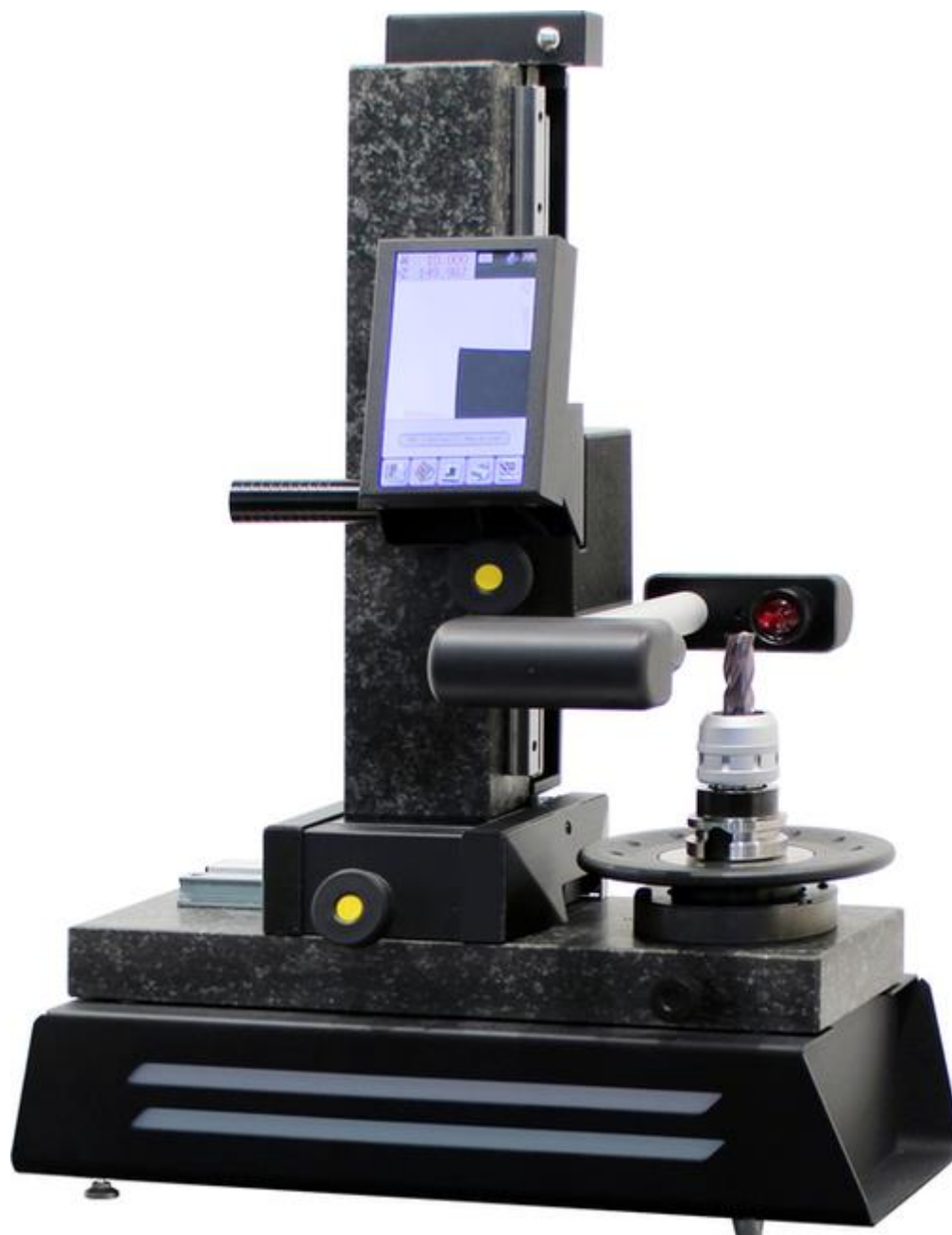


# *E236+*



VIDEO TUTORIALS



INSTALLATION, OPERATION AND MAINTENANCE MANUAL

REV. 1.1 – 03/21

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**2. CERTIFICATION**

The manufacturer, ELBO CONTROLLI S.r.l., under its own responsibility,

**DECLARES THAT:**

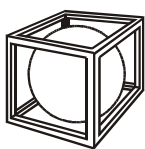
the E236+ presetter conforms to the following safety standards where enforceable:

- **2006/42/CE Machinery Directive (MD)**  
to the harmonized standards EN ISO 12100:2010
- **2014/30/EU Electromagnetic Compatibility Directive (EMC)**  
to the harmonized standards EN61326-1:2013, EN55011:2009+A1:2010 ISM (group 1, class A),  
EN61000-3-2:2014, EN61000-3-3:2013, EN61000-4-2:2009,  
EN61000-4-3:2006+A1:2008+A2:2010, EN61000-4-4:2012,  
EN61000-4-5:2006, EN61000-4-6:2009, EN61000-4-11:2004
- **2014/35/EU Low Voltage Directive (LVD)**  
to the harmonized standards EN60950-1:2006+A2:2013, EN60204-1:2006+A1:2009, EN61010-1:2010
- **2011/65/EU Restriction of Hazardous Substances (RoHS II)** 
- **2012/19/EU Waste Electrical and Electronic Equipment (WEEE)** 

as it results from the technical construction file and from the enclosed testing reports, kept by our seat.

MEDA, \_\_\_\_\_

**Massimiliano Tasca**  
General Manager



**ELBO CONTROLLI S.r.l.**  
Via S. Giorgio, 21  
20036 Meda (MI) Italia



Modello / Model

Numero seriale / SN

Anno costruzione / Year

Tensione / Voltage

Corrente / Current

Massa / Weight


Information relating to this presetter is listed on the identification plate stamped on the left-hand side of the machine as shown above.

### 3. WARNINGS

#### 3.1 INTRODUCTION

The following operation and maintenance manual of the preset E236+ should be considered an integral part of the apparatus and it should therefore be kept with care for future reference.

All the procedures and information contained in the manual cannot be a substitute for the end user's adequate tool presetting experience, but they provide the necessary information for the correct and proper use of the Presetter E236+.

Unauthorized equipment handling, non-compliance of instructions or improper or incorrect use may lead to unforeseen results for which *ELBO CONTROLLI S.r.l.* declines all civil or criminal liability.

*ELBO CONTROLLI S.r.l.* reserves the right to modify at any time the tool presetter and the operator's manual without prior notification on account of the continuous technical updating of the product in pursuit of the Company strategy aimed at perfecting presetter technology of tool measurement and presetting and of customer satisfaction.

All suggestions for improvements of the apparatus or manual are welcome either by fax or email to our head office.

#### 3.2 PURPOSE

The aim of the present manual is to allow the operator of the presetter E236+ to become acquainted with the machine operating directions, routine and non-routine maintenance, the proper operating procedures, and to show all the required necessary actions from the presetter's introduction until disposal

Implement only the allowed use and the configuration reported, approved by *ELBO CONTROLLI S.r.l.*; any other use or configuration is not recommended, as it may compromise the tool's proper functioning and/or its safety.

The manual does not substitute or replace the experience and the technical expertise of the personnel involved in the use of the Preset machine and is to be considered as a guide at all times.

**This manual must be read following the chapters in their logical order, because the repeated information is explained in full the first time it appears, thereafter it is only mentioned because it constitutes knowledge already acquired.**

#### 3.3 TYPOGRAPHICAL CONVENTION

This manual is sub-divided into chapters, which contain homogeneous information; each chapter is identified by a title in the following typographical character:

### X. FIRST CHAPTER

Each chapter is sub-divided into individual paragraphs in the following typographical format:

#### X.X FIRST PARAGRAPH

Notes or instructions of particular interest are indicated by the following typographical format:

☒ *Notes or Instructions of particular interest.*

## 4. PRESENTATION

First, we would like to take this opportunity to thank you for your purchase of *ELBO CONTROLLI's E236+* Presetters. You will certainly have great satisfaction with the decision you have made, and you will increase the productivity of your NC machines.

The E236+ Presetters have been manufactured in compliance with ergonomics and simplicity principles and offer outstanding technological solutions. The mechanical systems, electronics and software deal with tool measurement and pre-adjustment. The vision system, designed by *ELBO CONTROLLI*, is used to collect measurement data automatically.

The good value for money and the precision of measurements make the E236+ one of a kind.

### Technical Features

#### MECHANICS

- Measuring range: diameter max 260 mm (radius 130 mm); height max 360 mm
- Base and column made of natural granite
- ISO/BT/HSK/VDI... etc. interchangeable rotating spindle-holder (to be specified)
- 4 re-circulating ball bearing linear slides
- Manual mechanical braking of the interchangeable spindle-holder rotation
- Manual axes movement
- External 24Vcc power supply
- Overall dimensions: L = 570 mm, H = 793 mm, D = 408 mm      Net weight: 45 kg

#### ELECTRONICS - OPTICS

- Vision system for tool measuring
- ELBO CONTROLLI NIKKEN linear transducers in optical glass type SLIDE 371
- Axes resolution X = 1  $\mu\text{m}$ , Z = 1  $\mu\text{m}$ .
- C-MOS sensor framed image area 5 x 5 mm
- 20X magnification.
- Telecentric lens and LED illuminator
- TFT colour LCD 7" LED backlight point matrix graphic display (86 x 150 mm image size)
- Full touch screen for all Presetter operation
- ELBO CONTROLLI NIKKEN Firmware
- Data storage on flash memory
- Electronics driver based on RISC 32 BIT processor and integrated vision system

#### SOFTWARE

- 9 numerical machine origin management
- 9 numerical tool tables management, each of them composed of 99 tools
- Tool corrector specific storage of: T, Lx, Lz, insert radius
- Intuitive icons and menu-based software
- Display radius/diameter, mm/inch, ABS/INC
- Measurement capability by full-screen auto-targeting
- X axis and Z axis focusing control bars
- Radius and angle automatic computing cycle
- Td236+ (Tool Data 236+) to manage backup and restore functions, machine origins and tool table. Connection to the PC with an USB port and electronic Bios upgrade

#### OPTIONS

- Interchangeable rotating spindle ISO/BT/HSK/VDI...etc. additional
- Mini-label printer
- Support table

## 5. PREPARATION AND INSTALLATION

### 5.1 PACKING LIST

Before proceeding with preparation and installation, check that the tool presetter packaging contains the following components:

#### TOOL PRESETTER

Model ☐ E236+

Spindle ☐ ..... ☐ .....

☐ ..... ☐ .....

☐ ..... ☐ .....

#### RESETTING GAUGE

☐ ISO 40

☐ ISO 50

☐ .....

☐ .....

#### ADAPTERS

☐ ISO ..... ISO .....

☐ other .....

☐ ISO ..... ISO .....

☐ other .....

☐ ISO ..... HSK .....

☐ ISO ..... HSK .....

☐ ISO ..... VDI .....

☐ ISO ..... VDI .....

#### PRINTER

☐ S'PRINT-S

☐ LABELS PACK

#### POWER SUPPLY

#### USB KEY CONTAINING USER MANUAL AND TD236 + SOFTWARE

#### TEST REPORT

#### WARRANTY

CHECKED BY .....

## 5.2 SAFETY NORMS

The personnel destined to use the Presetter E236+ are not required to use any particular protection; however, they must be informed of the following potential dangers:

- In particular conditions of measurement of the vertical axis, the objective's vision system of the support structure can be at a height, which can be 'head butted' in case the machine is used without the necessary attention.
- We recommend carrying out the manipulation of tools carefully and if necessary, protecting one's hands because tools by their nature are sharp and may be dangerous.

☒ *The person responsible for employee safety should train the people required to use the tool presetter by insisting on the reading of this manual. (for Italy see Legislative Decree 81/2008 as amended by Legislative Decree no. 106 of 3 August 2009).*

## 5.3 SUGGESTED USE OF THE MACHINE

The E236+ Tool Presetter is an instrument to preset and measure the tools surveying their dimensions along X-Z-axes, in accordance with the axes definition of the machine using the above-mentioned tools. The measurable tools are to be compatible with the presetter spindle; any attempt to adapt the tool presetter spindle taper without using the appropriate adaptors supplied by *ELBO CONTROLLI S.r.l.* is to be considered improper use.

The maximum weight of the tool to be measured should be no more than 30Kg.

Any other use is to be considered improper and potentially compromising the operator's safety.

☒ *The E236+Tool Presetters to be handled by a single person in conditions of tested and controlled efficiency, in respect of all procedures described in this manual.*

## 5.4 PACKING, TRANSPORT AND STORAGE

The instrument must be handled inside its proper cardboard box, which prevents it from normal mechanical stresses.

Stated on the outside of the packaging are the shipping instructions, particularly the specified total weight, transport position and using symbols, vulnerability to atmospheric agents and the need to handle with care. Keep the original packing and use it for further transportation of the instrument.

Tool Presetter transportation is to be carried out by qualified carriers able to grant the correct handling of the transported goods, observing the following precautions:

- Lift only with trolleys or pallet jacks.
- Do not bump, throw, drop, roll or drag the case.
- Do not overcharge the packing by piling more than three cases.
- Avoid exposure to atmospheric agents.
- Maintain the prescribed transportation position.

The storage environment must fall within the following environmental conditions:

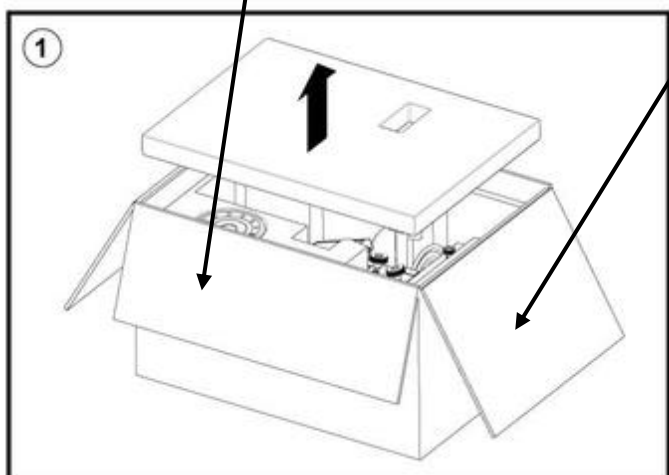
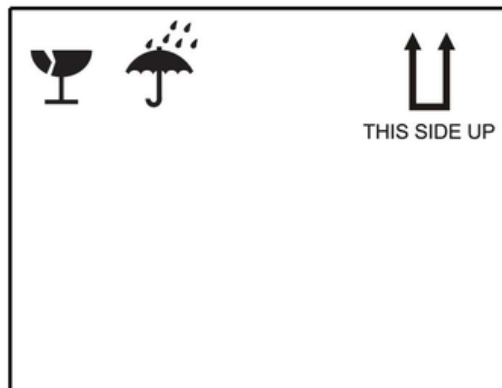
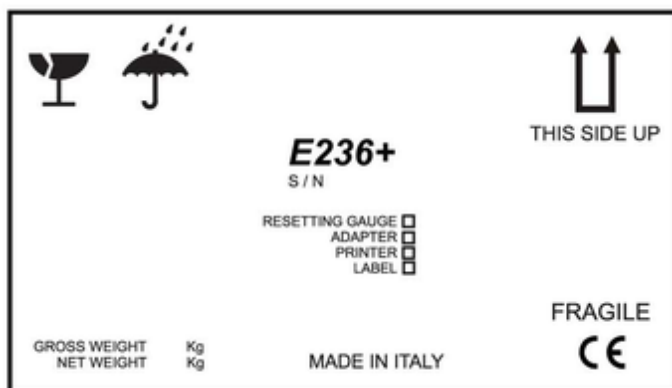
- Shelter from atmospheric agents.
- Temperature between -10 and 50 °C.
- Relative humidity between 20% e 95% without condensation.



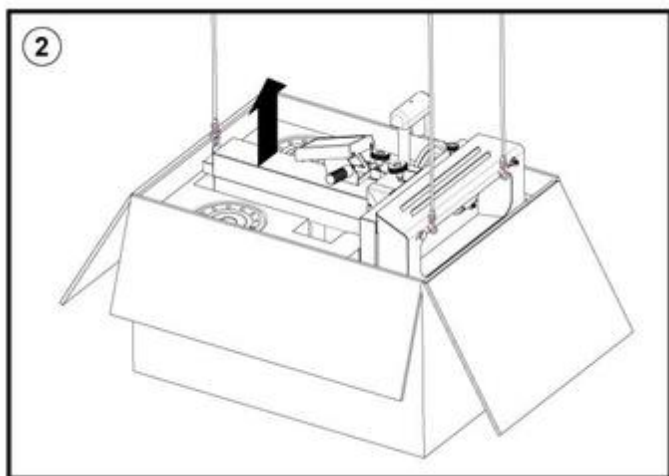
## 5.5 INSTALLATION

**✕ Installation Procedure**

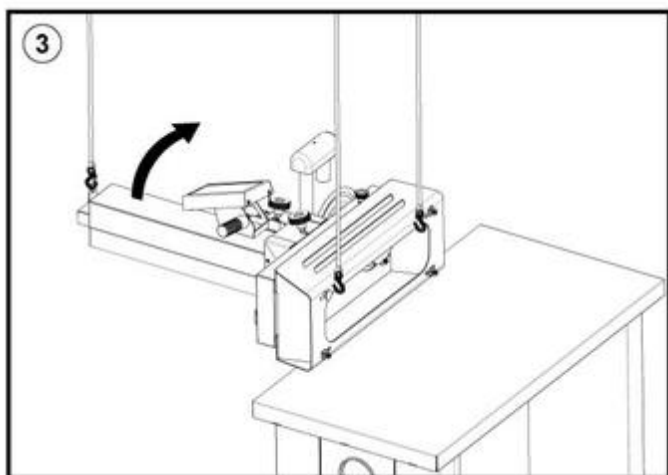
Place the presetter's package on a strong enough table, observing the orientation symbols printed on the cardboard box.



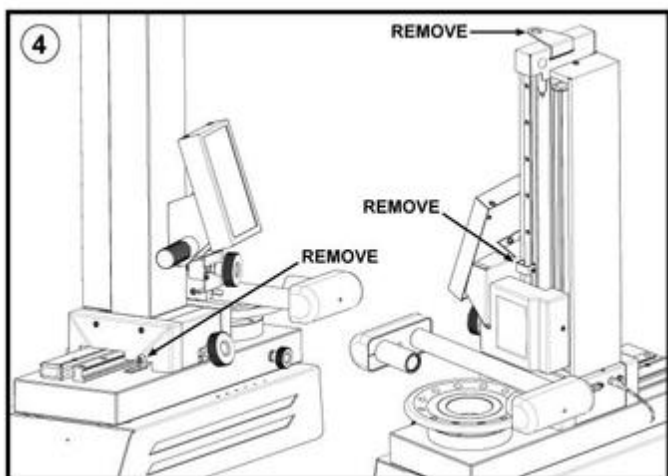
Remove the top cover of the packaging by removing the staples (see figure ①).



Hook the machine in three points as shown in the figure (see figure ②).



Remove the box then rotate the Preset to a vertical position (see figure ③).



Remove the lifting plate located at the top of the column and the axis stops (see figure ④).

Keep the cardboard packaging and all internal elements for later reuse in case of transport of the preset.

