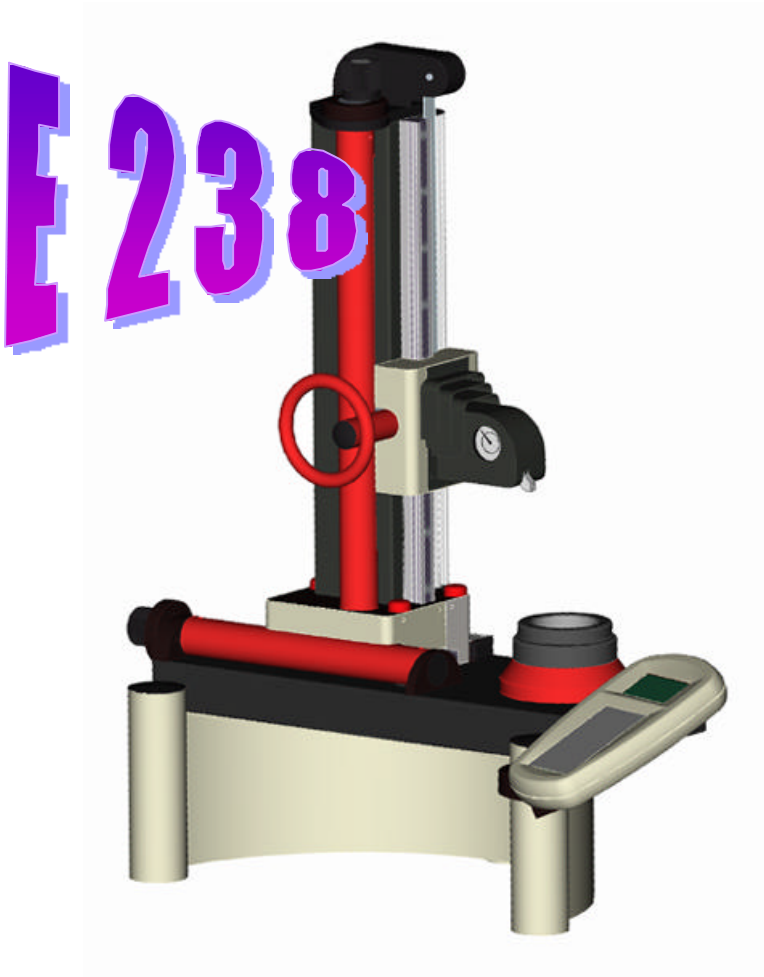

INSTALLATION, OPERATION AND MAINTENANCE MANUAL, REV. 2.0 – 04/00

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2. CERTIFICATION

The manufacture, *ELBO CONTROLLI s.r.l*., under its own responsibility

DECLARES THAT:

The E238 presetter and conforms to safety standards where enforceable.

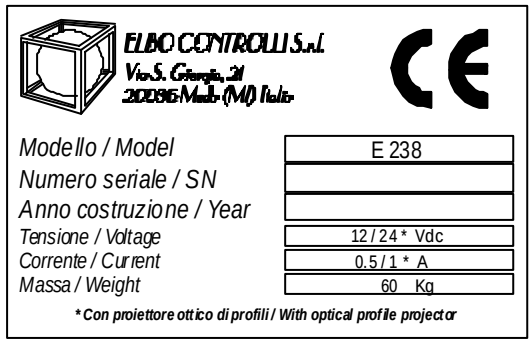
89/392/CEE and subsequent amendments 91/368/CEE, 93/44/CEE, 93/68/CEE
harmonized standards EN292-1 , EN292-2 , EN60204-1

- 89/336/CEE and subsequent amendments 93/68/CEE
  harmonized standards EN50082-2, EN61000-4-2, EN61000-4-4, ENV50140, ENV50141,
  EN55011 ISM (group 1, class A)
- 73/23/CEE and subsequent amendments 93/68/CEE
  harmonized standards EN60204-1, EN60950

as shown in the test reports enclosed to our technical brochure.

MEDA, 11/4/2000

Massimiliano Tasca
General Manager



Information relating to this presetter is listed on the rating plate stamped on the back of the machine as shown above.

