die has been drawn, press [**Die Dimensions**] and digitize 1 in the Pneumatic field;
- move to the [**OK**] button and press [**ENTER**];
- from this moment onwards, function 2 will be automatically enabled on the clinched bends.

When the bend is flattened with the pneumatic die, this latter will open and will then drop in the fast mode with the ram. The tools could touch each other in the fast mode (something to be avoided). The flattening opening target must be set in the general parameters if, during bend flattening, the ram must change speed (switch to the slow mode) first (at a higher target) (consult the machine parameters manual).

Entry of the pneumatic flattening die support

A new method for handling the pneumatic die support is available from version 13.2 onwards. If the press has a pneumatic flattening die support, the relative data can be entered in the General Parameters Configuration mask (refer to the machine parameters manual). Once the data have been entered, flattened bends can also be obtained in the graphic mode using standard dies without having to draw particular dies with bending-flattening functions.

Saving the drawing



At the end of the drawing, press the  key to memorize it.

Enter the name of the die in the window that appears.

After the name has been entered, move to the [**OK**] button and press [**ENTER**].

Tolerated name characters

The entered name can be formed by a combination of numbers and letters (e.g. the code of the die in the catalogue can be used).

2.Punches and Dies Setup

2.2.2 Preset dies

The preset die mask is presented in the form of a pre-drawn die along with a series of data that characterize the shape of that die.

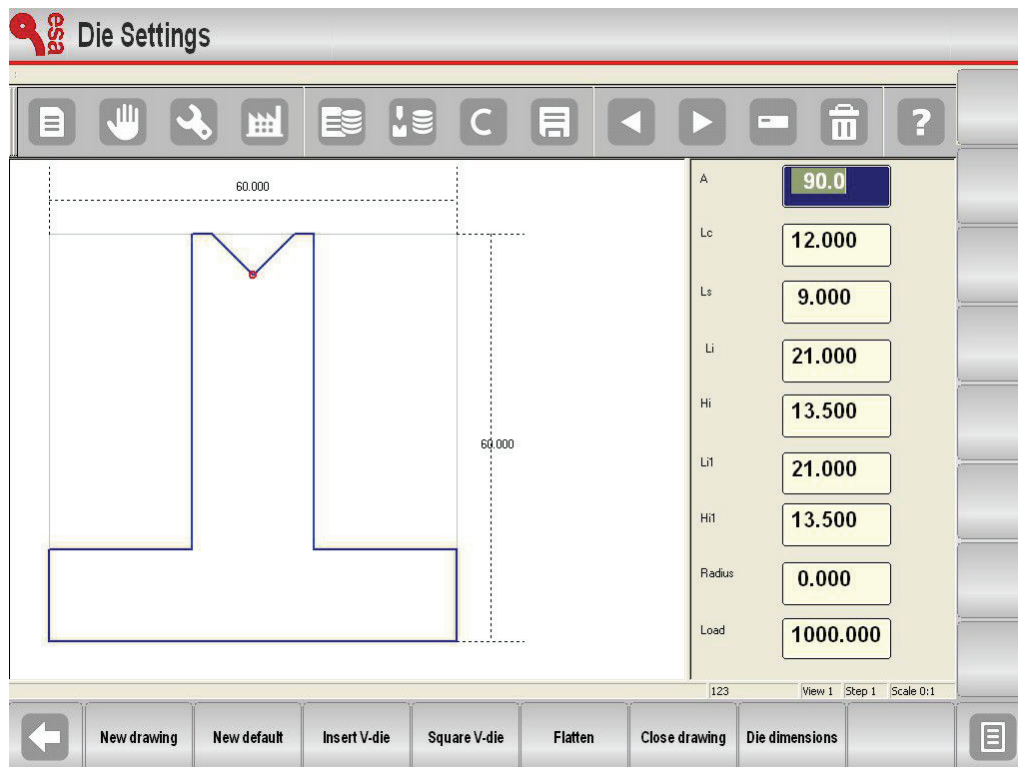


Figure 15 Preset die

When the data are scrolled with the arrows or **[ENTER]** key, an indication will appear on the drawing as to which measurement corresponds to the selected data item.

By modifying any one of the values and pressing **[ENTER]**, the drawing will be re-plotted by taking the modified value into account.

Saving the drawing



At the end of the drawing, press the  key to memorize it.

Enter the name of the die in the window that appears.

After the name has been entered, move to the **[OK]** button and press **[ENTER]**.

3.Programming

3.1 List of programmes

To enter the list of programmes it is necessary to follow the steps below:

- press  .
- the following window will appear:

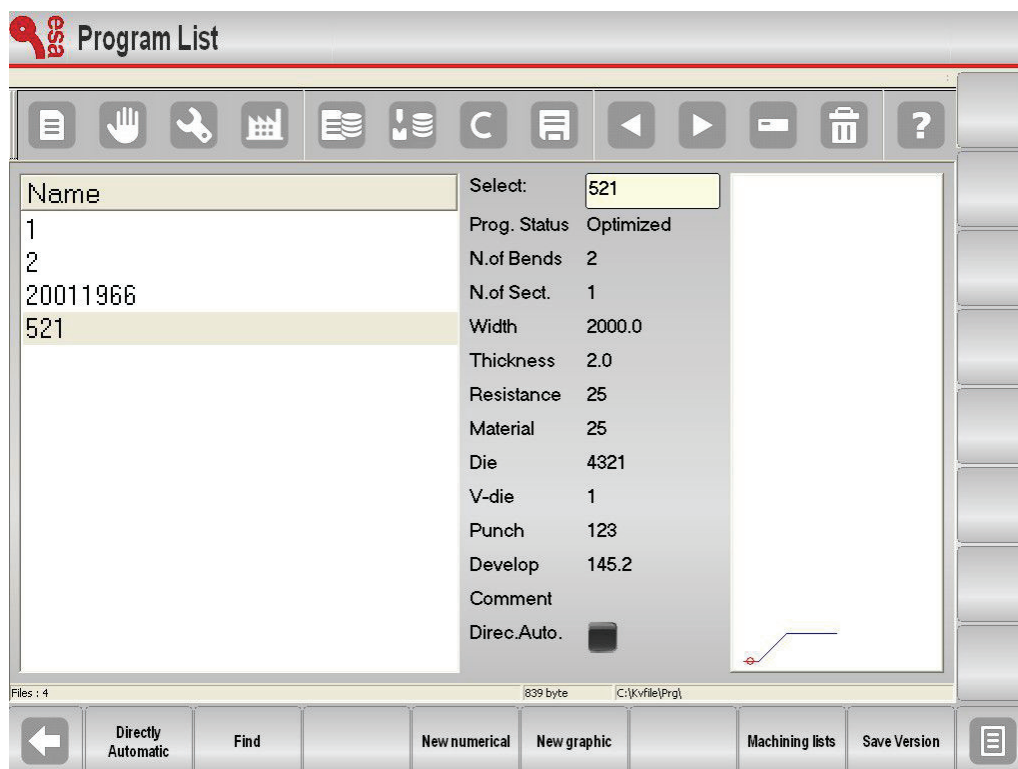


Figure 16 List of programmes

The window on the left is the list window.

The central boxes contain the programme data on which the cursor is positioned (on the list).

The window on the right shows a preview of the punch on which the cursor is found.

3.Programming

3.1

To scroll down the programmes available on the list just use your finger.

The function keys displayed have the following meanings:

[directly in automatic] by pressing and enabling this function, a symbol (small red square) will appear on the right of the words **DirectAuto** to remind the use of the type of selection and method if entering in automatic.


In fact, with this selection, when choosing a programme on the list instead of going to the editor mask, it is possible to carry out the programme by going directly into Automatic mode.

- **[Search]** to find a programme in the list window.
- **[New Numeric]** to set a new numeric programme.
- **[New Graphic]** to set a new graphic programme.
- **[Save Version]** to save the programmes in a previous version.

How to view the Preview

This allows you to see the preview of the programme (if the programme is graphic). The preview is normally enabled but if desired you can also disable it by following the steps below:




- press the  key to open the menu.
- select the item **Preview (4)**.
- the window preview window will be disabled.
- to re-enable it just repeat the steps above.

How to copy a program

This allows you to create a copy of a programme with another name so that you can change it. Move onto the programme you wish to copy and follow the steps below:



- press the  key to open the menu.
- select the item **Copy (0)**.
- a window will open in which it will be necessary to enter the name of the programme.
- after entering the name, move onto the **[Confirm]** key and press **[ENTER]**.


3.Programming

3.1

Renaming a program

This allows you to change the name of programme. Move onto the programme you wish to rename and follow the steps below:




- press the  key to open the menu.
- select the item **Rename(1)**.
- a window will open in which it will be necessary to enter the new name of the programme.
- after having entered the name move onto the **[Confirm]** key and press **[ENTER]**.

Saving a program

This allows you to save a programme on the USB device in order to then transfer it to another control (also useful for creating backup copies). Move onto the programme you wish to save and follow the steps below:




- press the  key .
- the programme selected will be saved on the USB device.

Deleting a program

This allows you to delete a programme. Move onto the device you wish the delete and follow the steps below:




- press the  key.
- press the **[ENTER]** key.
- the selected programme will be deleted.

Saving all the programmes on the USB device

This allows you to save the programmes on the USB device in order to then transfer them to another control (this also allows you to create backup copies). Follow the steps below:

Insert the formatted USB device with sufficient space for containing the programmes into the USB port:




- press the  key to open the menu.
- select the item **Save Programmes (2)**.
- All the programmes will be saved on the USB device.

3.Programming

3.1

Deleting all the programmes


This allows you to delete all the programmes. Follow the steps below:

- press the  key to open the menu.
- select the item **Delete Programmes (3)**.
- All the programmes will be deleted (you will be asked to confirm).

Programme list on the USB device


This allows you to view the programme list on the USB device. The possible operations are the same as for the tool list therefore it is possible to copy, rename and delete all the tools present on the USB device. Select the programme list and follow the steps below:

Insert the USB device containing the programmes (generated by kvara S 550 PC Touch) into the USB port.

- press the  key.
- the programme list on the USB device will be displayed.
- carry out the desired operation.


Saving a programme from a USB device to NC

This allows you to save a programme on NC from a USB device in order to be able to download it from another control. Move onto the programme you wish to save and follow the steps below:

- press the  key;
- the programme selected will be saved from the USB device to NC.


Saving all the programmes from a USB device to NC

This allows you to save the programmes on NC from a USB device in order to be able to download them from another control. Follow the steps below:

- insert a USB device containing the programmes (generated by kvara S 550 PC Touch) into the USB port.
- press the  key.
- the programme list on the USB device will be displayed.



3.Programming

3.1

- press the  key to open the menu.
- select the item **Save programmes (2)**.
- all the programmes will be saved from the USB device to NC.

Changing the work unit

This operation can be performed in the following sequence:

- press the  key to open the Programme list
- press the  key to open the menu
- press 7 »Backup unit.

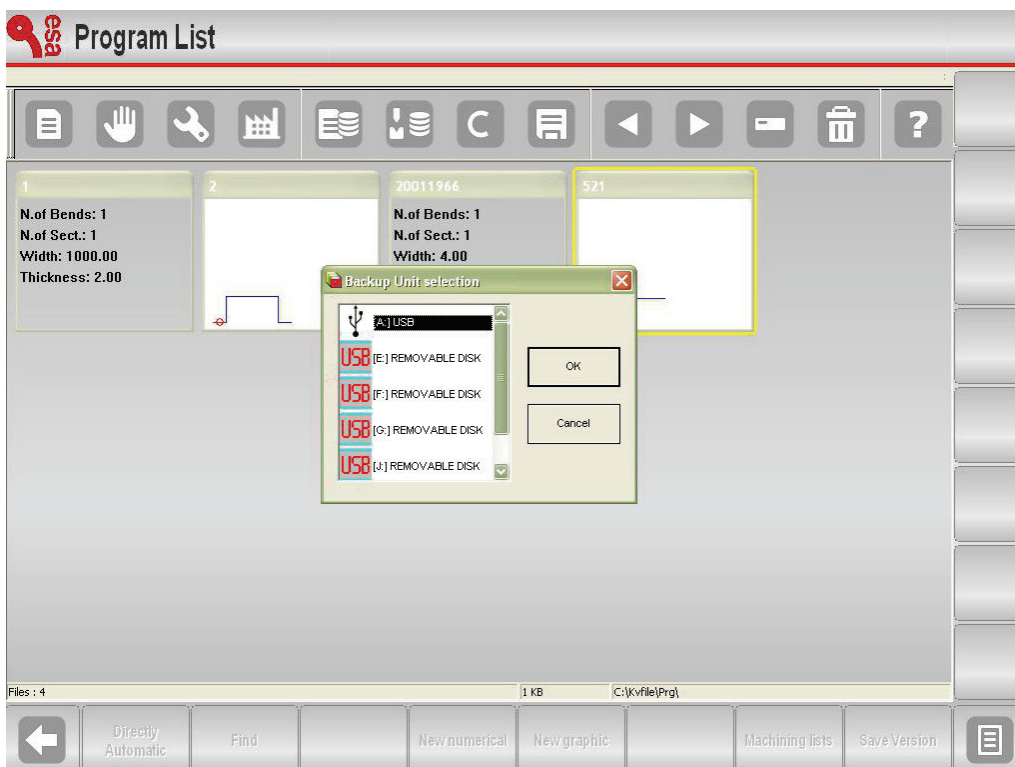


Figure 17 View of the operation for changing the work unit.

3.Programming

3.2 Entering a numeric programme

To enter a new numeric programme it is necessary to:



- press .
- press [**New numeric**].

Setting the piece data

A window will open for entering the programme data:

The 'Editor' window displays the following data entry fields:

Name		Bend	Section
1		1	1

Piece info		Angle	B.D.C.	Corrections
Comp.Pcs	0	Y1 90	117.35	0
To Do	0	Y2 90	117.35	0
Measures	0			0
Devel.	-3.7			

General data		Final	Retract	Corrections
Width	1000	X1 100	0	-1.85
Thickness	2			
Material	Aluminum			
Station	0			
Die	123			
V-die	1			
Punch	4321			

Work info	
T.D.C.	118
Force	14
Crown.	8.789
C.S.T.	0
Pinch P.	0
Mute	0
Bend time	0
Match.	0
Speed	0.6
Functions	0 0 0 0
Rep./Dir.	1 1
Ri	1.333

Figure 18 Mask for entering the bends

3.Programming

3.2

- enter the **width** of the metal sheet to be bent.
- enter the **thickness** of the metal sheet to be bent.
- enter the **material** (resistance) to be bent bearing in mind that, thanks to the new product functions, this is a rapid operations. In fact, by clicking or moving onto the parameter to be entered, the Materials Tables will immediately open containing all the values already entered: you can then select the desired row with a double click with the mouse or a double touch .

After this selection in editor program, in addition to the number, what is described in the NAME Field of the Materials Table will also appear. Figures 19 and 20

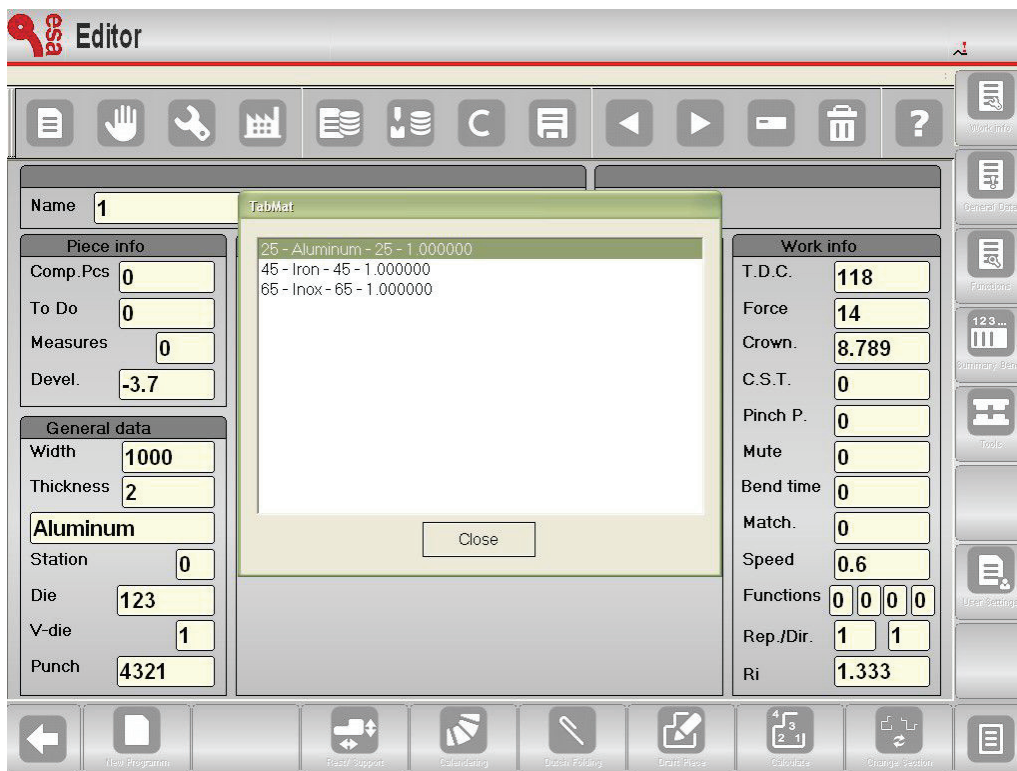


Figure 19 Mask for setting the resistance of the material

3.Programming

3.2

Name	Select:
1	1
2	Prog. Status Numerical
20011966	N.of Bends 1
521	N.of Sect. 1
	Width 1000.0
	Thickness 2.0
	Resistance 25
	Material 25
	Die 123
	V-die 1
	Punch 4321
	Develop -3.7
	Comment
	Direc.Auto. <input type="checkbox"/>

Figure 20 Viewing the Editor mask, the table and parameters of the programme entered

- the **material** is calculated automatically depending on the resistance.
- the entering of the numeric values and therefore of the type of material to be bent, thanks to the new product functions can be a rapid operations because by clicking or touching the parameters to be entered, the Materials Table will immediately open where you can select the desiderata with a double click of the mouse or with a double touch.
- enter the **work station** if more than one of these are defined.
- enter the **die** that will be used for the bend following the procedure described in paragraph 1.2 (the die must already have been drawn).
- enter the **cavity** of the die that will be used for the bend (a die can have more than one cavity; in the event of only having one, enter 1).
- enter the **punch** that will be used for the bend following the procedure described in paragraph 1.2 (the punch must already have been drawn).

3.Programming

3.2

Setting the bends



The cursor now moves into the fields for setting the bend.
Set for each bend:

- The desired bend angle in the **Y1 angle** field.
- The desired bend length in the Field **Finali X1** field.

All the other data relating to the bend will be calculated automatically but they can still be changed by the user.


Work data

This allows you to view the data relating to the absolute **P.M.S P.C.V** and **P.C.L** of that bend, move onto the desired bend and follow the steps below:

- press the  key to open the menu.
- select the item **Work data (5)**.
- a window will appear which contains the work data.
- for exit just move onto the **[Confirm]** key and press **[ENTER]**. In order to access your work data more quickly you can also use the Work data function  on the setting mask.


Copying a bend

To copy a bend, move onto the bend you wish to copy and follow the steps below:

- press the  key to open the menu.
- select the item **Copy step (3)**; the bend will be copied at the end of the section.

Entering a bend

To enter a bend in a section, move onto the bend after the one you wish to enter and follow the steps below:





- press the  key to open the menu.
- select the item **Enter step (2)**; the bend will be inserted before the one you moved onto.

3.Programming

3.2

Entering a copied bend

To enter an identical bend to the one already present in the section, move onto the bend after the one you wish to enter and follow the steps below:

- press the  key to open the menu.
- select the item **Enter step (2)**; the bend will be entered before the one you were positioned on.
- press the  or  keys to move onto the bend you wish to copy.
- press the  key to open the menu.
- select the item **Copy step (3)**; the bend will be copied on the one you have just entered.

Defining a calendering

In the window for entering the data of the numeric programme it is possible to activate help for creating a calendering:

- Press [**Calendering**]; a window will open to enter the data of calendering.
- enter the desired calendering angle in the Angle field.
- enter the calendering radius of in the Radius field.
- enter the length of the calendering pitch in the Length field.
- enter the initial position of the stop in the Height X field.
- move onto the [**Confirm**] key and press [**ENTER**], The calendering pitch calculated will be automatically entered on the Bend mask.

Correcting a calendering

Whenever a calendering is carried out it is unlikely that you will obtain a correct bend at first try; this imprecision depends on the fact that the angles that have to be bent to create the calendering are open too far (e.g.: 170°) and it is difficult to obtain bends with these angles.

In order to obtain a correct calendering it is necessary to measure the difference between the angle of the calendering obtained and the desired angle: the difference calculated must be divided equally on all the bends.

Example

Let's suppose we have to create a calendering with an angle of 90° in which it is necessary to make 15 bends equal to 170°; if the calendering obtained is 112.5° we must carry out the following:

$112.5 - 90 = 22.5^\circ$ (difference between the real and the theoretical angles)

$22.5 / 15 = 1.5^\circ$ (correction to be applied for each bend)

We must apply a correction of 1.5° in the calendering pitch which will be repeated 15 times.

3.Programming

3.2

Definition of a clinching (bend and squash)

In the window for setting the bends it is possible to define a clinched bend:

enter 0.0 in the Y1 angle field, and the arrival value of the ram will be calculated by keeping account of the depth of the cavity, the height of the cavity for squashing and the thickness of the piece; the position of the axis X is set at the minimum height reachable by the axis; the R axis is positioned by bearing in mind that the die is open.

For ensuring greater work programming speed a clinching can be defined by directly entering the setting mask and

pressing the Clinching function key .


Correcting a clinching

To correct a clinching it is not possible to change the value of the angle, but it is necessary to change the numeric value present in the Field P.M.I. of Y1.

If the bend is squashed too much it will be necessary to increase this value.

The Height Y2 will subsequently be changed.

Otherwise it will be necessary to:

- enter the *Corrections* mask by pressing 
- press the [**Correction coefficient**] key
- the height entered will be directly added to, or subtracted from the P.M.I. of both the Y and is a value linked to the machine and not to the programme. To cancel the correction press the key [**Ignore correction.**].

How to carry out a coining or moulding operation

A coining operation cannot be entered in graphic mode since the automatic calculation procedure does not foresee the possibility of making different bends to the V bends. It will therefore be necessary to enter a normal bend with the same angle as the tools and then change the force and make any corrections to the bend directly from the setting mask.

For ensuring greater work programming speed it is possible to carry out a coining or moulding operation simply by

pressing a secondary key  and selecting the Coining Function key .

Correcting a coining

To correct a coining it is necessary to change the lower dead point of Y1 and Y2.

If the coining is too shallow it will be necessary to reduce the lower dead point.

If the coining is too deep it will be necessary to increase the lower dead point.


3.Programming

3.2

Correcting a coining

Otherwise it will be necessary to:



- enter the Corrections mask by pressing the  key
- press the key [**Correction coefficient**].
- the height entered, which will be directly added to, or subtracted from the P.M.I. of both the Ys, is a value linked to the machine and not to the programme. To cancel the correction press the key [**Ignore correction.**].