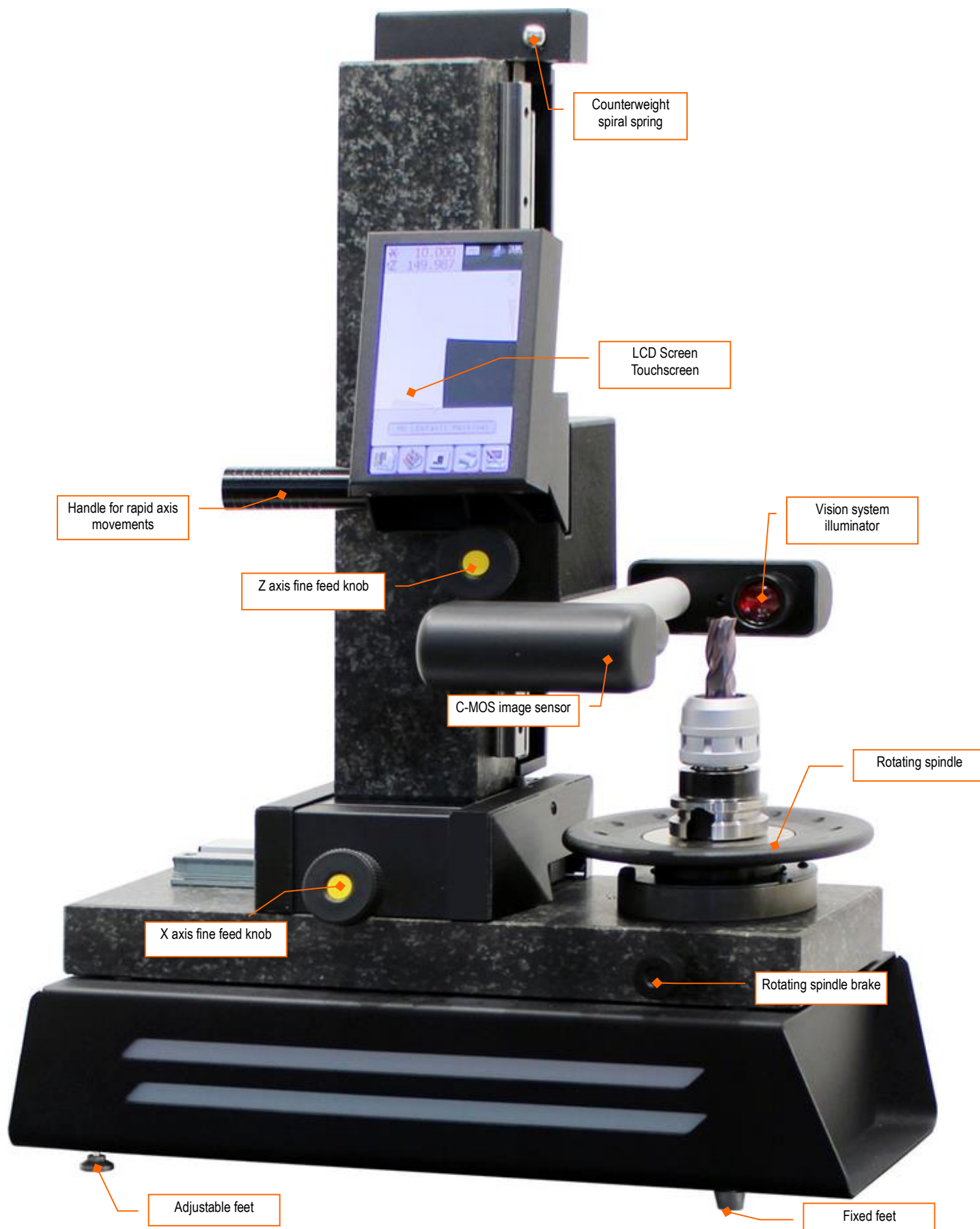
**SCAN THE  
QR CODE**



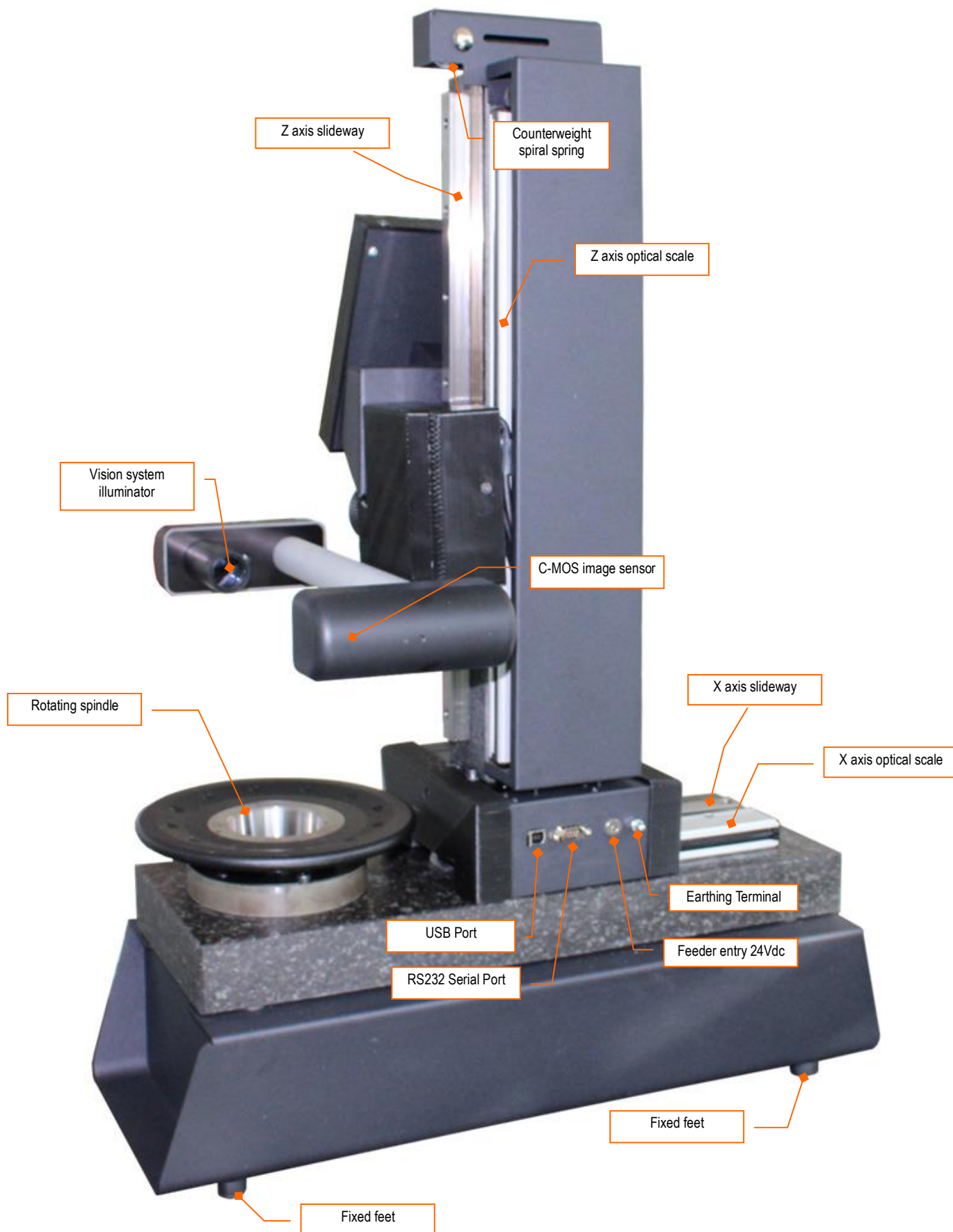
On the packaging there is a label depicting a QR Code. Scanning it you will get a link to a video that illustrates the procedure listed above.

☒ *To pack, carry out the same procedure in reverse.*

## 5.5.1 FRONT VIEW



## 5.5.2 REAR VIEW



## 5.6 OPERATING CONDITIONS

The E236+ Presetter is a precision instrument, it shall be positioned in a trouble-free site (free from dust and/or corrosive air substances, excessive vibrations, violent ranges of temperatures) safe from sunrays, direct illumination and far from windows and skylights. It shall be positioned preferably in rooms with diffused artificial lighting and a space for working facilitating measurement taking.

The instrument does not generate acoustic emissions.

The recommended climatic conditions are as follows:

- Sheltered from atmospheric agents.
- Temperature between 10 and 40 °C.
- Relative humidity between 20% and 95% without condensation.

☒ *The best performance is obtained in an environment with a constant temperature.*

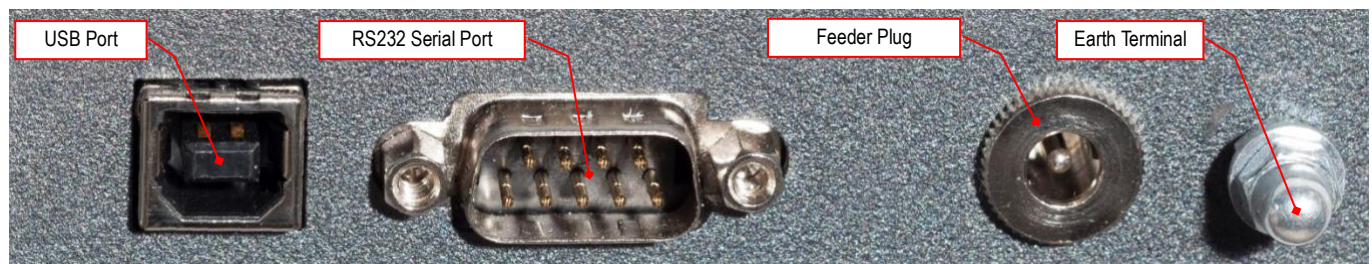
## 5.7 POWER SUPPLY AND CONNECTIONS

The E236+ Tool Presetter is fed a 24 Volt continuous current through an external power supply, supplied in series, the feeder has to be connected to the mains electricity: 115/230V AC, 50/60Hz, 24W.



The feeder is equipped with a series of interchangeable adaptors that can be used in different countries of the world. Put on the adaptor, with the suitable jack into the plug of the mains electricity available, on the body of the feeder slide it into the appropriate slot until it is locked in.

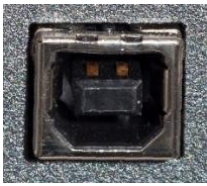
The electric connection panel is to be found on the rear of the Preset Column:





**☒ Connection Procedure**

- Connect the Presetter to the earthing terminal, using the yellow/green minimum sect. 1,5 mmq, fix it to the appropriate clamp.
- Connect the eventual label printer *s'Print-S* to the serial port RS-232 (see para. 5.7.3)
- Connect the feeder of the E236+ inserting the round spine of the power supply into the presetter's feeder socket.
- Assemble the suitable adaptor into the feeder supply socket and insert the plug into the mains electricity 115/230V AC, 50/60Hz.

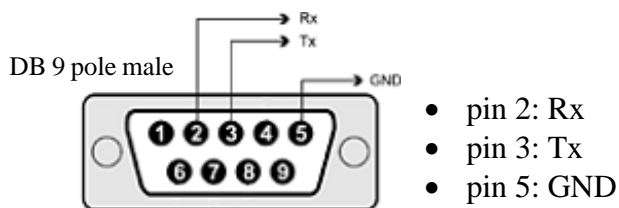
**5.7.1 USB PORT**

The USB port on the rear panel of the instrument can be used to connect to a personal computer with a Windows® operating system, the TD236+ software provided with the presetter can be installed.

**5.7.2 SERIAL PORT RS-232**

The serial port found on the rear panel of the instrument can be used to connect the label printer *s'Print-S* (optional).

The connection is made with a standard D-type 9 male connectors, having the following configuration:



The communication parameters of the serial port are:

- 19200 Baud
- 8 data bits
- 1 o 2 stop bit
- no parity
- no handshake

**5.7.3 CONNECTING THE LABEL PRINTER *s'Print-S***

The *s'Print-S* label printer can be connected through the serial port present on the connection panel of the E236+ observing the following procedures:

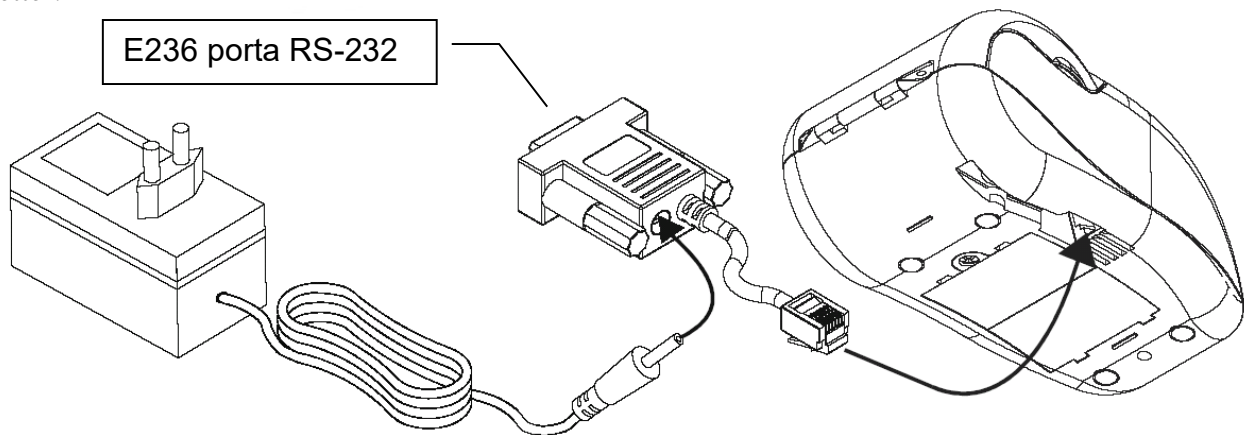
**☒ Connection procedures and using the label printer *s'Print-S***

The printer *s'Print-S* is embedded in the factory to function exclusively with the labels included in the packing.

The pace of printing between one label and the next is automatically understood thanks to the optic sensor that marks in black individually (signposts) those present on the roll.

For this reason, it isn't possible to use the normal roll of labels or thermal paper without modifying the predefined settings.

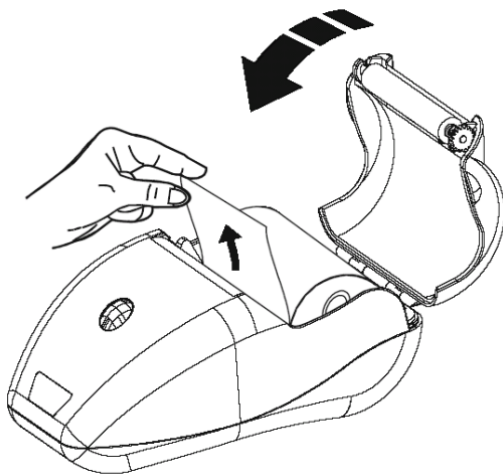
The **s'Print-S** label printer must be connected directly to the serial RS-232 communication port of the presetter.



Insert the telephonic type RJ11 into the socket on the underside of the printer.

To supply the printer, insert the pin of the feeder on the back of the connector D-Type 9 pole (see figure) and insert the feeder into the plug for electric current.

Open the cover of the printer and insert the roll of labels, after having freed it of the closing sticker and having thrown away the first label with its residue:




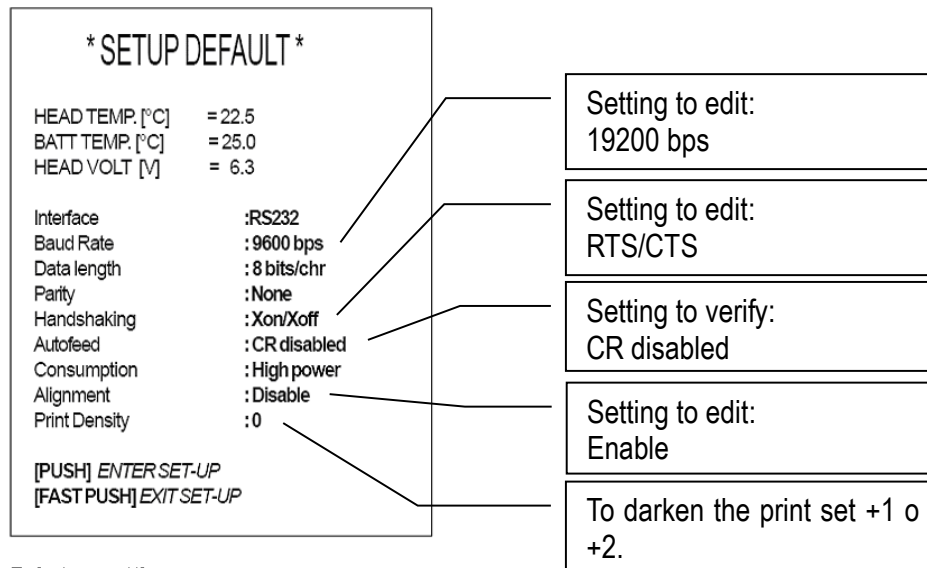
#### **☒ Restoration procedures of the settings of the label printer S'PRINT-S**

The printer comes supplied ready for use with the E236+ presetter: it isn't necessary to modify the settings for the correct functioning.

This procedure must be followed solely in case of malfunction, in fact if the configuration of the printer has to be cancelled, for example, following an electrical phenomenon in the mains supply, the restoration of the printer settings should be modified because they are not apt for use with the E236+ presetter.


To access the configuration, disconnect the feeder from the mains supply, wait a few seconds, then keep


pressing the push-button , re-insert the printer feeder; when the printer starts a settings report let go of the push-button:



Printer settings are:

- **Baud Rate:** 38400, 19200, 9600<sup>p</sup>, 4800, 2400, 1200, 600.
- **Data length:** 7, 8<sup>p</sup> bits/car.
- **Parity:** Nessuna<sup>p</sup>, pari o dispari.
- **Handshaking:** XON/XOFF<sup>p</sup> o Hardware.
- **Autofeed:** CR disattivato<sup>p</sup> o CR attivato.
- **Consumption:** Low power, High power<sup>p</sup>
- **Alignement:** Disable<sup>p</sup>, Enable.
- **Print Density:** -2, -1, 0<sup>p</sup>, +1, +2.

To check and if necessary, to restore the correct settings following the instructions that are printed from time to time: To modify the settings press and keep pressed the push-button  until the start of the paper (press length/time: >1 sec.).

It will now print a single setting and it will be possible to modify it with a brief press of the button , or confirm it with a longer press.

In case of an error in the setting it is necessary to repeat the procedure from the beginning.

At the end the printer will show the current setting, as it should be:

```
*****
*  CUSTOM Engineering  *
*  Strada Berettine, 2  *
*  43010 Fontevivo     *
*  (Parma) Italy       *
*  http://www.custom.it *
*****
*  s'print - 5         *
*  FW rel. 1.41        *
*****

SETUP DEFAULT 24 Col.:

HEAD TEMP. [°C] = 25.0
ALIM. TEMP. [°C] = 47.5
HEAD VOLT [V] = 6.8

Interface : RS232
Baud Rate : 19200 bps
Data Length: 8 Bits/chr
Parity : None
Handshaking: RTS/CTS
Autofeed : CR Disabled
Consumption: High power
Print Mode : Normal
Alignment : Enabled
Print Dens.: + 2

[PUSH] : ENTER SET-UP
[FAST PUSH] : EXIT
```

The printer will always keep this setting, for this reason it won't be necessary to modify it more.

For everything non-specific in the present document, it is necessary to refer to the respective instruction manual, the one for the printer is downloadable on-line at [www.custom.it](http://www.custom.it).

In the case in which the printer doesn't produce any label, or that the printed letters are incomprehensible, check the correctness of the settings as in the illustration above.



## 5.8 DNA MACHINE

DNA is a service provided to owners of Elbo Controlli NIKKEN presetter machines.

By accessing the registration form on our official website [www.elbocontrolli.com](http://www.elbocontrolli.com), on the "CUSTOMER AREA" page in the "SERVICES" section you can register your machines .

It is recommended to correctly insert the model and serial number as shown on the plate affixed to the machine (see page 4).

Once you have registered, you will receive a registration confirmation and the activation of your personal profile.

Within your personal page, you will always have the following information:

- Machine technical manual
- Software technical manual
- Machine software update
- Machine key points
- Technical machine's data
- CE declaration
- Warranty certificate
- Test reports
- Accuracy graphics



Moreover, you can remove any obsolete Presetters and add new ones.

Elbo Controlli NIKKEN is always at your side, providing you with a completely free service and giving you the opportunity to consult all the information concerning your product.

“We are your partner to optimize your investment in machine tools and tooling.”

*"Quality is not measured by what we put into something,  
but what our customers are able to get from it"*  
*Peter Drucker*

## 6. DESCRIPTION OF COMMAND

### 6.1 DISPLAY PANEL

The LCD display panel is the point from which it is possible to activate all the functions of the instrument by acting directly on the "touch-screen".

The available functions vary according to the mode chosen by means of the five main menus:



Machine Origins



Screen settings



E236+ Configuration



Tool Set

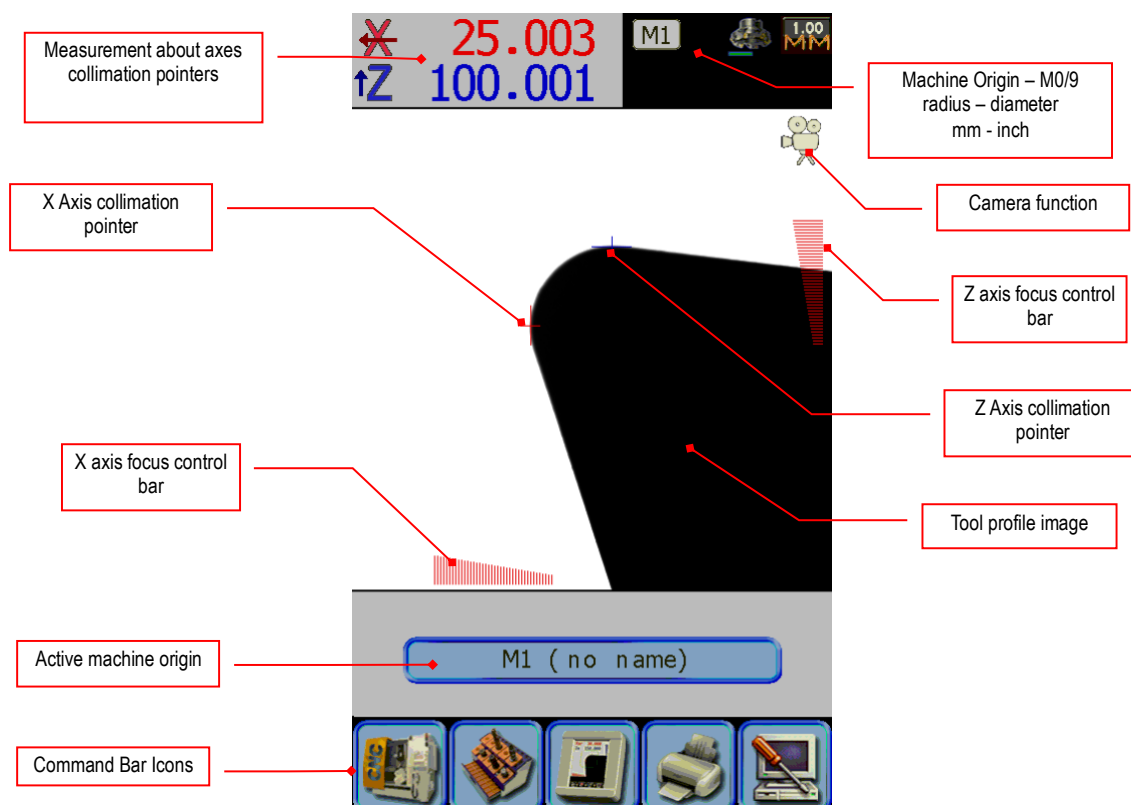


Printer

At which if adding the icon, always displayed, to access the way the camera function:



Other commands can be activated by pressing the relative icon, the display panel shows the profile of the tool to be measured, the assessment relative to the position to the points of collimation X & Z or of the fixed reticule and the two focusing control bars, as shown in the following figure:



Please note that all displayed elements relating to the X-axis are red, while all elements relating to the Z-axis are blue.

### 6.2 AXIS MOVEMENT

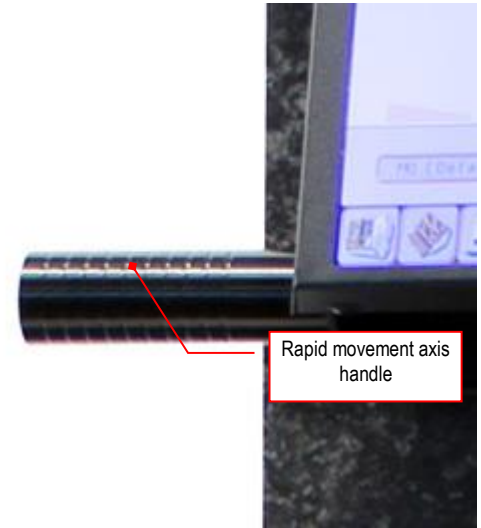
The movements of the axes are manual and have two modes, fast and fine.

The rapid movement is used to bring the tool within the visual field and to move away at the end of the measurement; the fine one is used to position the tool in the area of the screen where you intend to make the measurement (maximum precision is obtained in the central part of the screen), or for collimating the profile with the fixed grating if you intend to use this type of measurement.