3. WARNINGS

3.1 INTRODUCTION

This operation and maintenance manual, concerning the E238 Tool presetter should be considered as an integral part of the apparatus and therefore it should be kept with care for future references.
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 E238 tool presetter.
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 presetting technology of tolls measurement and presetting and at customer satisfaction.
All suggestions for improvements of the apparatus or manual are welcome either by fax or letter to our head office.

3.2 PURPOSE

The aim of the manual is to allow the E238 Tool Presetter operator to become acquainted with the machine operating directions, routine and non-routine maintenance and the proper operating procedures and to show all the required necessary actions from the presetter's introduction until disposal.
Only the instructions and drawings included are to be used as shown by *ELBO CONTROLLI S.r.l.*, any other use other than explicitly advised is expressly unadvisable because it could compromise the correct working conditions and cause accidents.
This manual does not 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, afterwards 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 identified by a title in the following typographical format:

X.X FIRST PARAGRAPH

The operation or maintenance procedures are identified by:

☑ *Procedure*

Then the characters will identify the procedures:

- step 1
- step 2

  .....
- step 4

The message shown on the LCD *function display* will appear in the following way:

Notes or instructions are identified using the following format:

☑ *Note or instruction of particular interest*

4. PRESENTATION

First we would like to take this opportunity to thank you for you purchase of Elbo Çontrolli's E238 Presetter. You will certainly have great satisfaction using the E238 *ELBO CONTROLLI* Tool presetter and you'll increase the profitability of your NC machines.
This new machine marks a very important turning point in the manufacture of small tool Presetters.
ARA and PULSAR versions have been carefully tried and tested at great length in order to give the best possible measuring accuracy combined with repeatability at a low cost. This innovation of design in the mechanical, electronic and software components has allowed us to reduce the manufacturing costs of the E238, without any loss of accuracy and reliability. It has a construction with no counter balance weight and interchangeable rotating spindle with extreme accuracy of 2µm maximum concentricity error. The base and column are made of ground granite.
Electronics were developed on FLASH® technology: versatile, powerful and organized.

It's not difficult to make a good product but what is difficult is to produce good quality at a low price.
Continuous research, deep development and our steady optimization of technology have always been winning strategies.

TECHNICAL CHARACTERISTICS: MECHANICS

- Measuring range: X axis 140 mm (ø 280 mm);
  Z axis 380 mm
- Travelling column system.
- Ground granite column base.
- Special double prism slideways.
- Double recirculating ball bearings slides.
- Axes movement: rapid and manual.
  continuous micrometric with wormscrew.
- Counterweight with constant load Archimedes spiral springs.
- Interchangeable rotating spindle on rollers cage;
- Maximum toolholder weight: about 30 kg.

TECHNICAL CHARACTERISTICS: ELECTRONICS

- ELBO CONTROLLI -PV2 digital read-out

- 21 key keyboard with alphanumeric fonts similar to a telephone keypad**.**
- Menus organized by icons to be selected by the function keys.
- Management of 99 machines origins (adapters).
- Tool management organised in tables /tool set (max 10) for a total of 500 tools **.**
  Tool storage: N° corrector, Lx, Lz, insert radius, Tool description (16 fonts).
- The memorized data are stored for 10 years, even after power failure
- Two serial ports: one for the printer and the other for the PC data exchange.
- FLASH® technology for BIOS updating from RS-232 serial port .
- Machine linearity error correction.
- 24 Vcc 5 W feeding (standard supplied power cord):
  ARA: 12 Vcc. 5 W
  PULSAR: 24Vcc. 35W
- Optoelectronic measuring systems with zero pulse
  SLIDE 375 ELBO CONTROLLI, with resolutions: X axis = 0.005 mm
  Z axis = 0.005 mm

TECHNICAL CHARACTERISTICS: PANVISION

- 5,6" 320x240 pixel resolution LCD colour monitor
- 640x480 pixel resolution C-MOS sensor image
- Framed area 6,4 mm X 4,8 mm (20X)
- Zoom hardware displayed area 3,2 mm X 2,4 mm (40X)
- 5µm measurement resolution
- Amber colour LED lighting
- Control bars focusing on X and Z axes
- Collimation with analogical scale for the right tangency 1µm. res. 80 µm breadth
- Possibility of automatic measurement at all screen
- Orientation acknowledgment of DX/SX – UP/DW tool profile
- Measurement display on screen
- Angular grid on defining position
- Circular grid

DIMENSIONS

Width: 800 mm
Height: 900 mm
Depth: 550 mm (ARA)
600 mm (PULSAR)
Weight: 55 Kg

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 E238 Mod.