Defining a conical bend

This function allows for carrying out the "Conical" work after mounting special stops and configuring the X2 axis as conical. To "bend in conical" the use of an X2 axis mounted on the bar of the X1 axis (**incremental** type) is necessary, otherwise two completely independent axes X1 and X2 (**absolute** type), which you must move after positioning X1 in order to allow for putting the axes out of phase. In addition to this special X2 axis, the stops also have a special profile that enables the blocking of the sheet (see figure). The entering of the data for carrying out a bend in conical is only possible from the **Settings** mask and for entering the conical bend the X2 axis must allow for conical operation (or incremental or absolute). In this case, after entering the typical data of a normal bend, the final height finale of the X2 axis is calculated in "incremental" or "absolute" compared to the final height of the X1 axis. From the window for entering the data of the numeric programme it is possible to activate a guide for carrying out a conical bend:

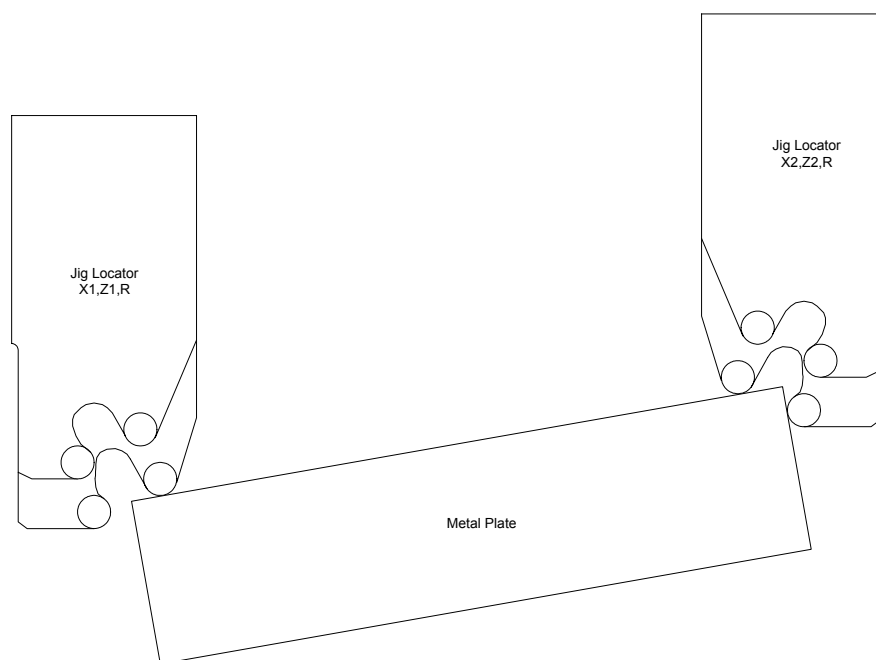




Figure 21 Example of a conical bend


3.Programming

3.2

- Enter the initial position of the stop in the X1 Field.
- press the  key to view the secondary menu.
- press the Conical function key  and a window will open to enter the desired conical angle.
- enter the desired conical angle in the Angle Field (included between -45 and 45).
- move onto the key **[Confirm]** and press **[ENTER]**, on the setting mask the heights X1, X2, Z1 and Z2 will be automatically updated.
- in the case of positive phase displacement angles, the final heights that are calculated are the X2, Z1 and Z2, and for negative phase displacement angles they are the X1, Z1 and Z2.



Once a bend in conical has been generated, if you want to change the phase displacement angle or the width of the metal sheet, before re-entering in the window for

entering the angle with the function  key, you must delete the bend and enter a new one; if this operation is not carried out, the heights generated by the angle set in the window will be ineffective. In the case of changes to the data of a bend (e.g. metal sheet width or thickness, etc.), the heights will not be calculated: X2, X2 Corrections and X2 Recoil. In a bend set as conical the backup function will not recalculate the correction of the heights of X2 Corrections and X2 Recoil, and therefore it is necessary to first enter the resting against/supported mode and then set the conical.

Defining a conical calendaring

To set a conical calendaring, it is necessary to move onto the first calendaring bend and carry out the conical; on the first bend the heights will vary as described above, while for the bends with negative X1 will have the Z equal to the Zs of the first calendaring bend. If the calendaring is applied to a bend with the negative X1 nothing will be calculated.

How to make out-of-cavity bends

In the out-of-cavity bends the point of end of the bend is higher than the upper level of the die; the height of fine bend will be numerically higher compared to the theoretical height of clamping of the metal sheet found in the general data programme.

The numeric control checks the validity of the heights of the bend cycle and asks whether the following heights are in a decreasing numeric order:

- Upper dead point.
- Height change speed (from the version 13.2 onwards it is possible to entered lower PMS than the PCV).
- Height of 180 (height of clamping).
- Height of fine bend (lower dead point).

3.Programming

3.2

If the order is not complied with, it will not possible to carry out the programme in automatic.

For out-of-cavity bending it is necessary to:

- directly enter the value of the end of the bend in the fields **P.M.I Y1** and **P.M.I Y2** of the numeric programme (the Y1 angle and Angle Y2 fields will be reset to zero).
- In the **P.C.L** Field of the programme work data, enter a value which when added to a **theoretical Height of 180** gives a higher value than the set P.M.I.s.
- In the **P.C.V** Field of the programme work data, enter a value which when added to the **theoretical Height change speed** gives a higher value than the **theoretical Height of 180 + P.C.L**.
- Check that the **Upper dead point** (P.M.S) in the steps of the programme is higher than the **theoretical Height change speed + P.C.V**.

Example

Let's suppose we have set a programme in which the:

Height change speed = 132.00

Height of 180 = 127.00

Height of bend (at = 135°) = 124.72

After having checked that the desired value of the end of the bend is 142.35 we enter this value in the P.M.I Y1 and P.M.I Y2 fields.

In order to carry out this programme it is necessary to:

enter 20.00 in the P.C.I. Field : $127.00 + 20.00 = 147.00 > 142.35$

enter 20.00 in the P.C.V field: $132.00 + 20.00 = 152.00 > 147.00$.

Check that the upper dead point is higher than 152.00.



It is not possible to set an out-of-cavity bend from a graphic programme.

Saving the program



At the end of the setting, press  ; a window will open in which it is necessary to enter the name of the programme.


After having entered the name move onto the key **[Confirm]** and press **[ENTER]**.

3.Programming

3.2

Save with name

It is possible save a programme with a different name to the one you started off with. This may be useful if the changes made to a programme must not be lost, but you wish to change the programme uploaded (possibility of having various programmes with different corrections). Follow the steps below:

- press the  key to open the menu.
- select the item **[Save with name]**.
- a window will open in which it is necessary to enter the name of the new programme.
- after having entered the name move onto the key **[Confirm]** and press **[ENTER]**.

Updating a program

If you change a tool already used in a program, it will be necessary to update the programme because the heights calculated will no longer match.

How to update a program

To update a program, download the programme from the list and follow the steps below:

- from the *Settings* mask press the  key to open the menu.
- select the item **Update Prog. (2)**; the following window will appear on the display

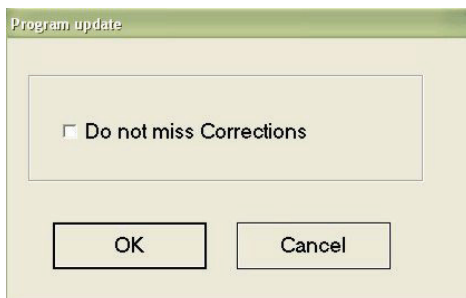


Figure 22 Updating a Programme

- Select OK (without ticking any of the boxes **[Do not miss Corrections]**).
- All the programme data will be calculated.
- Save if necessary.

3.Programming

3.3 Entering a graphic program

To set a new graphic programme it is necessary to:



- press the key.
- press [**New graphic**].

Setting of the general data

A window will open of entering the general data of the programme.

If these data are not entered, access will not be permitted to the drawing function:

- enter the **width** of the metal sheet to be bent.
- enter the **thickness** of the metal sheet to be bent.
- enter the **material** (resistance) to be bent bearing in mind that, thanks to the new product functions this is a rapid operation. In fact, by clicking or touching the parameter to be entered, the Materials Table will immediately open containing all the values entered; afterwards, select the desired row with a double click of the mouse or with a double touch.

After selecting in the editor program, besides the number, what will be described in the NAME Field of the materials table will also be displayed. See Figures 19 and 20, mask 42/43

- the **material** is calculated automatically depending on its resistance.
- enter the **work station** if more than one station are defined.
- enter the **die** that will be used for the bend (the die must already have been drawn).
- enter the **cavity** of the die that will be used for the bend (a die may have several cavities; in the case in which it only has one, enter 1).
- enter the **orientation of the Die** (0 = standard, 1 = rotated by 180°).
- enter the **punch** that will be used for the bend (the punch must already have been drawn).
- enter the **orientation of the Punch** (0 = standard, 1 = rotated by f 180°).
- enter a **Comment** if desired.
- move onto the key [**Confirm**] and press [**ENTER**].

3.Programming

3.3

Drawing window

The drawing window will be opened of the piece that is created by means of the drawing function.

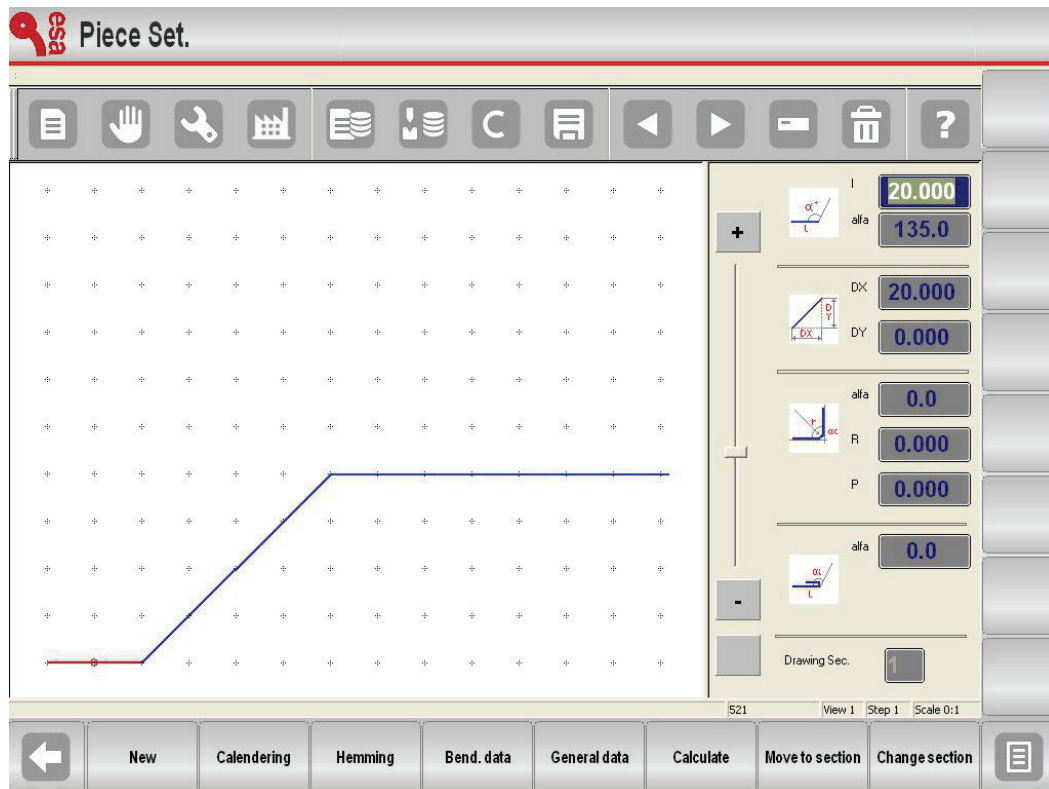


Figure 23 Drawing mask of the piece.

3.Programming

3.3

The window on the left is the drawing window.

The four windows on the right are for entering the drawing data and they respectively represent:

- 1) the polar drawing data.
- 2) the Cartesian drawing data.
- 3) the drawing data of the calendring operations.
- 4) the drawing data of the clinching of the bends (squash and close).

After having entered the general data and accessed the SET PIECE mask, the first segment will appear in red with a length of 20.0 mm. Touch the centre of the segment with your finger and the "Soft Keyboard" will open, as in Figure 24.

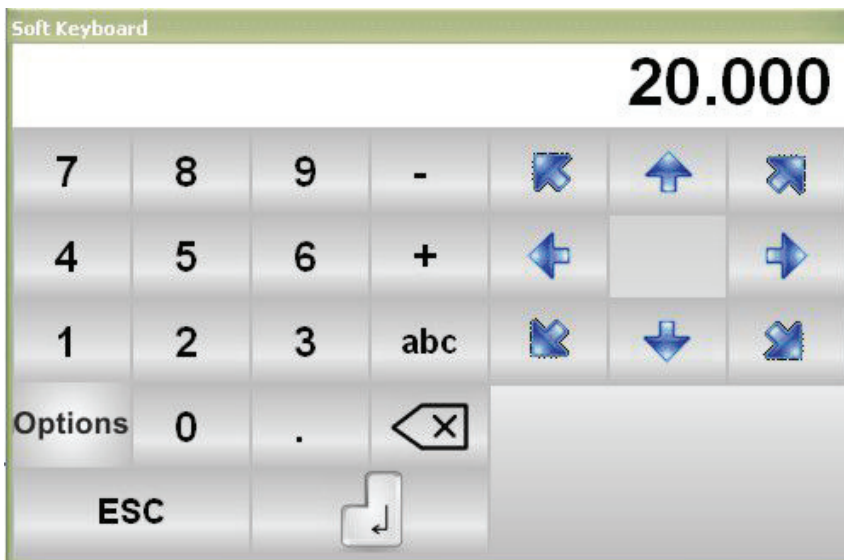


Figure 24 Soft Keyboard for setting the piece
with which you can:

- change the length of the first segment by entering a height differing from 20, and after having pressed "Confirm" (with the option enabled for always having the keyboard active in the foreground) and selecting one of the BLUE arrows on the virtual keyboard, the angles to be entered in the next bend will automatically be displayed.



- by touching one of the seven arrows starting from the right in a clockwise direction, the next segment will be taken to 45, 90, 135, 180, -135, -90, -45.

3.Programming

3.3

- If the “pincushion” option of the keyboard has not been enabled, by touching the ALPHA angle Field (as illustrated in Figure 25) the Soft Keyboard will reappear and allow you to enter the angle:

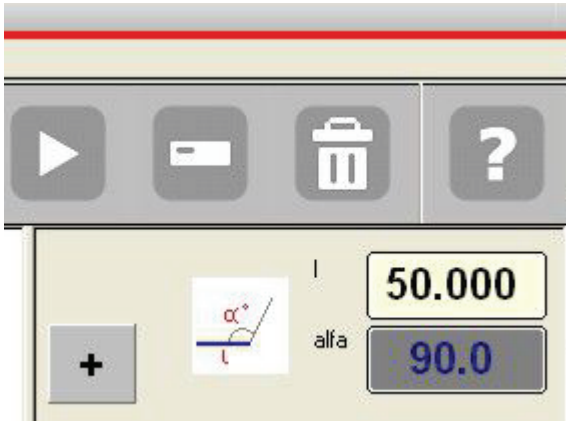


Figure 25 Portion of the part described above, viewed on the “ALPHA angle field” display

- The next segment can only be entered by simply touching the screen with your finger in the desired direction.
- Once the segment has been entered, by touching the screen with your finger in the centre of the line drawn it will be possible to enter the measurement of the desired length on the virtual keyboard.
- also to change the angle, with your finger just press the intersection between the previous segment with the following one to make the virtual keyboard appear with the 8 blue direction arrows of the angles (obviously you can also directly write in the editing field of the virtual keyboard if preferred, or if the angle differs from one of the 8 specific angles):



Figure 26 Intersection of the segment

The intersection between the previous segment and the next one, indicated in red, is the point to touch to change its direction and consequently also the height of the angle.

Also on the SET PIECE mask:

- by touching the ZOOM bar and sliding it up and down you can intervene on the display either enlarging or reducing the view of the piece. In addition, you can hook onto it with you finger to move it to the right or left and up or down.
- by pressing CALCULATE and touching the machine drawing with your finger, you can move it to the right or left and up or down.




These two new functions can also be used in the graphic viewing of the piece on the SEMIAUTOMATIC and AUTOMATIC mask.

3.Programming

3.3

Bend sequencing

This allows you to view the sequence via which the piece must be bent. Follow the steps below:

- press the  key to open the menu.
- select the item **Bending sequence (0)**.
- move among the various bends by pressing the  and  keys.

Changing the colour

This allows you to change the colour of the background and of the piece to be bent. Follow the steps below:

- press the  key to open the menu.
- select the item **Colour change (1)**.

3D vision

This allows you to view the drawing in 3D version. Follow the steps below:

- press the  key to open the menu.
- select the item **3D Viewer (3)**.
- to return to the 2D version press the  key.

3.Programming

3.3

How to carry out the drawing of a piece

Let's suppose we have to draw the piece illustrated in the figure below:

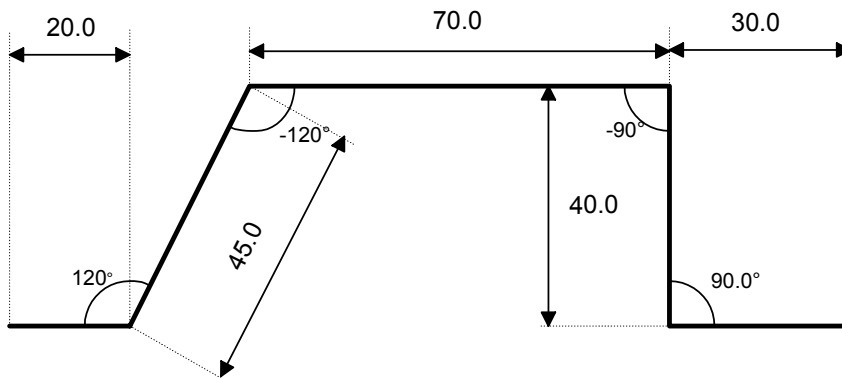


Figure 27 Example of piece to be drawn

The cursor is located in Field I of the window for the polar setting of the drawing data:

- Enter in Field I, the length corresponding to the first section of the piece to be drawn (20.0) in Field I.
- Press **[ENTER]**.
- Enter the value of the first angle (120.0°) in Field α (value of the angle compared to the following section).
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section that the data refer to will be highlighted.
- Enter the length corresponding to the second section of the piece to be drawn (45.0) in Field I (length of the section).
- Press **[ENTER]**.
- Enter the value of the second angle (-120.0°) in Field α (value of the angle compared to the following section).
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section that the data refer to will be highlighted.
- Enter the length corresponding to the third section of the piece to be drawn (70.0) in Field I (length of the section).
- Press **[ENTER]**.

3.Programming

3.3

- Enter the value of the third angle (-90.0°) in the Field α (value of the angle compared to the following section).
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section that the data refer to will be highlighted.
- Enter the length corresponding to the fourth section of the piece to be drawn (20.0) in Field I.
- Press **[ENTER]**.
- Enter the value of the fourth angle (90.0°) in Field α (value of the angle compared to the following section).
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section that the data refer to will be highlighted.
- Enter the length corresponding to the fifth section of the piece to be drawn (30.0) in Field I (length of the section).
- Press **[ENTER]**, the drawing has now been completed.

How to carry out calendering

In order to carry out a calendering it is necessary to bear in mind that as per the convention, there must be a section of metal sheet before and after the calendering.

Let's suppose we have to draw the piece illustrated in the figure below:

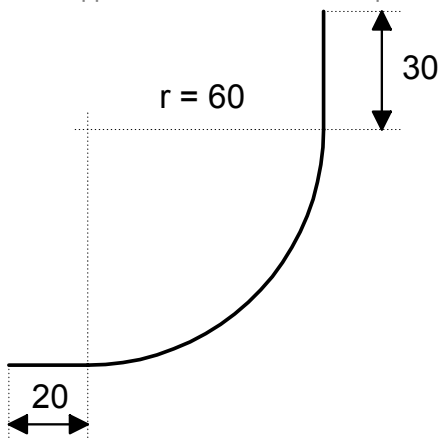


Figure 28 Example of the calendering to be drawn

3.Programming

3.3

The cursor is located in Field I of the window for the polar setting of the drawing data:

- Enter the length corresponding to the first section of the piece to be drawn (20.0) in Field I.
- Press **[ENTER]**.
- Press **[Calendering]**; the window of the calendering data will open.
- Enter the desired calendering angle (90.0°) in Field α .
- Press **[ENTER]**.
- Enter the radius of the calendering (60.0) in Field R.
- Press **[ENTER]**.
- Enter the length of the calendering pitch you want to obtain in Field P.
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section that the data refer to will be highlighted.
- Enter the length corresponding to the last section to be drawn (30.0) in Field I (length of the section).
- Press **[ENTER]**, the drawing has now been completed.

How to carry out a clinching (squash and bend)

Let's suppose we have to draw the piece illustrated in the figure:

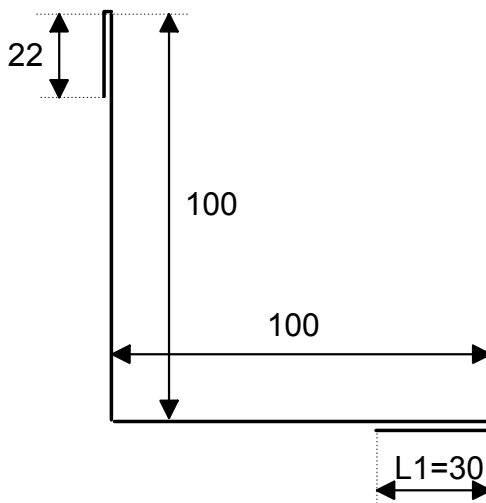


Figure 29 Example of clinched bend to be drawn

3.Programming


3.3

The cursor is located in Field I of the window of polar setting of the drawing data.

- Enter the length of side L1 to be clinched (30.0) in Field I.
- Press **[ENTER]**.
- Press **[Clinching]**.
- Enter the intermediate clinching angle (e.g.: 45.0°) in the Alpha field.
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section the data refer to will be highlighted.
- Enter the length of the current section (100.0) in Field I.
- Press **[ENTER]**, the cursor will move onto Field α for setting the angle compared to the following section.
- Enter the value of the angle (-90.0°).
- Press **[ENTER]**, the cursor will move onto Field α for setting the length of the section.
- Enter the length of the side (100.0) in Field I.
- Press **[ENTER]**.
- Press **[Clinching]**.
- Enter the intermediate clinching angle (e.g.: 45.0°) in the Alpha field.
- Press **[ENTER]**, the next section will be drawn in automatic mode; the section the data refer to will be highlighted.
- Enter the length of the last section (22.0) in Field I. The drawing has now been completed.

Saving the drawing



At the end of the setting, press the  key; a window will open in which it is necessary to enter the name of the programme.

After having entered the name move onto the key **[Confirm]** and press **[ENTER]**.

3.Programming

3.4 Automatic calculation of the bending sequence

It is possible to access the automatic calculation procedure from the drawing mask of the piece by following the steps below:

- Press [**Calculate**].

Calculation window

A window will open that shows the simulation of the piece to be bent, including the lower and upper part of the bender press, the punch, the die, the stop and the piece prior to being bent.

On the right hand side of the mask there are three windows the respectively indicate the number of rotations, the tipping up of the piece relating to the bending sequence found, and the enabling of the search for the bending sequence with all the solutions.

The numeric control searches for the solution by always trying to leave the greatest part of the metal sheet in the operator's hands; if you change the calculation criteria it is possible to search for the sequence among all the possible solutions.

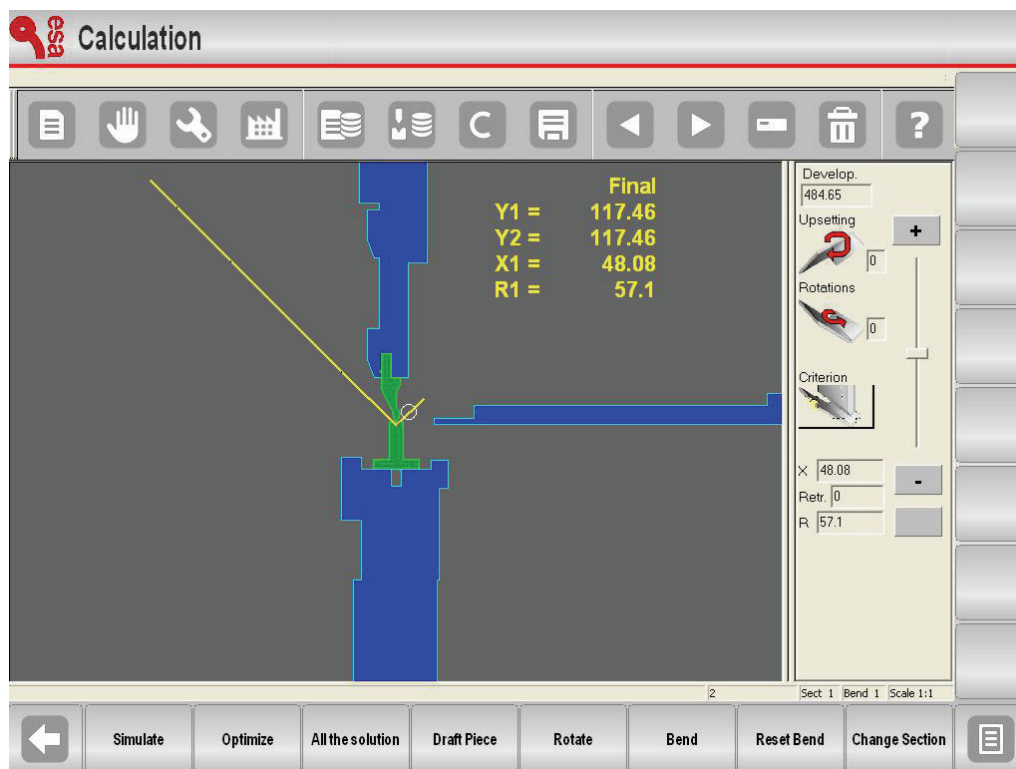


Figure 30 Calculation mask of the bending sequence

It is possible to make the calculation of the bending sequence in two modes: automatic or manual.