### 6.2.1 RAPID MOVEMENT

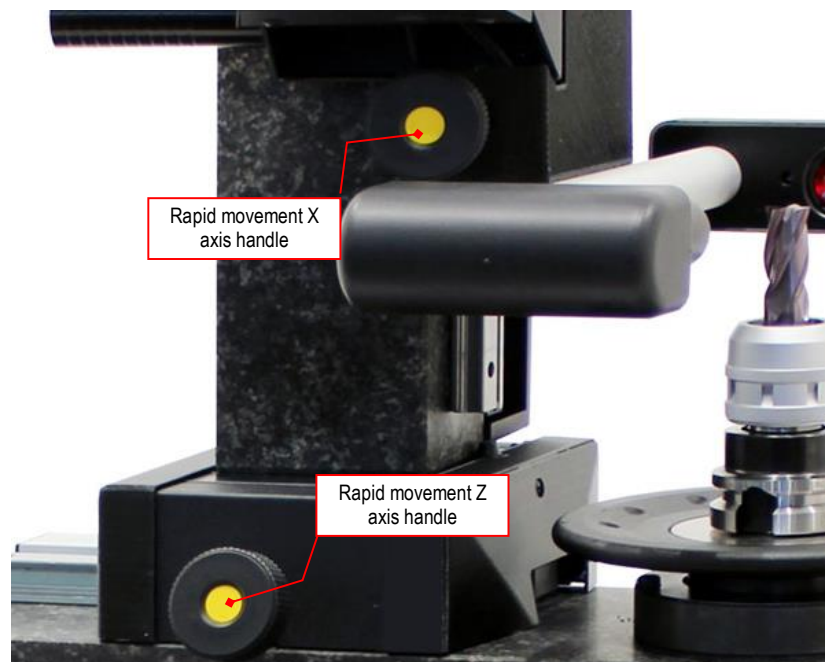
To move the axes rapidly, hold the quick movement handle (see figure), then move it in the desired direction (X or Z) until the tool to be measured is positioned.

☒ *In order to prevent damages to the Presetter, do not bump into the limit stops at the end of the stroke.*



### 6.2.3 FINE MOVEMENT

After approaching or framing the profile of the tool with the rapid movement, to move an axis in fine mode, rotate the fine movement knob of the axis concerned to position it in the most appropriate area of the screen and carry out the measurement.



## 6.3 THE SPINDLE

The E236+ is equipped with an interchangeable rotating spindle system in which it is possible to insert different rotating spindles of a pre-selected shape and measure (ISO, BT, HSK, VDI...).

### 6.2.1 REPLACING ROTATING SPINDLES

In case different rotating spindles are available, keep to the following instructions for their replacement.

#### Procedure for the replacement of rotating spindles

- Move the column to a position that makes spindle disassembly operations easier: X axis all the way to the left, Z all the way up.
- Remove any eventual tool from the spindle and make sure it is not locked with the brake (see par. 6.2.2).
- Remove the rotating spindle upwards, keeping it parallel to the column.
- Clean the removed spindle and lubricate the parts to rectify with antioxidant liquid (eg. Chesterton 775), before putting it in a protected place.
- Clean the spindle and insert it into the presetter.
- Introduce into the spindle holder of the presetter the new spindle, paying attention when inserting it to keep it parallel with the column.
- In the case that different spindles aren't available but there are adaptors, follow the following procedure.

#### Procedure for replacing spindle adaptors

- Remove, if present, the other adaptor, clean and lubricate the rectified parts with antioxidant liquid (e.g. Chesterton 775), then put it in a protected place.
- Clean the spindle and its new adaptor.
- Insert the new adaptor into the spindle.


### 6.2.2 MANUAL SPINDLE BRAKE

#### MANUAL SPINDLE BRAKE

The spindle brake allows the locking at any point of the rotation of the spindle of the presetter.

It will then be possible, locking the rotation of the spindle in the exact measuring point of the tool (see para. 7.2), the micrometric adjustment of a pre-adjustable reamer will be possible, without causing measurement mistakes due to an involuntary movement of the spindle.

In order to activate the rotating spindle brake, rotate the wheel in clockwise direction; wheel rotation in a counterclockwise direction releases the brake, allowing the spindle to rotate freely.

-  Do not exceed the torque force of 5 N/m in order to avoid any damage to the preset spindle.



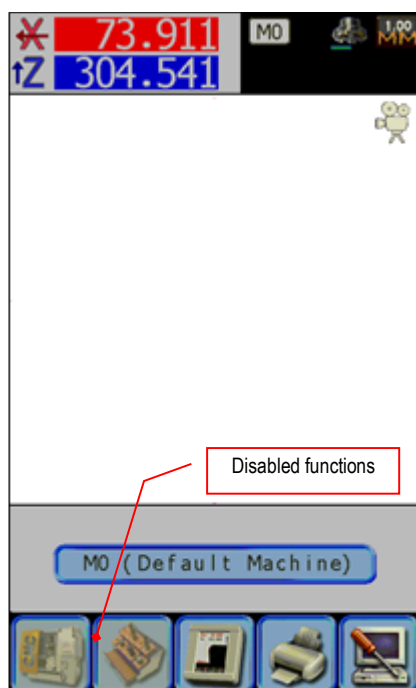
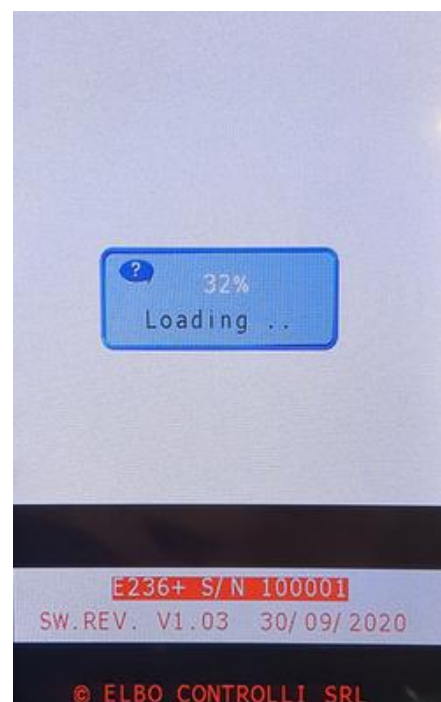
## 6.4 BASIC FUNCTIONS

### 6.4.1 TURNING ON

To turn on the instrument by inserting the 24Vcc power supply pin into the socket found on the rear panel; then insert the feeder plug into an electric socket (115-230Vac).

If the machine is already on, just press any point on the touch screen to exit the standby mode.

The LCD display, while the software is loading, will now show the text “LOADING” and the software version, important to report any anomalies or to determine a possible upgrade.



After a few seconds, E236+ will be ready to operate and signals the need to pass over the reference points for both axes by showing the measurements blinking (red axis X – blue axis Z).

Turning on always activates the autocollimation mode

As shown in the picture, the functions Machine Origins and Toolsets are disabled until the reference point for both axes are reached.

Move the axes of the instrument in rapid mode, so that the measurements stop blinking and display in a correct way.

Once reached the reference points, the functions Machine Origins and Tool Set are enabled.





☒ *In case of mechanical maintenance or technical assistance of the detection system, the reference zero-point moves. Therefore, it will be necessary to check and reset the absolute origin with a control gauge.*

### 6.4.2 TURNING OFF

To completely turn off the instrument, remove the power supply plug from the rear panel or the feeder from the electric socket.

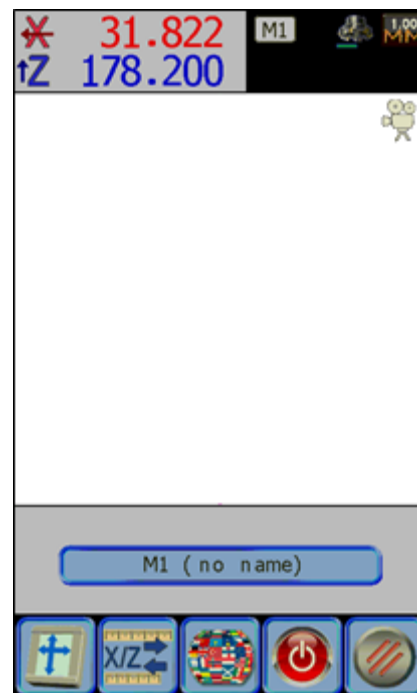
It's also possible to use the stand-by function, however, it is worth knowing that in this mode power consumption is extremely reduced but not absent (ca. 2W).

In order to use the stand-by function press the icon , the display will show the machine calibration:

press the Turn Off icon .



After that, press any part of the screen to restart the device.

The system will require to obtain the reference points on both axes, the dimensions will be blinking (see Para. 6.4.1)




### 6.4.3 SELECT THE DESIRED LANGUAGE

The use of E236+ is facilitated by a privileged use of graphical to the disadvantage of text messages.

The text messages, warnings or errors, can be configured in the language of the user by pressing the icon , followed by the icon .

Now it's possible to select the desired language from the list that appears on the screen.

The ten languages available are shown in the picture on the side.

To exit from menu, press the icon .



All functions can be controlled by touching the buttons on the Touch Screen Monitor.

☒ For best performance of the Touch Screen Monitor use the stylus included.





## 7. COLLIMATION

### 7.1 INTRODUCTION

Collimation is the operation that detects the point in which you have to carry out the measurement. E236+ is equipped with an industrial vision system, which was exclusively designed for tool measurement/prerecording without contact.

Its operating principle is similar to the one of the optical profile projector; by means of a specific shooting lens, a collimated light source projects the profile of the tool to be found between the two elements over a C-MOS image sensor, through an appropriate lens, the profile of the tool is interposed between the two elements. The tool outline acquired by the image sensor is displayed in real time on to a colour LCD screen of 86 x 150 mm. the framed field equals approximately 5 x 5 mm, which establishes an image visual scale ratio in the screen of about 20 times.

Furthermore, there are two bars to monitor image focusing: one bar detects the focus of the X-axis measurement point, while the other detects the focus of the Z-axis measurement point. This way the operator can easily detect the point of maximum tangency of the tool.

The real advantage, if compared to an optical profile projector, is the exclusion of measurement subjectivity, which makes measurements objective and repetitive. In fact, E236+ can analyse the cutting edge of the tool and find out it's measurement points in the profile with a resolution of 1  $\mu\text{m}$ ., it is the task of the operator to decide whether to carry out the measure on the central reticule, assisted by the compared electronics, or in whichever position on the screen: E236+ establishes the measurements in real time from the addition between the coordinates of reticule centre and image position.

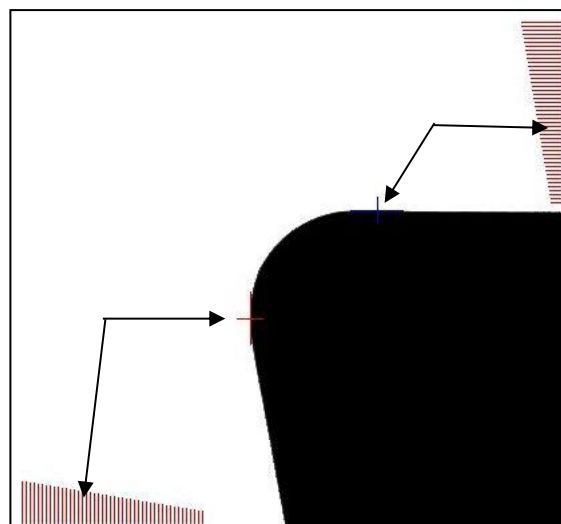
The measurements are continuously displayed on the screen, in order to have all necessary pieces of information available in the same area.

### 7.2 IMAGE FOCUSING

With the E236+ measurements are carried out in a way similar to those made with optical profile projectors; you have to frame the tool outline in the screen by placing it in the light beam using rapid manual displacements.

Before carrying out the measurement, it is necessary to rotate the spindle to search for the point that has the best image focusing.

The screen always displays two control bars for image focusing (one for each axis); it is sufficient to rotate the cutting edge until reaching the highest possible value on the bar of the specific axis, to obtain the best focus.



- ☒ *The dimensions taken as the reference for focusing are the ones relating to the two X and Z measurement points, which were detected by the two pointers.*



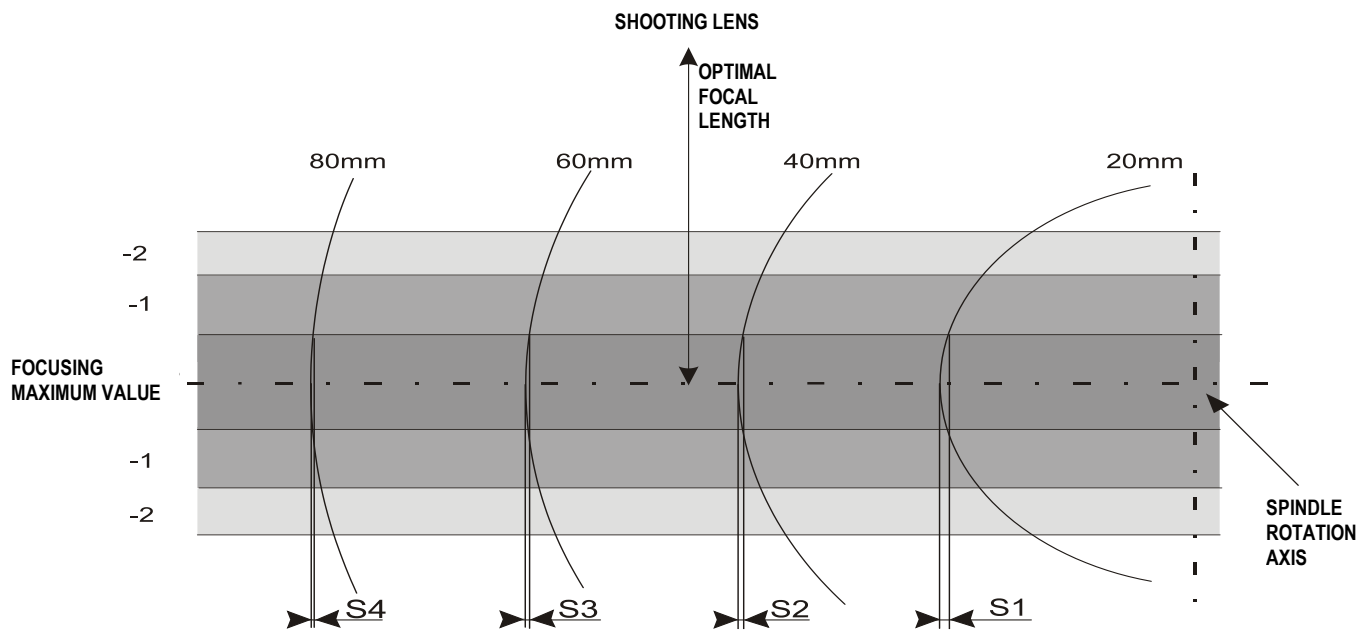
The focusing control bars supply information about image sharpness in the measurement points that are specified in the figure; therefore, it's possible to obtain different pieces of information (in the maximum value) for different tools or also for different cutting edges in the same tool. For example, this depends on the wear level or the relief angle.

However, in order to carry out correct measurements, it is necessary to reach the highest possible value, which is highlighted by the peak indicator to be found with each bar.

There is no need, however, to forget that the measurement point is the one relating to the tool maximum tangency and that focusing is only used to make the search easier; indeed, the **maximum tangency will always be found in the maximum focusing value**. But this means that **the maximum focusing value contains a residual measurement inaccuracy**, which is determined by the radius of the measured tool.

The following figure shows the relation between the focusing value (indicating the distance of the tool from the lens) and the maximum tangency of the tool (indicating the angular position of the tool compared to the spindle rotation axis).






As you can see, the residual inaccuracy value (S1, S2, S3, and S4) depends on the radius of the measured tool and approximately corresponds to 0.01 mm, for tools having a radius of 20 mm, while it is smaller than 0,001 mm. For radii that are bigger than 80 mm.

Based on these considerations, we repeat that it is necessary to reach the best possible focusing and after that search for the maximum tangency, that is, the maximum measurement being displayed.

### 7.3 COLLIMATION MODE

To carry out the measurement of tools, the E236+ has two modes of collimation: on a fixed central reticule or automatic on all the screen.

In particular cases, in which E236+ isn't able to identify correctly the measurement point, it will however, be possible to effect measurements "by hand" of the particular display.

To set up the collimation mode desired press the camera function button/icon , the relative menu is composed of the following icons:



Converts the fixed reticle mode, circular reticle and auto-targeting.



Rotate the angle fixed reticle counterclockwise by increments of 1.00 degrees (enabled only with the displayed angle reticle).



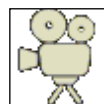
Angle setting to display with 0.01 degrees resolution (enabled only with the displayed angle reticle).



Rotate the angle fixed reticle clockwise by increments of 1.00 degrees (enabled only with the displayed angle reticle).



Not active



Return to the previous menu



### 7.3.1 AUTO-TARGETING MEASUREMENT

This is the default operating mode when the instrument is turned on (auto-collimation) and greatly reduces the time required to measure tools; in fact, it is enough to frame the interested part on the screen and E236+ will find the dimensions.

The fact of being able to measure across the entire visual area does not exclude the need to focus on the image and seek maximum tangency to obtain correct measurements.

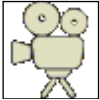

The automatic measurement is the result of the algebraic sum between the relative position of the image on the screen and the absolute position of the movement of the X and Z axes.




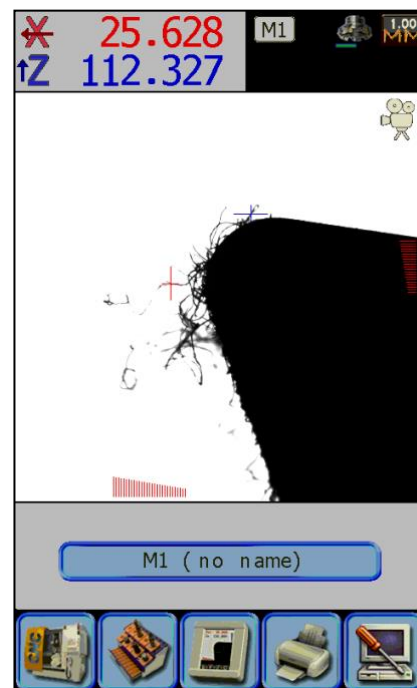
In the images, you can note the presence of small differences in the dimensions that are automatically detects in various points of the screen. This is due to the machining tolerances of illuminator and objective lens, as well as other factors of optical, electrical and mechanical type. For this reason, if you use the whole screen to make the measurements, it will be reasonable to expect a 10µm increase of the measurement uncertainty margin.

This is the limit for the auto-targeting mode, which, on one hand allow to carry out faster measurements, and on the other hand determine a higher tolerance than the same measurement that is carried out in the centre of the screen. Take into consideration according to type of measured tool and the accuracy class required for processing.

To activate the auto-targeting measurement, select on the menu "camera setup",

pressing the icon , then press the reticule icon .

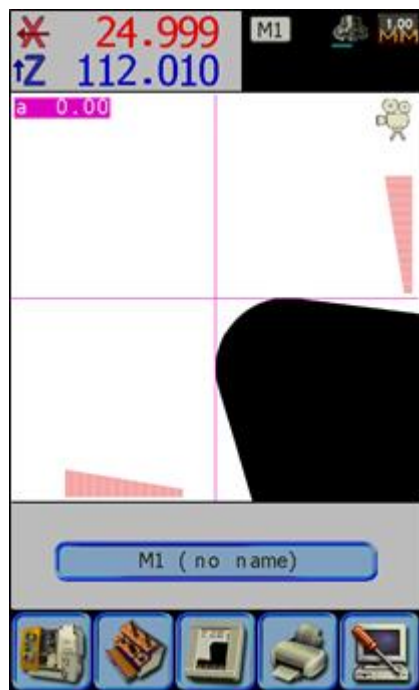
Press again the icon  to exit the menu.



- ☒ Focus the image in the axis involved in the measurement and again rotating the spindle, control that the measurement being carried out expresses the maximum tangency of the tool.
- ☒ Control that the tool cutting edge has no dust, chips or any other impurity on it that could modify the result of measurement (see image).

### 7.3.2 MEASURING ON THE FIXED RETICULE

In this operating mode, as in a profile projector, a fixed grid is drawn in the centre of the screen.





The quotas indicated refer to the center of the displayed grid: the measurements must be made by moving the axes of the preset until the edge of the image to be measured is in tangency with the measurement line.

Rotate the spindle using the comparator bar to locate the point of "maximum tangency", then move the axis again until the tool profile is perfectly in line with the grid line:

At this stage it is very important to approach and reach tangency with the lattice always from the same direction, avoiding reversing the motion of the axis. Doing so ensures better accuracy and repeatability of the instrument.



The fixed grid measurement mode is therefore recommended when a high degree of precision is required, for example to set the machine origins (see chapter 9).


To select the fixed reticule mode, select the "camera settings" menu,

press the icon , then press the reticule button .

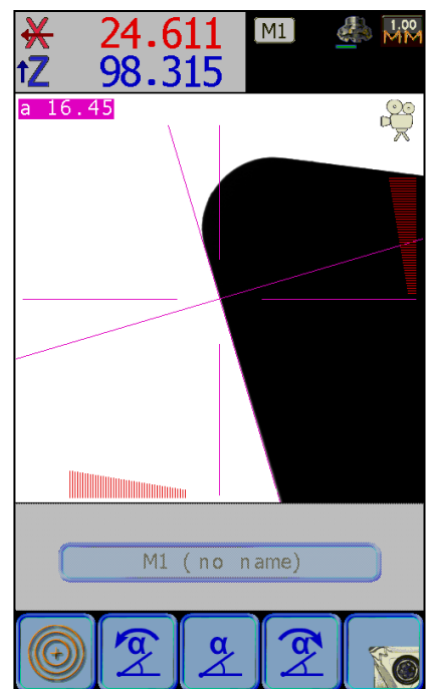
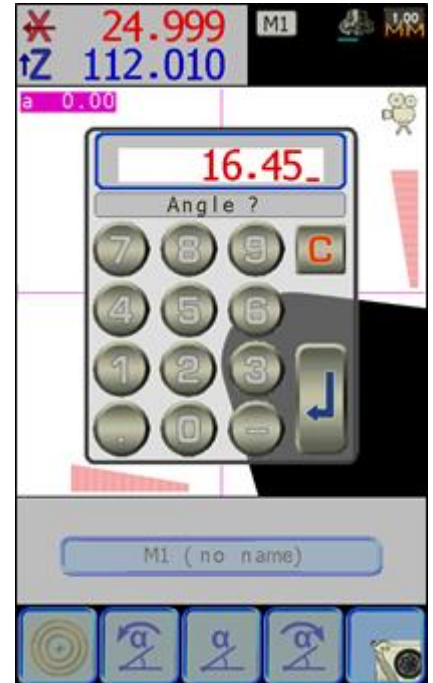
Each press of the key will toggle between angular grid, circular grid or full screen auto measurement.