☐ ARA (with single-gauge) ☐ PULSAR (Panvision)

ROTATING SPINDLE

☐ ISO 30 ☐ ISO 40 ☐ ISO 45 ☐ ISO 50

RESETTING GAUGES

☐ ISO 30 ☐ ISO 40 ☐ ISO 45 ☐ ISO 50

REDUCERS

☐ ISO ..... VDI ..... ☐ others .....…….....

PV2 DIGITAL READ-OUT

FEEDER

KIT FITTINGS AND SPARE PARTS

- Hexagonal key 3
- Fuse 1,2A rapid

Only for PULSAR version:

- Hexagonal key 4

OPERATION MANUAL

TEST REPORT

WARRANTY

DUST COVER

Checked by.....

5.2 SAFETY NORMS

The personnel involved with the Tool Presetter are not required to use any particular protection, however they must be informed of the following potential dangers:

- The Panvision screen at certain positions maybe at eye level. Caution must be taken not to bump into camera (only PULSAR version).
- Due to high voltage, only qualified personnel should remove back panel of Panvision or power supply.
- Finally, it is recommended to take care when handling the tools and protect your hands, as the tools are sharp and therefore potentially dangerous.

☑ *The person responsible for employee safety should train the people required to use the tool presetter, by imposing the reading of this manual.*

5.3 SUGGESTED USE OF THE MACHINE

The E238 Tool Presetter is an instrument to preset and measure the tools surveying their dimensions along the 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 adapters 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 then 30kg.
Any other use is to be considered improper and compromising the operator's safety.

☑ *E238 Tool Presetter is 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 machine must be transported disassembled in its special wooden case. Inside this case, there is foam padding, made of preformed polyurethane, which guarantees clamping and protection of the instrument from normal mechanical and thermal stresses.
Stated outside the packaging are the shipping instruction, particularly the specified total weight, transport position and through symbols, vulnerability to atmospheric agents and the need to handle with care.

The original packing must be used during each transport.
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 stack item son top of container
- Avoid exposure to atmospheric agents.
- Maintain the prescribed transportation position.

The storage environment must fall within the following environmental conditions:

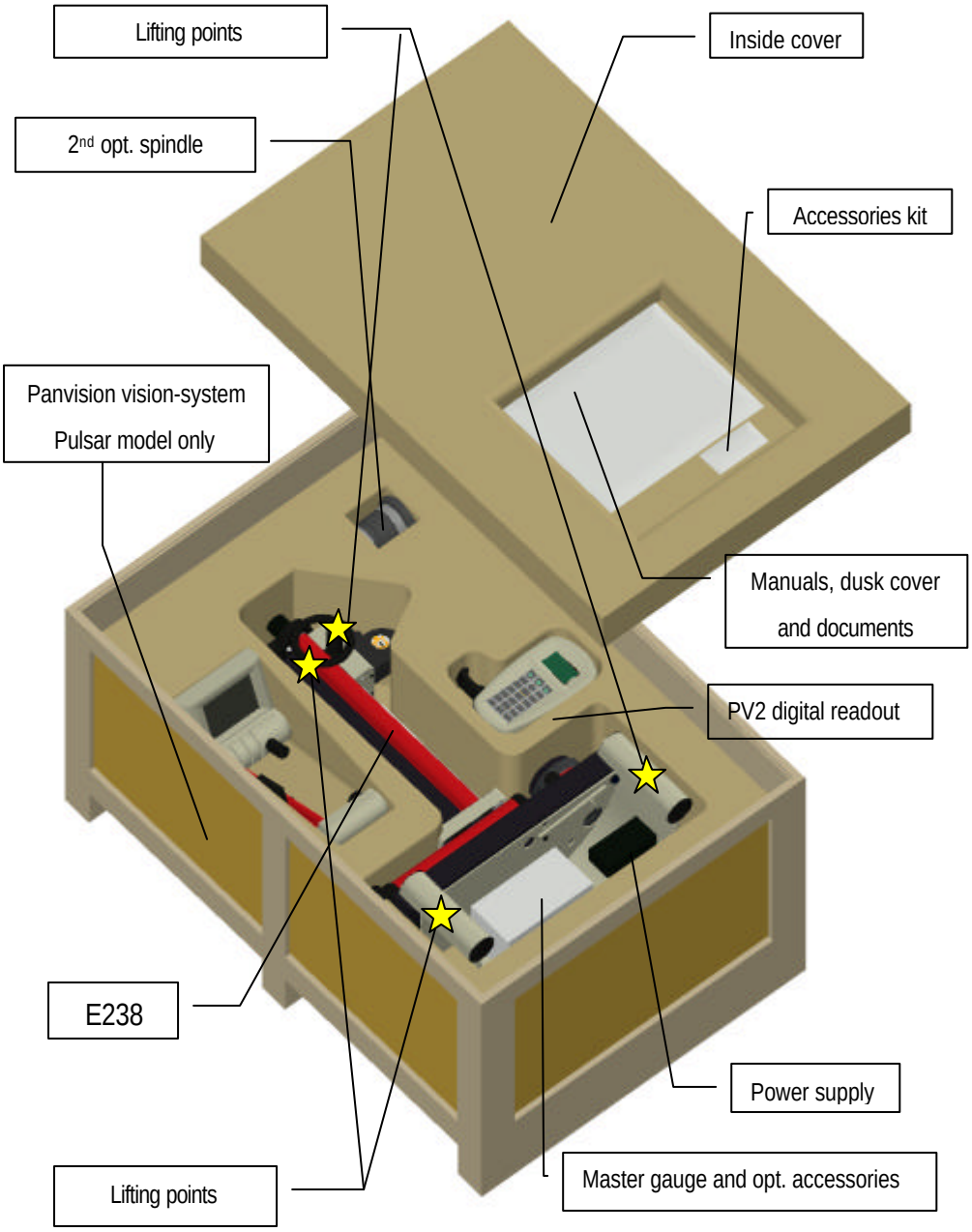
- Temperature between -10 and 50 °C.
- Relative humidity between 20% and 95% without condensation.