3.Programming

3.4

Automatic search for the bend sequence

In the automatic search, the optimal bending sequence is established by the numeric control; by pressing [**Optimise**] the numeric control automatically searches for the solution.

Manual search for the bend sequence

In the manual search, the bending sequence is established by the operator who forces the bends. The bending sequence can be completely or partially forced by the operator: in the case of the sequence only being partially entered, the remaining bends will be calculated automatically by the numeric control.

The operator has the possibility of shifting between the various bends by pressing the  and  keys.

To force the bends it is necessary to press the [**Bend**] key next to the selected bend; if you press the key next to a bend that has already been forced, that bend will be straightened.

The operator has the possibility of rotating the piece by pressing the [**Rotate**] key;

Press [**Optimise**] when you want to force the desired bends.

The numeric control searches for the solution while keeping in mind the sequence forced by the operator.

Results of the optimisation

If the piece is not feasible, the control will warn the operator with a **No Solution** message.

In this case the operator can try to make the calculation using the criterion that carries out the search for all the solutions. In the event that there is no possible solution, the operator can try to identify which bend makes it impossible to bend the piece from the manual search of the bend sequence; any collision of the piece with the various parts of the machine is notified by a colour change on the side of the piece that enters into collision.

In order to bend a piece even if it enters into collision (for example in the case in which the collision does not damage the sheet metal) the operator must force the entire bend sequence.

If the piece is feasible the control advises the operator with a **Solution Found** message; the operator can select the following functions in this window:

- [**Stop**]: the optimisation is stopped in order to make changes.
- [**Continue**]: a different solution to the one just found is used; if you continue to refuse to accept the solutions proposed, the numeric control will search until it comes to the end of the different solutions, and then it will display the message:
- **No Solution**.
- [**Simulate**]: the simulation of the bending of the piece is displayed; the user can continue with the bending sequence by pressing [**Continue**] or stop the simulations by pressing [**Stop**].
- [**Accept**]: the values calculated in the solution found will be entered in the programme.

3. Programming

3.4

Simulation

Once the solution has been accepted, it will be possible to simulate the bending sequence obtained in the optimisation window of the graphic program:

- Press the function key [**Simulate**], the piece without bends, set up and ready for the first bend will be displayed.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first support or the second support (if available) or the resting-against position of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made and in position for the second bend.
- **To stop** the simulation press the function key [**Stop**], to return to the previous step in the simulation press the function key [**Previous**].
- Press the function key [**Continue**], until the end of the simulation (the function key [**Simulate**] will reappear)

Resting against/supported mode

Once the solution has been accepted, it will be possible to select whether to carry out a resting-against bend in the optimisation window of the graphic program:

- Press the function key [**Simulate**], the piece without bends, set up and ready for carrying out the first bend will be displayed.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first or second resting-against position (if available) or the supporting of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made and in position for the second bend.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first supported or second supported position (if available) or the resting-against position of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- **To stop** the simulation press the function key [**Stop**], to return to the previous step in the simulation press the function key [**Previous**].
- Press the function key [**Continue**], until the end of the simulation (the function key [**Simulate**] will reappear)
- The function is displayed in the numeric programme at the top, on the right hand side of the type of bend (see the meaning of the icon). The control automatically calculates the corrections necessary on the X and the R. The function key [**Resting against/supported**], in numeric mode will not work if the programme is graphic. To change the resting against/supported it is necessary to enter the simulation mask.

3. Programming

3.5 Manual calculation of the bending sequence

It is possible to access the manual calculation procedure from the drawing mask of the piece by following the steps below:

- Press [**Calculate**].


Calculation window

A window will open that displays the simulation of the piece to be bent, including the lower and upper parts of the bender press, the punch, the die, the stop and the piece before being bent.

On the right hand side of the mask there are three windows that respectively indicate the number of rotations, the tipping up of the piece relating to the bending sequence found (refer to the figure in the paragraph on the Automatic calculation of the bend sequence).

Manual searching for the bend sequence

IN the manual search the bending sequence is established by the 'operator by forcing the bends.

The operator has the possibility of shifting between the various bends by pressing the  and  keys.

To force the bends it is necessary to press the [**Bend**] key next to the selected bend; if you press the key next to a bend that has already been forced, that bend will be straightened.

The operator has the possibility of rotating the piece by pressing the [**Rotate**] key;

Press [**Optimise**] when all the desired bends have been forced.

The numeric control searches for the solution keeping in mind the sequence forced by the operator.

Results of the optimisation

If the piece is not feasible, the control will warn the operator with a **Forced Solution** message.

In the event that there is no possible forced solution the operator can try to identify which is the bend that makes it impossible to bend the piece from the manual search of the bend sequence; any collision of the piece with the various parts of the machine is notified by a colour change on the side of the piece that enters into collision.

In order to bend a piece even if it enters into collision (for example in the case in which the collision does not damage the sheet metal) the operator must force the entire bend sequence.

If the piece is feasible the control advises the operator with a **Solution Found** message; the operator can select the following functions in this window:

- [**Stop**]: the optimisation is stopped in order to make changes.
- [**Accept**]: the values calculated in the solution found are entered in the programme.

3.Programming

3.5

Simulation

In the optimisation window of the graphic program, once the solution has been accepted, it will be possible so simulate the bending sequence obtained:

- Press the function key [**Simulate**], the piece without bends will be displayed, set up and ready for carrying out the first bend.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first or second supported position (if available) or the resting-against position of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made and in position for the second bend.
- **To stop** the simulation press the function key [**Stop**], to return to the previous step in the simulation press the function key [**Previous**].
- Press the function key [**Continue**], until the end of the simulation (the function key [**Simulate**] will reappear)

Resting against/supported

In the optimisation window of the graphic program, once the solution has been accepted, it will be possible so select the whether to carry out a supported bend:

- Press the function key [**Simulate**], the piece without bends will be displayed, set up and ready for carrying out the first bend.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first or second supported position (if available) or the resting-against position of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made.
- Press the function key [**Continue**], the piece will be displayed with the first bend already made and in position for the second bend.
- Press the function key [**Resting against/supported**], as many times as necessary, to select the first or second supported position (if available) or the resting-against position of the piece, obviously the stop will only move into the supported position if there are collisions and if the limit heights of the axes permit.
- **To stop** the simulation press the function key [**Stop**], to return to the previous step in the simulation press the function key [**Previous**].
- Press the function key [**Continue**], until the end of the simulation (the function key [**Simulate**] will reappear)
- The function is displayed in the numeric programme at the top, on the right hand side of the type of bend (see the meaning of the icon). The control automatically calculates the corrections necessary on the X and the R. The function key [**Resting against/supported**], in numeric mode will not work if the programme is graphic. To change the resting against/supported mode it is necessary to enter the simulation mask.



3.Programming

3.5

Changing the bend sequence

Once the bend sequence has been optimised, it will still be possible to change the bending sequence obtained:



The operator has the possibility of moving among the various bends by pressing the  and  keys. To remove the bends it is necessary to press the **[Bend]** key next to the bend selected, remove the other bend you wish to exchange, and press **[Bend]** to select the new sequence desired on each bend removed.

3.6 How to bend a box

The numeric control does not allow to directly set the development on the flat of a box to be bent.

To be able to bend a box it is necessary to set a programme with two bend sections (it doesn't matter if the programme is graphic or numeric) in which to set the bends relating to the horizontal section and the bends relating to the vertical section respectively.

The two programmes will be carried out one after the other, thus making it possible to create the box



The execution of a programme with several sections always starts from the section with the smallest width of the sheet metal.

How to add or delete a section

To add a section in graphic or numeric, it is necessary to press the function key **[Change Section]** whereas to delete a section, move onto the desired section and follow the steps below:




- press the  key to open the menu.
- select the item **Delete section (4)**; the section will be deleted and the programme will move onto bend 1 of section 1.

3.7 Work data

It is possible to check the absolute PMS, PCVs and PCLs of a bend, in the following manner:



- press the  key to open the menu.
- select the item **Work data (5)**; a window will appear containing the absolute PMS, PCVs and PCLs.
- to exit press **[ENTER]**.
- for greater programming speed and control of the work carried out, the data of a can be directly accessed from the

Settings mask, by pressing the rapid work data function key .

3.Programming

3.8 Execution of a programme in automatic mode

After setting a numeric programme or calculating a graphic programme it is possible to carry this out in automatic.



Automatic mode can be enabled by pressing the key .

Automatic graphic mask

If the programme currently selected is a calculated graphic programme the automatic graphic mask can be viewed by pressing **[Graphic]**; this mask consists of three windows:

The main window contains the drawing of the upper and lower parts of the machine, the drawing of the punch and the die entered in the program, the drawing of the piece before and after the bend, and the drawing of the stop.

The second window shows how to orient the piece for each bend (clenching or rotation of the metal sheet compared to the previous bend).

The third window contains the data of the bend in progress and the piece counter.

The final and actual heights of the axes are shown in yellow.

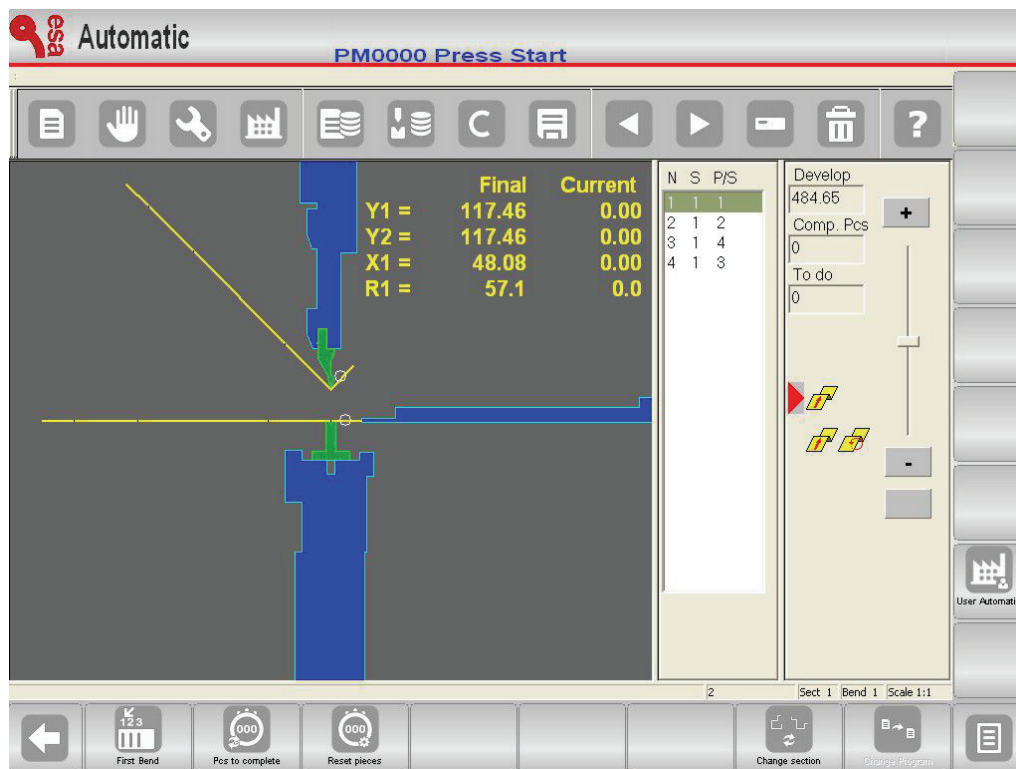


Figure 31 Automatic graphic mask

3.Programming

3.8

Automatic numeric mask

If the programme currently selected is numeric, added to the numeric setting data there will also be the current heights of the axes; it is not possible to change the programme data in automatic mode.

The mask also shows how to orient the piece for each bend (clinching or rotation of the metal sheet compared to the previous bend).

	Angle	B.D.C.	Corrections	Current	Calibra
Y1	90	117.35	0	0	<input type="checkbox"/>
Y2	90	117.35	0	0	<input type="checkbox"/>
			0		
	Final	Retract	Corrections	Current	
X1	100	0	-1.85	0	<input type="checkbox"/>
R1	56			0	<input type="checkbox"/>

Figure 32 Automatic numeric mask

- In order to have a better view of the heights of the axes, it is possible to double the size of the characters of the mask.



This mask is enabled by pressing



- To return to the mask with single size characters press again.

3.Programming

3.8

The screenshot displays the 'Automatic' programming interface for a press machine. The title bar shows 'Automatic' and 'PM0000 Press Start'. The interface is divided into several sections:

- Top Bar:** Contains icons for file operations, machine control, and help.
- Form Fields:**
 - Name: 1
 - Bend: 1
 - Section: 1
- General data:**
 - L: 1000
 - S: 2
 - R: 25
 - m: 25
 - St: 0
 - M: 123
 - C: 1
 - P: 4321
- Angle:**
 - Y1: 90
 - Y2: 90
 - X1: 100
 - R1: 56
- Final:**
 - 117.35
 - 117.35
- Current:**
 - 0
 - 0
 - 0
 - 0
- Calibre:**
 - 0
 - 0
 - 0
 - 0
- Piece Inform.:**
 - Devel.: -3.7
 - Comp.Pcs: 0
 - To do: 0

The bottom bar contains icons for 'Pos to complete', 'Reset pieces', 'Graphic', 'Functions Machine', 'Change Section', 'Change Program', and 'First Bend'.

Figure 33 Double size automatic numeric mask

Carrying out the automatic cycle

To start an automatic cycle just press the **START** key; this operation enables the positioning of the stop axes. At the end of the positioning of the stop axes press the **lowering pedal** to lower the ram and make the bend.

Once the bend has been made, the ram will automatically return and the positioning of the stop axes relating to the next bend will take place.

Once the last bend of the programme has been made, the automatic cycle will start from the first bend.

3.Programming

3.8

First bend

This allows you to view the first bend carried out. Select [*First bend*]

Carrying out the of the sample piece

The calculations made by the numeric control are purely theoretical and due to the imperfection of the sheet metal, it may be necessary to make corrections to the values calculated.



To simplify the correcting of the bend data of a piece there is a procedure for carrying out a sample piece in the SEMI-AUTOMATIC mask.

If this procedure is enabled, at the end of a bend there is no step change, instead the cycle remains on the current bend to allow the operator to correct the bend data and then repeat the bend that has been corrected.


It is possible to make step-by-step corrections to the angle or the length of the bend in a uniform manner for all the bends.

The corrections entered are automatically illustrated in the programme.

The procedure can also be enabled from the AUTOMATIC mask in the following manner:


- press  .
- press the  key to position the stop axes.
- press the **lowering pedal** to carry out the bend.
- measure the bend made in terms of bend length and angle.





If the bend is not correct:





- press  to access the correction data. If you need to make a correction to all the steps (e.g.: if all the bends have to be at the same angle it is recommended to correct the programme in general mode), enter the data in the piece column. If you need to correct the data of a section, enter the data in the section column, of if you want to correct the data relating to a bend, enter the data in the bend column.
- enter the correction data.






3.Programming

3.8

 Corrections







Name2Bend1Section1

Angle

Y1000

Y2000

YB000

Bend

000

Section

000

Piece

000

Meas.

Y1117.46

Y2117.46

Meas.

X1000

R157.1

Bend


000

Section

000

Piece

000

Undo correct.

Material Table

Coeff. Corrections




Figure 34 Correction mask

3.Programming

3.8

Setting of the correction data

The correction data to be entered are in mm for the position of the stop axes, and in degrees for the bend angle; the data entered will be added to the value contained in the programme.

Example: if the bend is closed by 2° it is necessary to enter a positive correction value (+2.0°); if the bend is open by 2° it is necessary to enter a negative correction value (-2.0°).

If the length of the bend is less than the desired length you must enter a positive value in the **Corr. X1** Field corresponding to the difference detected; if the length of the bend is greater than the desired length you must enter a negative value in the **Corr. X1** Field corresponding to the difference detected.

If several corrections are made to the data of the same bend, the last value entered will be added to the previous ones.

Example: if a bend is initially closed by 3° and after the correction (+3.0°) it is open by 1°, it will be necessary to enter 1.0° in the field for correcting the angle.





During the correction of the pitch, the correction data of the angles are separated per cylinder; it is therefore possible to correct the angle of Y1 in a different manner to the angle of Y2.

In the general correction the bend angle will be corrected the same way for both cylinders.


If a correction to the pitch is made as well as a correction to the piece during the same step, the values entered will match.

Example: if a pitch correction is made equal to -2.0° and a piece correction equal to -1.0°, the angular correction of that step will be -3.0°.

At the end of the operation for setting of the correction data:

- press  .
- press the  key to reposition the stop axes (a correction may have been made to their position).
- repeat the bend.
- check that the bend è correct:
- if correct: repeat the procedure for all the bends of the program; to move between the various bends press the  or  keys.
- if incorrect: make new variations to the data of the current bend.

Once the data have been corrected for all the bends:

- press  ; the automatic cycle will start from the bend currently selected.
- there are new methods for setting the corrections which are described hereunder.

3.Programming

3.8

How to delete the correction data

To delete the changes made to the corrections press the key [*Ignore corrections*].
The values present on opening the mask will be restored.

3.9 Using a Database

With the introduction of this configurable database it is possible to acquire the corrections identified during the bend steps and thus compose a data base from which the corrections previously saved in automatic mode can be obtained during the work steps.

During the composition of the numeric programmes and the filling out of the graphic programmes. the corrections will automatically be searched for in the database and if found, they will be inserted in the respective correction fields.

In order to guarantee optimal and uniform behaviour for all types of bends, linear interpolation functions have been integrated on the values saved in the database.

In this way it is possible to obtain a theoretical correction value, also for bends in which no correction value has been saved, calculated starting from the data acquired previously.

The values calculated in this way may be corrected and in turn re-entered in the database, in the aim of continuing to enrich the knowledge acquired about the machine.

3.9.1 General information about the Database

Database

Each Database consists of a series of tables, each of which corresponds to a material. In order to render the functioning of the system more versatile, the application is able to manage more than one database.

Each Database is identified by a different name: but only one is enabled at a time.

How to configure a Database

The database does not initially have a predefined structure, however it can be built by selecting the various fields made available by the application.

Each Field of the Database consists of a sensitive value of the numeric programme (example: angle of the bend, width of the sheet metal, width of the cavity used, etc....) and corresponding associated correction values.

Once the structure of the Database has been decided it can no longer be changed.

3.Programming

3.9.1

The key correction fields

The fields are divided into key and value fields.

The key fields are those on the basis of which the single records of each table are identified in a univocal manner, and on which the arrangement and searches are carried out.

The correction fields are simply the values associated with the respective keys which are saved at the same time.

The properties of the fields

Each key field has several settable properties that determine the functioning of the Database.

Arrangement: this is a numeric index that determines how the fields are arranged in the table.

Interpolation: this indicates whether interpolations have to be carried out on a field during a search step (in the case in which the exact data is not immediately found in the database).

Interpolation Range: if this function is enabled it indicates the maximum difference between the two values identified in the database (upper and lower values) so that the interpolation can be carried out.

3.9.2 Example of a database

An example of a database called METALLASER will be illustrated in this document.

The structure of the METALLASER database consists of 6 fields, 4 keys, and 2 corrections:

- (*)Angle of the bend
- (*)Width of the sheet metal
- (*)Thickness of the sheet metal
- (*)Heights

- Correction of the Y heights
- Correction of the X heights

The asterisks (*) indicate the key fields, the remaining fields represent the corrections acquired.

In this example of a database it is therefore possible to acquire the corrections on the Y heights and also on the X heights X corresponding to the values.

3.Programming

3.9.2

The tables

Each table is identified by the number of the corresponding material (from 1 to 99). It is also possible to associate a descriptive text with the table.

All the corrections acquired over time for that specific material are also saved in each of the tables.

Each table generated inside a database inherits its structure, that is, the same key and correction fields and relative properties.

3.9.3 How to use the Kvara Database

Enabling the KvaraDatabase

To enable the functions of the Kvara Database access the **CORRECTIONS** mask by pressing the  key.

Press the function key **[Enable KVARADB]** or **[Disable KVARADB]** to enable/disable the database.

Once the database has been enabled the following image will appear in the area of the application icon in the top right-hand corner:

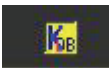


Figure 35 Enabled KvaraDB icon

This means that is now possible to acquire the corrections found in the **SETTINGS**, **AUTOMATIC**, **SEMIAUTOMATIC**, and **CORRECTIONS** masks.

To access the mask for managing the Kvara Database you must enter the Corrections mask by first pressing the



key, and then the function key **[Kvara Database]**.



This mask is in table form and contains the table of the material currently active; normally this will be the material entered in the current programme.

In the example in the figure, the table illustrates the corrections relating to the material number "2" called "Iron 1", belonging to the "METALLASER" database.

Each column corresponds to a Field of the database, the number of columns and their contents will depend on how the database has been configured.

Each row, or record, instead corresponds to a correction entered.

3.Programming

3.9.3

As illustrated above, the structure of the database in the example is as follows:

- 4 key fields (angle of the bend, width and thickness of the metal sheet and equipment)
- 2 correction fields (correction on the Y and correction on the X)

For a total of 6 columns; the first four are recognisable as key fields key since marked with the symbol (*) .

The equipment Field consists of the name of the die used, the number of cavities (in brackets), and the name of the punch used.

For example: "B(1)-1" means die "B", cavity number "1" and punch "1"

3.9.4 Operations in the tables

Following is a description of all the operations that can be carried out with the tables.

Selecting and deleting rows

To shift the selection onto the desired record just press your finger directly on top of the tables.

To select the following or previous table in the Database press the  and  keys.

To delete the current table press the  key and reply "YES" to the confirmation message.

Following is a list of the functions relating to the function keys:

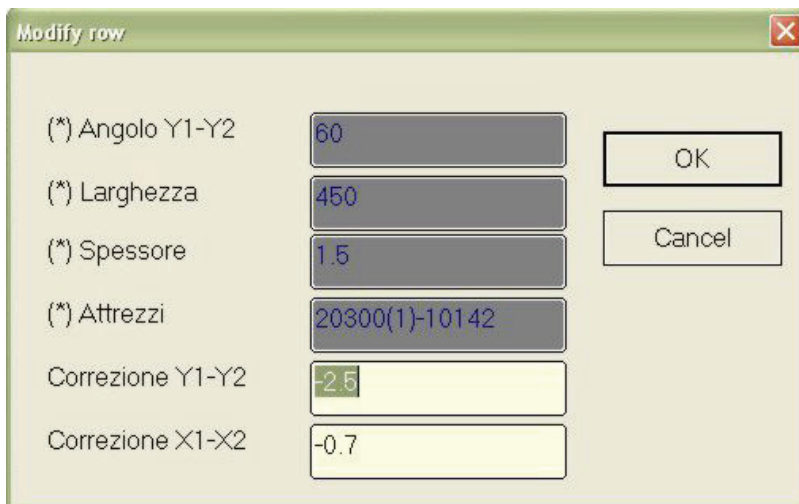
[Add Row] Add a new row to the current table.

[Change Row] Change the row currently selected in the table.

3.Programming

3.9.4

The following mask will open in which you can enter the new values for the data correction.

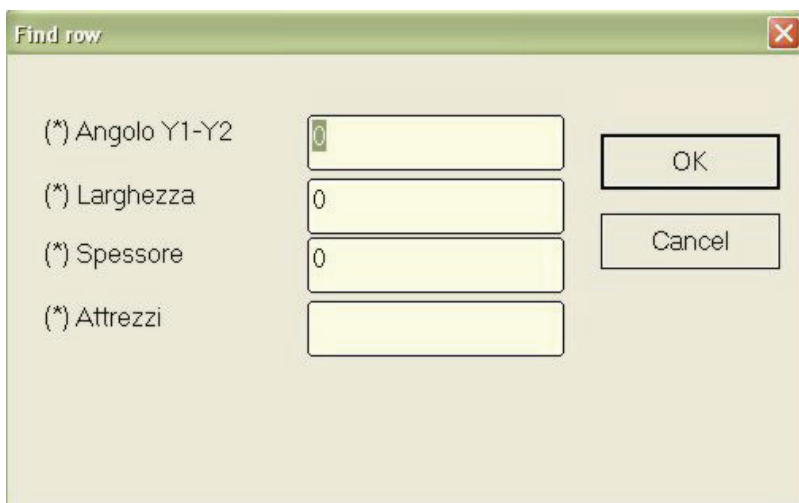


A screenshot of a software dialog box titled "Modify row". It contains six input fields with the following labels and values: "(* Angolo Y1-Y2" with value "60", "(* Larghezza" with value "450", "(* Spessore" with value "1.5", "(* Attrezzi" with value "20300(1)-10142", "Correzione Y1-Y2" with value "-2.5", and "Correzione X1-X2" with value "-0.7". To the right of the input fields are two buttons labeled "OK" and "Cancel".