### 7.3.3 MEASUREMENT WITH FIXED ANGULAR RETICLE

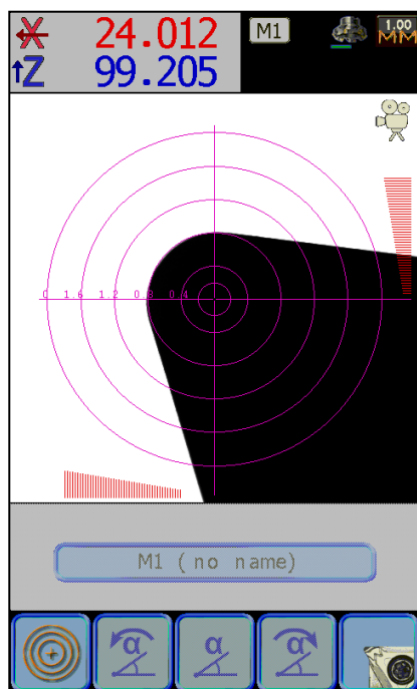
With the angular reticle enabled, it's possible to rotate on the left and on the right the displayed angle pressing the  and  icons. The rotation will be carried out with 1.00 degrees increases/decreases. While holding down the button, the rotation is faster.

Using the  icon, it's possible to directly specify the angle to be drawn on the screen with 0,01 degrees resolution (e.g. 16.45 degrees).

In this way, it's possible to compare the angles of the tool profile with the drawn reticle.



### 7.3.4 MEASUREMENT WITH FIXED CIRCULAR RETICLE



Pressing again the

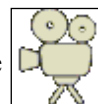


icon, it's possible to display the fixed circle reticle.

It will be possible to switch the radius of the standard inserts from 0,4 mm to 2,0 mm, matching the tool profile with the circumference arcs on the reticle.

The measurement scale of the reticle is always referred to the concentric circles' radius, while the measure unit will be *mm* in "metric" mode, *inch* in "imperial" mode.

To exit from the "screen settings" menu, press the

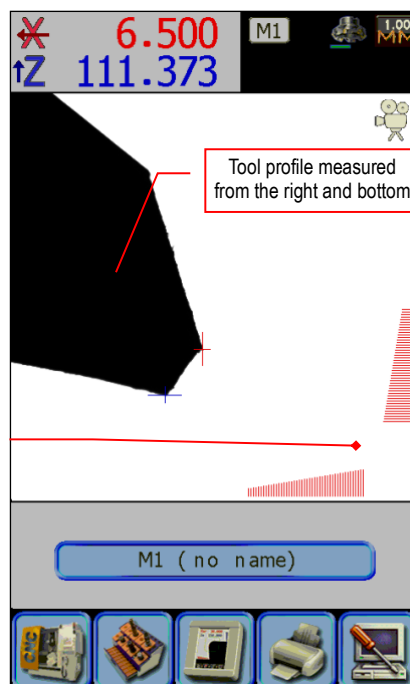
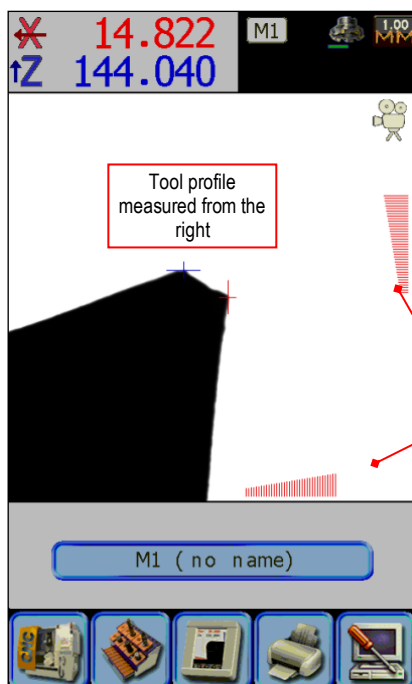


icon again.

- ☒ *Avoid inverting the movement direction during the collimation to achieve the best accuracy of the measurement on fixed reticle.*

### 7.4 SPECIAL MEASUREMENT CASES

E236+ can automatically recognize the orientation of the tool and measure it from the left or from the right of the X axis, and from the top or the bottom of the Z axis. The operator has to do nothing when the tool has been framed, the system analyses the image and sets the suitable collimation direction. The priority is given to the measurement from the left of the X axis and from the top of the Z axis. This means that, in case there are two valid measurements of the X axis, only the left measurement will be considered.

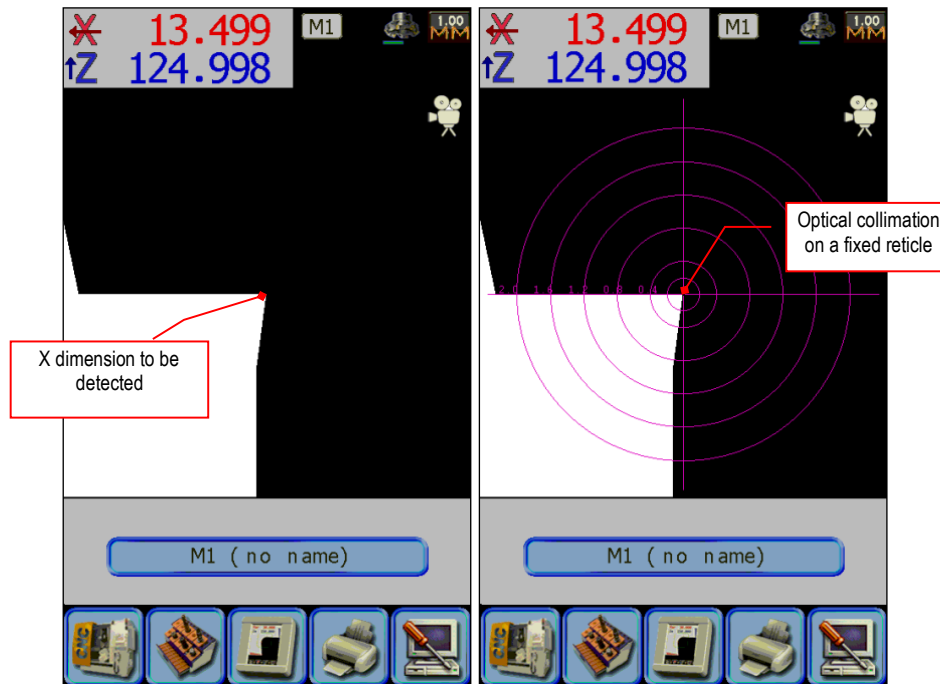


The position of the bars, indicates the direction of collimation

If you observe the position of the focusing bars, you can recognize the active direction of collimation, indeed the bars move according to the measuring direction.

#### 7.4.1 OPTICAL MEASUREMENT

Despite the fact that E236+ can detect and measure the tool profile in any orientation, there are particular cases in which measurement cannot be performed automatically or with the assistance of electronic comparisons. This occurs when the point to be measured (see picture) is internal compared to the tool shape.



In these cases, measurement needs to be manually carried out, by using the device as a normal profile detector.

It is recommended to activate the “fixed reticule” (para [7.3.1](#)). Subsequently, rotate the spindle to carry out focusing of the tool profile and find the maximum tangency (attention: the information of the bar is not correct, because it relates to the recognized measurement point). Finally, optically collimate the measurement point with the fixed reticule by means of the hand wheels for the “fine” movement of the axes.



## 8. HOW TO USE THE INSTRUMENT

### 8.1 MACHINE ORIGIN SELECTION

Before using the instrument to measure any tool, you have to set a correct starting reference: the origin.

When switched on the instrument suggests the origin M0 as a default with the same references and the same options radius/diameter, millimetre/inch, absolute/incremental enabled when the machine was switched off.

It is not possible to associate toolsets to the M0 origin, so it will be possible to measure tools and print labels but not the storage of measured dimensions. To create a valid zero reference for M0 you require a sample tool which has known X and Z dimensions.

Insert the sample tool into the spindle, rotate the tool in the spindle, and rotate it to find the maximum tangency, then collimate the profile with the central reticule (see para.7.3.1). Now it's possible to setup the measurement of the sample tool by touching the screen where the measurements are displayed.

A numerical icon board will appear; type the radius of the sample tool (e.g.



), then press

Touch the screen again in the measurement display zone.

Digit now the default tool length



(e.g.

), then press

Eventual typing errors can be corrected by pressing the cancellation icon



The new absolute axes origin set is automatically stored and will be active again at the next switch on of the instrument, right after the reference point on both axes is taken (para. 6.4.1 switch on).


For how to store the machine origins see chapter 9.

- ☒ *The setting of the values is possible only for the “absolute” measurement that will be enabled at the end of the operations.*
- ☒ *The setup operations of the measurements is usable also in “auto-collimation” mode; in this case it will be sufficient to frame the tool and rotate the spindle to find the position of maximum tangency, the measurement inserted will be relative to the individual point automatically measured.*



## 8.2 HOW TO SELECT RADIUS / DIAMETER



Select the “display settings” menu, by pressing the  icon, then press alternatively the selection icon Radius/Diameter to see the dimension in X changing in both ways




The dimension shown is the radius of the measured tool.



The dimension shown is the diameter of the measured tool.

At the top right of the screen, is indicated the mode in use.

To exit the “display settings” menu press the icon .

- ☒ *The settings of the function “radius” or “diameter” are automatically saved and reactivated at the next switch on.*

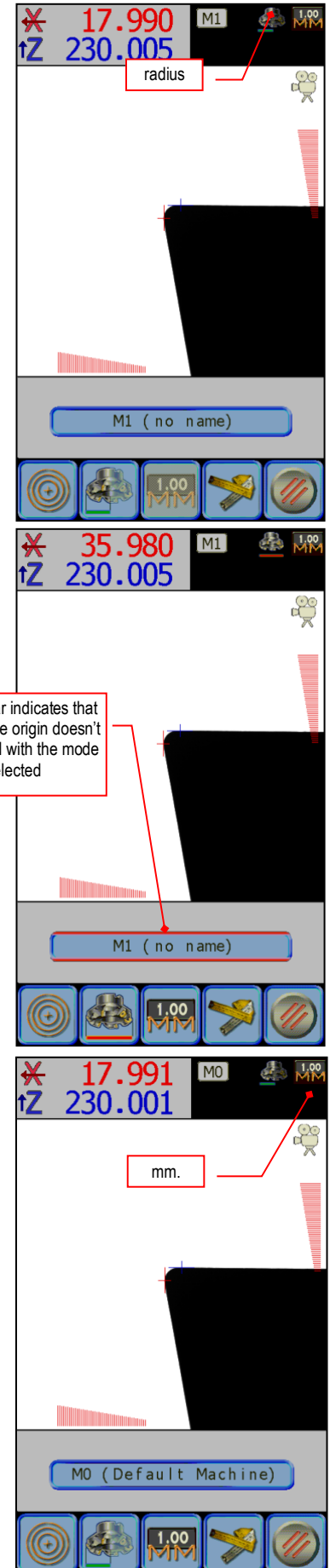
## 8.3 HOW TO SELECT MM / INCH



Select the “display settings” menu by pressing the icon, then press alternatively the icon mm/inch to see the dimensions changing in both ways.



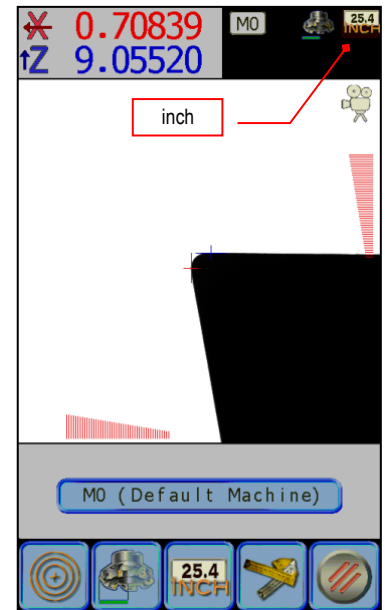
The value shown is in millimetres; three decimal places are displayed








The value shown is in inches; five decimal places are displayed



At the top right of the screen, is indicated the unit of measure active.


To exit the “display settings” menu press the  icon.

- ☒ *The setting of the function “Millimetre” or “inch” is automatically saved and reactivated at the next switch on of the instrument.*

## 8.4 HOW TO SELECT ABSOLUTE / INCREMENTAL



While using the instrument it may be useful to clear the axes measurement to carry out partial measurements or to check quickly the differences in the alignment between the different inserts of a tool with multiple cutting edges. In this case, it isn't necessary to clear the reference of the axes absolute origin but you can simply use the “incremental” mode, for major ease joined to the automatic measurement mode (auto-collimation).

Select the menu “display settings”, press the  icon, then press alternatively the selection icon Absolute/Incremental to see the dimension changing in both ways, or to set the value to zero.

The counter of the incremental mode is always reset to zero every time.

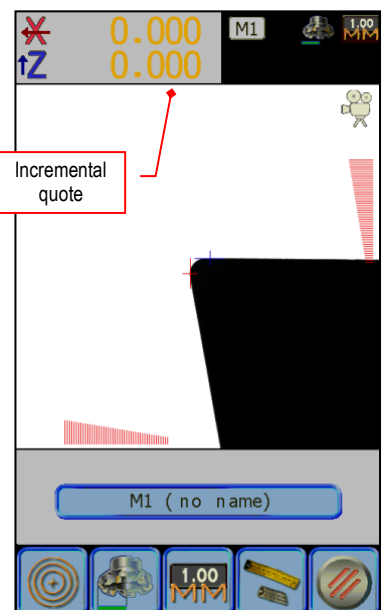


The value is the actual dimension of the tool




The axes are set to zero and the measuring mode is incremental  
The value is shown in the colour yellow to signal that the actual measurement of the tool isn't indicated

To exit the menu “display setting,” press the  icon.



## 8.5 GEOMETRICAL CALCULUS AND LABEL PRINTING

By connecting the specific optional label printer *s'Print-S*, it is possible to transfer the measures of the tool and its geometry onto adhesive thermal paper, including a small image with the shape of the tool.

To access the menu “print”, press the icon with the  icon.

The print menu includes the following commands:



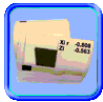
Command to store the X axis dimension to be printed;



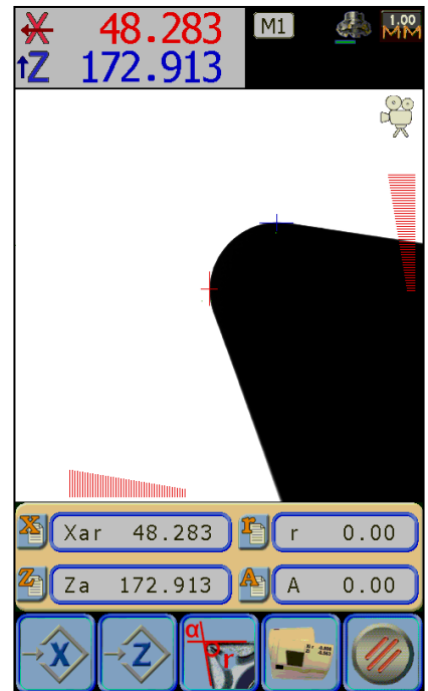
Command to store the Z axis dimension to be printed;





Command to carry geometric analysis of the tool profile and to detect an inserts angle and radius;




Label printing icon.



In order to print the label at least one of the three settable data (dimension X, dimension Z or insert angle/radius) has to be present.

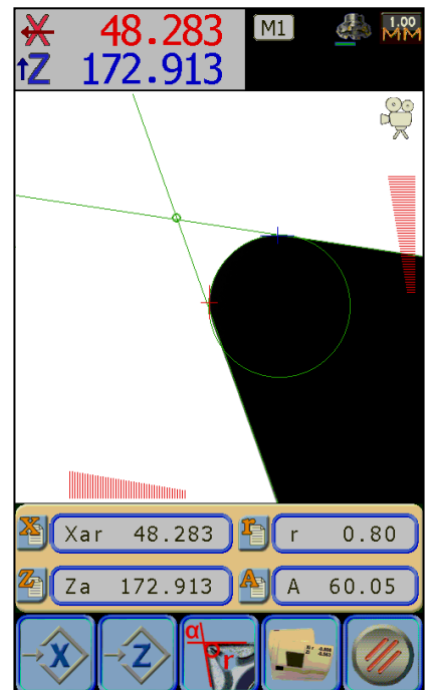
Press the  and/or  icons, to memorize the tool dimensions; the stored dimensions will be displayed in the area on top of the two icons.

In case of error or inaccuracy you can press the icons repeatedly until the stored measurement is correct.

Press the  icon to carry out the analysis and the geometric calculus of the tool profile: *with the automatic measurement mode activated*, it will search for all the angles and radii to be found in the profile. The result that can be printed on the label includes the first radius and the first angle being found or, when detected, the included angle.

On the screen, there will be drawn, with the colour green, the detected geometrical figures to carry out a quality control of the result.

When two or several angles are detected, the included angles being calculated are highlighted with a circle, which is displayed on top of the geometry icon.

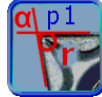


☒ In case of the result wasn't satisfied, verify the tool cleaning, therefore try to lightly rotate the spindle and/or carry out short movement.

- ☑ *Attention: it is possible to use all the measurement modes available to store the value of X and Z to print, the only trickiness is to do it before the geometric calculus effect, otherwise the geometric drawing can't coincide with the profile of the tool.*

In this case it is also possible to repeat several times the geometrical calculation, in order that E236+ recognizes all the required entities. Eventually proceed with short movement to exclude no relevant or annoying profile parts for the achieved result.


For this type of analysis, tool profile cleaning and outline integrity is very important: the tools whose cutting edge is splintered or excessively worn will not be recognized. Even lines or circles with profiles shorter than 0.5 mm will not be recognized.

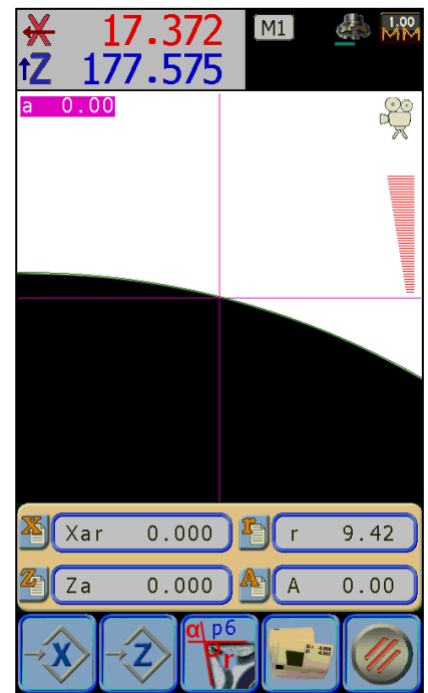
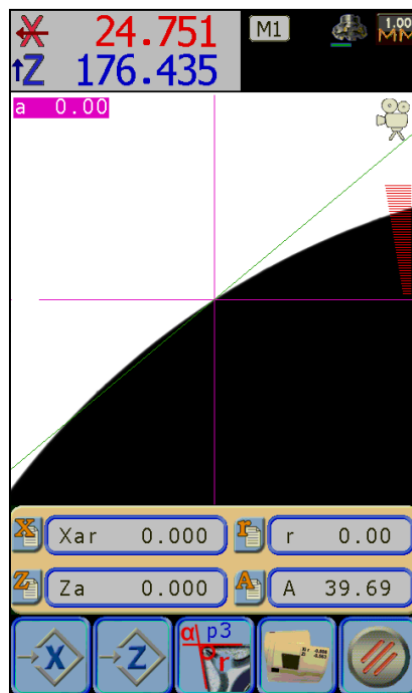
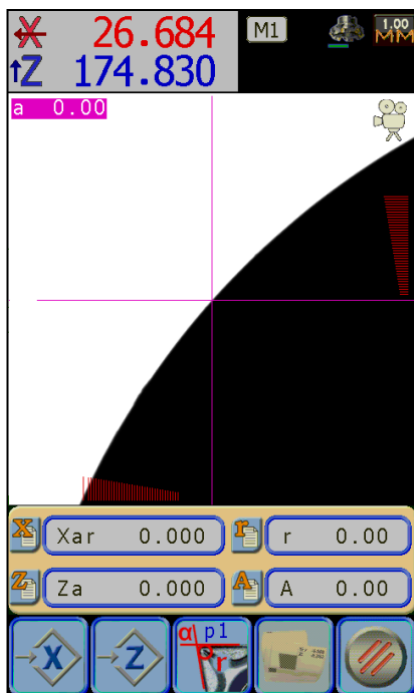
For each single point to be acquired, it will be necessary to move the axes along the tool profile, collimate the shape with the centre of the fixed reticule, therefore push the  icon.

The icon on the button shows the number of the point to be stored. For each geometrical entity, it's possible to acquire up to 99 points: generally, the result will be more accurate using more points.


It's necessary minimum 2 points to calculate the angle of a straight line, while it's necessary, at least, 5 points to calculate the radius of a circumference.

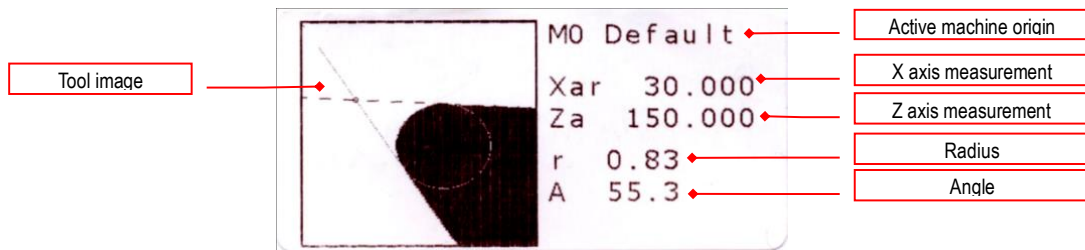
At each new stored point, it'll be carried out the calculus and it'll be drawn the result on the screen. E236+ automatically recognizes if the stored points describe a straight line or a circumference, by adapting the result.