5.5 INSTALLATION

The following pictures show the positions of the machine and components inside the packing, and also the correct handling procedures for unpacking or packing (carried out in the opposite direction).

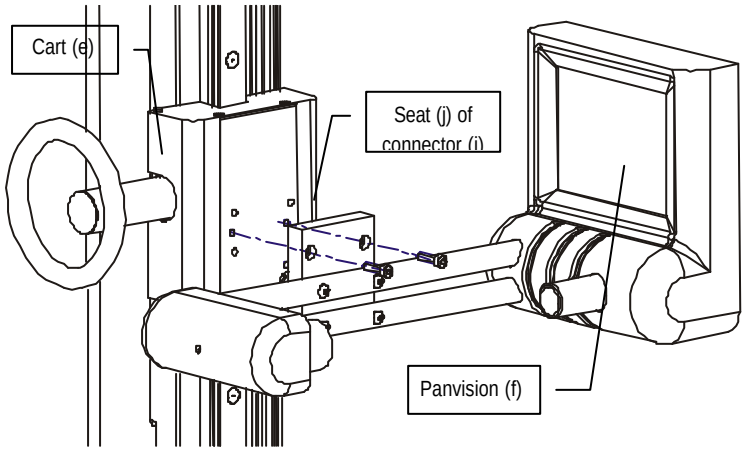
☑ *Installation Procedure*

- Remove the wooden cover by loosening the screws.
- Remove the instrument documentation and warranty information; inside the hollow of the foam cover then take off foam cover.
- Remove the fittings (if any) and the feeder from its housing.
- Pull out the instrument from its case; position it on a sufficiently sturdy platform at a suitable height for measuring. For lifting and Tool presetter movement, two people are necessary. They must grasp it in the points shown in the figure. The instrument weight, as it is placed in the packaging, is approximately 50 Kg.