Figure 37 Mask for changing a row

[Search for Row] This carries out a search in the current table for the row corresponding to the key values entered in the following mask.

A search is carried out in the current table for the row corresponding to the key values entered in the following mask.



A screenshot of a software dialog box titled "Find row". It contains four input fields with the following labels and values: "(* Angolo Y1-Y2" with value "0", "(* Larghezza" with value "0", "(* Spessore" with value "0", and "(* Attrezzi" with an empty field. To the right of the input fields are two buttons labeled "OK" and "Cancel".


Figure 38 Mask for searching for a row

3.Programming

3.9.4

[Delete Row] This deletes the row currently selected in the table.

[Table Selection] This allows you to select the current table from a list.

The following mask will open, select the material by directly pressing on the display and confirm (on the soft keyboard) by pressing the ENTER  key (S 550 PC Touch model).

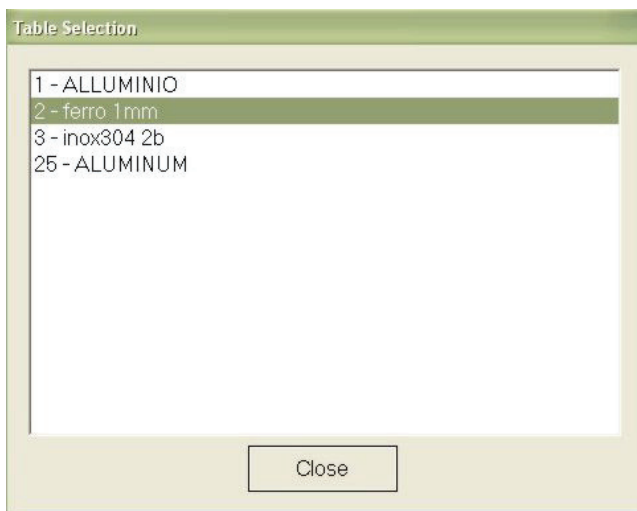


Figure 39 Mask for selecting the material

[Table properties] This allows you to change some of the properties of the individual table but not its structure, understood as number and type of its fields.

3.Programming

3.9.4

The arrangement indexes can be changed, where the number indicates the priority in the arrangement criterion of the table.


Key Fields				Correction Fields
Selection	Sorting	Interpolation	Int. Range	Selection
<input checked="" type="checkbox"/> Y1-Y2 Angle	0	<input checked="" type="checkbox"/> Yes	0	<input checked="" type="checkbox"/> Y1-Y2 Correction
<input checked="" type="checkbox"/> Width	1	<input checked="" type="checkbox"/> Yes	0	<input checked="" type="checkbox"/> X1-X2 Correction
<input checked="" type="checkbox"/> Thickness	2	<input type="checkbox"/> Yes <input type="checkbox"/> Toll		
<input checked="" type="checkbox"/> Tools	3			

Figure 40 Mask for changing the table settings

[Change Table Name] This allows you to change the description of the material associated with the table.

[Save Table As...] Save the current table with a new numeric code and description of the material.

3.9.5 Operating on databases


Following are the descriptions of all the operations that can be performed on the databases. Access to the following functions is possible from the System Menu which opens when you press the menu key .

3.Programming

3.9.5

Creating a New Database (0)

This allows you to create a new database, and set its structure.
The mask will open from where you can decide the name of the new database.

Afterwards, when you press (on the soft keyboard) the ENTER  key (S 550 PC Touch model), you can select the keys and the corrections from the selection boxes which have to be saved in the records of the database.

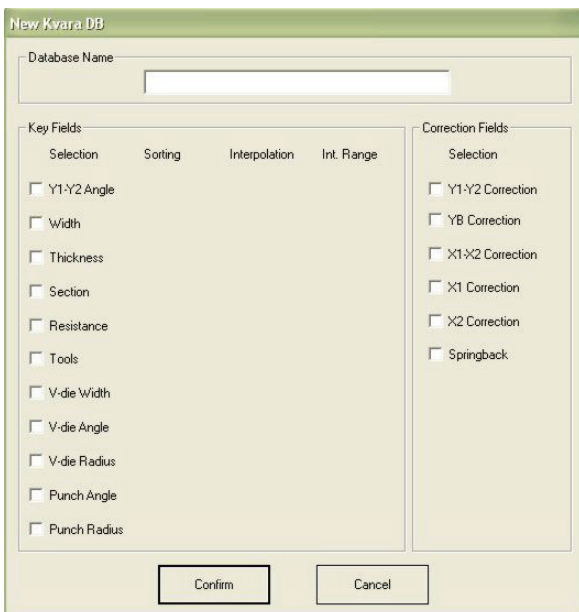


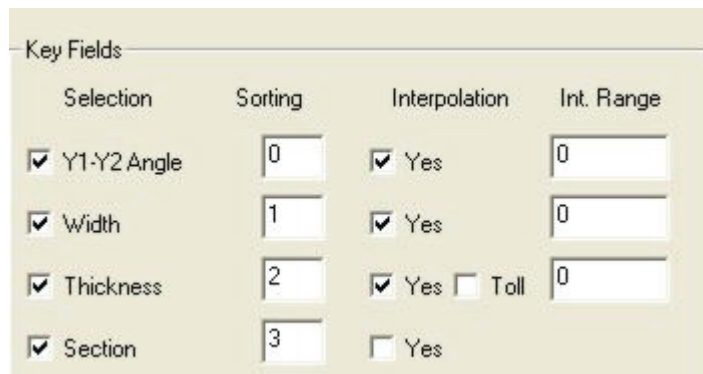
Figure 41 Mask for creating a new database

At the same time as the keys are selected, it is possible to enter the properties for each one.
The first is the arrangement index which determines the order in which the rows of each table will be arranged and displayed.
The second is the *interpolation*, which determines whether interpolation will be attempted during the search phase (in the case of the exact value not being found).

3.Programming

3.9.5

The interpolation range is a parameter used for the interpolation, and is illustrated in the following paragraph.



Selection	Sorting	Interpolation	Int. Range
<input checked="" type="checkbox"/> Y1-Y2 Angle	0	<input checked="" type="checkbox"/> Yes	0
<input checked="" type="checkbox"/> Width	1	<input checked="" type="checkbox"/> Yes	0
<input checked="" type="checkbox"/> Thickness	2	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Toll	0
<input checked="" type="checkbox"/> Section	3	<input type="checkbox"/> Yes	

Figure 42 Setting the arrangement and interpolation properties of the keys

Excluding corrections (1)

This allows you to exclude one or more corrections from the new programmes present in the Database.

Changing the Settings DB (2)

From the mask in the figure it is possible to change the arrangement and interpolation settings of the keys for all the tables of the database.

Deleting a Database (3)

From the mask similar to the one in the figure it is possible to delete one of the databases in the system from the list.

Selecting a Database (4)

From the mask similar to the one in the figure it is possible to select one of the databases in the system from the list.

Saving the current DB (5)

This allows you to save the current database on the USB device.

Save all DB (6)

This allows you to save all the database present on the USB device.

Uploading all the DB (7)

This allows you to upload on the system all the databases present on the USB device.

3.Programming

3.9.6 Acquiring correction values

Once the KvaraDatabase has been enabled, it is possible to acquire corrections from the **SETTINGS, CORRECTIONS** or **SEMIAUTOMATICO** masks.

Once the right correction has been entered on the Settings or Semiautomatic mask, press the function key [**Learn KvaraDB**].

The correction present on the mask will be recorded in the Materials Table corresponding to the one currently entered.

If this table does not yet exist, the mask will automatically open where you can enter the description of the new material and then confirm the creation of the table



Kvara Database - METALLASER - New material table

Material Number

Material Name

Figure 43 Confirm the creation of a new Materials Table

Should you try to re-enter an already existing value in the database, you will be asked to confirm whether you wish to replace the existing value or not.



Kvara Database - METALLASER - Table 25

i Correction Inserted

Angolo Y1-Y2 = 135.00
Larghezza = 2000.0
Spessore = 2.00
Attrezzi = 4321(1)-123

Correzione Y1-Y2 = 0.00
Correzione X1-X2 = null

Figure 44 Confirm replacement of correction

3.Programming

3.9.6

Self-learning mode

The self-learning mode is extremely useful in the initial phases of learning about the KvaraDB, when this is empty. The scope to simplify the procedure for acquiring corrections by the operator.



To enable the self-learning mode you must enter the Corrections mask by pressing

If the database is not enabled press the function key **[ENABLE KVARADB]**.

By activating this function the corrections are acquired without having to press the key **[Learn KvaraDB]**.

Each time a correction value is changed from the **SETTINGS** or **CORRECTIONS** mask which is configured in the current database, all the corrections will be automatically learnt without having to press the key **[Learn KvaraDB]**.

Press the **[Self-learning KDB]** key: the icon for enabling the KvaraDB will be displayed in the top right hand corner:



KvaraDB enabled in normal mode



KvaraDB enabled in self-learning mode

Corrections and stretching

Unlike with the other axes, the corrections that appear in the correction field are not directly saved in the database: account is only taken of the correction entered by the user and the stretch of the sheet metal.

In this way it is possible to use the interpolation function of the stretching, irrespective of the type programme (graphic or numeric).

In fact, for the X, the values (X_{db}) obtained as the difference between the value calculated by the stretch formula (X_f), and the value entered in the User Interface (X_{ui}), are saved in the database.

In short, the value saved in the database is equal to:

$$X_{db} = X_{ui} - X_f$$

while the values downloaded from the database in the fields of the programme are calculated in an inverse manner:

$$X_{ui} = X_{db} - X_f$$

3.Programming

3.9.7 Using the correction values

Once the *KvaraDatabase* has been enabled, the correction data are automatically searched for and entered in the programmes, both numeric and graphic.

During the filling out of a numeric programme from the *Settings* or *Semiautomatic* mask, every time a change is made to the key data of the *Database*, a search is made for the corresponding correction in the table relating to the material entered.

If the correction exists, or if it is possible to calculate a value for interpolation, the matching value will be automatically entered in the Field of the mask (**SETTINGS** or **SEMIAUTOMATIC**).

In case of graphic programmes, during the filling out phase, the corrections will automatically be searched for and applied to the correction fields in exactly the same way as for the numeric programmes.

Interpolation of the data

In the event of the interpolation property being entered in one or more key fields, this will be calculated starting from the data recorded in the Database.

The interpolation that is made is of the linear type: the records are searched for with a key value immediately higher (SUP) and lower (INF) than the desired one.

If the INF and SUP are found, the result will be an average value between the corresponding correction values, whereas if they are not found, no correction will be calculated.

The maximum distance between the two higher and lower values can be entered on the property mask (the Range Int. parameter in Figure).

This means that if the difference between INF and SUP is greater than the value Range Int. the interpolation will not be calculated as they would if the two values had been found.

If the Range Int.= 0 the interpolation will always be calculated.

Tolerance on the thickness

This function allows you to exploit the corrections of the database also for bend programmes with thickness values that differ slightly from those saved.

By setting a tolerance on the thickness, in fact, the corrections are only searched for if a thickness value exists in the database that is found within the tolerance range.

EXAMPLE

If we only have correction values in the database that correspond to thickness of 2 mm, and we have entered a thickness of 2.1 mm in the program, normally no value will be uploaded.


By adding the tolerance at 0.2 mm, for any programme with thicknesses found between 1.8 mm and 2.2 mm, the corrections corresponding to S=2 mm will be uploaded, that is, the only ones existing in the database.

3.Programming

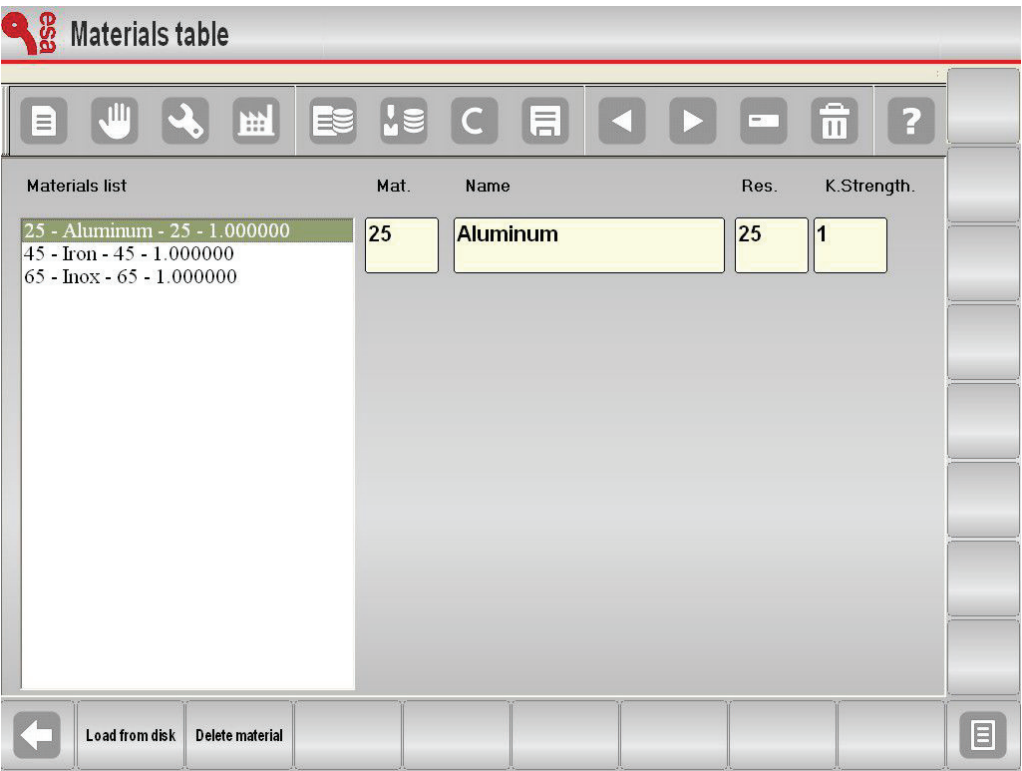
3.9.8 Materials Table

How to enter the Materials Table mask

To access the *Materials Table* mask follow the steps below:

- enter the Corrections mask by pressing the  key
- press the **[Materials Table]** key

The mask appears as illustrated in the figure:



Materials list	Mat.	Name	Res.	K.Strength.
25 - Aluminum - 25 - 1.000000	25	Aluminum	25	1
45 - Iron - 45 - 1.000000				
65 - Inox - 65 - 1.000000				

Figure 45 Material list table

3.Programming

3.9.8

How to use the materials coefficient

Open the *Materials Table* mask and enter the coefficients for correcting the materials.

This parameter will be used in the calculation of the stretch for all the bends entered after the change in the coefficients and for all the new programmes. To apply the corrections to the existing programmes it will be necessary to re-enter the angle in each bend.

The default value of the coefficients is 1, with this value the standard stretch is calculated by re-processing the DIN6935 standard. The value entered in the coefficients will be multiplied by the stretch calculated, therefore by setting the value 2, a double stretch is calculated, while by setting the value at 0.5, half a stretch is calculated.

The tolerated values must be found between 0 and 9, the tolerated decimals are up to a maximum of 2.

How to disable the calculation of the stretching

To disable the calculation of the stretch of the material, it is sufficient to set the coefficients to 0.

With the calculation disabled, the corrections of the X in the numeric programmes will no longer be calculated and the development of the piece in the graphic programmes will be the exact sum of all the segments.

Saving the coefficients

To save the coefficients entered just press the save  key .

Uploading the coefficients

To upload the coefficients entered from a USB device just press the function key [**Downloading from disk**].

The coefficients will also be saved and automatically uploaded from the **Configure** mask (2) via the function keys [**Save ALL**] and [**Download ALL**] (1).


3.Programming

3.10 Clinching/Coining coefficient

How to enter the Corrections Coefficient mask

La mask *Correction coefficients* contains the parameters Clinching and Coining coefficients.

In order to access to the mask *Correction coefficients* it is necessary to follow the steps below:

- enter the Corrections mask by pressing the  key.
- press the key [**Correction coefficient**].

The following mask will appear:

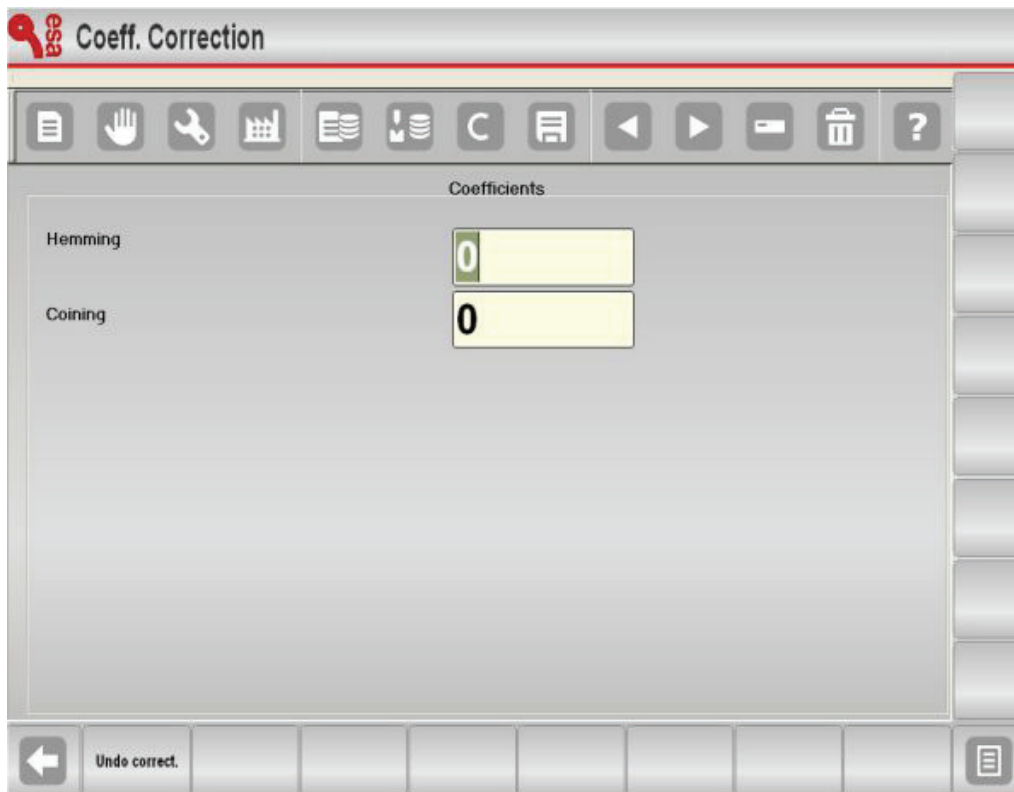


Figure 46 Correction coefficients

3.Programming

3.10

How to use the Clinching/Coining coefficient

Open the *Correction coefficients* mask and enter the parameters. In order for them to be assimilated after the setting it is necessary to reboot the NC.

These parameters will be used to calculate the P.M.I.s for all the bends of the Clinching/Coining type. This means that they will be algebraically added to the P.M.I.s that are calculated normally.

Saving the coefficient

The coefficients are automatically saved every time you exit from the *Correction coefficients* mask. They are not saved in the current work program, however they always remain linked to the machine.

How to delete the changes to the coefficient

To delete the changes to the coefficients press the **[Ignore Correct.]** key. The values present on opening the mask will be restored.

3.11 Corrections in semiautomatic mode

It is possible to directly enter the corrections of the angles and the stops in the semiautomatic mask with the possibility of applying the correction entered to all the angles that are the same as that specific piece of that section, or just that specific bend.

Semiautomatic mask

When the machine is found in **STOP**, the following semiautomatic mask will appear:

Semi-automatic PM0000 Press Start

Name: Bend 1 Section 1

Piece info

Comp.Pcs	0
To Do	0
Measures	0
Devel.	0

General data

Width	1000
Thickness	2
Steel	Steel44
Station	0
Die	1
V-die	1
Punch	1

Angle B.D.C. Corrections Current Calibra

	Angle	B.D.C.	Corrections	Current	Calibra
Y1	90	117.47	0	238.18	
Y2	90	117.47	0	237.64	
X1	Final 100	Retract 0	Corrections 0	Current 98.1	
R1	56			56	

Work info

T.D.C.	118
Force	24.5
Crown.	0
C.S.T.	0
Pinch P.	0
Mute	0
Bend time	0
Match.	0
Speed	0.6
Functions	0 0 0 0
Rep./Dir.	1 1
Ri	2

Bottom bar icons: Acquisition, Y auto-learn, Z auto-learn, Graphic, Functions Machine, Change section, Change program.

Figure 47 Semiautomatic mask in STOP

3.Programming

3.11

It is possible to edit the corrections of Y1, Y2, and the X axes as well as the heights of the R axes, therefore the operator can enter the corrections directly from this mask without having to return to the Settings mask.

When the **START** is enabled, the editing listed above will just be in 'read only' format therefore the semiautomatic mask will appear as follows:

The screenshot displays the 'Semi-automatic' mask in the START software. The title bar indicates 'PM0001 Press down to bend'. The interface is divided into several sections:

- Top Bar:** Contains icons for file operations, navigation, and help.
- Header:** Shows 'Name', 'Bend 1', 'Section 1', and a material selection button 'N'.
- Piece info:** Includes 'Comp.Pcs' (0), 'To Do' (0), 'Measures' (0), and 'Devel.' (0).
- General data:** Includes 'Width' (1000), 'Thickness' (2), 'Steel44', 'Station' (0), 'Die' (1), 'V-die' (1), and 'Punch' (1).
- Angle, B.D.C., Corrections, Current, Calibra:** A table for editing parameters for Y1, Y2, X1, and R1.
- Work info:** Includes 'T.D.C.' (118), 'Force' (24.5), 'Crown.' (0), 'C.S.T.' (0), 'Pinch P.' (0), 'Mute' (0), 'Bend time' (0), 'Match.' (0), 'Speed' (0.6), 'Functions' (0, 0, 0, 0), 'Rep./Dir.' (1, 1), and 'Ri' (2).
- Bottom Bar:** Contains icons for 'Acquisition', 'Y auto-learn', 'Z auto-learn', 'Graphic', 'Functions Machine', 'Change section', 'Change program', and a list icon.

	Angle	B.D.C.	Corrections	Current	Calibra
Y1	90	117.47	0	238.18	<input checked="" type="checkbox"/>
Y2	90	117.47	0	237.64	<input checked="" type="checkbox"/>
X1	Final: 100	Retract: 0	Corrections: 0	Current: 100	<input type="checkbox"/>
R1	56			56	<input type="checkbox"/>

Figure 48 Semiautomatic mask in START

How to make the corrections

If the corrections are made on the semiautomatic mask, said corrections will be made directly to the current bend. When a correction is changed, the corresponding edit is displayed with the colours reversed; in this way the operator is advised about the changes made.

3.Programming

3.11

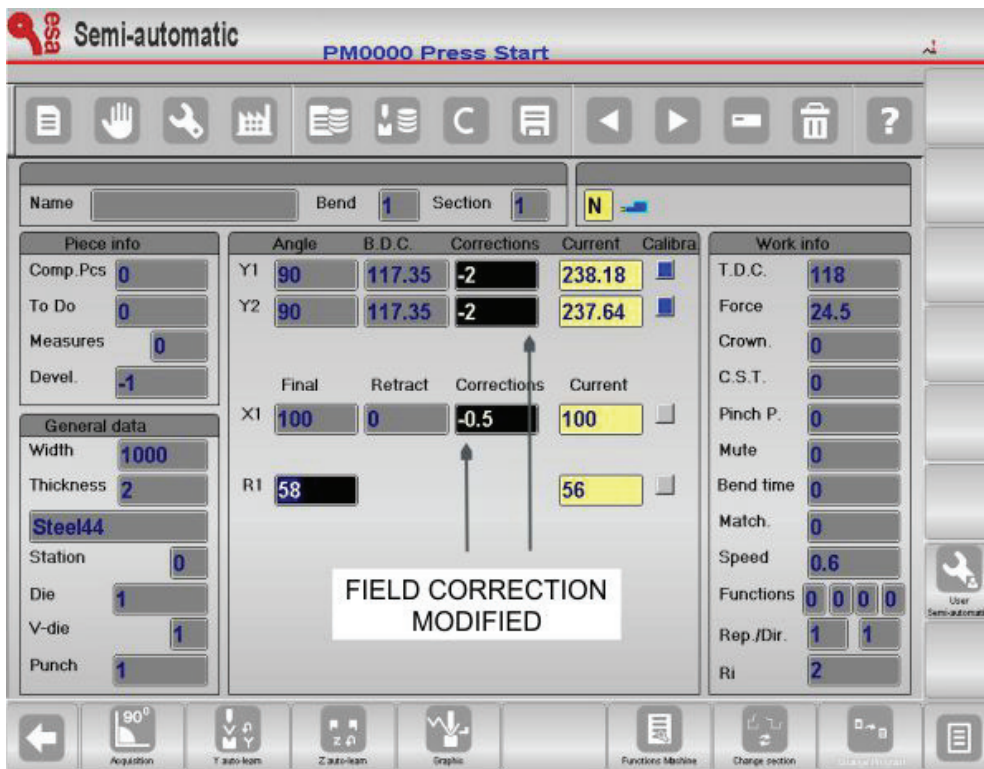



Figure 49 Corrections in Semiautomatic


In order to extend the corrections to all the bends of the current section with the same angle as that of the current bend, you must follow the steps below:

Make the corrections:

- press the  key to view the secondary menu;
- press the function key **[Conf. Same. Sect.Ang.]**

In order to extend the corrections to all the bends of the piece having the same angle as that of the current bend, you must follow the steps below:

Make the corrections:

- press the  key to view the secondary menu;
- press the function key **[Conf.Pr. Same.Ang.]**.