Before to start a new calculus, delete the stored points sequence by pushing one time  icon.



- ☑ *It's normal that drawn the angle formed by first two points, also by measuring a radius, because they fall on a straight line. The straight line will disappear by acquiring the points and it will be drawn a circumference.*
- ☑ *In the event it's necessary to print the result both radius and angle measured in manual mode, first of all carry out the calculus of the radius.*

When all necessary measurements have been carried out, press the  icon to print the following label:




To exit the “print” menu press the  icon; it will be necessary to press it a second time if we have just made a manual calculation of angle and/or radius.

- ☒ While printing the label E236+ electronic equipment will not respond to the commands for a few seconds.
- ☒ While printing the label E236+ electronic equipment will not respond to the commands for a few seconds.

## 8.7 SYSTEM SETTINGS

The latest available menu includes system settings.

Some instrument settings directly affect the accuracy of the measurements, therefore they are password protected to avoid accidental or unauthorized access.

To access the “settings” menu press the icon .

In the menu there are the following commands:



calibration of the vision system and of the touchscreen;



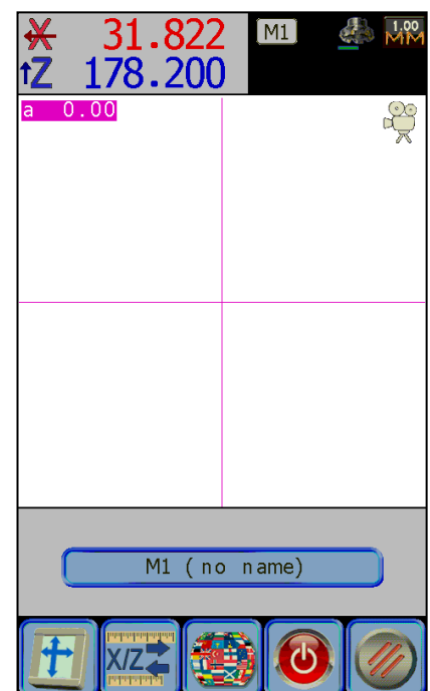
linear compensation for X and Z axes measurement;



language selection (see para 6.4.3);



stand-by mode (see para. 6.4.2).



## 8.7.1 CALIBRATION OF THE VISION SYSTEM

## CALIBRATION OF THE VISION SYSTEM

The calibration allows adapting the real optical blow-up of the image to axes. In fact, the position on the screen is estimated in “pixel”, the image sensor uses 480x480, while the framed vision area is about 5x5 mm., as a consequence each pixel of the sensor “detects” about 0,01 mm. of the image. In order to grant a precise measurement E236+ measures in an accurate and necessary way to know exactly it's dimensions (in mm.), what is detected in pixels by the image sensor.

Thanks to the calibration cycle, E236+ can precisely self-learn the lens blow-up factor and estimate to how many mm. each single pixel corresponds. Measurements accuracy will depend on these values.

The calibration operation is carried out at the factory and it will have to be repeated if the vision system is replaced or the Preset memory is deleted (para. 8.8).

In order to carry out the automatic calibration cycle press the icon



Type the password



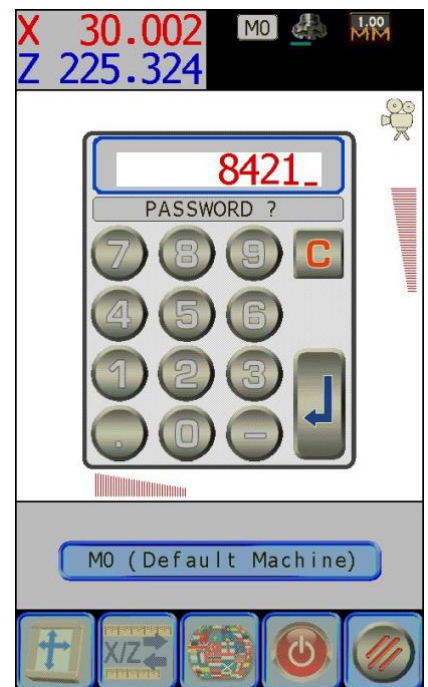
, confirm pressing



icon.

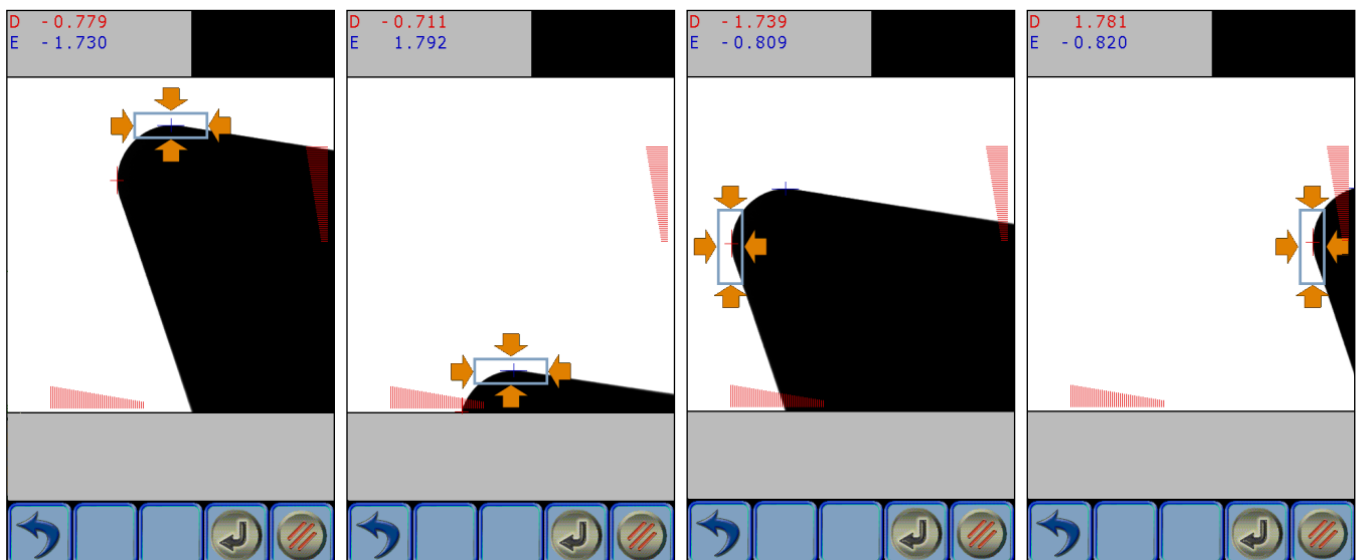
E236+ activates the procedure that asks to collimate any tool in four points on the screen: frame the tool, focus it in the Z-axis; displace the axes and take the image in central position for the X-axis, collimate the tool first on the top and then on the bottom, as asked positioning inside the green rectangle present on the screen, confirm every point with the

icon




Repeat the operation for the X-axis: take the Z-axis in a central position, focus the X-axis collimate it first on the left and then on the right as the icons displayed on the screen ask for, confirm every point with the

icon



- ☑ It's advisable to add, in the positioning window move the axes in the same direction, for example from the bottom to the top for the Z-axis from the right to the left for the X-axis.



During this procedure it is possible to repeat the collimation of one point that was previously confirmed by mistake, press the icon .

The dimensions that are displayed for the X (D) e Z (E) axes, relate to the centre of the screen and can be useful if you want to reduce the calibration area travel: indeed, it is not compulsory to reach the farthest position indicated in the green rectangle, but you can decide to calibrate only in the central area.

At the end of the procedure, the calculated values will be shown, and you will be asked to save or cancel the newly acquired calibrations.




Ca\_x=1.019021  
Ca\_z=1.017614

Press  to save the new camera calibration values, press  to delete.

### 8.7.2 CALIBRATION OF THE TOUCH SCREEN

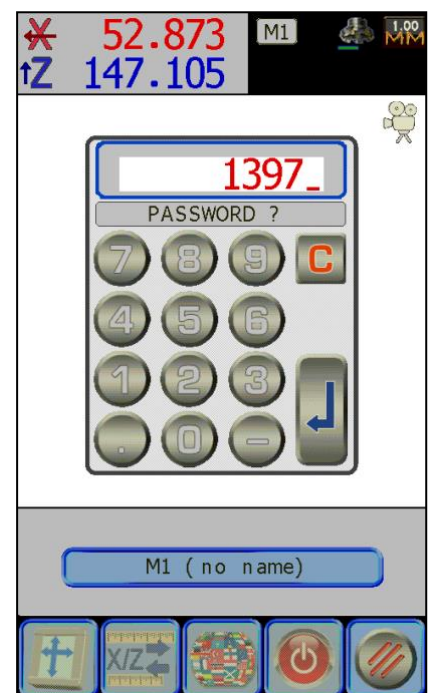
The calibration allows you to correlate the positions of the points you touch on the screen to the coordinates of the LCD display below.

The calibration of the touchscreen is enabled in the factory, and can be repeated in case it is found it doesn't correspond between the point touched and the activation icon, or in case of restoration of standard settings (para. 8.8).

To access the "configuration" menu press the icon , successively to follow the cycle of calibration of the touch-screen press the icon



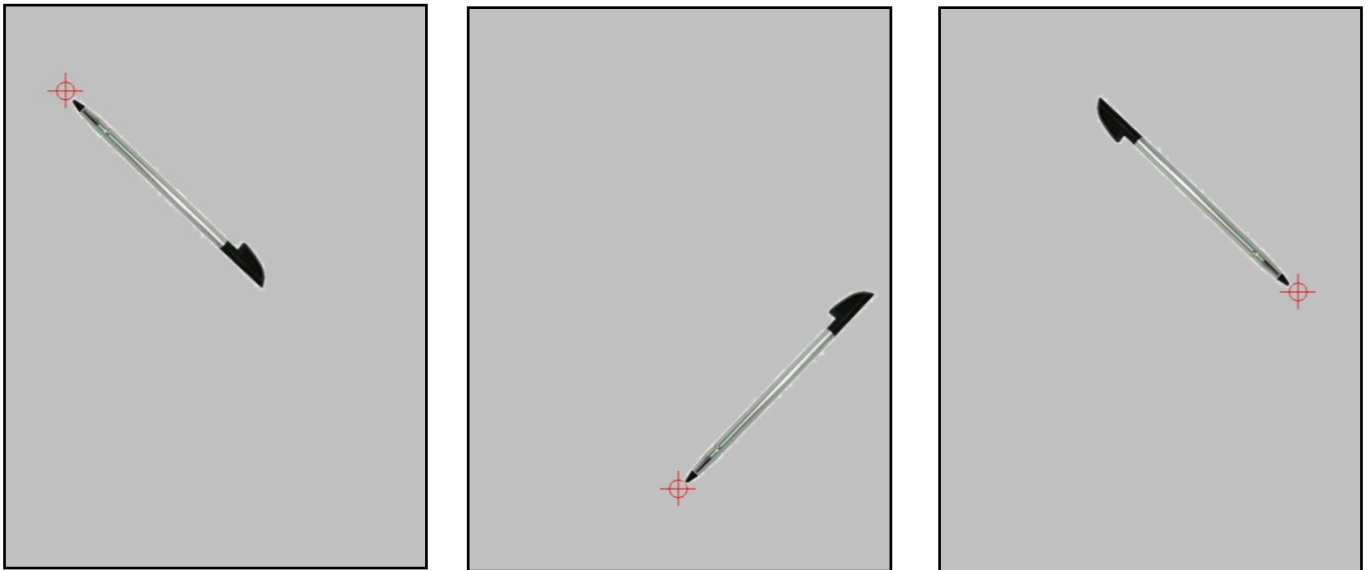
Type the password , confirm it by pressing the




E236+ activates the procedure that asks you to press three points of the screen to note coordinates, to calculate the compensation matrix of the touchscreen.




It serves to use a “pointed-pen” for the touchscreen, touch in sequence on the screen the points indicated:




At the end it is possible to verify the outcome of the calibration by trying to touch the screen in different positions and in particular in the zone at the bottom of the LCD.

If the result is satisfactory confirm the saving pressing the icon , the new calibration will be activated immediately and saved for future switching on of the instrument.



To cancel or repeat the operation press .



For a new request to repeat the calibration procedure press , otherwise to exit without saving press



### 8.7.3 LINEAR COMPENSATION OF AXES MEASUREMENT

Due to employment of temperatures that differ from 20°C, it may be necessary to correct the measurements detected by the Preset in order to restore the correct value.

To do this, you can modify the two compensation parameters for the X-axis and the Z-axis, which, by acting as multiplier of the measurement being carried out, corrects the detected error.

The procedure used to compensate measurements is very simple:  
Collimate a tool whose measurement is well known or a Johansson block and then type in the correct measurements.

In the example on this side, we assumed a 30.000 mm reading for the X-axis against a real displacement equalling 30.150 mm.

Enter to "configuration" menu by pressing



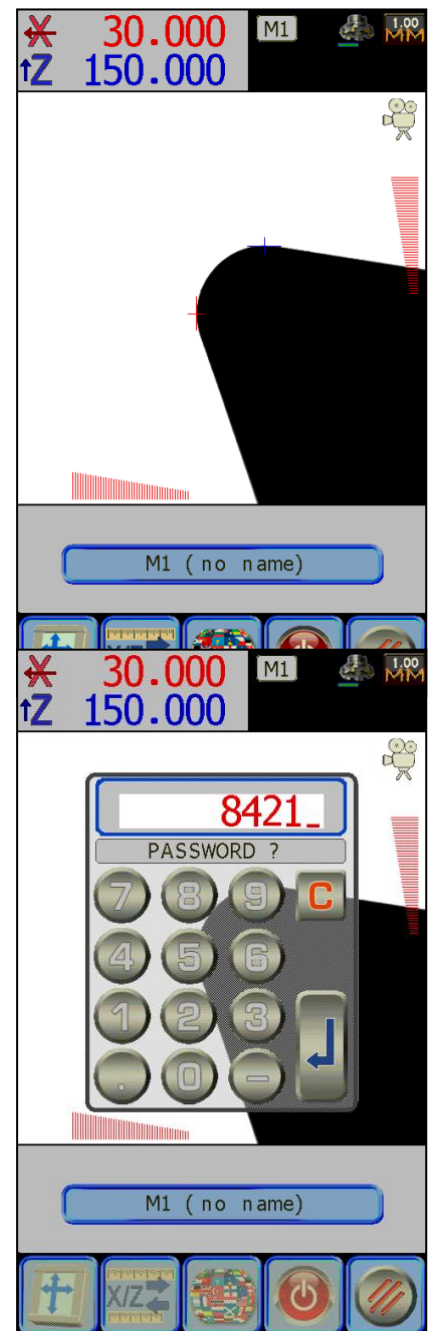
Press the icon relating to axis to be compensated



Type the password



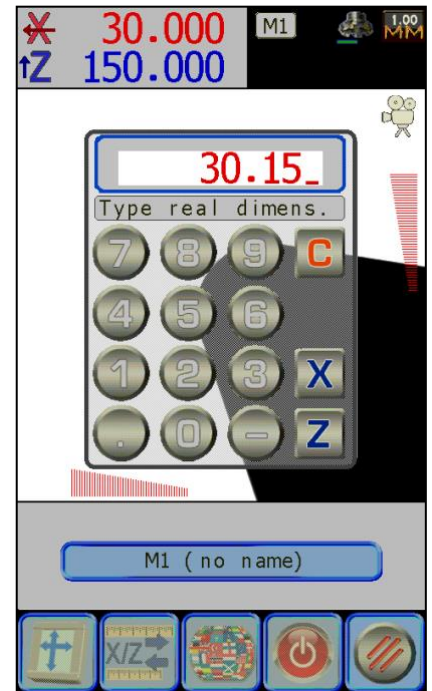
Confirm by pressing the icon







Type in the actual dimension that has to be displayed     , confirm it by pressing the axis .

It will calculate the compensation factor that is necessary to correct the display, then it will be stored and activated.





The compensation factor activation will be pointed out through the symbol  which it is after the dimension of the required axis:

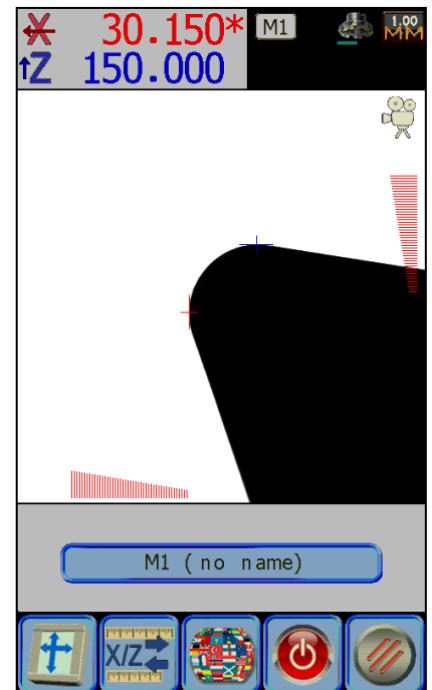
 30.150\*

To exit the “settings” menu press the icon .

To disconnect the linear compensation, repeat the procedure and insert



as real value, then confirm it by pressing (  or  ) axes.



☒ *The maximum allowed compensation equals +/- 1%, inserting higher values the compensation will be disconnected.*

## 8.8 HOW TO RESTORE STANDARD SETTINGS

E236+ stores all settings (from display and axes origin settings to system settings: optical calibration and measurement compensation) in an EEPROM memory.

All these data are saved in two different memory areas and completed by the CRC control to check their integrity. Indeed, it may occur that stored data are altered or are not complete due to power supply faults during information storage or due to external electromagnetic events (lighting, etc.)

Any time E236+ is switched on, it controls data integrity, and, in case of alteration, it initialises the concerned memory area once more.

Therefore, after the starting screen, which displays the software release, it may happen that the wording is displayed



Specify the automatic deletion of the axes origin and display data area and the system settings area.

In the latter case, carry out the vision system calibration procedure (para. 8.7.1), under pain of measurement inaccuracy.

In case the instrument behaves in an irregular way, you can force memory re-initialization by restoring the standard settings:

Turn off the device by disconnecting the power supply and then connect it again and keep the central area of the screen pressed until the start-up message disappears. Doing this, the content of the memory will be fully initialised.

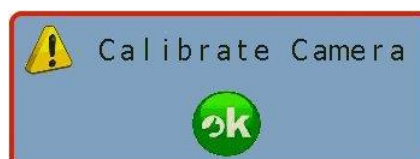
A first message will indicate the recovery process is underway



after the standard settings are restored, you will be asked if you want to cancel the camera calibration values



and then to perform the camera calibration procedure (para.8.7.1).

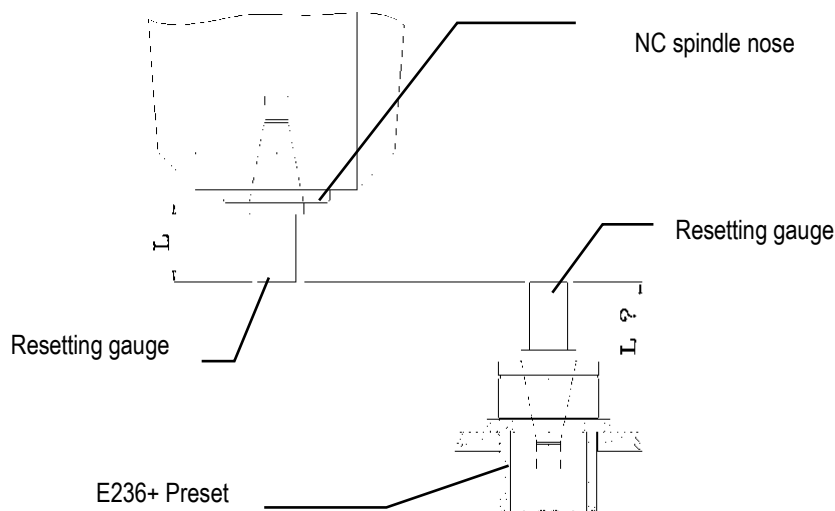


## 9. MACHINE ORIGINS

### 9.1 NC MACHINE ORIGINS

In case of tool measurement options, there are no particular problems in the X-axis radial measurements, but a conventional reference point must be established for length (Z-axis) measurements. In fact, when a tool radius or diameter is measured, the zero point will always be located on the tool, the situation is quite different for length measurements. For this reason, the tool presetter must be reset on this same point for the Z-axis of this NC machine (absolute machine zero-point, spindle nose, etc.).

The simplest method is to measure a master gauge or a reference tool directly on the NC machine, the dimension is then transferred to the tool presetter. The radius and length measurements set on the machine will then be shown on the display.



A more efficient system is to use the same origin given by the length marked on the reset gauge, for all of the machines having the same spindle intersection.

The electronic equipment of the E236+ gives freedom of choice in which system to use in order to express the length on axis Z and includes in preset functioning the self-learning of the origins for each machine or group of machines according to the system applied.

It is possible to specify for each machine either as radius or as diameter, the unit of measure. All the settings stored for each machine become active simultaneously with the origin shifting, that is every time they are recalled, and thus avoiding any possible error.

## 9.2 DEFAULT MACHINE

As described in paragraph 8.1, after having switched on the machine and acquired reference zero points for axes X and Z, the preset enables a fictitious machine source called “M0”.


The values for this source are set by the user through the procedures already described in paragraphs 8.1, 8.2 and 8.3 and allowing the user to perform measurements without storing any machine sources on digital controls.

☒ *Warning: The origin “M0” is always shown in the list of the machine sources and cannot be edited or deleted.*

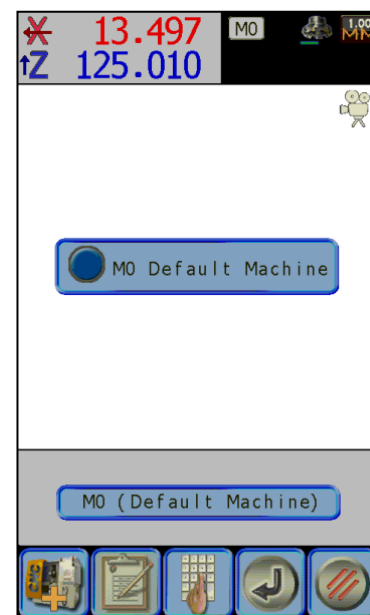
## 9.3 CREATING AN NC MACHINE ORIGIN

E236+’s electronics allow managing up to nine different machine origins (M1 ÷ M9) beside the default machine M0.