Lifting points
Inside cover
2nd opt. spindle
Accessories kit
Panvision vision-system
Pulsar model only
Manuals, dusk cover
and documents
PV2 digital readout
E238
Power supply
Lifting points
Master gauge and opt. accessories

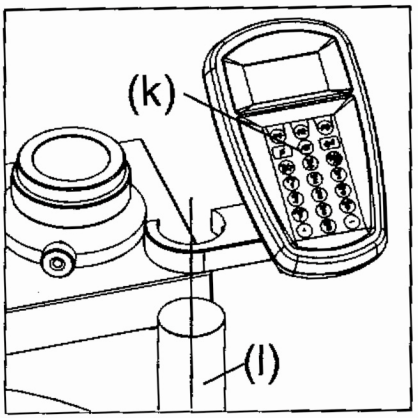
For PULSAR version, assemble the Panvision:

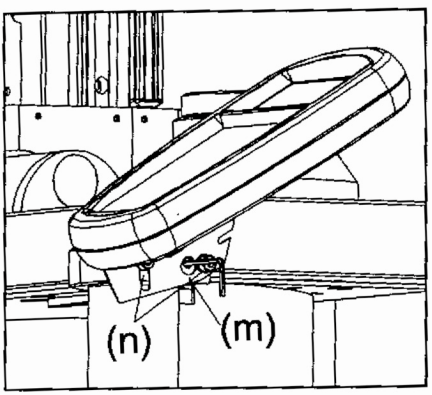
- Remove the two allen screws form the support plate
- Remove the Panvision from its container, then carefully position the Panvsion's bracket onto the support plate, this is done by seating the 4 pre-drilled holes on the Panvision support bracket on to the 4 pegs of the support plate.
- Secure the Panavision to the support plate with the two allen screws
- Connect the Panvision's data cord into the port located on the Presetters's cart.



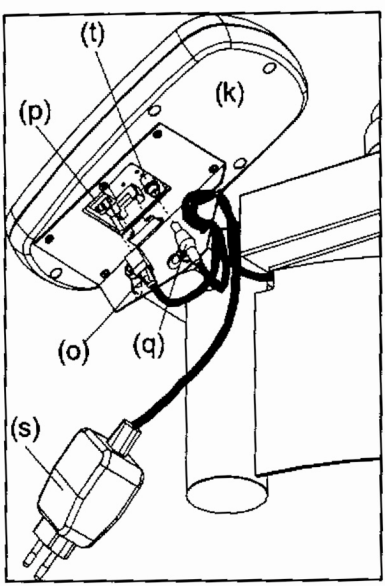
Assembly of Panvision

- Remove the P238 digital read-out (k) from the case, insert the digital read-out bracket in the right tool presetter stand tube (l).



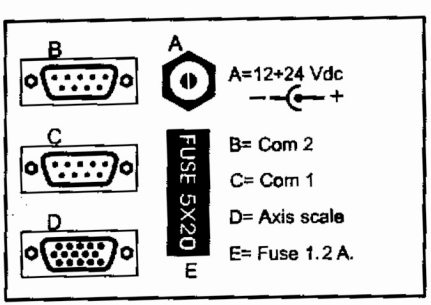


- Position the digital read-out height, rotate and incline as to make usage as comfortable as possible, fasten the grain screw (m) and the screws (n) locking the digital read-out.