3.Programming

3.11

Corrections internal radius

It is possible to display the internal radius of the bend on the settings mask. The internal radius is always calculated, either in graphic or numeric, the calculation method can be selected from the generic parameters. The change of the internal radius will influence the stretch calculations, but only if the programme is numeric. If the programme has been generated in graphic, the change to the internal radius will not recalculate the stretching.

Consult the machine parameters manual for the various application modes for the internal radius.


3.12 Selection of the DIN formula to calculate the stretch

It is possible select the standard DIN formula if you need to use it (for calculating the stretch). In order to select the standard formula, set the generic Stretch formula parameter to 1. This Field can also be changed by the operator from the **User Parameters (4)** mask.

Consult the manual of the machine parameters, for the various application methods of the internal radius.

Checking the program



Once the changes have been made, press  to take the axes into position. The check of the programme will be carried out automatically and in case any errors are detected, a message will then be sent which will remain in semiautomatic **STOP** status.

Self-learning cycle

There are special situations in which it is not possible to use the bend height calculated by the numeric control for carrying out a bend (rounded punches, bends to mould, bends outside the cavity, etc...).

In these circumstances it is helpful to use the self-learning cycle of the bend height you want to make on the SEMIAUTOMATIC mask.

If this procedure is activated, no change will be made at the end of a bend, instead the cycle will remain on the current bend to allow the operator to carry out self-learning of the desired height of the end of the bend.





3.Programming

3.12

In order to find the correct height of the end of the bend the operator can adopt various methods:

- if the height to be reached is greater than the height of the end of the bend calculated, the height can only be searched for via use of the pedal;
- if the height to be reached is less than the height of the bend calculated, the operator must enable the **Raise up to the PMS with the raise consent** input, release the pedal at the height of the end of the bend and use the hand wheel on the front panel to raise or lower it by one tenth of a millimetre at a time.

The procedure can be activated from the SEMIAUTOMATIC mask in the following manner:

- press ;
- press the  key to position the axes of the stop;
- press the **lowering pedal** for make the bend;
- search for the point of the desired end of the bend via the procedure described above;
- press [**self-learn. Y**];
- press the **raising pedal**;
- repeat the procedure for all the bends of the program; in order to move between the various bends use the  and  keys.

Once the self-learning has been completed for all the bends:

- press  and carry out the programme from the first bend.

4. Bend programming and management

4.1 Bend summary mask


This mask allows you to simultaneously view the data of all the bends of the current programme. This mask is in table form similar to the graphic interface of TRIA.

From this mask it is also possible to change the programme data, using the main functions contained in the settings mask.

The table is organised so that a bend corresponds to each column, and the date of the bends correspond to each row.

4.1.1 How to enter the bend summary mask

In order to access the *Bend Summary* mask follow the steps below:

- from the settings mask press the  key to open the menu
- select the item **Bend summary** (8); and the Bend summary will open.
- this mask contains the following information (indicated in the figure):
- the heading of each column contains the progressive number of the bend in the program
- the first column on the left contains the description of the value associated with the row
- the value currently selected will be highlighted against a yellow background
- indications of the name of the programme selected
- indications of the bend selected from the total number of bends in the current section
- indications of the current section from the total number of sections in the program
- function key [**New Program**] to create a new program
- function key [**Change Section**] to take the current selection to the first bend in the next section.

4.Bend programming and management

4.1.1

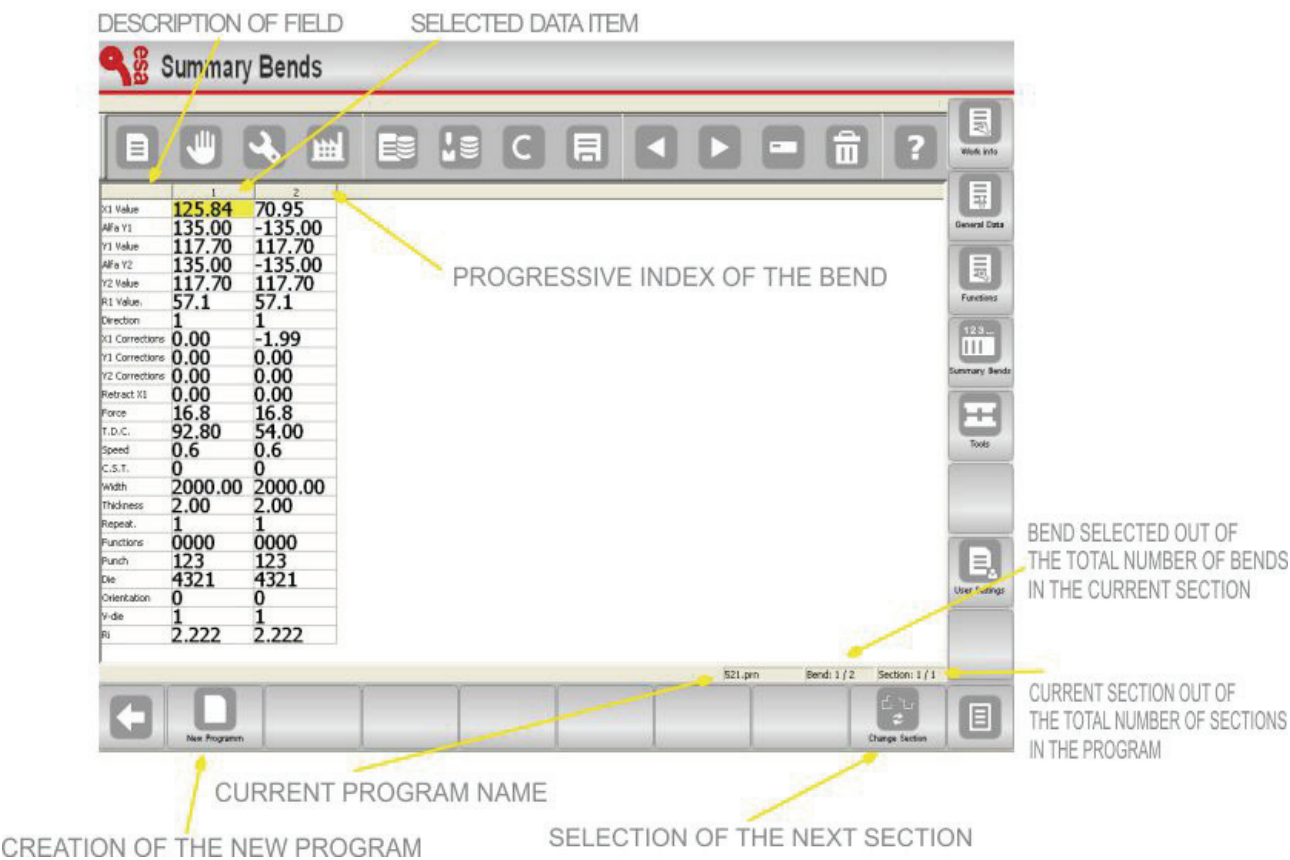


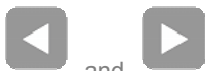
Figure 50 Bend summary Mask



4. Bend programming and management

4.1.2 How to use the bend summary mask

How to shift the selection

To shift the selection from one bend to another in the program:



- press the  and  keys. If you press the second key when the selection is on the last bend in the program, a new bend will be added to the end of the queue.

To shift the selection onto the first or last bend and from one side to the other of the selected bend, use the specific touch function of this product, as indicated above in this document.

N.B.

When there are several bends of the columns that could be displayed width-wise, the ones in excess will not be immediately visible.

These can be viewed by shifting to the right of the selection, in this way all the columns will be shifted towards the left. Similarly, when the monitor is not able to contain all the description rows, it will be possible to shift the rows either upwards or downwards and thus move the selection.

How to change a value

In order to change a value, move onto the corresponding cell, enter the desired value and press the ENTER



key (soft keyboard environment- S 550 PC Touch model) - the selection will move onto the field underneath.

How to change the section

In order to shift the selection onto the first bend of the following section press the **[Change Section]** key.

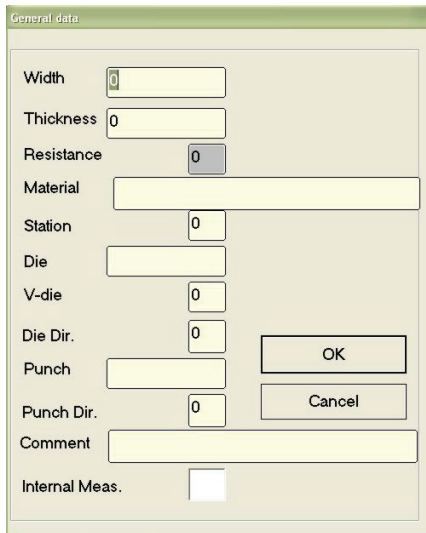
If the selection is positioned on the last section of the programme, by pressing the **[Change Section]** key you will cause a new section to be entered.

4. Bend programming and management

4.1.3 How to create a new program

In order to create a new numeric programme from the *Bend summary* mask :


- press the **[New Program]** key and the following window will open for entering the general programme data:



The 'General data' window is a form with the following fields and controls:

- Width: text input field with '0' entered.
- Thickness: text input field with '0' entered.
- Resistance: text input field with '0' entered.
- Material: text input field.
- Station: text input field with '0' entered.
- Die: text input field.
- V-die: text input field with '0' entered.
- Die Dir.: text input field with '0' entered.
- Punch: text input field.
- Punch Dir.: text input field with '0' entered.
- Comment: text input field.
- Internal Meas.: checkbox.
- OK button.
- Cancel button.


Figure 51 General data window

- enter the **width** of the metal sheet to be bent.
- enter the **thickness** of the metal sheet to be bent.
- enter the **material** (resistance) to be bent bearing in mind the following regulations:
 - aluminium: 0 – 30
 - sheet metal: 31 - 50 (ideal value 42)
 - stainless steel: more than 50
- the **material** is calculated automatically depending on the resistance.
- enter the **die** that will be used for the bend (the die must already have been drawn).
- enter the **cavity** of the die that will be used for the bend (a die can have more than one cavity; in the case in which it only has one, enter 1).
- enter the **punch** that will be used for the bend (the punch must already have been drawn).
- move onto the key **[Confirm]** and press the ENTER  key (soft keyboard environment – S 550 PC Touch model).


4.Bend programming and management


4.1.3

Nota

If the default data are enabled ( icon on the settings mask) the window illustrated above will not open and instead a new bend will be directly created containing the data entered in the default bend. Once the general data have been entered, the cursor will be positioned on the **Alfa Y1** field of the first bend, at this stage it is possible to enter the rest of the data.

Saving the program

At the end of the setting press ; a window will open in which it is necessary to enter the name of the programme.

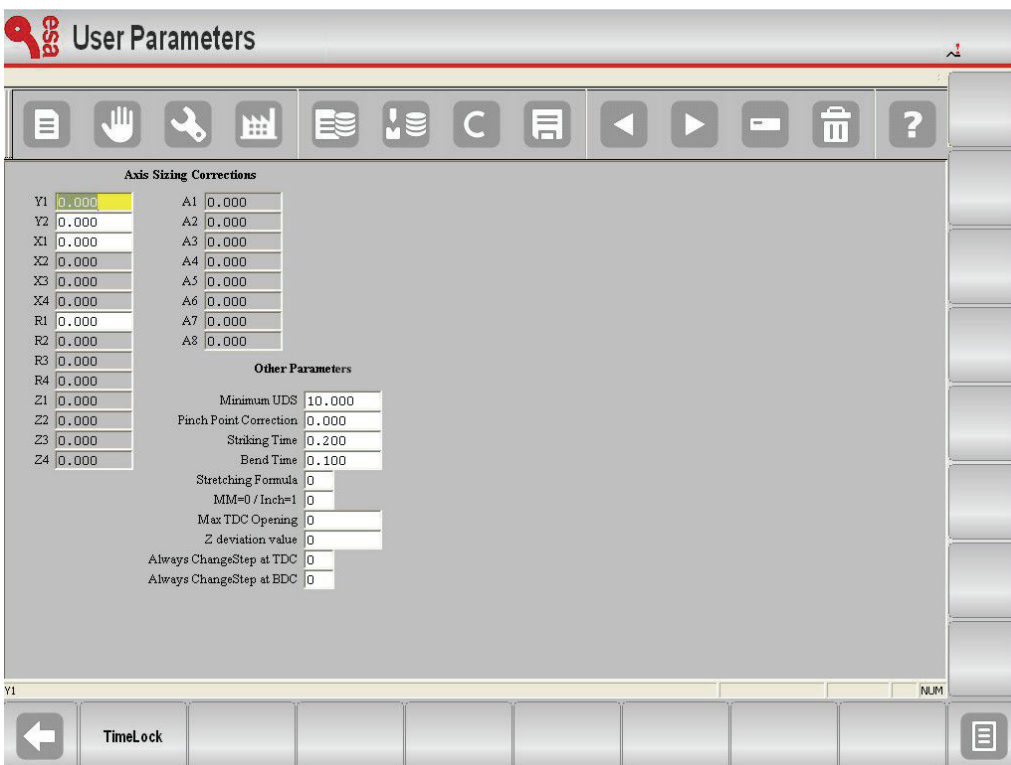
After having entered the name move onto the key **[Confirm]** and press the Enter  key (soft keyboard environment - S 550 PC Touch model).

4.Bend programming and management

4.2 “User Parameters” mask

This mask, which does not require a password, only makes the changeable data available to the end user, in this way preventing access to the main machine parameters.

- from the settings mask press the  key to open the menu.
- select the item **User Parameters** (4); and the following window will open:



Axis Sizing Corrections	
Y1	0.000
Y2	0.000
X1	0.000
X2	0.000
X3	0.000
X4	0.000
R1	0.000
R2	0.000
R3	0.000
R4	0.000
Z1	0.000
Z2	0.000
Z3	0.000
Z4	0.000
A1	0.000
A2	0.000
A3	0.000
A4	0.000
A5	0.000
A6	0.000
A7	0.000
A8	0.000

Other Parameters	
Minimum UDS	10.000
Pinch Point Correction	0.000
Striking Time	0.200
Bend Time	0.100
Stretching Formula	0
MM=0 / Inch=1	0
Max TDC Opening	0
Z deviation value	0
Always ChangeStep at TDC	0
Always ChangeStep at BDC	0

Figure 52 User Parameters mask

4.Bend programming and management

4.2.1 CORRECTIONS TO AXIS CALIBRATION parameters

In the fields of the axes configured, it is possible to make a correction to the resetting height compared to the factory data of the machine: this change may become necessary with any deterioration of the mechanics of the bending press. For example, the factory data of the machine regarding the resetting heights of the ram axes are **230.93 mm** for **Y1** and **230.09 mm** for **Y2** (as illustrated in the following figure).

The screenshot shows the 'Axes parameters' mask for the 'Ram axis'. It is divided into three main sections: GENERAL parameters, PRESSURE Parameters, and CROWNING Parameters. Each section contains several input fields with numerical values.

GENERAL parameters		PRESSURE Parameters		CROWNING Parameters	
Minimum position	60	Ramp	0.2	Ramp	0
Maximum position	515	0% Voltage	2.8	0% Voltage	0
Y1 Reference position	509.04	25% Voltage	3.6	25% Voltage	2.8
Y2 Reference position	509.37	50% Voltage	5.6	50% Voltage	5.2
Position tolerance	0.02	75% Voltage	7.7	75% Voltage	7.6
Unbalance correction	3	F.S. (A)	0.7	Crowning rate	15
Maximum unbalance	15			F.S. (A)	0
Conversion factor	25				
Coining time	0.2				
Bend. time	0.1				

Figure 53 Axis Correction Parameters Mask

It will consequently be necessary to carry out a correction of **-0.09 mm** for **Y1** and **0.1 mm** for **Y2**, and you must enter the correction values of correction in the **Y1** and **Y2** fields in the **PARAMETERS USER** mask.

4.Bend programming and management

4.2.1

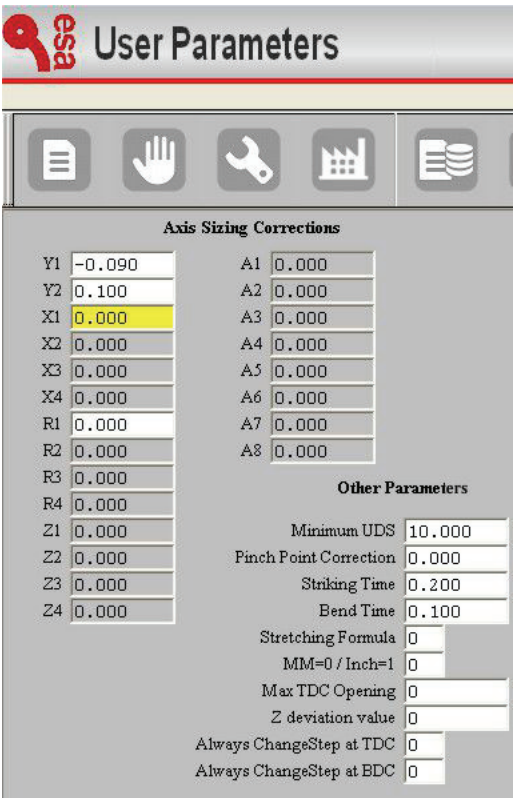


Figure 54 Viewing the axis calibration corrections table on the display

The factory data of the axis parameters of the ram are not changed, however from now on, after having made the calibration of the ram axis, **Y1** will automatically calibrate to a height of **230.84 mm** and **Y2** to a height of **230.19 mm**.

Saving the user parameters

To save the new user parameters (in the file **UserTara.par**) press the save  key.

4.Bend programming and management

4.2.1

Resetting of corrections

If the manufacturer of the press decides to change the factory parameters of the resetting height of the axes that entail a correction, for example of the **Y1**, the following message will appear on the display:

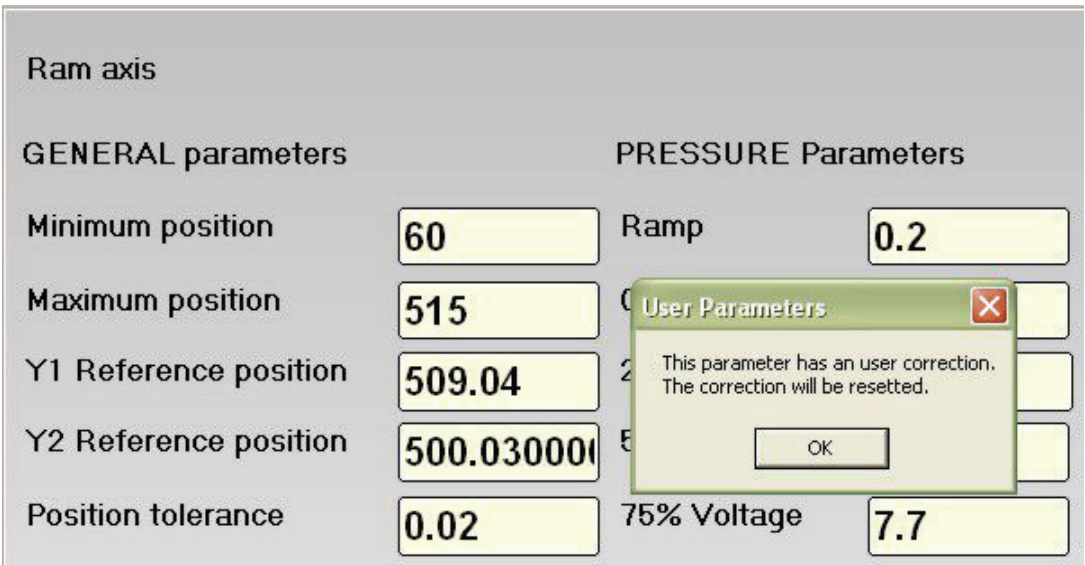


Figure 55 Resetting of corrections message

4.Bend programming and management

4.2.1

The relative correction will be automatically reset and the calibration height will return to being that of the ram axis:

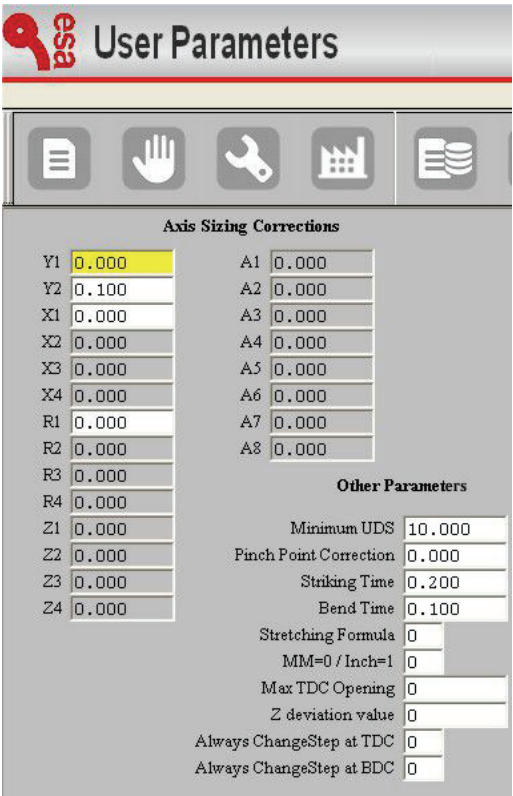


Figure 56 Viewing the axis calibration corrections table on the display after resetting the heights

4. Bend programming and management

4.2.2 Other parameters

The other parameters contained on the *User Parameters* mask are the same as the *AXIS PARAMETERS*, *GENERAL CONFIGURATION PARAMETERS* and *GENERAL PARAMETERS*, except that they are made available to the user without an access password, and have the following meanings:

Minimum PMS	
Minimum value: 0.00	Maximum value: 9999.99
Default value: 0.00	Measuring unit: mm
Value type double	Protection level: none
Present in SW version 1.0	Change activated From data setting
Description:	This indicates the minimum opening of the ram compared to the metal sheet contact point to allow for extracting the sheet metal.
Application:	Automatic calculation of the upper dead point.
Special cases, errors, ..	In the case in which this parameter is set to 0.00 the automatic calculation procedure will calculate an opening in the ram which is just sufficient for extracting the plate of sheet metal.
Correction PCL	
Minimum value: 0	Maximum value: 9999.99
Default value: 0	Measuring unit: mm
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	Parameter used to compensate the value of the metal sheet contact point of the machine. The parameter is added to all the metal sheet contact points (PCL) calculated in the machine programmes.
Application:	Automatic calculation of the metal sheet contact point
Time of coining	
Minimum value: 0.00	Maximum value: 99.99
Default value: 0.10	Measuring unit: seconds
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	Time during which the ram remains stopped on the bend in order to carry out a coining or stamping operation.
Application:	The control carried out the coining operation automatically if the bend has been defined as clinching/coining.