When you insert a new origin, the electronics automatically select the first free position 1 to 9.

Insert a resetting gauge, of which length and diameter are known, into the presetter spindle, then enter the machine origins menu using the  icon.

The display will show the machines list already entered and the icons to access the different functions, create, edit and activate.



Create a new machine origin.



Edit the parameters of the selected origin (not active for the machine M0).



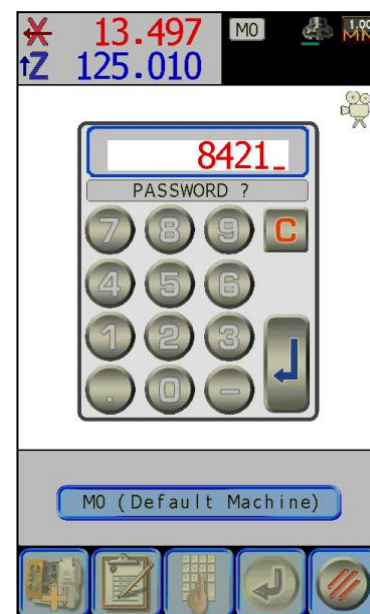
Manual settings of axis dimensions (automatically enable the machine M0).






Activate the selected machine origin.







Exit the machine origins menu.







Pressing the icon to create a new machine origin , the password request window will pop-up.


Type  and confirm pressing they icon . The window that appears shows the options to create a new machine origin that the system will set to M1 that is the first one available in numerical order.


   In the top right corner is shown the machine origin number, the function radius or diameter and the measuring unit used, millimetres or inches.

 Access to the counting direction and axes swap configuration submenu (see par. 9.3.1)

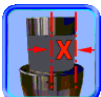
  X-axis dimension relative to radius or diameter

  Measuring unit, millimetres or inches

 Delete machine origins


 Exit from the “machine origins” menu

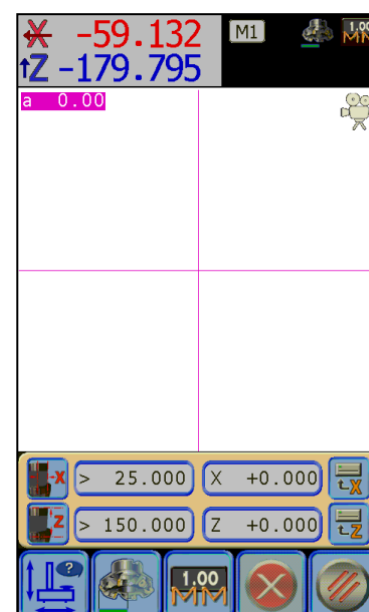
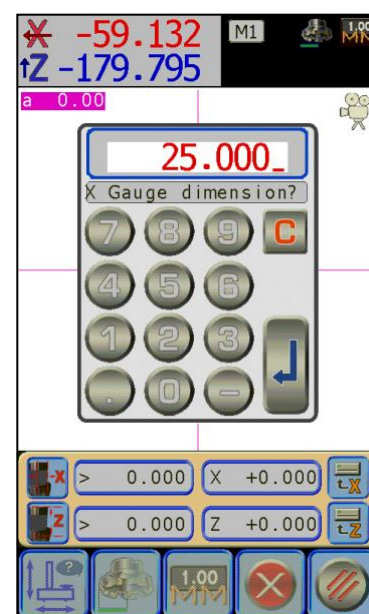
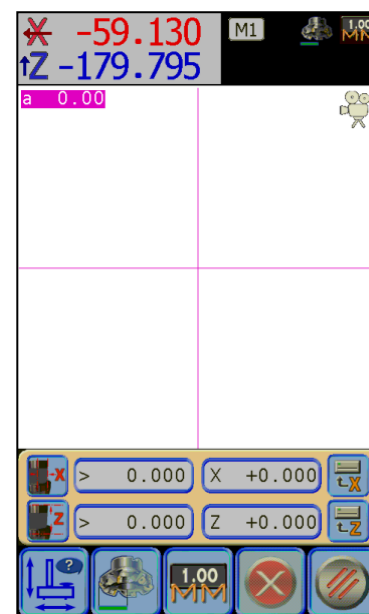
Once the selected options “mm/Inch”, “Rad/Dia” corresponding to our needs we can proceed to the new machine origin measurements.

Press icon  and insert the radius of the resetting gauge using the icon pad that appears on the screen

E.g. 

Confirm the dimension with the icon .

Press the icon  and insert the length of the resetting gauge



E.g. 



Confirm the dimension with the icon

The set dimensions are shown beside their respective icons.


E236+ allows the acquisition of the machine origins whether in auto-collimation mode or through the use of the fixed reticule. As illustrated in the para.7.3, for a higher precision of the measure it's advisable to memorize the machine origins using the fixed reticule and measuring at the centre of the screen.

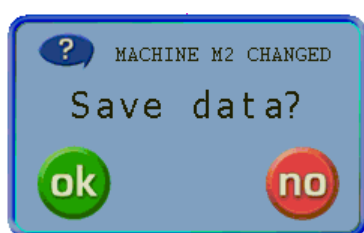
Frame the tool or resetting gauge, find the best collimation (best focus + best tangency, see para 7.2), then press the confirm icon




to acquire the dimensions.

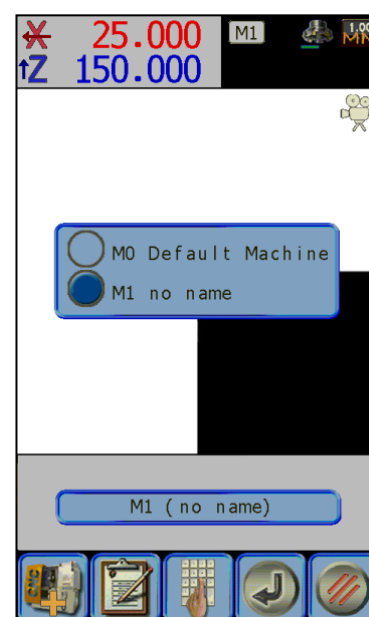
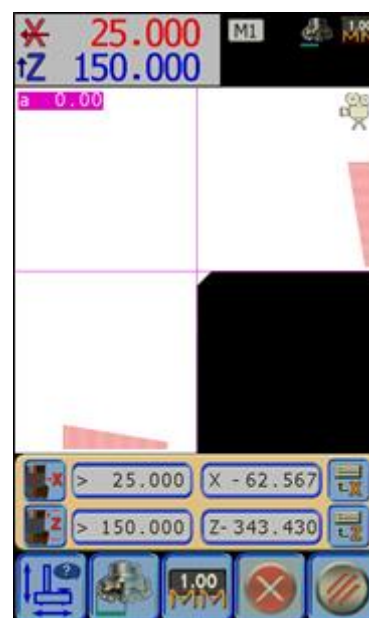
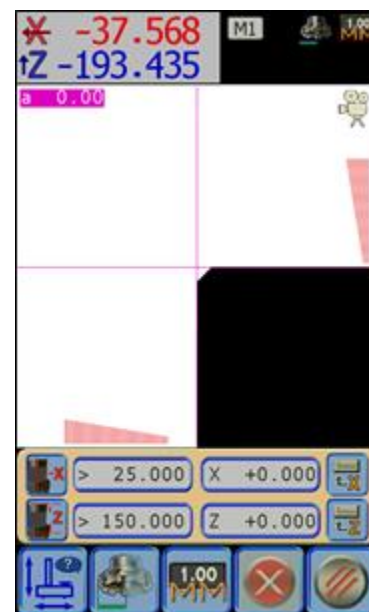
As soon as the dimensions are saved, the offset is activated and shown in the X and Z fields. The axis measurement should match the values entered for the resetting gauge. If the dimensions don't match it's possible to repeat the procedure.

At the end press , you will be asked to save the modified data:





Press the icon  the new origin will be saved, and the display will show the machine origin just created as active. If the axes have not been moved after the calibration measurement, also the dimensions will coincide with those defined.

In the centre of the screen will be shown the new list of machine origins that are now available.





Press  to exit the machine origins function and start to measure or press  and repeat the previous procedure to create a new machine origin.

As shown in the picture, beside the number (M1 ÷ M9) the system will assign to each origin the name “no name”.


This can later be edited using the software TD236+ (see chap.11).

☒ *Warning: For the memorization of a machine origin it isn't necessary to acquire the dimensions of both axes.*

### 9.3.1 MULTIFUNCTION MACHINE ORIGIN CONFIGURATION

As we have seen in the previous paragraph, it's possible to assign to each NC origin its own configuration of the measurement axes respect to the conventions used, for example by multitasking machines for turning and milling.

E236+ is able to individually manage the reversal of the counting direction of horizontal and vertical axes and assign their measure to the X and Z dimension, depending on the requirements of the machine center.

To set the axes configuration, press the  icon, set the E236+ horizontal movement counting direction:



default counting direction,



reverse counting direction.

Set the E236+ vertical movement counting direction:



default counting direction,



reverse counting direction.


Finally choose if the X and Z dimensions correspond to the horizontal and vertical movement or not:

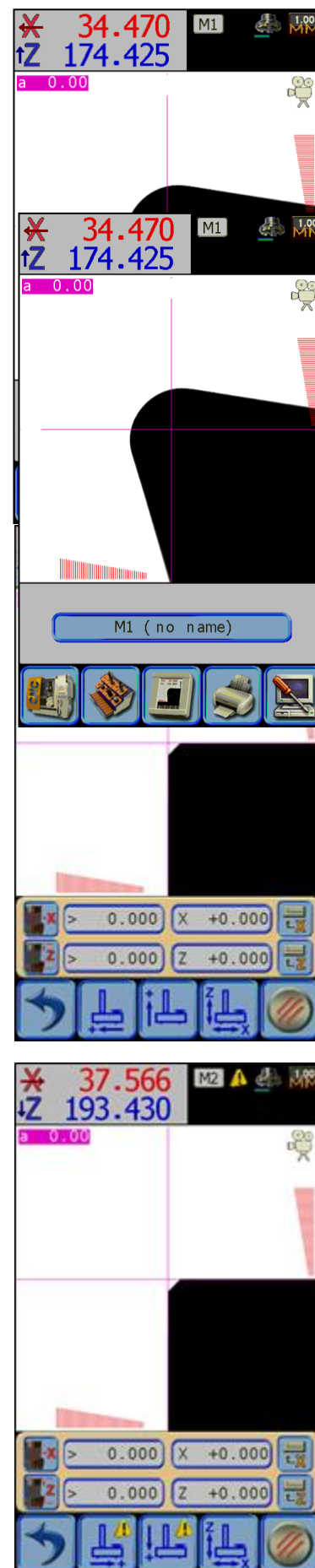



X = horizontal, Z = vertical (default configuration),





Z = horizontal, X = vertical.

The  “attention” symbol is located in icons with different setting from the default one, in order to recognize it immediately.



When the desired axes configuration is settled, press the  icon to return to the base settings or to continue with offset measurement procedure, as described in the previous paragraph.

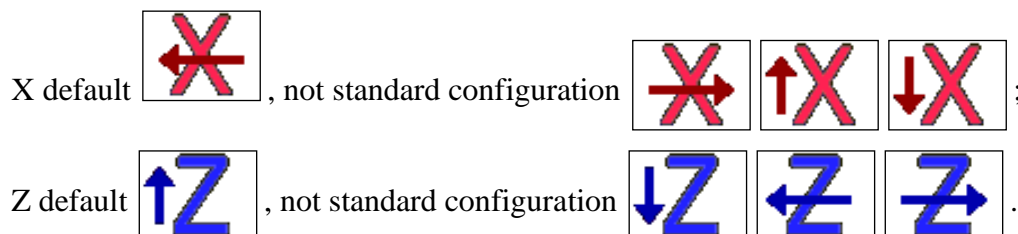
☑ **Attention:** the offset measurement, by pressing  and , icons, must be carried out after having settled the counting direction and the axes assignment.

Horizontal and vertical reversal counting


Axes configuration different from standard



When the NC machine origin input procedure is finished, the counting direction and the axes configuration will be clearly shown by identifiers of the displayed dimensions:



The arrow indicates the axes configuration, either vertical/horizontal or positive/negative counting direction.


If axes are not set in default mode, it will be shown the , “attention” symbol nearby to the active origin number.

## 9.4 ACTIVATION OF A NC MACHINE ORIGIN

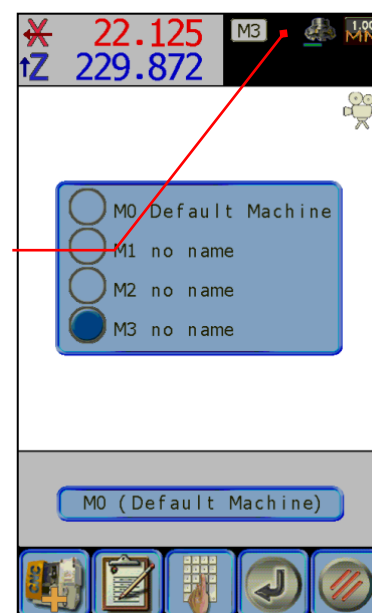
With the preceding operation a machine origin has been registered on the presetter memory of all machines for which the tools should be measured (up to a maximum of nine).

In order to properly measure a tool, it is therefore necessary to activate the origin of the machine to work on.

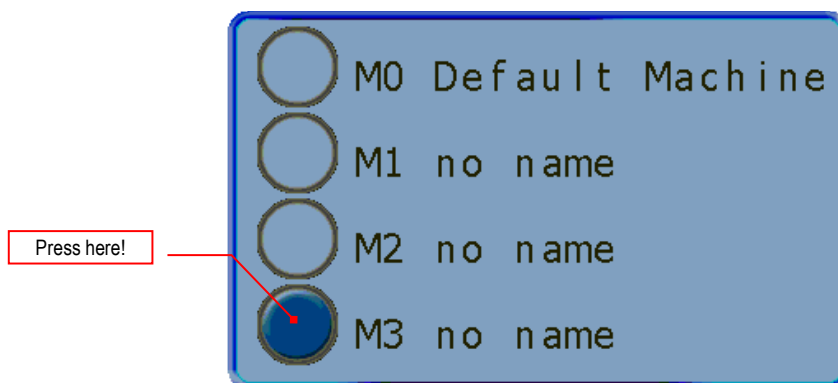
The procedure is as follows:


Press the icon  to enter the machine origins menu.

Setting of the selected machine



Choose from the list the origin to activate pressing the round button: the system automatically shows the settings of the selected machine.

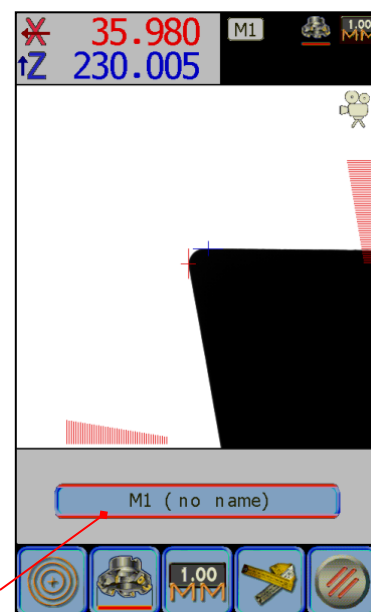


Press the icon  to confirm the selected origin.

The screen will return to the main page; the dimensions displayed will be updated and referred to the requested machine that is shown in the top right of the screen. From now on all the measurements taken will be valid only for this machine.

If it is needed to switch from radius to diameter (par. 8.2) with one active machine origin different from the one set on the machine origin, this would be highlighted by two red bars in the label above the main menu.


It isn't possible to switch from mm/inch or vice versa: the measuring unit must be set when the machine origin is created.



## 9.5 EDIT OR DELETE A NC MACHINE ORIGIN

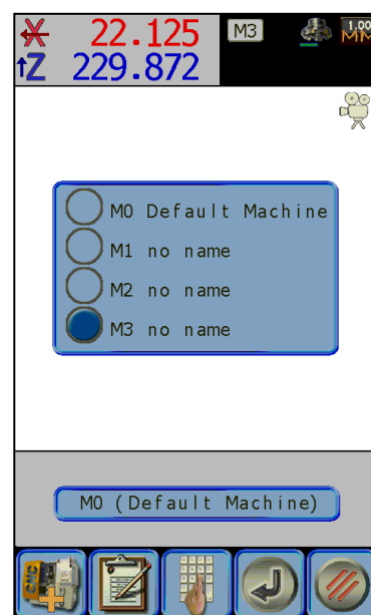
Press the icon  to open the machine origins menu.

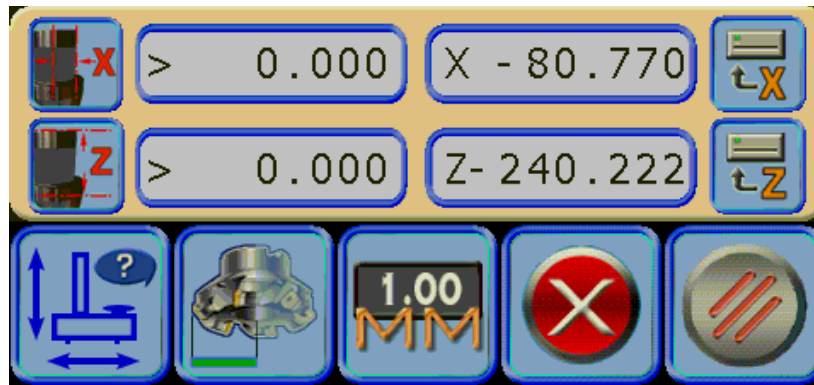
Select from the list the machine origin to edit or delete.

Press the icon , and insert the password





The menu already seen in the previous para. 9.3, will reappear and allow you to measure the origin again and to switch from radius/diameter and MM/Inch.





To cancel the machine origin, press the icon , the system will ask you to confirm the operation:



Selecting  the machine origin will be deleted, selecting  it will go back to the previous window.

If the machine origin has toolsets assigned to it a second request will be shown:



☒ *Warning: the cancellation of a machine origin will also delete all the toolsets related to it*

## 10. TOOLSET

### 10.1 INTRODUCTION

E236+ has the possibility to store and manage the measurement carried out in nine different lists: the "toolset" (S1 ÷ S9); each of which must be associated with a machine origin and can contain a maximum of 99 tools.

A set of tools is a group of tools needed for a particular piece or machining operation on the assigned machine.

For example, the piece DRW0123 to be worked needs a rougher, a finishing mill, a bit and a reamer, these four tools would become a "set" drw0123 in the memory of E236+ and it is possible to use the same corrector number that the NC will use in its "part-program", in this way it has absolute correspondence of data and avoids possible errors.

### 10.2 CREATE AND MEASURE A TOOLSET

It isn't necessary that the operations of creation and measurement are carried out simultaneously; a toolset can be created first and then at a second time it is possible to assemble and measure it. In this case refer also to the next paragraph.

Instead it is essential to have created at least one machine origin other than the default (M0) to be able to associate the toolset: **no toolset can be associated to the M0 origin.**


To define and measure a new tool set proceed as follows:

From the main menu, press the icon  if no toolset is memorized, the warning appears:



Press  to continue.

If, instead, there are already toolsets present, a list will appear as shown in the image beside.

To create a new toolset press , this will automatically be identified with the letter "S" followed by the first available number from 1 to 9 and will be associated to the active machine origin and assigned the name "no name".

If the M0 machine origin is activated, the list of the memorized machine origins will appear to select the origin which is associated with the new toolset.

Selecting one of the machine origins, we are able to create a new toolset,

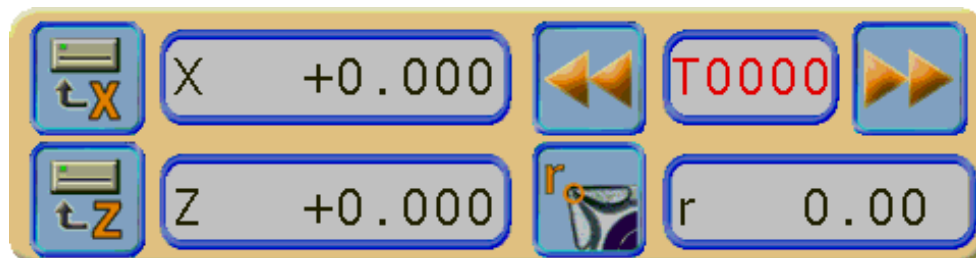
instead pressing the icon , we cancel the operation.

Once the toolset is generated, it is possible to verify the toolset characteristics in the top right of the screen:





While in the lower part of the screen the first record will appear of the number of tools defined for the Set:



For each tool it's possible to be memorized: the letter "T" of the corrector used by the numerical control of the machine (from 1 to 9999), the "X" and "Z" dimensions and the radius "r".

All the numerical fields can be measured and acquired or, pressing directly on the value, set by the iconboard.



The first thing we have to define is the number of the tool corrector: press

the icon **T0000**, and type the number assigned to the tool e.g.



, followed by the confirm icon.

Once the best collimation of the tool is made (best focus + best tangency), it

is possible to store the dimensions using the icons  e .

**X +18.001**

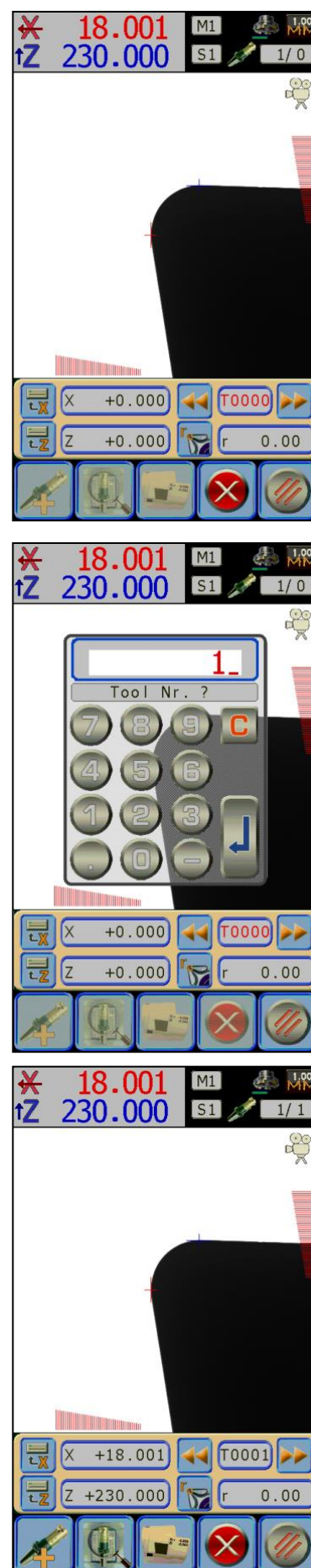
**Z +230.000**

Values of the dimensions of the tools are immediately shown in the boxes next to the storage icons and will be automatically be saved on exiting the toolset or before inserting a new tool.