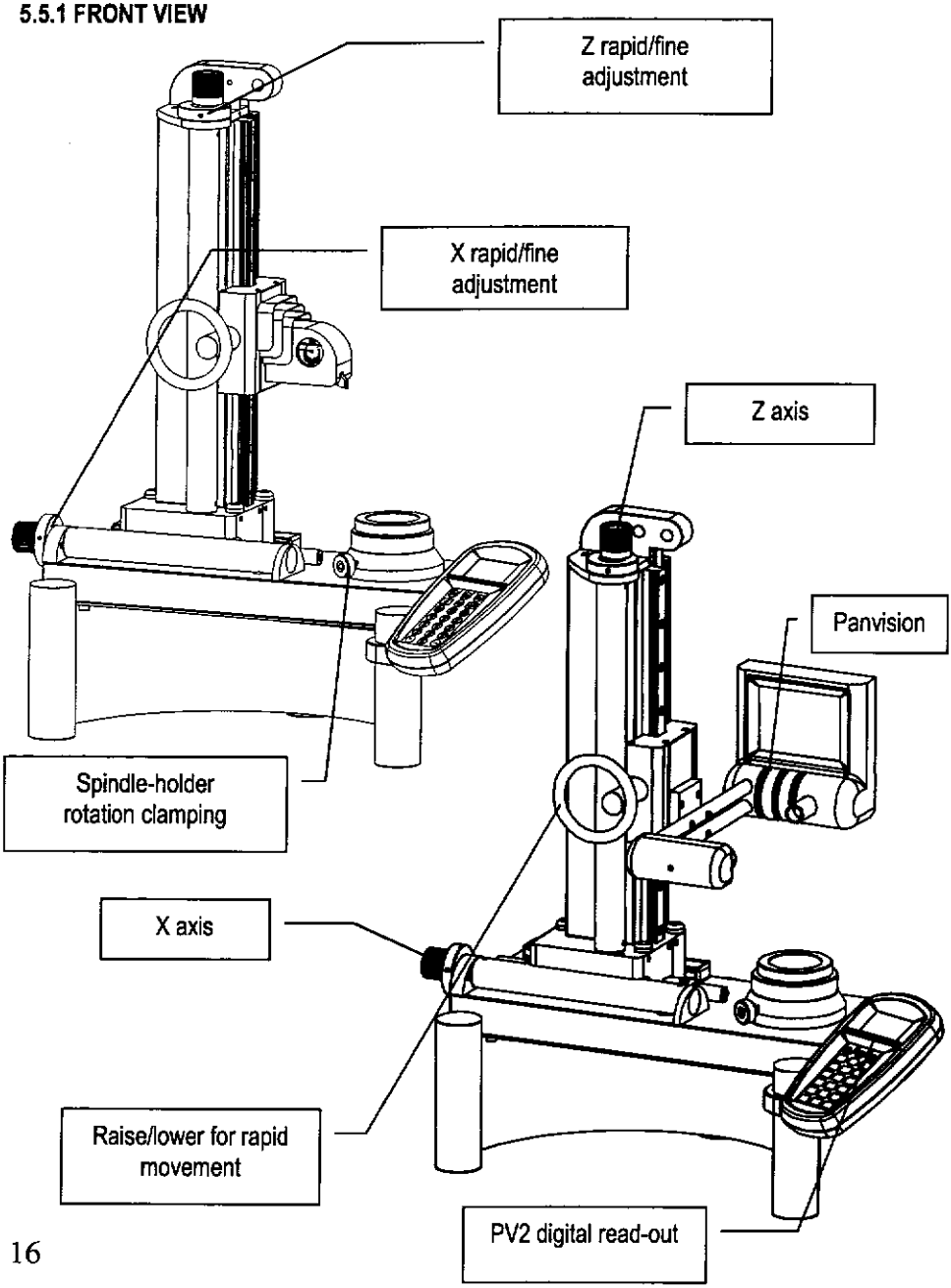


- Connect the cable (o) coming from the tool presetter to the connector (p/D) located on the back of the digital read-out. Insert the power cord (q) of the external feeder (s) to the current-tap (t) at the back of the digital read-out.
- Hook the printer cables to the digital read-out bracket as shown in the figure