4.Bend programming and management

4.2.2

Bending time	
Minimum value: 0.00	Maximum value: 99.99
Default value: 0	Measuring unit: seconds
Value type double	Protection level: none
Present in SW version 4.0	Change activated from data setting
Description:	Default bending time of default: this is applied automatically with each new bend created
Stretch formula	
Minimum value: 0	Maximum value: 1
Default value:	Measuring unit:
Value type double	Protection level: none
Present in SW version 14.2	Change activated from data setting
Description:	<p>This parameter allows for selecting the method of calculating the stretch of the material (Bend Allowance), according to the following scheme:</p> <p>0: ESA Formula</p> <p>1: DIN 6935 Formula.</p>
MM=0, INCH=1	
Minimum value: 0	Maximum value: 1
Default value: 0	Measuring unit:
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	<p>The following values can be assumed:</p> <p>0 : heights expressed in millimetres</p> <p>1 : heights expressed in inches.</p>

4.Bend programming and management

4.2.2

Maximum PMS in numeric	
Minimum value: 0.00	Maximum value: 9999.99
Default value: 0	Measuring unit: mm
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	This indicates the opening of the ram calculated automatically in the numeric programmes. It must be considered an absolute value compared to the 0 machine - 5 mm.
Application:	Automatic calculation of the upper dead point.
Special cases, errors, ..	In cases in which this parameter is set to 0 the automatic calculation procedure will calculate a opening height equal to the maximum height - 5 mm.
Deviation value of Z	
Minimum value: -1000000	Maximum value: 100000
Default value: 0	Measuring unit: mm
Value type dword	Protection level: none
Present in SW version 6.4	Change activated Setting parameter
Description:	<p>Indicates the deviation height to be used whenever the deviation of the Z axis is enabled in the bend in progress.</p> <p>Only one value exists, this is used for both the Z axes and in particular: Z1 will carry out an incremental positioning of the value set towards negative heights Z2 will carry out an incremental positioning of the value set towards positive heights</p> <p>Example :</p> <p>Deviation value of Z = 50 Height Z1 = 1000 Height Z2 = 2000</p> <p>When the recoil is carried out Z1 will move to 950, and Z2 will move to 2050</p> <p>From the 8.7 version, if the deviation value is negative, the deviation of the Z will be carried out first, followed by the deviation of the X, if the value entered is positive, the deviation of the X will be carried out first, followed by the deviation of the Z.</p>

4.Bend programming and management

4.2.2

Forced change P. to the PMS	
Minimum value: 0	Maximum value: 1
Default value: 0	Measuring unit:
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	The following values may be assumed: 0 : the pitch change is carried out when the ram reaches the PCL during the raising. 1 : the pitch change is carried out once the ram has reached the PMS .
Application:	Execution of a programme in automatic or semiautomatic.
Forced change P. to the PMI	
Minimum value: 0	Maximum value: 1
Default value: 0	Measuring unit:
Value type double	Protection level: none
Present in SW version 1.0	Change activated from data setting
Description:	The following values may be assumed: 0 : the pitch change is carried out when the ram reaches the PCL during the raising 1 : the pitch change is carried out once the ram has reached the PMI .
Application:	Execution of a programme in automatic or semiautomatic.

4. Bend programming and management


4.3 “General data”

In this mask it is possible to make changes to a bend in the programme and then later on, apply said changes to



- all the bends in the program
- all the bends in the section
- all the bends in the programme with the Y1 angle equal to that of the changed bend
- all the bends in the section with the Y1 angle equal to that of the changed bend.

4.3.1 How to enter the new “General data” mask

In order to access to the new general data mask it is necessary to follow the steps below:

- from the settings mask press the  key to open the menu
- select the item general data (6); now you enter the general data mask.

This mask has the same set up as that of the *Settings* mask and contains the following information (indicated in the figure):

- the fields in which the user has changed the value are illustrated with their colours reversed .
- the fields in which the value has been changed due to the effect of a recalculation made by the program, will have a red background .
- the [**Ignore corr.**] key for cancelling the changes made temporarily.
- the [**Confirm Program**] key for applying the changes made to all the bends in the programme.
- the [**Confirm Section**] key for applying the changes made to all the bends in the current section.
- the [**Conf. Same Pr. Ang.**] key for applying the changes made to all the bends in the programme that have the same Y1 angle as the one displayed on the mask.
- the [**Conf. Same Sect. Ang.**] key for applying the changes made to all the bends in the current section that have the same Y1 angle as the one displayed on the mask.

4.Bend programming and management

4.3.1

FIELD SELECTED

FIELD CHANGED BY USER

FIELD CHANGED AS A RESULT OF RECALCULATION

General Data

Name: 521 Bend: 2 Section: 1 N

Piece info

Comp. Pcs: 0
To Do: 0
Measures: 0
Devel.: 145.23

General data

Width: 2000
Thickness: 2
Iron
Station: 0
Die: 4321
V-die: 1
Punch: 123

Angle

Y1: 90
Y2: 90

B.D.C.

113.69

Corrections

0

Final

X1: 70.95

Retract

0

Corrections

-1.99

R1

57.1

Work info

T.D.C.: 54
Force: 30.1
Crown: 15
C.S.T.: 0
Pinch P.: 0
Mute: 0
Bend time: 0.1
Match: 0
Speed: 0.6
Functions: 0 0 0 0
Rep./Dir.: 1 1
Ri: 3.33

← Lose Correct. Confirm Program Confirm Section Sme.Crms.Pr.Conf Sm.Crms.Sec.Conf →

Figure 57 General data mask

4. Bend programming and management

4.3.2 How to make corrections to the bend program

From the settings mask open the general data mask, which contains the same data as the currently activated bend.

Change the data of the bend displayed.

The changed or recalculated fields will turn a different colour to the one of the normal fields in order to remind the user which changes have been made.

N.B.

The bend displayed on this mask is NOT actually the bend of the active programme but instead, a copy to be changed as desired.

For this reason the changes made on this mask are NOT applied to any bends in the programme until such time as one of the four confirm keys are pressed.

How to apply the changes made only to the current section

To apply the changes made to all the bends of the current section press the **[Confirm Section]** key.

The values highlighted with reverse colours will be copied to all the bends of the current section in the active program, and for each one, the corresponding recalculations will be carried out.


If you only wish to apply the changes to the bends in the current section, which have the same bend angle as that of the bend displayed, press the **[Conf. Same Sect. Ang.]** key.

Upon concluding the operation all the fields of the mask will return to their normal colours.

How to cancel the changes made

To cancel the changes made on the general data mask press the **[Ignore Corrections]** key.

N.B.

It is possible to shift between the bends of the programme with the  and  keys or by editing the *Bend* and *Section* fields.

It is not possible to add or delete bends from this mask, to carry out these operations you must return to the settings mask.


4. Bend programming and management

4.4 “Metal-working machine” function

The “Metal-working machine” functions are as follows:

- “New Bend” function
- bend clinching function.



4.4.1 How to enable the “Metal-working machine” function

- from the settings mask press the key to open the menu
- select the item **Configure (2)**; and you will enter onto the *Configure* mask.
- select the item **7) General parameters**
- press the key **[Next]**
- enter the password and press **[OK]**
- enter the value 1 in the **Metal-working machine** Field and press the ENTER  key (soft keyboard environment – S 550 PC Touch model)
- from this moment on both the “New Bend” and “Forced bend clinching” functions will be enabled.

4.4.2 “New Bend” Function

This function, active on the *Settings* and *Bend summary* mask, allows you to create new bends containing the same data as the previous bend. Normally instead, the new bends only have the general data the same as those of the previous bend.

This function is active in the following cases:

- **Next** function: by pressing the  key when you are positioned on the last bend in the section, a new bend will be added to the bottom of the section. This new bend contains the same data as the preceding bend.
- **Enter step** function: by selecting the *Enter step* item from the menu  you add a new bend to the current position.
- This new bend contains the same data as the preceding bend.

N.B.

When the function is enabled it will be necessary to pay attention to the **Next** function. In fact, if you are positioned on the

last bend in the section and you continue to press the  key under the impression that you are scrolling the bends, in actual fact you will be adding new ones instead.

4. Bend programming and management

4.4.2



In order to scroll through the bends it is recommended to use the key . To add new steps according to the normal method, when the "New Bend" function is enabled, the function key **[New Step]** will be activated on the *Settings* and *Bend summary* mask.



If you press this key it is the same as pressing the key when this function is not enabled. In this case however, the function is not enabled and therefore each new bend will only contain the general data of as the preceding bend.

4.4.3 Forced bend clinching

This function, active on the *Settings* and *Bend summary* mask, allows you to enter a bend as Clinching simply by setting the value 0 in the Y1 Angle Field.

4.5 Last Bend

The icon indicates that the current bend is the last one in the section which will prevent you from pressing the key and inadvertently adding new bends. Figure 58 below illustrates the last bend icon.

ICON THAT REPORT LAST BEND



General Data

Name: 521 Bend: 2 Section: 1


Piece info		Angle		B.D.C.		Corrections		Work info	
Comp.Pcs	0	Y1	-135		117.62		0	T.D.C.	54
To Do	0	Y2	-135		117.62		0	Force	67.1
Measures	0						0	Crown	34
Devel.	145.23							C.S.T.	0
General data		Final	Retract	Corrections				Pinch P.	0
Width	2000	X1	70.95	0	-1.99			Mute	0
Thickness	2	R1	57.1					Bend time	0.1
Aluminum								Match	0
Station	0							Speed	0.6
Die	4321							Functions	0 0 0 0
V-die	1							Rep./Dir.	1 1
Punch	123							Ri	2.22

Buttons: Lose Correct, Confirm Program, Confirm Section, Sme.Crms.Pr.Conf, Sme.Crms.Sec.Conf

4.Bend programming and management

4.6 “Machine Functions” Mask

It is possible enter some special Machine functions for each bend.

- from the data settings mask press the  key to open the menu;
- select the item **Machine functions (7)**; you now enter the following mask.

The following window will be displayed:



The screenshot shows a software window titled "Functions machine" with a close button in the top right corner. The window contains two columns of settings, each with a numeric input field (displaying '0') and a text label. The left column includes: Function 1, D. Folding pneum., Retract axis Z, Follow. Uncoupling, Slow down, Function 6, Function 7, Function 8, Step Chg. BDC, and Function 10. The right column includes: Tray Mode LZS, Stop at Mute, Hand - Foot, Hand - Hand, Two Stations, Second Station, Function 17, Function 18, Function 19, Function 20, Box Height, New 2, New 3, New 4, New 5, New 6, Function Prog. 2, Function Prog. 3, Function Prog. 4, Function Prog. 5, Function Prog. 6, Function Prog. 7, Function Prog. 8, and Function Prog. 9. An "OK" button is located at the bottom left of the window.

Figure 59 Machine functions

4.Bend programming and management

4.6

The PCSS Machine functions are as follows:

Pneumatic Squash Function

If this function is set to 1 in the bend with a stop, the pneumatic bend squash die will be raised.

Z axes recoil Function

If this function is set to 1, the Z1 and Z2 axes will carry out a recoil set in the general parameter "Deviation value of Z" during the movement cycle.

Function to enable unhooking of accompaniment

If this function is set to 1, during its movement cycle, the accompaniment will also carry out the unhooking cycle. To learn about the functioning of the guiding axes, consult the relative use manual.

Slow descent function

If this function is set to 1, during the Semiautomatic and Automatic cycle, the ram will always be descend at slow speed.

Pitch change to the PMI Function

If this function is set to 1, the pitch change will be made once the ram reaches the Lower dead point (that is, the end of the bend).

LZS Mode Tray Function

This function is only used with the 'laser safe' safety system, that is, when the value of the parameter is 1.

End of height function

This function is only used with the 'laser safe' safety system. It indicates the height of the fin to be entered in mm, to be specified in case of using the LZS Tray Mode (boxed-structure pieces).

If a height is entered in this function, when the laser safe intercepts the fin with its beam and after checking that the entered height coincides exactly with the height of the same (meaning that its beam is not broken) it makes the ram descend more rapidly until reaching the speed change point calculated by the programme.

Stop at Mute Function

This function is only used with the 'laser safe' safety system. By setting the parameter to 1 you are able to stop at the speed change point. It is possible to start the bending of the piece again by pressing the lowering pedal.

Hands-Feet Function

This function is only used with the 'laser safe' safety system. By setting the parameter to 1 you are able to stop at the speed change point with the manual control (if installed), and then continue again by pressing the lowering pedal.

Hands-hands Function

This function is only used with the 'laser safe' safety system. By setting the parameter to 1 you are able to stop at the speed change point with the manual control (if installed), and then continue with the same.

Double pedal Function

This function is only used with the 'laser safe' safety system. By setting the parameter to 1 you are able to use both pedals (if installed).

4.Bend programming and management

4.7 Saving the programmes

The format of the work programmes changes after version 10.1 due to the fact that the number of functions has been increased to 20. While the version 10.x is able to read programmes from earlier versions, the programmes saved with 10.x versions or higher are not compatible on the earlier versions. For this reason, it is now possible to save a programme or all the numeric programmes in the previous version (which means it is compatible with the versions between 5.0 and 9.1).

Version Saving Mask

The mask contains the following information (indicated in the figure):

- list of the numeric programmes present in the current work directory
- indicator of the version of the programme currently selected on the list
- radio button for selecting the version in which to save the programmes
- function key **[Save As...]** to save the selected file on the list in the selected version
- function key **[Save ALL As...]** to save all the files present on the list on a floppy disk, in the selected version.

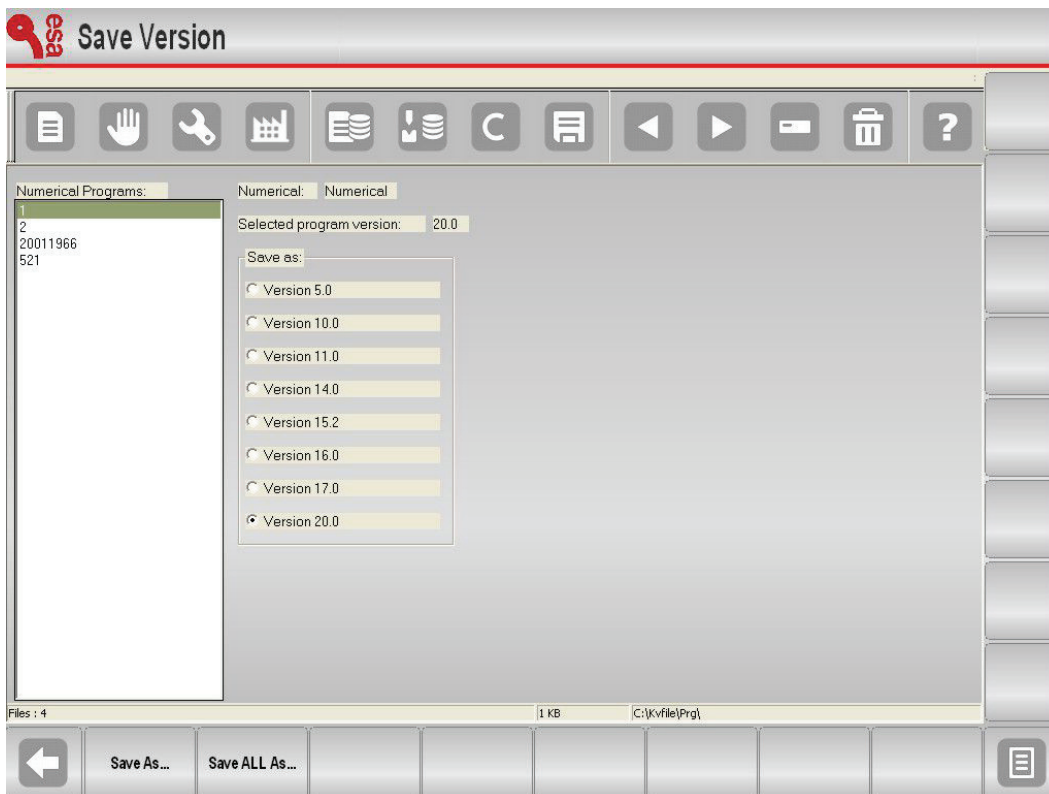


Figure 60 Version saving mask


4.Bend programming and management

4.7

How to save a numeric programme in the previous version

To save a numeric programme in the previous version, follow the steps below:



- press the  to enter the programme list mask.
- press the function key [**Save version**] to enter the saving mask.

To select the programme to be converted and subsequently select the format to be saved (example **Version 20.0**), use the touch function.

- press [**ENTER**].



Figure 61 View of the “save as” window

- press the function key [**Save As ...**].
- a window will open in which it is necessary to enter the name of the programme.
- after having entered the name move onto the key [**Confirm**] and press [**ENTER**].
- the new programme will be saved in the desired format.


4.Bend programming and management

4.7

How to save all the programmes in the previous version

To save all the programmes in the previous version, follow the steps below:



- press the  key to enter the programme list mask
- press the function key [**Save version**] to enter the saving mask.

In order to move onto the **Save As** window and select the format to be saved (example **Version 10.0**) use the touch function.

- press [**ENTER**].

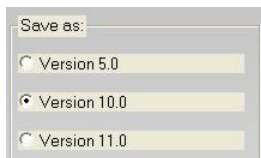



Figure 62 View of the “save all as” window

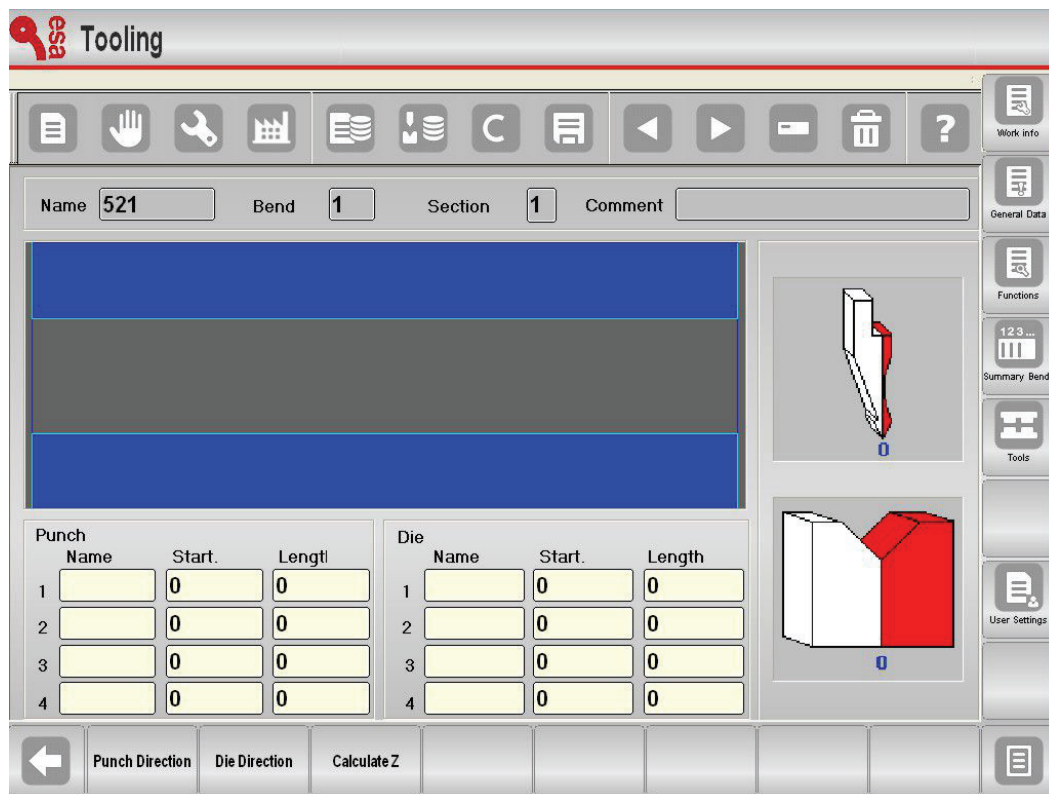
- Insert a formatted device into the USB port with sufficient space for containing the programmes.
- press the function key [**Save all As ...**].
- all the programmes present in the directory will be saved in the desired format.

4. Bend programming and management

4.8 “Tools” Mask

This mask manages the work stations and therefore allows for automatic calculation of the Z axes. You can access this mask in the following manner:

- from the data settings mask press the  key to open the menu.
- select the item **Tools (9)**; and you will access the following mask.



Punch			Die		
Name	Start	Length	Name	Start	Length
1	0	0	1	0	0
2	0	0	2	0	0
3	0	0	3	0	0
4	0	0	4	0	0

Figure 63 Tools Mask

The window at the top gives a front view of the machine.

The “Teeth” inside the machine, represent the tools.

The two windows on the right represent the directing of the tools.

The two windows at the bottom contain the data of the tools for each work station (a maximum of 4) and represent respectively:


- the number of the work stations to be entered in the programme (from 1 to 4).
- the name of the punch and the die used in that specific work station (the name must be the same as the one contained on the list of dies and punches).
- the measurements of the beginning of the tool for each work station (if the General parameter 2 “Distance 0- internal shoulder” is entered, the measurements will be calculated from point 0 and not from the point of the internal shoulder).
- the lengths of the tools for each work station.

4.Bend programming and management

4.9 Other Menu Pages

Turning off the NC

This allows you to turn off the NC machine. Follow the steps below:

- press the  key to open the menu.
- select the item **Turn Off (5)**.

Viewing the software version

This allows you to view the information relating to the software version currently in use, the number of axes enabled, and the software options installed. Follow the steps below:

- press the  key to open the menu.
- select the item **Version (7)**.


Viewing the logo

This allows you to view the Esautomation logo. It is also possible to personalise it with the logo of your own company. Follow the steps below:

- press the  key to open the menu.
- select the item **Logo (8)**.

Viewing the memory monitor

This allows you to view the data relating to the memory which is a useful function for your work. Follow the steps below:

- press the  key to open the menu.
- select the item **Memory Monitor (9)**.

4.10 Remote selection of the programmes



In order to use this mode it is necessary to prepare the necessary resources and correctly configure the CNC. For this purpose, please refer to the Machine Parameters Manual provided by the manufacturer of the machine.

5.Integrated CAD

Introduction

The Esautomation numeric controls for the bender are also equipped with a function that allows for drawing all the necessary graphic elements for checking the feasibility of the sequences of a bend; these graphic elements are as follows:

- lower part of the machine.
- upper part of the machine.
- punch.
- die.
- piece to be bent.

Access to the drawing of the elements listed above is described in the brief handbook.

5.1 Drawing function

The drawing function works by tracing the straight line segments in accordance with the data entered by the operator. The data can be entered in either polar format or Cartesian format, however use of the polar format is recommended to make the settings more user-friendly.

5.2 Polar setting of the drawing data

This function allows for defining the sections that will make up the drawing by mean of setting a pair of data:

- length of the section.
- angle compared to the following section.



the angles entered must be found within $\pm 180.0^\circ$.

5.Integrated CAD

5.2

The conventions via which these angles must be entered is as follows:

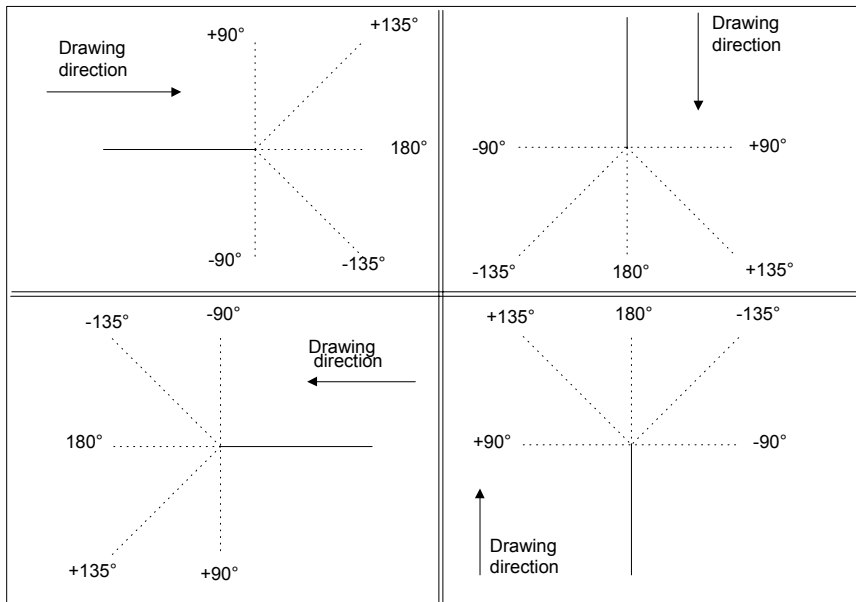


Figure 64 Conventions for setting the VSD angles

5.2.1 Cartesian setting of the drawing data

This function allows for defining the sections that will make up the drawing by means of a pair of coordinates that identify the difference between the beginning and end of the segment.

The Cartesian coordinates are not absolute but instead relate to the beginning of the segment and they must be entered as described in Figure 65.