In case you want to take the measurement using the fixed reticule, before acquiring the measurement, bring the axis into tangency with the reticule.




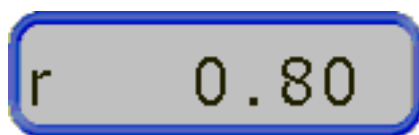
E.g. Acquisition X and Z axis with fixed reticule.







Pressing the icon , the system will analyse the profile of the tool to search, if it is detected, the radius will be drawn on the screen and the measure will be inserted in the proper field:




It is possible to repeat more times the geometrical calculations since E236+ recognizes many geometrical entities, if necessary, with small movements you can eliminate parts of the profile not actually required that can disturb the geometrical entities.

For this type of analysis, it is very important to perfectly clean the tool to ensure the correct shape of the tools shadow: tools with damaged cutting edges or used are not recognized. Tools with circles smaller than 0,5 mm will not be recognized.

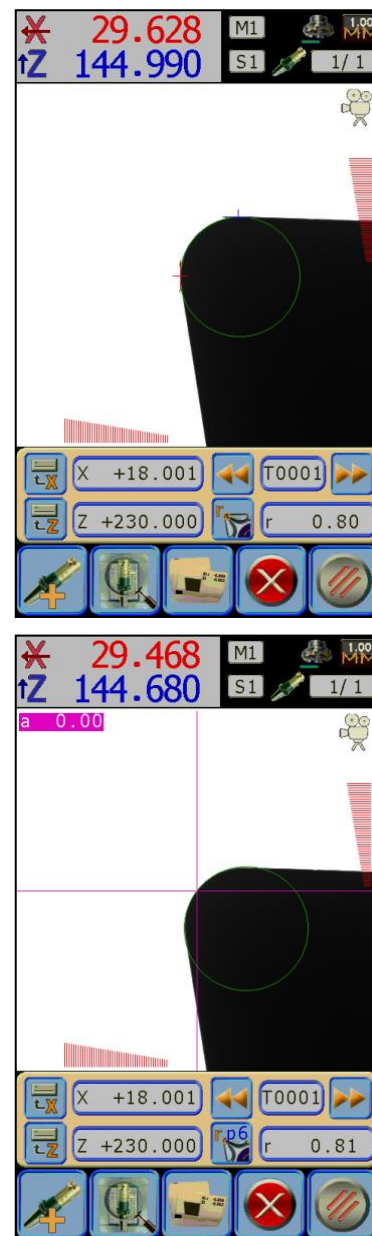
If we want to measure the radius acquiring the points with the fixed reticule, it's necessary to collimate each single point along the radius to be measured




and confirm with . The maximum number of points are nine and the meter appears on the text graphic.

The same rules explained in par. 8.5 are valid.

After the memorization of the fifth point, I will be displayed the result of the manual calculus.




Once the first tool is stored it is possible to create a new one pressing the icon  and repeat the operation described so far.

It's possible to create a new tool without measuring it, or acquire only some dimensions or more insert the theoretical values pressing the grey icon of the measurement of the axis to measure or the radius one, this way to manually insert, using the icon board, the values desired.

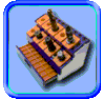
For all the other functions of the toolset see below.



To finish the operation and go back to the Toolset list press , all changes will be automatically saved.

### 10.3 EDIT A TOOLSET


It's possible to access the toolset to add, remove, measure the tools or print the label of it.

From the main menu, press the icon  , in order to open the memorized Toolset list.

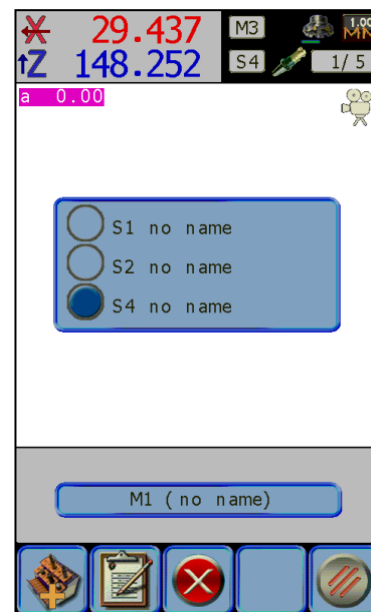
As is possible to notice from the picture, the name assigned by the system to each toolset when it is created "no name".

This can be later edited using the TD236+ software (see chap. 11).

The simple selection of a Tool Set will be shown also with the relative information that is: the associated machine origins and the number of the tools of which it's made up.

Select the toolset to edit, then press the icon  .

The first tool of the set will be shown, and it will be possible to add the measures following the modality illustrated in the previous paragraph.



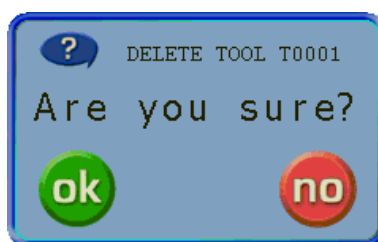
The scroll icons allow moving backward and forward into the toolset positioning on the tool before or after the one selected





The search icon allows you to insert, using the icon pad, the number of the tool that is being looked for within the toolset. If the number searched for doesn't exist the software will be pointing to the tool offset number before the entered one.




The delete icon allows you to erase the record of the active tool of the active toolset. After using the search button or the scroll icons in order to choose the desired tool, if pressing the delete button, the system will ask you to confirm:



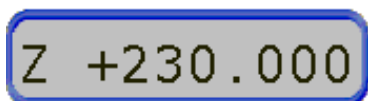
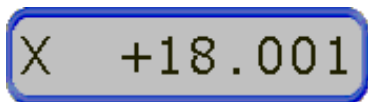
selecting  the tool will be erased, selecting  will go back to the previous screen.




The offset grey icon allows you to change the tool number previously assigned; without changing the memorized measures.

When the tool number is reassigned the tool will automatically recognize the tools of the Set and update the index of the current record  .

If we try to insert an existing tool number in the Set this will be aborted by the system with the message:




It's also possible to directly insert/modify the measurements with the numerical icon board by pressing the stored values.

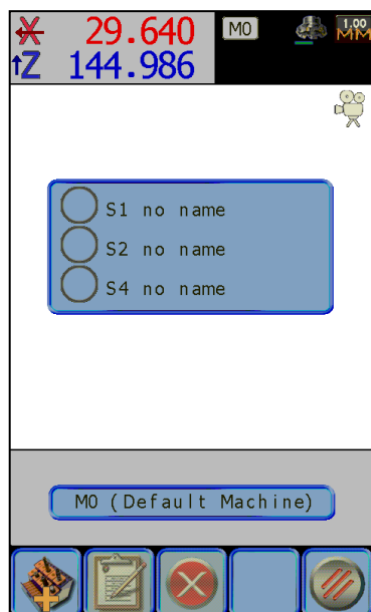
To end this operation and return to the Toolset list press the icon , all changes will be automatically saved.



## 10.4 DELETE TOOLSET AND TOOLS

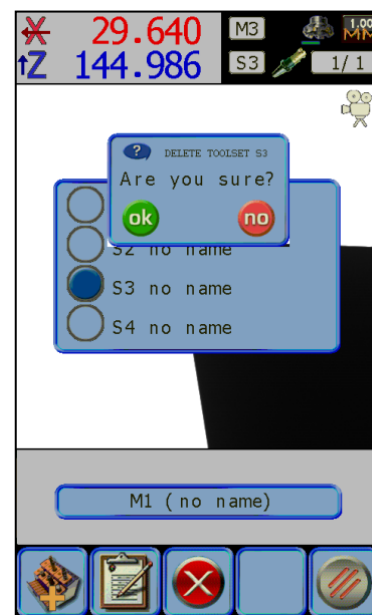
It's possible to delete a toolset to allow more space for new lists.

From the main menu, press the icon , to open the list of toolsets stored in the memory.

Select the one to delete and press the icon ,. The system will ask to confirm the operation before executing it.



Selecting , the entire set will be deleted, selecting , the operation will be cancelled.





Naturally, the deletion of a complete toolset will delete all the tools of the toolset.


☑ *The mistaken cancellation of a toolset can be replaced only using the valid backup copy realized from TD236+ software.*

## 10.5 LABEL PRINTING

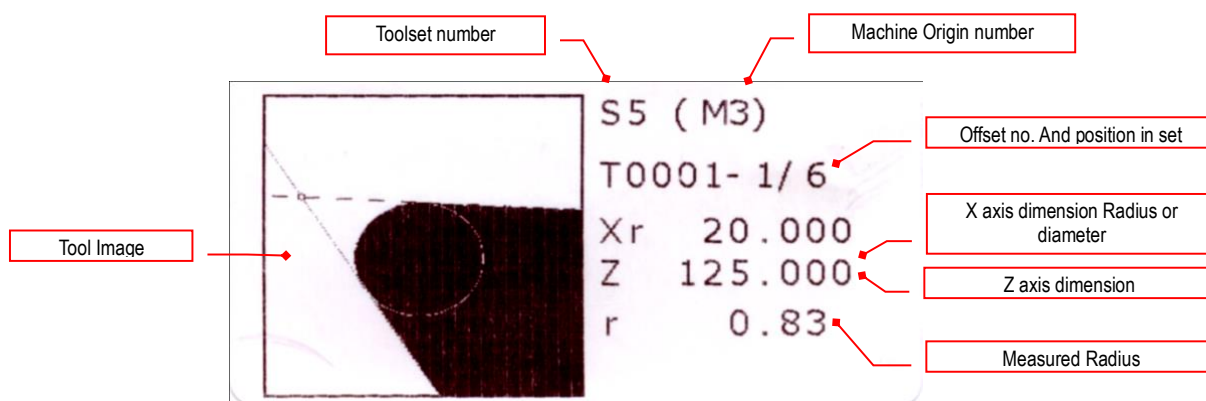
If your presetter is connected to a mini label printer *s'Print-S*, it is possible to transfer measurements on to labels stored in the Tool Set.

From the main menu, press the icon  to open the list of Toolsets stored in the memory.

Select the Tool Set to print and press the icon .

To print the label, after the tool is being measured and has saved the dimensions into its record, press the icon .

You will get a printout of information in the following format:



☒ *The printed values are only those saved in the tool record, the image which is correctly shown on the screen .*

## 11 TD236+ Software

The TD236+ software, installable on a PC with a Microsoft Windows operating system®, is found on the USB KEY enclosed with the machine together with the user's current maintenance and usage manual. TD236+ lets you achieve the following functions:

- updating BIOS
- machine names definition and table of tool names
- movement of tool names from one machine to another (with automatic correction of the offset)
- inserting code and orientation for each tool on the table
- post-processor tool charting the best communication format CNC
- printer tool chart
- presetter back-up and restoration

The functioning of the TD236+ software is possible only if the PC is linked up to the E236+ presetter, this is because all the data (machines, tool charts) are memorized there.

### 11.1 CONNECTING

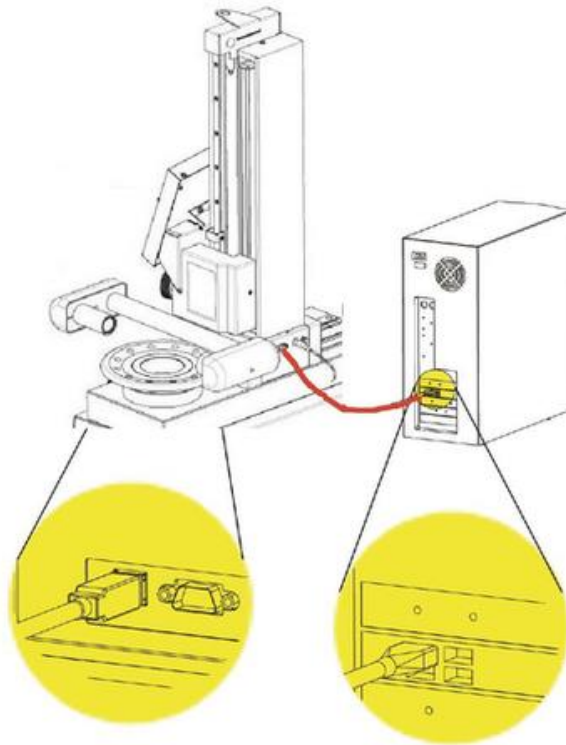
The E236+ Presetter must be connected to a PC through a USB cable of type A-B supplied in equipment:



**ATTENTION:** if preset E236 + is not connected correctly, the following screen will appear:



Only when the connexion is established, can you continue to use the service offered from TD236+.



Connect the USB port of the presetter with the USB port of the PC in the one which was installed in TD236+, at the connecting of the cable, the PC will automatically proceed to install on the driver the necessary functions.

## 11.2 SOFTWARE REGISTRATION

The licence of TD236+ is free, however we ask you to register the product and to join within the serial number of the Presetter E236+ and to receive communications on the available updates. The service and the added files are and always will be completely free.

At the start and before the execution of each command an invitation to register will appear:



elbo controlli NIKKEN

Il presetter non è ancora registrato, registralo ora per rimuovere questa schermata e per ricevere gli aggiornamenti software  
Vai su <http://www.elbocontrolli.it/registration> per ottenere il codice di registrazione o clicca sul link sotto.  
La registrazione è gratuita.

**Presetter S/N 0**

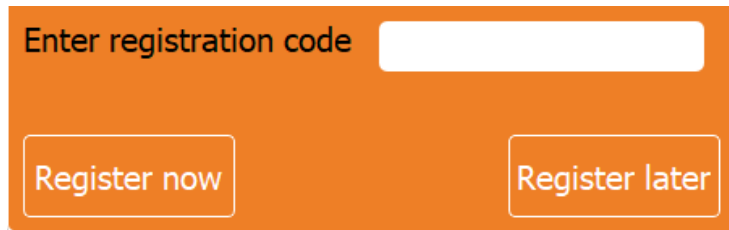
[Vai al sito di registrazione](#)

Inserisci codice registrazione

If the PC is connected to the internet, click directly on the link "Go to the registration site", otherwise use a PC with access to the channel and go to the page "<http://www.elbocontrolli.it/registration>".

Fill in the registration module paying attention to correctly inserting the model of the Presetter, the serial number and a valid e-mail address, then confirm the sending of the data.





Enter registration code

Register now Register later

An alphanumeric registration code of 14 characters will be sent to the specified e-mail address; copy it and insert it in the appropriate space respecting the upper case and lower-case letters, then press the icon

Register now

Not until the registration code is available is it possible to proceed to unlimited use of the software pressing

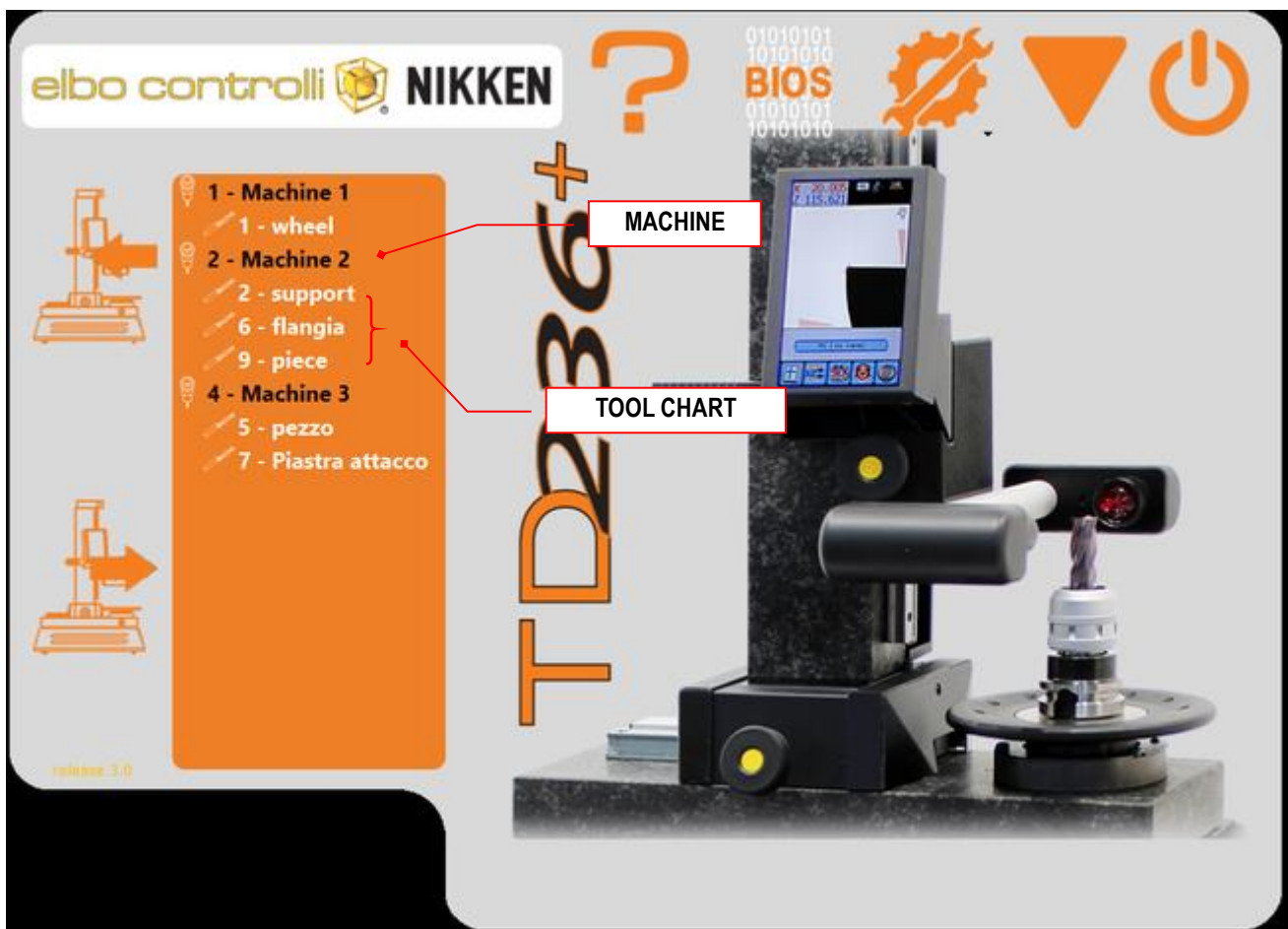
Register later

at each request.

☒ In case there are more machines available, it will be necessary to register each one.

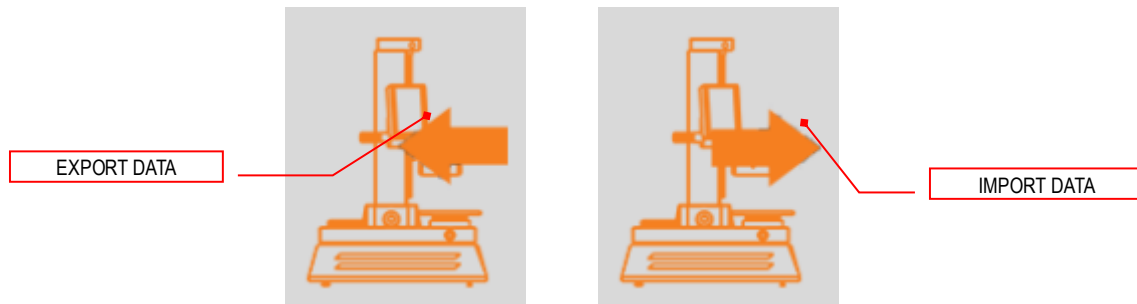
### 11.3 USE OF THE SOFTWARE

At the start Td236+ connects itself to the preset and loads all the content, automatically creating a backup copy. Once the data is imported, the directory of the machine it's set of tools are shown in the structure of a tree.



☒ TD236+ functions exclusively if the presetter is connected correctly and if the driver is successfully installed.

In whichever moment it is possible to import/export the data by pressing the icon:



The selection of a machine will show the configuration to be associated:

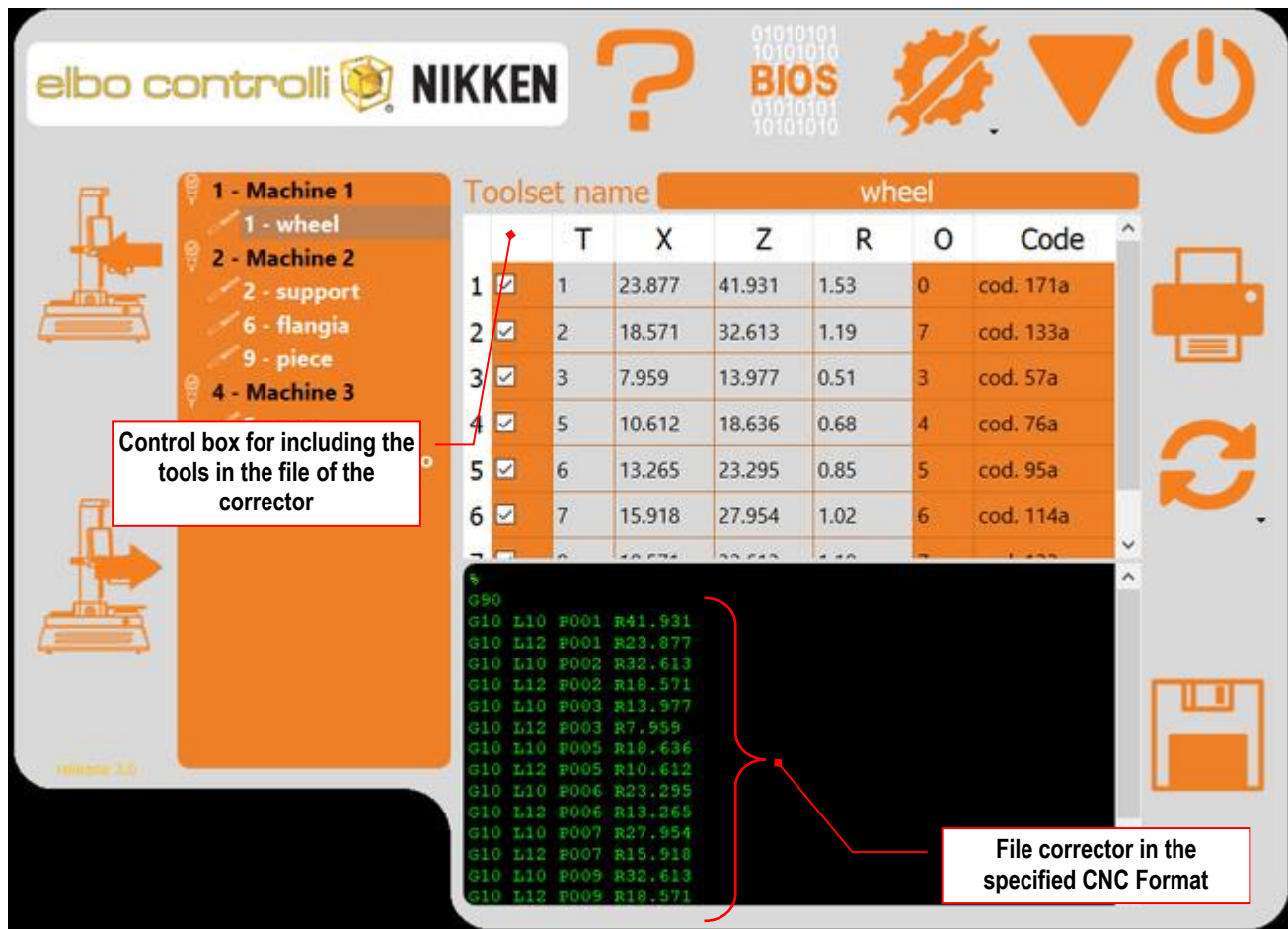


Here it is possible to assign a name to the machine, select the format of the post-processor from those available, define the maximum number of tools acceptable on the corrector's chart of the numeric control and at last the predefined way in which the contents of the file will be saved of the offset tools.