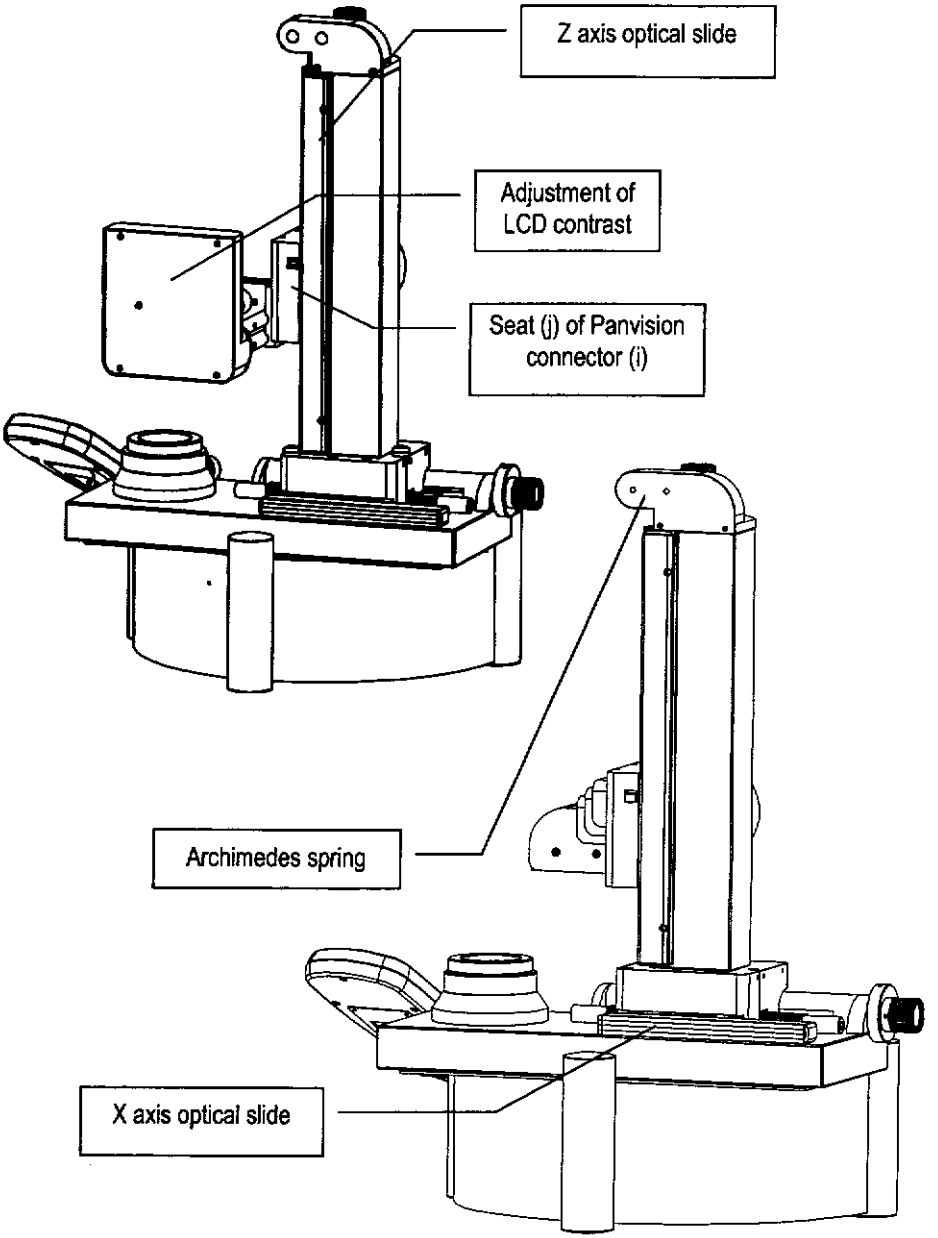
Your E238 Tool Presetter is now ready for use



5.5.1 FRONT VIEW



5.5.2 REAR VIEW



5.6 OPERATING CONDITIONS

Since this tool presetter is a precision machine, it must be located in a place that is sufficiently free of environmental interference (dust, excessive vibrations, high thermal ranges, absence of corrosive substances in the air), with adequate lighting and a working area that facilitates measurement reading operations.
Furthermore the PULSAR version needs an environment without any strong lights; the Panvision must be sheltered from the direct lighting of sunrays and far from windows and skylights; mostly in rooms with indirect artificial light.
This instrument does not generate acoustic emissions except for the bearings rolling in the guideways, which is considerably below the 70 dB A limit.
The recommended climatic conditions are as follows:

- 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 SUPPLIES

Electrical Circuit: The Presetter is fed 12/24 volt by direct current through an external feeder to be connected to the electric grid 115/230V AC, 50/60Hz, 1A.

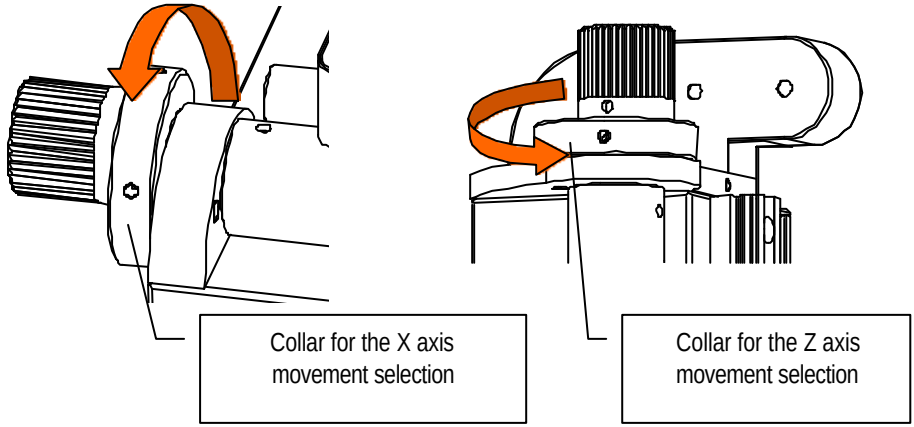
6. DESCRIPTION OF CONTROLS

6.1 AXES MOVEMENTS

Axes movements are manuals and have two operating speeds: rapid and fine adjustment. Rapid adjustment is used to quickly distance and advance the measuring components (projector and/or gauges), while fine adjustment is used for the tool profile and measurement acquisition.