5.Integrated CAD

5.2.1

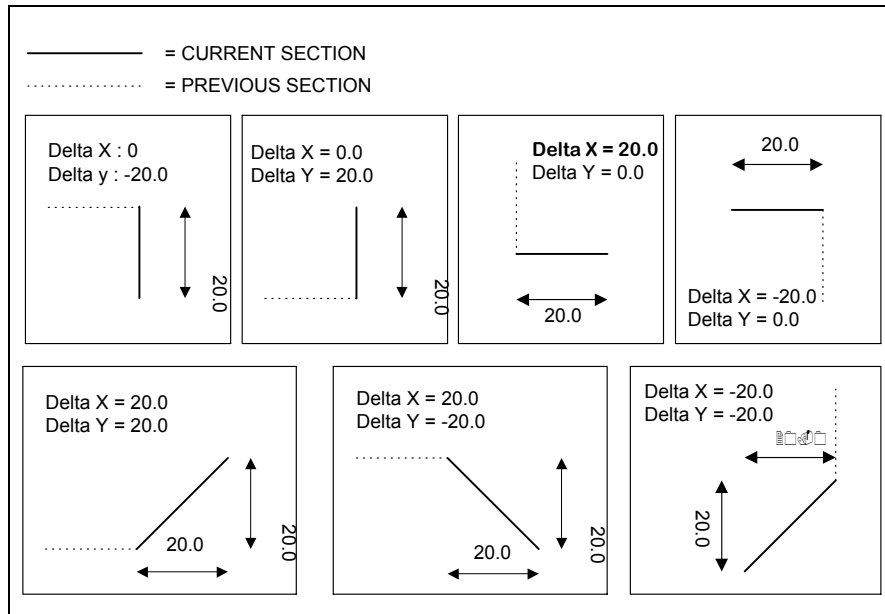


Figure 65 Conventions for setting the coordinates

5.2.2 General data

Before starting the drawing of a graphic element it is necessary to enter some general data that will vary according to the object you wish to draw.

The data to be introduced in this phase are described in the specific chapters for each object.

5.Integrated CAD

5.3 Mask of drawing

Activation

In order to access the drawing move onto the key **[Confirm]** and press **[ENTER]**.

The drawing mask consists of several windows:

- **Area 1** window of the drawing information or the status bar contains:
the name of the file that you are drawing.
the number of the step of the current drawing.
the scale factor of the drawing.
- **Area 2** window of the graphic tracing of the drawing in which:
the drawing corresponding to the data entered will be displayed.
- **Area 3** window of the polar setting of the drawing in which:
it is possible to enter the data relating to the length of the section to be drawn "**L**" and the angle compared to the following section "**Alpha**".
- **Area 4** window of the Cartesian setting of the drawing in which:
it is possible to enter the Cartesian coordinates "**DX**" and "**DY**" which represent the difference between the initial coordinates and the final ones of the section to be drawn.

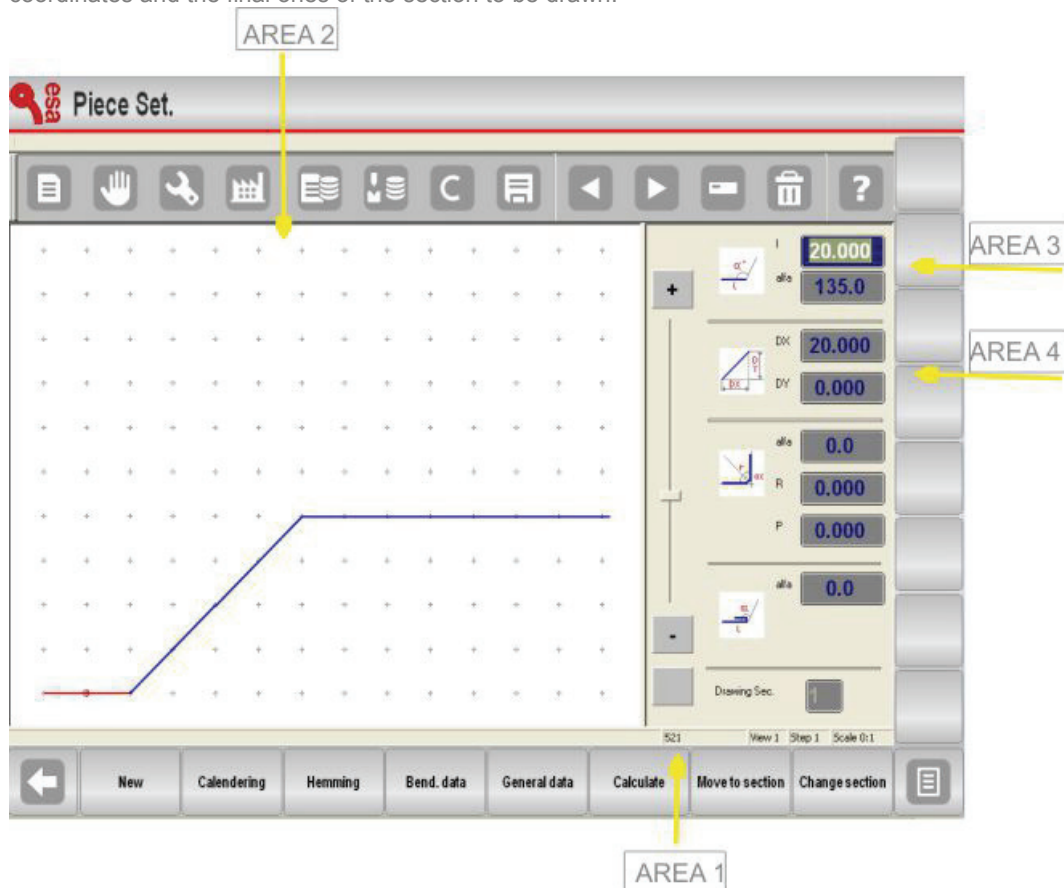


Figure 66 Drawing window

In the section of the brief handbook relating to each graphic object there is a description of the how to use the windows for setting the dedicated data.

5.Integrated CAD

5.4 Entering of the data of the drawing

When you access the drawing in Area 2 the first section standard length is automatically drawn. This section will be highlighted in red with a circle around it.


The initial direction of the drawing can be changed by pressing the arrow keys.

The cursor is located in Field “*l*” in Area 3; there is a standard value in this Field.

N.B.

Each value entered must be confirmed by pressing the ENTER  key (soft keyboard environment – S 550 PC Touch model)

5.4.1 How to enter a drawing in polar mode

If the cursor is not located in Field “*l*” of Area 3 it will be necessary to press the keys [Next Menu]  and [Polar Format] to activate the polar type setting. As described in the Polar Setting chapter of the in drawing data, the values to be entered are as follows:

- 1) the length of the section; the section will be rescaled depending on the length entered and the cursor will move onto the “*alpha*” Field for setting of the angle.
- 2) the angle compared to the following section.

The section described above will turn blue; the following section will be drawn that then becomes the current section, and it will be shown in red.

A circle surrounds the section currently being entered.

After completing the entering of the data the cursor moves into Field “*l*” for setting of the length of the new section.

The entering of this data pair must be repeated until the drawing has been completed.

Updating the information about the drawing

If the measurements entered exceed the dimensions of the window, the drawing will automatically be rescaled; the scale factor of the drawing in Area 1 will be updated.

Every time a new section is drawn, the number of the current section displayed in the PITCH Field of Area 1 will be increased.



5.Integrated CAD



5.4.1

How to finish the drawing

In order to indicate that the drawing is finished you must set the angle of the last section to zero.

How to select the drawing data

To select the drawing data it is necessary to scroll through them with the  and  keys.

The  key scrolls backwards through the data forming the drawing in a sequential manner, passing step-by-step between the “*alpha*” Field and the “*l*” Field. The  scrolls backwards through the data in a sequential manner, passing step-by-step in the “*l*” Field. Whenever you scroll through the data of a drawing the section relating to the data displayed will be highlighted and the number of the section of current drawing will be displayed in Area 1.

How to change the drawing data

To change the drawing data it is necessary to:

- select the value.
- enter the new value.
- press **[ENTER]** to accept the new value.
- the drawing will be traced depending on the new value entered.

Use the directional arrows and keys

To automatically enter the angle of a section with respect to the following one, you can use the directional arrows and keys. When you press one of these directional keys, a new segment will be traced in the direction indicated on the key you have pressed.

The directional keys include: **[Home]**, **[PgUp]**, **[PgDn]**, **[End]** and they are located near the arrows.

5.Integrated CAD

5.4.1

Using the directional arrows and keys on the touch keyboard

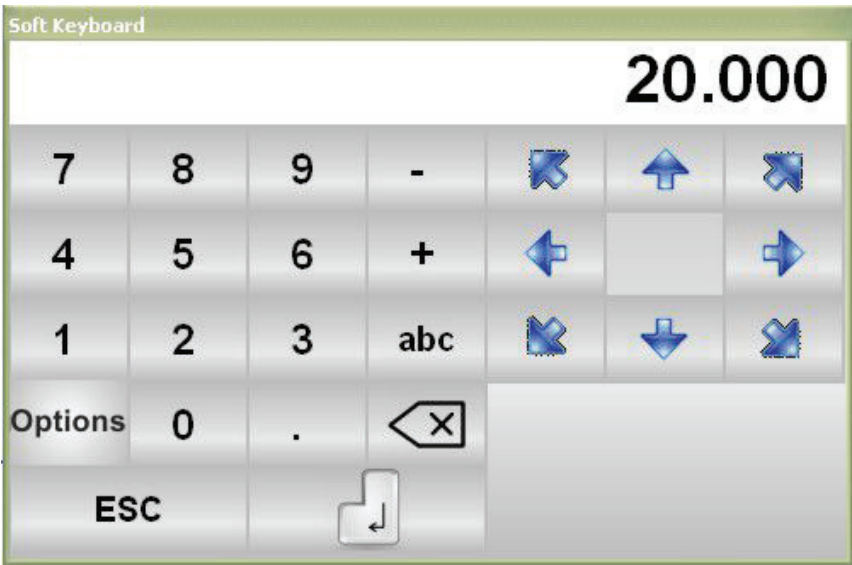


Figure 67 Position of the direction keys

The directional keys move both horizontally or vertically through the segments.

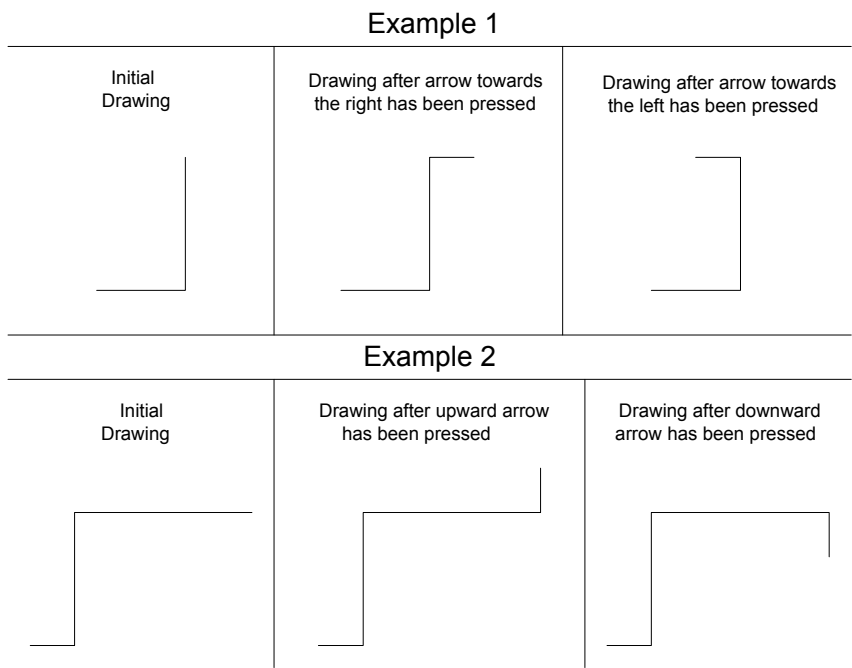


Figure 68 Using the arrows

5.Integrated CAD

5.4.1

Using the directional arrows and keys of the touch keyboard

The directional keys move diagonally through the segments.

Use of the directional arrows

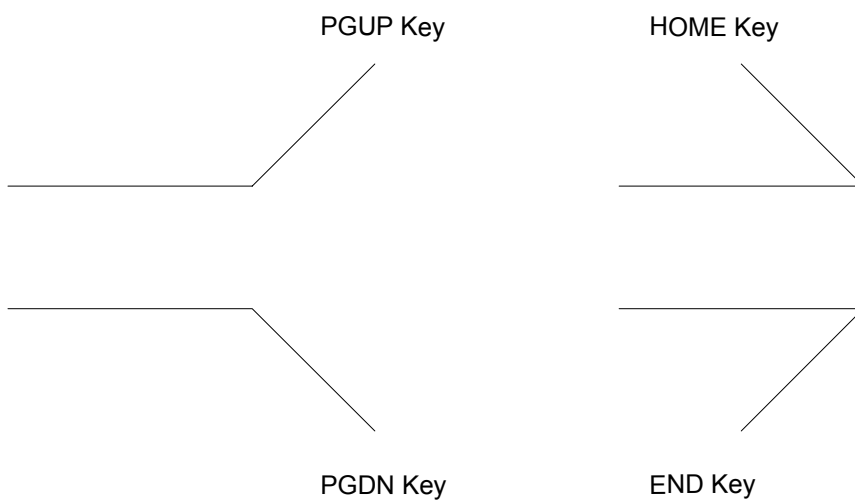


Figure 69 Using the directional keys

The existing angle is automatically entered in the **“alpha”** Field between the current section and the segment traced depending on the directional key that has been pressed.

This angle must be confirmed with the **[ENTER]** key if you want to move on and enter the length of the new section.

How to delete a section of the drawing

To delete a section of the drawing it is necessary to select the data of the section that you want to delete and press the



key.

The current section will be deleted; the following sections will be orientated depending on the angle entered in the previous section previous to the one deleted.

5.Integrated CAD

5.4.1

How to delete a section of the drawing

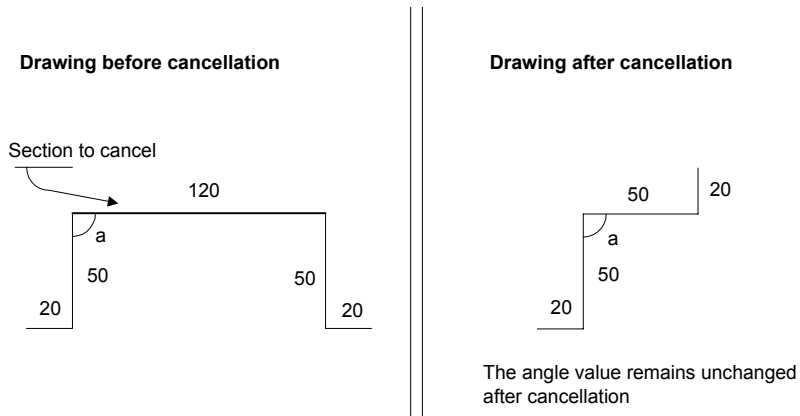



Figure 70 Deletion of a section

If the last section entered is deleted it will be replaced by a section with a standard length. If you also want to delete this you must move onto the data of the previous section and finish the drawing.

How to enter a section of the drawing

Press the  and select **[Insert]** - in this way a section will be inserted before the current one.

The data of the section that is inserted will be standard and they cause the extending of the currently selected side by 20 mm.

At this point it is necessary to enter the values of the new section to obtain the desired the drawing.

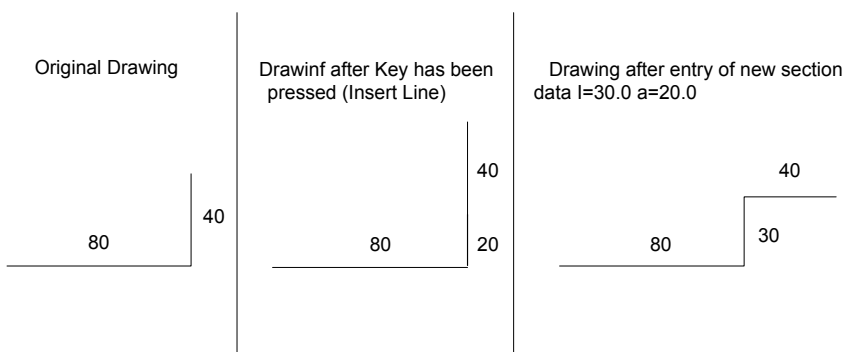


Figure 71 Inserting a section

If you have difficulties using the Insert function it is recommended to move onto the point where you want to insert the new section, delete all the subsequent sections, and then reset the drawing.

5.Integrated CAD

5.4.2 How to use the Cartesian format

If it is not possible to define a segment in polar format, the function of drawing allows you to define it in Cartesian format.

Activation



Press [**Next Menu**] and [**Cartesian Format**] once you are located on the drawing section concerned.

The cursor will move onto Area 4.

- 1) you must enter the difference between the beginning and the end of the segment along the horizontal axis in the **DX** Field.
- 2) you must enter the difference between the beginning and the end of the segment along the vertical axis in the **DY** Field.

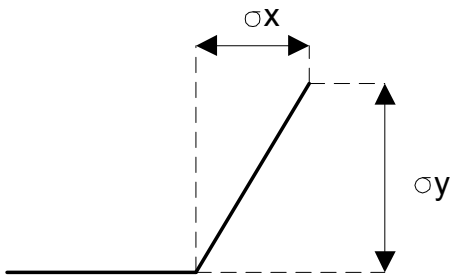


Figure 72 Cartesian data setting

By confirming the data with the key [**ENTER**] the new segment will be traced.

To return to the polar format it is necessary to press the [**Polar Format**] key once again

6.Managing the data in the Windows® NC memory

Types of data

In the numeric control S 550 PC Touch for the Esautomation bender press, it is possible to identify several categories of fundamental data for the operation:

- configuration parameters of the machine (option 2 of the Menu)
- axis parameters (option 1 of the Menu)
- work programmes (graphic or numeric)
- equipment (punches and dies).

6.1 Memory devices

These data can be saved in the following memory devices:

- Flash
- buffered RAM
- SSD (Solid State Disk) Flash Hard Disk
- USB device.

6.1.1 Flash

This is the resident device in the MULTIFUNCTION board in which the management software of the movements of the machine is memorised together with its operating system.

6.1.2 Internal memory (buffered RAM)

This is the memory device of the numeric control (in the MULTIFUNCTION board) in which all the machine data are downloaded before being used; due to the battery, these data are stored even when the control is turned off.

6.1.3 SDD (Flash Hard Disk)

This is the memory device which contains a copy of the operating system, the S 550 PC Touch application programme and its backup copy, including the series of data saved by the S 550 PC Touch application programme (machine data, programmes and equipment).

6.1.4 USB device

This is a normal USB 1.1 or USB 2.0 device (pen drive).

It is used to save the configuration parameters of the machine and the parameters of the axes; it is also used for the saving the security copy of the programmes, punches and dies. It is possible to view the contents of the device from any compatible IBM Personal Computer.

6.Managing the data in the Windows® NC memory

6.2 Logic location of the data

Foreword

The term logic location of the data is understood as the memory device in which the data reside when turned on.



At the time of their use, all the data reside in the internal memory.

Summarised table

Type of value	Memory device
Configuration parameters	Internal memory + SSD
Axis parameters	Internal memory + SSD
Work programmes	SSD
Punches	SSD
Dies	SSD

Files associated with the data

All the machine data (Configuration and Axes) are stored on files for enabling their recovery in case of an incorrect entry or a loss of memory.

6.3 Exchanging the data between the memory devices

Data exchanging is understood as the transferral of the data from the internal memory devices to the USB device (SAVING) or from the USB device to the internal memory devices (UPLOADING).

6.Managing the data in the Windows® NC memory

6.3

All the data managed by the S 550 PC Touch programme and listed in the previous paragraphs can be Uploaded and/or Saved according to the following block diagrams:

CONFIGURATION PARAMETERS AND AXIS PARAMETERS

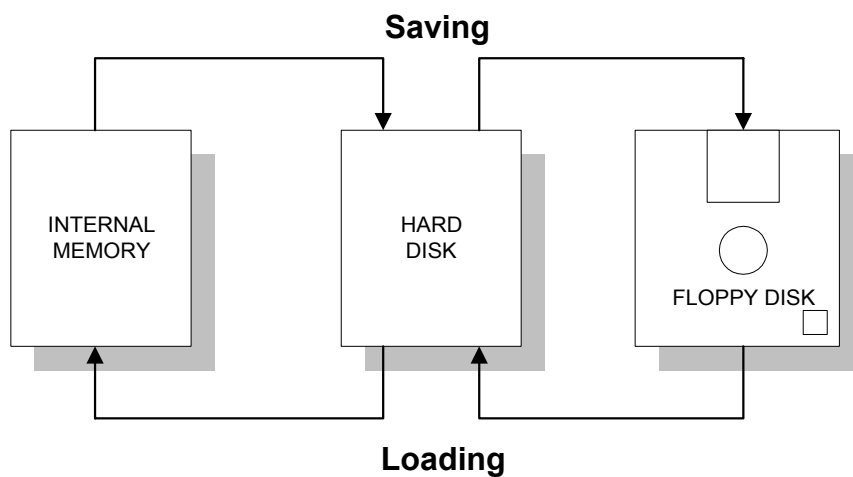


Figure 73 Saving/Uploading of configuration parameters and axis parameters

PROGRAMMES AND EQUIPMENT

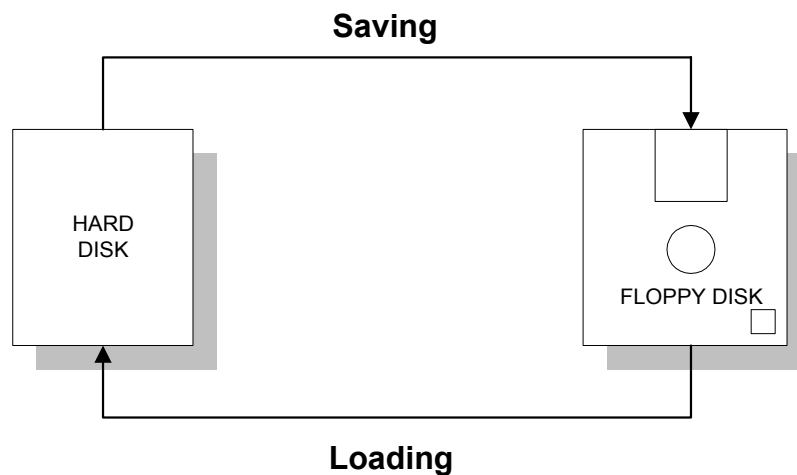


Figure 74 Saving/Uploading of PROGRAMME and EQUIPMENT parameters

6.Managing the data in the Windows® NC memory

6.3

As can be observed in the figure, during the uploading/saving of the configuration or axis parameter data, the files can first be saved in SSD and then later transferred onto the recipient device. This means that in case of malfunctioning of one of the memory devices (either the USB device or internal memory) there will always be a backup copy (SSD) of the last operation carried out on the data.

It is possible to simultaneously save and/or upload the machine parameters and the configuration parameters in automatic mode; this special function is described in the paragraph "Saving/Uploading all the parameters". Following are descriptions of the uploading and saving operations for every category of data.

6.3.1 Save / Uploading the Configuration Parameters

The configuration parameters consist of the following data:

Description	Type (video name)	File name
Configuration parameters of the axes	Conf. of Axes	COFAXES.CNF
General configuration parameters	General configuration	GENERALI.GEN
Valve configuration parameters	Valve configuration	VALVOLE.VAL
Special parameters	Special configuration	SPEC.PAR
General parameters	General configuration	GENER.PAR
General parameters 2	General configuration. 2	GENER2.PAR
Configuration parameters I/O	I/O 1 configuration	CONFIGIO.PAR
Configuration parameters I/O	I/O 2 configuration	CONFIGIO2.PAR
Materials Table	Materials	MATERIAL.TMT
Correction of angles	Angle correction	CORRANG.DAP
Drawing of the upper part of the press	RAM	SUPERIOR.SUP
Drawing of the lower part of the press	BASE	INFERIOR.INF

The uploading and/or saving can be carried out in one of the following ways:

- SINGLE saving/uploading: the operation is performed on the type of parameters selected.
- GLOBAL saving/uploading: the operation is performed for all the types of configuration parameters.


6.Managing the data in the Windows® NC memory

6.3.1

Single saving

To save one type of configuration parameter only it is necessary to:

- 1) select the Menu **Configure Machine (2)**.
- 2) select the type of parameters on which to carry out the saving operation (keys from **1** to **8**) by entering the corresponding mask

- 3) press  for carry out the saving operation of the file containing the selected data on the USB device.

Example

Following is an example of the procedure to be followed to save the VALVE configuration parameters; in order to save the other types of parameters repeat the procedure by selecting the type you wish to save.