At first use of the program will be necessary to setup the configuration requested for each machine used, in particular mode the format of the data to export (post-processor), in function of the numeric control model that is used in the centre of work.

☒ *TD236+ automatically saves the data of the machine configuration.*

At the same way selecting a tool chart will show the contents in a grill form:



At the foot of the settings associated to the tool chart is shown the preview of the CN file contents the transfer correctors to the centre of work.

It is possible to assign and edit the name of the tool chart and you have a yellow background that is the guideline and the code, in which it could be important at the end of the exportation of the corrector tool file.

The remaining fields, definitions and tool measures, can be uniquely edited on the E236+ presetter (see para. 10.3)

To use the control box post on the left of the tool number, to include (if selected) or exclude (if not selected) a single tool in the generation of the correctors file.

The icon on the right of the tool chart carries out the following functions:



Print tool chart



1 - okuma  
1 - art. 1234

T	X	Z	R	O	Codice
1	23.877	41.931	1.53	0	cod. 171a
2	18.571	32.613	1.19	7	cod. 133a
3	7.959	13.977	0.51	3	cod. 57a
5	10.612	18.636	0.68	4	cod. 76a
6	13.265	23.295	0.85	5	cod. 95a
7	15.918	27.954	1.02	6	cod. 114a
9	18.571	32.613	1.19	7	cod. 133a

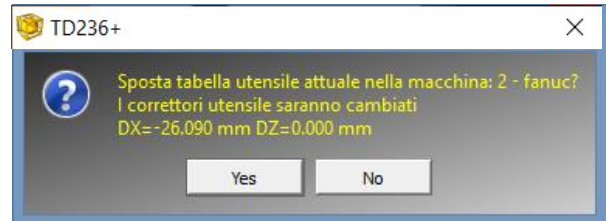
The tool chart print button will produce the paper print of the chart actually selected:



#### ▼ Moving the tool chart on to another machine

Through this function it is possible to change the machine of the tool chart selected. The tool correction values will be edited in accordance with the difference between the machine of origin and that of destination.

Once the machine chooses the destination it will indicate the difference in measures between the two origins and it will necessary to confirm the operation requested:



#### Save

Carry out the saving of the tool offset in the specific language of the numeric control. This file must be successively transferred on to the numeric control to update the correction values

It will be necessary to specify the file name and eventually choose a different way of that predefined for the machine in use.

## 11.4 CONFIGURATION AND RESTORING DATA



#### ▼ Configure

The configuration menu allows you to edit the interface language of the software: select the language desired from the ones available:



☒ *The settings will have an effect on the successive restarts of the software.*

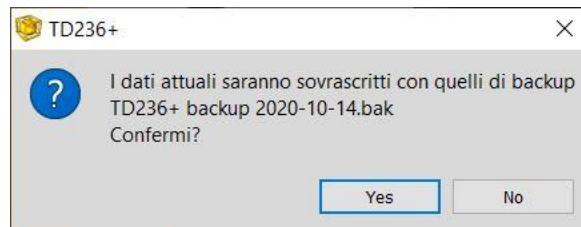
Through the configuration icon it is furthermore possible to restore the data (machine origins and tool charts) of a previous saving.

Td236+ automatically creates a data backup copy of each operation of importation/exportation, overwriting the previous ones. In this way, only the last daily backup is available, but they are kept in the archive for the last 15 days.



To restore the data, access the configuration menu: in the entry “Restore data” there is listed the copies available to restore, from the oldest to the most recent (year, month, day).

To select the copy of the data requested and to confirm the operation:



The data therefore can be edited, printed, “post-process” but they remain only in the circuit of the TD236+ software.

In case it’s necessary to restore the data in the memory of the E236+ presetter you will need to use the “Exportation” button



☑ **ATTENTION:** the data present in the memory of the preset will be overwritten without any possibility of cancelling the operation. All the new machines and toolsets created, and the measures effected in successive data of the restored backup copy, will be lost!



## 11.5 UPDATING BIOS

Incorporated in the characteristics of the TD236+ software, is the function of updating Bios of the preset, allowing the installation of the latest available version freely from Elbo Controlli in the “Download” area of their website: [www.elbocontrolli.it](http://www.elbocontrolli.it).

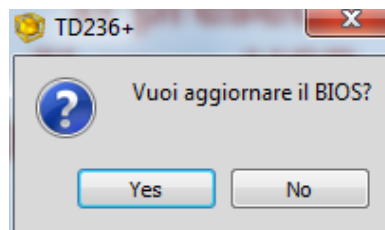
Registering the TD236+ software, will automatically notify you of the availability of a new update for their Preset and supply a link to download it. Otherwise, it will be necessary to identify the adapted file in function to the model and serial number of the presetter, navigating the Download area of the Elbo Controlli site.



Once in possession of the file “E236+\_fw\_v\*\*\*.bios” to install, start the procedure of updating by selecting the icon “BIOS”.

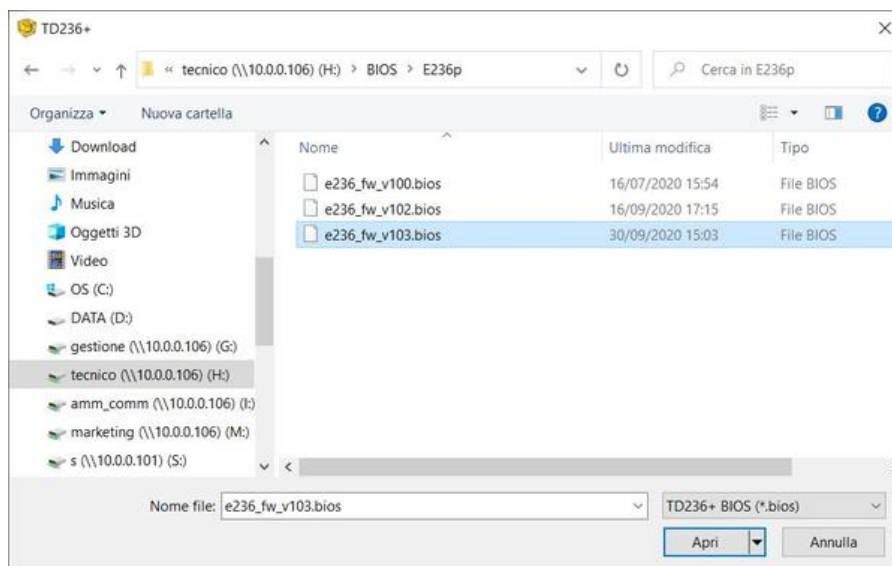


The program will ask you to confirm before starting to update:



Press "Yes" to continue.

Select the way and double click on the file to transfer to the E236+ presetter.





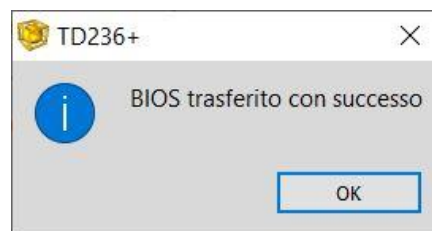


It will initialize the transmission of the file from the PC to the presetter; wait until the file transmission is complete.

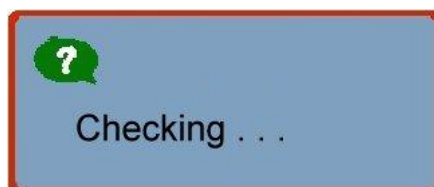
At the same time, also on the screen of the E236+ you can follow the flow of the data from the PC to the presetter.




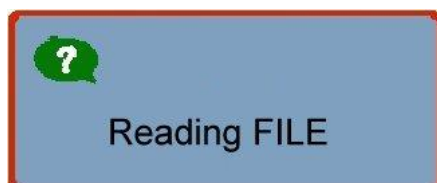
At the end of the data transfer, press OK on the window of TD236+.



At the finished reception E236+ will affect a check on the integrity of the file received, then ask to proceed with the installation of the new software.



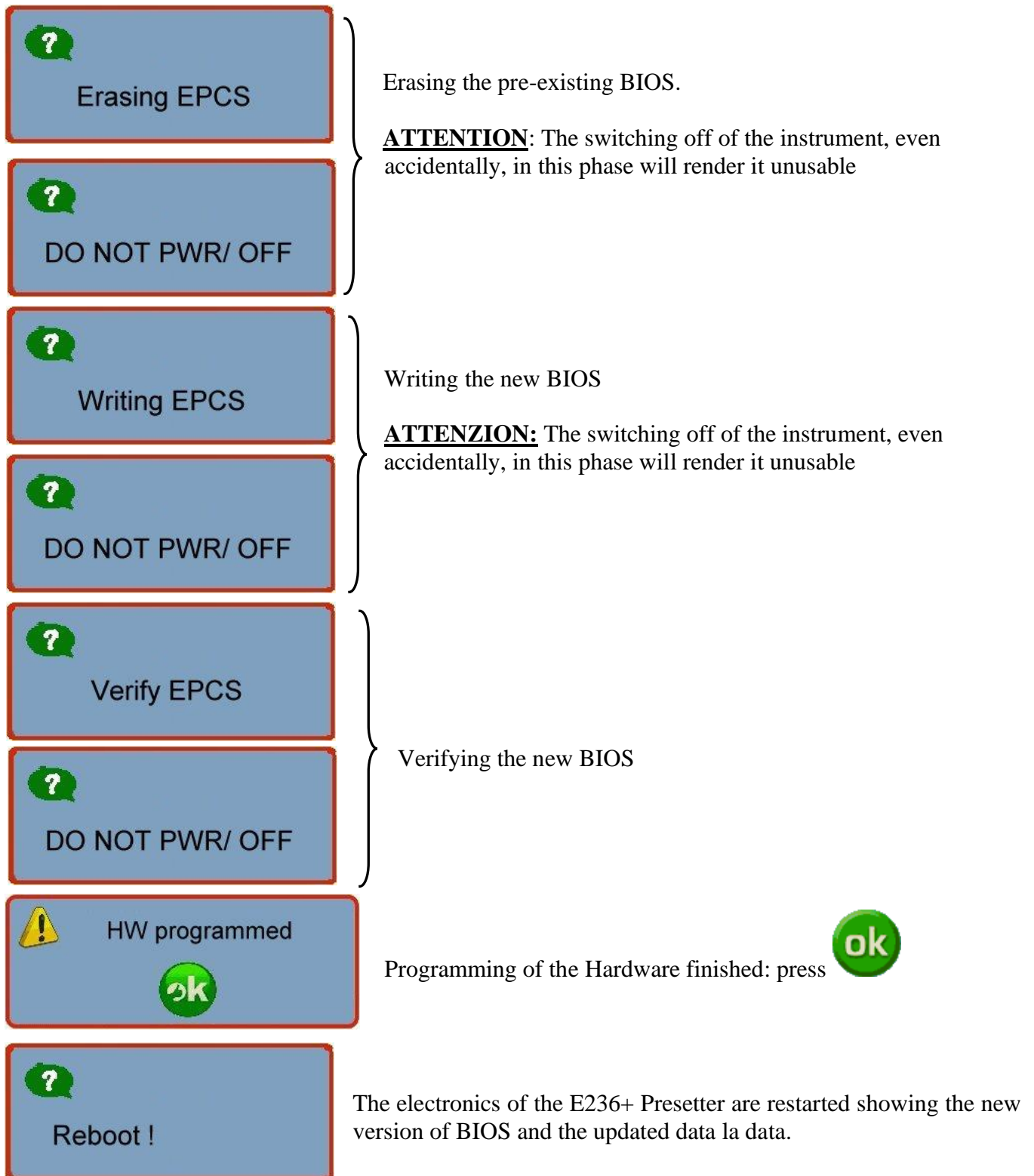
Pressing  on the Presetter will initiate the installation of the new Bios and you'll see in sequence the following messages:



Reading the file received from TD236+



Overlooking the internal Flash memory



**E236+ S/ N 100001**  
SW.REV. V1.03 30/ 09/ 2020

## 12. MAINTENANCE

### 12.1 ORDINARY MAINTENANCE

The presetter does not normally need scheduled maintenance: However, should it be necessary, carry out the following simple interventions.

#### 12.1.1 LUBRICATION OF GAUGES, ADAPTORS AND SPINDLES

To maintain the aforesaid basic parts of the presetter perfectly efficient and ensure their precision, you have to clean and lubricate them any time they are replaced and then store them in a dry place.

For the spindle, you have to clean and lubricate only ground parts at sight, at least at the end of the work shift, in order to protect them from oxidization.

For all lubrication operations we advise the use of suitable antioxidant products such as for example Chesterton 775 liquid or equivalent.

#### 12.1.2 CLEANING THE DISPLAY PANEL

The display panel is made of polystyrene, the touch-screen is made of polyester; for cleaning we suggest you use a clean cloth, dampened with proper degreasing products ( do not use either solvents or abrasive products): DO NOT spray directly on the screen.

#### 12.1.3 CLEANING THE OPTICAL SYSTEM

For the optics, lens and illuminator, use an antistatic cloth, soak its surface with sprays or detergents for optical lenses.

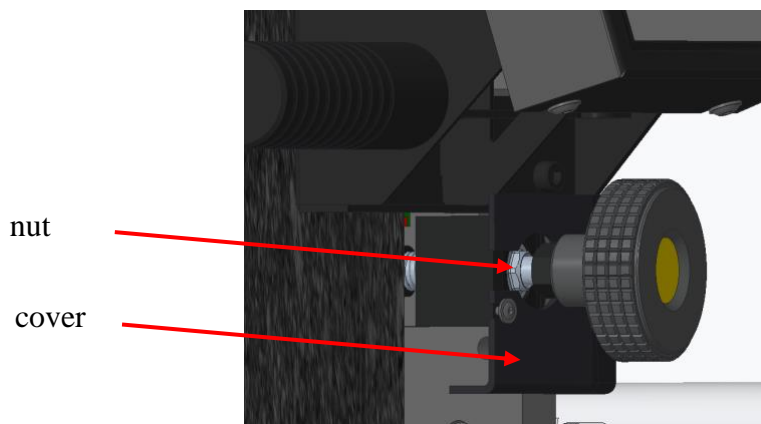
#### 12.1.4 CLEANING OF GRANITE

For proper operation of the fine axis movement knobs, periodically clean the granite using alcohol or a degreaser.

#### 12.1.5 Z AXIS FINE ADJUSTMENT SET UP

To set up the spring preload of the Z-axis fine adjustment group, remove the cover and screw (no more than 45°) the ring nut indicated in the figure (11mm key wrench).

Test the rapid and the fine movement: if the movement is working properly, reposition the cover. If the rapid movement is hard, slightly unscrew the nut; while if the fine movement towards Z + does not work (slip), screw the ring in steps of maximum 45°.



## 13. TROUBLESHOOTING

### 13.1 INTRODUCTION

This chapter is a guide to solve the most common problems that can occur while using the presetter. Each problem that can be detected is mentioned together with a series of checks that have to be carried out and the possible corrective actions that can solve them. Obviously, the following list is not complete: in case you need assistance, please contact your local distributor.

### 13.2 PROBLEMS, CAUSES AND SOLUTIONS

**PROBLEM:**      **The presetter does not turn on.**

**CAUSE:**            *The general power supply is missing.*

**SOLUTION:**      Check the connection to the external power supply circuit

Check possible external fuses and/or switches and, if they are damaged, replace them.

**CAUSE:**            *The Preset power supply is missing.*

**SOLUTION:**      Control if the power supply plug has been correctly introduced into the rear panel of the Preset (see installation par. 5.7);  
check the operation of the feeder by measuring if there is a 24Vcc voltage at the output and repeat the test when the Preset is connected. If the 24Vcc voltage is present, please contact the assistance service.

**PROBLEM:**      **Difficulty in displacing the Z-axis towards the top.**

**CAUSE:**            *The spring of the balance weight is damaged.*

**SOLUTION:**      Remove the case of the spring to be found in the top of the column, check the damage of the balance-weight spiral spring and then contact the technical assistance service to replace the component.

**CAUSE:**            *the adjustment wheel slips on the granite, when rotating the adjustment knob*

**SOLUTION:**      read page 67 par. 12.1.4 and 12.1.5

**PROBLEM:**      **The count is incorrect but supplies repetitive measurements.**

**CAUSE:**            *The linear compensation machine parameter is incorrect.*

**SOLUTION:**      Restore the standard settings (see par. 8.7.3).

**PROBLEM:**      **The count is incorrect, and the measurements are not repetitive.**

**CAUSE:**            *The vision system reticule, due to a collision, is not parallel any more to machine axes*

**SOLUTION:**      See the corresponding trouble afterwards.

**CAUSE:**            *Faulty E236+ electronic equipment or detection system.*

**SOLUTION:**      See the following trouble

**PROBLEM:**      **Axes count is not carried out.**

**CAUSE:**            *Faulty E236+ electronic equipment or detection system.*

**SOLUTION:**      If the defect relates to both axes, probably the fault is to be found in the E236+ electronic equipment; otherwise the fault is caused by the measurement system or cable. Please contact the technical assistance service to replace the component.

**CAUSE:**            *Due to power supply loss while saving the data, the content of the memory can be altered.*

**SOLUTION:**      See the solution for the following trouble

**PROBLEM:**      **Irregular behaviour during the use of the device.**

**CAUSE:**            *Due to power supply loss while saving the data, the content of the memory can be altered origins, settings).*

**SOLUTION:**      restore the standard settings (see par. 8.8).

**PROBLEM:**      **How to update the visualise software.**

**CAUSE:**            *Installation of new updated functions and/or options.*

**SOLUTION:**      For this operation, you need to have a personal computer at your disposal, which has to be connected to the USB port of the E236+ electronic equipment.

In the DOWNLOAD section of the [www.elbocontrolli.it](http://www.elbocontrolli.it) Internet address, download the software that is suitable for the update; install and perform the TD236+ program into the USB KEY attached to the preset and follow the instructions explained in par. 11.5.

**PROBLEM:**      **The self-collimation supplies different measurements in different points of the screen.**

**CAUSE:**            *Vision system calibration is not correct.*

**SOLUTION:**      Carry out a new calibration by following the instructions mentioned in paragraph 8.7.1.

**CAUSE:**            *The fixed reticule of the vision system is not parallel to Presetter axes.*

**SOLUTION:**      See the following point.

**PROBLEM:**      **The fixed reticule of the vision system is not parallel to Presetter axes and/or image focus is not in the tool maximum tangency point any more.**

**CAUSE:**            *Due to a collision, the position of the support or the optical system of the vision system has been rotated and/or displaced.*

**SOLUTION:**      check the mechanical integrity of the support and the fastening of all components in the optical system, and then contact the technical assistance service.

**PROBLEM:**      **S'Print-s label printer does not work.**

**CAUSE:**            *Printer is not powered or the connection has not been performed correctly.*

**SOLUTION:**      Verify the presence of power supply and the wiring as described in par. 5.7.3

**CAUSE:**            *Printer has lost the configuration setting.*

**SOLUTION:**      Set the configuration required from E236+ as described in par. 5.7.3

**PROBLEM:**      **Labels are not correctly spaced.**

**CAUSE:**            *Labels are not in the correct format and/or they are not equipped with the marker alignment.*

**SOLUTION:**      Use only the original labels

**CAUSE:**            *Labels are slipping or not advancing correctly because they have different thickness.*

**SOLUTION:**      Use only the original labels

**CAUSE:**            *The printer has lost paper alignment setting.*

**SOLUTION:**      Set the configuration required from E236+ as described in par. 5.7.3

**14. DISPOSAL****Information obligations to the users****DISPOSAL OF WASTE MATERIALS**
**INFORMATION FOR PROFESSIONAL USERS**  
**- VALID IN EUROPEAN COMMUNITY ONLY -**

**As per the 2012/19/EU Directives, concerning the reduction in the use of hazardous substances in electrical and electronic apparatuses, as well as the disposal of waste materials.**

The symbol of a crossed box applied on the apparatus indicates that at the end of its useful life the product must be collected separately from other waste materials.

The separate waste collection of the apparatus which has reached the end of its useful life is organized and managed by the national dealer.

The user who desires to get rid of the present apparatus must therefore contact the national dealer and follow the given instructions.

Suitable separate waste collection for then sending the cast-off apparatus for recycling, treatment and environmentally friendly disposal, contributes towards preventing any possible negative effects on the environment and on health and encourages the reuse and recycling of the materials the apparatus is made up of.

Unauthorised disposal of the product by the user will lead to payment of the administrative sanctions in force in the country where it is put on the market.





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