- 1) select the Menu **Configure Machine (2)**

- 2) press .

- 3) press .

Single uploading

In order to only upload a single type of configuration parameters it is necessary to:

- 1) select the Menu **Configure Machine (2)**.
- 2) select the type of parameters on which to perform the saving operation (keys **1** to **8**) by entering the corresponding mask.
- 3) press [**Upload from Disk**] to carry out the uploading the file containing the selected data from the USB device.

Global saving

To save all the configuration parameters on the disk it is necessary to:

- 1) select the Menu **Configure Machine (2)**.
- 2) press [**Save All**].

Global uploading

To upload all the configuration parameters from the disk it is necessary to:

- 1) select the Menu **Configure Machine (2)**.
- 2) press [**Upload All**].

6.Managing the data in the Windows® NC memory

6.3.2 Saving/Uploading the Axis parameters

The machine parameters consist of the following data:

Description	Name displayed	File name
Machine parameters of the axes	Axis parameters	AXES.AXE
Machine parameters of the axis Ram in AC	Axis parameters	PESTAC.PAR



The uploading and/or saving can be carried out in one of the following manners:

- Single saving/uploading: the operation is carried out by entering the mask Menu **Axis Parameters (1)**;
- Global saving/uploading: the operation is carried out together with the Configuration Parameters in the global saving/uploading procedure described in the previous paragraph.

Single saving

To save just the Axis Parameters it is necessary to:

- 1) select the Menu **Axis Parameters (1)**.

- 2) press  or  to carry out the saving of the file containing the data on the USB device.

Single uploading

To upload just the Axis Parameters it is necessary to:

- 1) select the Menu **Axis Parameters (1)**.
- 2) press **[Upload from Disk]** to carry out the uploading the file containing the data from the USB device.

Saving/Uploading ALL the parameters

It is therefore possible to save or upload ALL the PILZ parameter configuration and axis configuration parameters onto the disk by moving onto the Configure Machine Menu (2) and pressing the relative function key **[Save All]** or **[Upload All]**.


6.Managing the data in the Windows® NC memory


6.3.3 Saving/Uploading the punches

The punches consist of the following data:

Description	Name displayed	File name
Data making up the drawing of the punch	filename	filename.PNZ


The punch data reside in the SSD and do not require any specific uploading or of saving procedure for being changed;

after having selected the punch from the list of punches and pressed the key ENTER  (soft keyboard environment – S 550 PC Touch model) to access the drawing:

- press  to memorise the changed data.
- move into another mask in order to ignore the changes made.

Saving on the disk

To save a punch on the disk it is necessary to:


- 1) enter onto the list of the punches by pressing the key .
- 2) move with the cursor onto the punch you wish to save.

- 3) press .

Uploading from the disk

In order to upload from the disk a punch it is necessary to:

- 1) enter onto the list of the punches by pressing the  key twice.

- 2) press  to view the list of the punches on the disk.

- 3) move with the cursor onto the punch that you wish to upload.

- 4) press .


6.Managing the data in the Windows® NC memory

6.3.4 Saving/Uploading the dies

The dies consist of the following data:

Description	Name displayed	File name
Data making up the drawing of the die	filename	filename.MTX

- the data of the die reside in the SSD and do not require any specific uploading or of saving procedure for being


changed; after having selected the die from the list dies and pressed the key ENTER  (soft keyboard environment - S 550 PC Touch model) to access the drawing:

- press  to memorise the changed data.

- move into another mask in order to ignore the changes made.

Saving on the disk

To save a die on the disk it is necessary to:


- 1) enter onto the list of the dies by pressing the key .
- 2) move with the cursor onto the die you wish to save.

3) press .

Uploading from the disk

In order to upload from the disk a die it is necessary to:

- 1) enter onto the list of the dies by pressing the key .

2) press  to view the list dies on the disk.

3) move with the cursor onto the die that you wish to upload.



4) press .

6.Managing the data in the Windows® NC memory

6.3.5 Saving/Uploading all the tools




Saving on the USB device

To save all the punches and all the dies on the USB device it is necessary to:

- 1) enter onto the list of the punches or the dies by pressing the key  .
- 2) press the  key to open the menu and select [**Save tools**], all the tools will be saved on the USB device.

Uploading from the USB device

In order to upload all the punches and all the dies from the USB device it is necessary to:

- 1) enter onto the list of the punches or dies by pressing the key  .
- 2) press  to view the list punches or dies on the USB device.
- 3) press the  key to open the menu and select [**Save tools**], all the tools will be uploaded from the USB device.

6.3.6 Saving/Uploading programmes

Foreword

The programmes may consist of several files:

- file name.PRГ containing the data of the drawing of the piece.
- file name.PRN containing the heights of the axes and the bend data.


The files that are saved (by pressing the key ) will depend on the way in which a programme has been set up.




6.Managing the data in the Windows® NC memory

6.3.6

Description	Name displayed	File name
Numeric programme	filename	filename. PRN
Graphic programme non calculated	filename	filename. PRG
Graphic programme calculated	filename	filename. PRN filename. PRG

The data programmes reside in the SSD and do not require any specific uploading or of saving procedure for being

changed; after having selected the die from the list dies and pressed the key ENTER  (soft key board environment - S 550 PC Touch model).



Type of program	Changing the data
Graphic programmes	<ul style="list-style-type: none"> - press [Graphic] in the function keys to access the drawing data of the piece currently selected; otherwise access the desired programme by selecting it from the Programme list. - press  to save the changed data. - reselect the name of the programme from the list in order to ignore the changes made.
Numeric programmes	<ul style="list-style-type: none"> - press  to access the numeric data of the piece
Graphic programmes calculated	<ul style="list-style-type: none"> - press  to save the changed data. - reselect the name of the programme from the list in order to ignore the changes made.

6.Managing the data in the Windows® NC memory

6.3.6



Saving the current programme on the USB device

To save on the USB device the programme currently selected it will be necessary to :

- 1) press  from the data settings mask if the programme is only NUMERIC;
- 2) press  from any one of the SETTINGS, CALCULATE, or GRAPHIC EDITOR masks if the programme a graphic programme.






Saving a programme on the USB device

To save any programme found in the SSD on the USB device it will be necessary to :

- 1) press  to select the programme list.
- 2) move with the cursor onto the programme you wish to save.
- 3) press .

Uploading a programme from the USB device

In order to upload a programme from the USB device:



- 1) press  to select the programme list.
- 2) press  to select the list on the USB device.
- 3) select the programme that you wish to upload.
- 4) press : the programme will be copied from the USB device onto the SSD.
- 5) A this point, by pressing  (list in the SSD) the programme you have just copied should be present; to access the data programme it is necessary to select it and then press the ENTER  key to upload it, (soft keyboard environment - S550 PC Touch model).

6.Managing the data in the Windows® NC memory

6.3.7 Saving/Uploading all the programmes




Saving on the USB device

To save all the programmes on the USB device it is necessary to:

- 1) press  to select the programme list.
- 2) press the  key to open the menu and select [**Save programmes**], all the programmes will be saved on the USB device.

Uploading from the USB device

In order to upload all the programmes from USB device it is necessary to:

- 1) press  to select the programme list.
- 2) press  to view the programme list on the USB device.
- 3) press  to open the menu and select [**Save programmes**], all the programmes will be uploaded from the USB device.

6.Managing the data in the Windows® NC memory

6.4 Recommended security saving

Foreword

The term security saving is understood as the memorising on the USB device of the data that make it possible for the bender press to operate.

Parameters

The security saving of the parameters must be carried out at the time of the shipping; any subsequent changes must be saved immediately they are made.

Programmes

The security saving of the programmes must be carried out from time to time by the customer depending on the number or importance of the programmes that it sets.

Equipment

The security saving of the equipment must be carried after the inserting of all the customer's tools; the customer must take care of saving data every time a new punch or a new die is entered.

6.4.1 Recommendations for the manufacturer of the bender press

It is recommended to keep:

- USB device containing the machine parameters for each bender press sold (in double copy or a backup copy on the hard disk of a personal computer);
- USB device containing the equipment to be supplied that comes together with the bender press.

6.4.2 Recommendations for the end user

It is recommended to keep:

- USB device containing a copy of all the machine parameters, the equipment and the programmes normally used onboard the numeric control;
- USB device for the identical saving of everything described above;
- backup copy of the machine parameters on the hard disk of a personal computer;
- USB device containing the programmes for each individual customer in order to be able keep the memory as free as possible and allow for speeding up the search phase (this USB device is only necessary if you have a large number of programmes).

7.Description of the programme data

7.1 Header section

This section contains a description of the header information contained in the upper part of the ENTERING mask:

Name	
Minimum value:	Maximum value:
Default value:	Measuring unit: Alphanumeric characters
Value type	Protection level:
Present in SW version 1.0	Change activated
Description:	This is the name of the programme currently in progress; if nothing is entered in the field the programme will be the temporary type which has still not been saved. As many as 16 characters are managed in the header.
Bend	
Minimum value: 1	Maximum value: 80
Default value:	Measuring unit: pure number
Value type unsigned word	Protection level:
Present in SW version 1.0	Change activated
Description:	This is the bend currently in progress.
Section	
Minimum value: 1	Maximum value: 8
Default value:	Measuring unit: pure number
Value type unsigned word	Protection level:
Present in SW version 1.0	Change activated
Description:	This is the section currently in the bending phase; the term section is understood as the side of the metal sheet on which you are carrying out the bends.

7.Description of the programme data

7.2 Supplementary information that cannot be changed

The header section also contains some information that cannot be changed:

- type of bend; the following values may be assumed:



normal bend in the air



calendered bend



conical calendered bend



squashed (clinching) or stamped (coining) bend



conical bend



Hammerle bend with variable die at the bottom of the cavity (bend on 3 points)

- resting-against or support; the following values may be assumed:



resting-against bend, the metal sheet must be pushed against the stop



supported bend, the metal sheet must be resting on top the first step of the stop



double supported bend; the metal sheet must be resting on top the second step of the stop

- Default Mask:  the default mask of is enabled.

7. Description of the programme data

7.3 Section data of the piece

This section contains the data regarding the entire piece.

Pieces made	
Minimum value: 0	Maximum value: 9999
Default value: 0	Measuring unit: pure number
Value type dword	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates how many pieces of the programme in progress have been made; the value is automatically updated during the execution, however the user can change this as desired.
Pieces to be made	
Minimum value: 0	Maximum value: 9999
Default value: 0	Measuring unit: pure number
Value type dword	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates how many pieces the user wishes to carry out; the number is automatically decreased at the end of each piece; at the end of the last piece the automatic execution will stop and it will be necessary to press the START button to continue working.
Measurements	
Minimum value: 0	Maximum value: 1
Default value: 0	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This indicates whether the user describes the piece by means of external, neutral fibre or internal measurements; the following values may be assumed:</p> <p>0 = external measurements (default). Description of the piece by means of external measurements (the stretch operations of the metal sheet are taken into account in the programme calculations).</p> <p>1 = Description of the piece by means of neutral fibre measurements (no account is taken of the stretch operations of the metal sheet in the programme calculations).</p> <p>2= internal measurements. Description of the piece by means of internal measurements (the stretch operations of the metal sheet are taken into account in the programme calculations).</p>

7. Description of the programme data

7.4 Section general data

This section contains a description of the general data concerning the piece; the user can however change them bend by bend.

Width	
Minimum value: 0	Maximum value: 99999.9
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates the width of the metal sheet in the point of bend.
Thickness	
Minimum value: 0.01	Maximum value: 99.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates the thickness of the metal sheet in the point of bend.
Resistance	
Minimum value: 0	Maximum value: 150
Default value: Aluminium = 25 Iron = 45 Stainless steel = 70	Measuring unit: kg/mm²
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates the resistance of the material; it is recommended to use the default values specified if you do not know the real resistance values, nevertheless, in case of errors in the final angle or in the calculation of the development, it will be necessary to check that any incorrect entering of this value will not influence the results.

7. Description of the programme data

7.4

Material	
Minimum value: 1	Maximum value: 9
Default value:	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This indicates the type of material and the following values may be assumed:</p> <p>1 = aluminium type 1 2 = iron type 1 3 = stainless steel type 1 4 = aluminium type 2 5 = iron type 2 6 = stainless steel type 2 7 = aluminium type 3 8 = iron type 3 9 = stainless steel type 3</p> <p>This value is automatically initialised depending on the resistance entered; in particular, if the resistance is found between 0 and 30 the aluminium type 1 is used, if it is found between 31 and 50 the iron type 1 is used, if it is greater than 50 then the stainless steel type 1 is used; it is the user's responsibility to check whether it is necessary to change the material proposed according to the results obtained.</p> <p>Once the programme has been entered, the selection of the Material must be carried out manually even if you have to reset the resistance. In order to generate the material in automatic mode based on the resistance it will be necessary to create a new programme.</p> <p>The value of the material refers to the Materials Table contained in the correction mask.</p>
Station	
Minimum value: 0	Maximum value: 4
Default value: 0	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 5.0	Change activated setting of value
Description:	<p>This is the number of the work station that is used for this bend, it allows you to make an automatic calculation of the Z.</p> <p>0 = no account is taken of the work stations and the machine positions the Z for bending in the centre of the machine.</p> <p>1 - 4 = number of the station to be used in the bend displayed, defined in the tools mask.</p>

7.Description of the programme data

7.4

Die	
Minimum value:	Maximum value:
Default value:	Measuring unit: Alphanumeric characters
Value type char[9]	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the name of the die used to make the bend.
Cavity	
Minimum value: 1	Maximum value: 10
Default value: 1	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the number of the cavity used to make the bend; it must be borne in mind that it is possible to draw multi-cavity dies that are exactly the same as the real ones; the cavities are automatically numbered in a progressive manner during the drawing phase.
Punch	
Minimum value:	Maximum value:
Default value:	Measuring unit: Alphanumeric characters
Value type char[9]	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the name of the punch used to make the bend.

7.Description of the programme data

7.5 Axis and angle data section

This section identifies the data contained in the central part of the video in which it is possible to enter the angles of the bend, the positions of the axes, and any corrections.

Y1 Angle	
Minimum value: -179.9	Maximum value: 180.0
Default value:	Measuring unit: degrees
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the angle of the bend required on the cylinder piloted by the Y1 axis.
P.M.I. Y1	
Minimum value: 0.00	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that the Y1 axis must reach in order to achieve the required angle.
Corrections to Y1	
Minimum value: -90.0	Maximum value: 90.0
Default value:	Measuring unit: degrees
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the correction to be made to the angle of the bend resulting after the bending in order to achieve the correct angle; this can also be entered in the CORRECTIONS mask.
Y2 Angle	
Minimum value: -179.9	Maximum value: 180.0
Default value:	Measuring unit: degrees
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the angle of the bend required on the cylinder piloted by the Y2 axis.

7. Description of the programme data

7.5

P.M.I. Y2	
Minimum value: 0.00	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that the Y2 axis must reach in order to achieve the required angle.
Corrections to Y2	
Minimum value: -90.0	Maximum value: 90.0
Default value:	Measuring unit: degrees
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the correction to be made to the angle of the bend resulting after the bending in order to achieve the correct angle; this can also be entered in the CORRECTIONS mask.
X1	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that the X1 axis must reach in order to achieve the required angle.
X1 Recoil	
Minimum value: 0	Maximum value: 999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the measurement of how far the X1 axis must move backwards when the ram reaches the metal sheet contact point (PCL) in order to prevent the metal sheet from colliding against the stop.

7.Description of the programme data

7.5

Corrections to X1	
Minimum value: -999.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the correction to be made to the position of the X1 axis in order to obtain the required length of the bend.
X2	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that must be reached by the X2 axis in order to obtain the required length of the bend.
X2 Recoil	
Minimum value: 0	Maximum value: 999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the measurement of how far the X2 axis must move backwards when the ram reaches the metal sheet contact point (PCL) in order to prevent the metal sheet from colliding against the stop.
Corrections to X2	
Minimum value: -999.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the correction to be made to the position of the X2 axis in order to obtain the required length of the bend.


7. Description of the programme data

7.5

R1	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that the stop must reach in height in order to allow it to support the sheet metal.
R2	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the position that the stop must reach in height in order to allow it to support the sheet metal.
Z1	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the opening position of the stop towards the left to allow for correctly positioning any large pieces of sheet metal.
Z2	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the opening position of the stop towards the right to allow for correctly positioning any large pieces of sheet metal.

7. Description of the programme data

7.5

A1 (Mechanical curvature)	
Minimum value: 0	Maximum value: 100
Default value:	Measuring unit: %
Value type double	Protection level:
Present in SW version 3.2	Change activated setting of value
Description:	<p>This is the position of the mechanical centring board (WILA type), expressed in % of the maximum recovery of the bending of the bench.</p> <p>This function is present if the system is capable of managing this type of curvature.</p>
A1 (M Axis Hammerle press)	
Minimum value: -99.99	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 14.0	Change activated setting of value
Description:	<p>This is the position of the M axis M used to change the depth of the die and therefore also the angle, in the 3-point bend of the Hammerle type.</p> <p>This function is present if the press is of the Hammerle and consists of a die with a variable cavity bottom.</p> <p>If this type of Axis is enabled, the icon  will be displayed in the top right-hand corner to indicate that the press is of the Hammerle type.</p>
A1 (Accompaniment 1)	
Minimum value: 0	Maximum value: 90
Default value:	Measuring unit: Degrees
Value type double	Protection level:
Present in SW version 6.0	Change activated setting of value
Description:	<p>This is the position of the accompaniment 1, expressed in degrees, compared to the angle formed with the with the supporting plane of the sheet metal.</p> <p>This function is present if the press is equipped with accompaniments.</p>

7. Description of the programme data

7.5

A2 (Accompaniment 2)	
Minimum value: 0	Maximum value: 90
Default value:	Measuring unit: Degrees
Value type double	Protection level:
Present in SW version 6.0	Change activated setting of value
Description:	<p>This is the position of the accompaniment 2, expressed in degrees, compared to the angle formed with the with the supporting plane of the sheet metal.</p> <p>This function is present if the press is equipped with accompaniments.</p>

7.6 Work data section

This section contains a description of the work data used bend by bend.

P.M.S. (Upper dead point)	
Minimum value: 0.01	Maximum value: 999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This indicates by how many millimetres the bender press must be opened at the end of the bend (the space between the edge of the die and the punch).</p>
Force	
Minimum value: 0.1	Maximum value: 9999.9
Default value:	Measuring unit: tons
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This is the force necessary to bend the sheet metal.</p>
Bomb. (Curvature)	
Minimum value: 0	Maximum value: 100
Default value:	Measuring unit: %
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This is the compensation necessary for straightening the bender press; this is relative to the strength used for the bend and is a percentage of the maximum force of the machine.</p>

7. Description of the programme data

7.6 Work data section

T.C.P. (Pitch change time)	
Minimum value: 0	Maximum value: 99.99
Default value: 0	Measuring unit: seconds
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the time that the starting of the stops will be delayed when the pitch change is carried out in order to allow the user to extract the metal sheet from the bender press.
P.C.L. (Metal sheet contact point)	
Minimum value: -99.99	Maximum value: 999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates by how many millimetres the theoretical metal sheet contact point must be changed to allow for correct clamping.
P.C.V. (Speed Change Point)	
Minimum value: -99.99	Maximum value: 999.99
Default value:	Measuring unit: mm
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates by how many millimetres the theoretical speed change point needs to be changed to ensure the correct speed change.
Time P. (Bending time)	
Minimum value: 0	Maximum value: 99.99
Default value: 0	Measuring unit: seconds
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This is the time that the ram remains stopped at the lower dead point to allow for debilitating the sheet metal.

7.Description of the programme data

7.6

Acc.(Accompaniment)	
Minimum value: 0	Maximum value: 10
Default value: 0	Measuring unit: m/min
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This is the speed (slow) that allows you to accompany the metal sheet when it is very heavy in order to prevent a raising action that is too fast from tipping the metal sheet on top of the operator. This is the speed used by the ram to raise up from the PMI to the PCL.</p> <p>If the value has been left at zero this accompanying action will not be carried out.</p>
Speed	
Minimum value: 0	Maximum value: 10
Default value: 0	Measuring unit: m/min
Value type double	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>This is the bending speed; if the user has to carry out delicate bends (for example with very fine thicknesses) it is recommended to use speeds that are lower than the maximum acceptable speed.</p>
Functions from 1 to 20	
Minimum value: 0	Maximum value: 1
Default value: 0	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	<p>These are the data used to manage the special functions like the pneumatic R axes, squash dies and pneumatic bends; they can assume the following values:</p> <p>0 = function not enabled 1 = function enabled</p> <p>In order to access to the functions not directly displayed in this mask, follow the instruction in the relative chapter of the brief handbook.</p>

7.Description of the programme data

7.6

Rep. (Repetitions)	
Minimum value: 1	Maximum value: 99
Default value: 1	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates the number of times the bend must be repeated before passing over to the next one.
Verso	
Minimum value: -1	Maximum value: 1
Default value: 1	Measuring unit: pure number
Value type unsigned character	Protection level:
Present in SW version 1.0	Change activated setting of value
Description:	This indicates whether the metal sheet must be inserted in one direction or the other; the information will automatically be displayed in the mask in magnified form to allow the operator to know how to insert the piece even if the programme has been written numerically.
Ri Internal radius)	
Minimum value: 0	Maximum value: 9999.99
Default value:	Measuring unit: mm
Value type unsigned character	Protection level:
Present in SW version 14.0	Change activated setting of value
Description:	This indicates the internal radius of the bend, calculated by the NC. If the programme is numeric, any changes to this value will have a direct influence on the calculation of the development. If the programme is graphic, it will only serve for indicating to the operator which internal radius will be obtained.

8.S 550 PC Touch installed on PC 19 "

It is possible to install the software S 550 PC Touch also on PC S 560 19"; in this case the visualization of all the mask is enlarged.

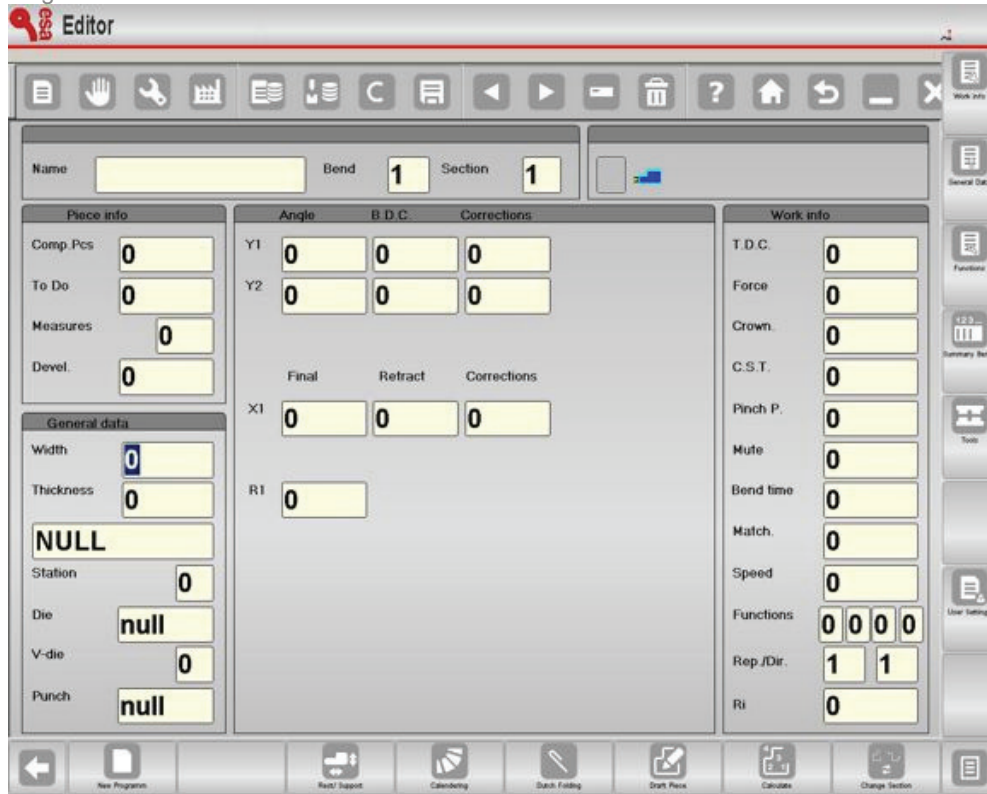


Figure 75 Editor mask S 550 PC Touch on PC 19"

Increasing the definition at 19 ", there are at the top bar, 4 new icons connected to 4 new functions:



Home: Enters the home mask



Back: Returns to the previously selected mask



Minimize: Minimizes the software S 550 PC Touch



Exit: close the software S 550 PC Touch



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