6.1.1 RAPID ADJUSTMENT

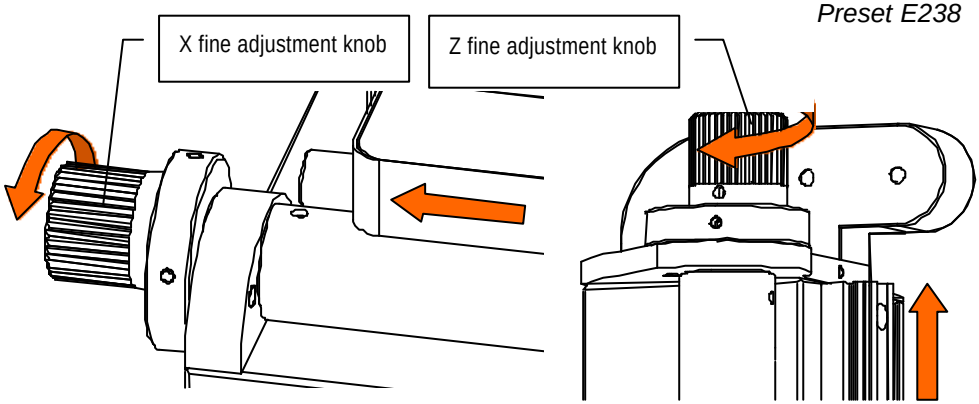
To move the machine in rapid movement mode, you must first switch from fine adjustment to rapid adjustment by rotation in the direction shown below: Then grasp the round handle on the column and move in the desired direction



It's now possible to displace the axes moving the stick in the desired direction.

6.1.2 FINE ADJUSTMENT

After approaching with rapid adjustment, you must rotate the collars in the opposite direction allowing you to only move column in fine adjustment mode.



By rotation of the outer knobs of each axis, the operator will be able to finely adjust the measurements.

6.2 THE KEYBOARD

The keyboard is a greaseproof impermeable polyester, raised key. It's organized in 7 rows of three keys each; the keys have the following functions:

These keys assume the function of the displayed icon in the lower LCD part, which depends on the selected operations context. In short, they will be called "function" keys.

“Cancellation” key for the last entered letter, for returning to the previous field or the previous menu and, in general, for the selected procedure cancellation.

Key for finding out the alternative "functions" or to change choices in certain fields.

"Enter" key is for confirmation of selected operations, and for skipping to the next field or record.

Axis selection keys to set the position.

Key to initiate the Panvision functions (PULSAR).

Numerical/alphanumerical keys for the insertion of dimensions and data inside the fields. In case of alphanumerical data, the key must be pressed in a rapid sequence several times until the desired letter is displayed (for ex. for the letter R, it will be necessary to press the 7 key three times); after about 1 second the cursor will go to the next field therefore allowing you to insert entire words

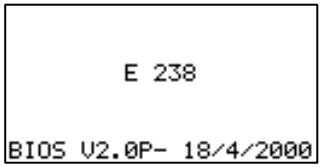
Keys to set algebraic signs and the decimal point in the numerical input

6.3 BASIC FUNCTIONS

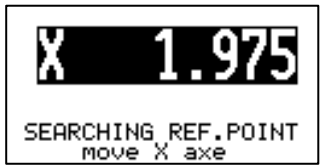
6.3.1 SWITCHING ON PRESETTER

Switch on the presetter by plugging the power cord into a suitable outlet (115-230Vac).

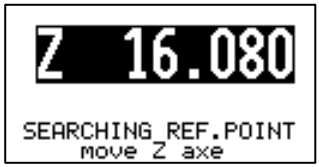
After two seconds, the time required to execute the auto diagnostics, the LCD display will show:
In this moment it's possible to read the software revision number, important for discovering anomalies or deciding about possible updates.



After two more seconds, the PV2 display will ask you to reach the reference points, first on the X-axis.



Then on the Z axis.



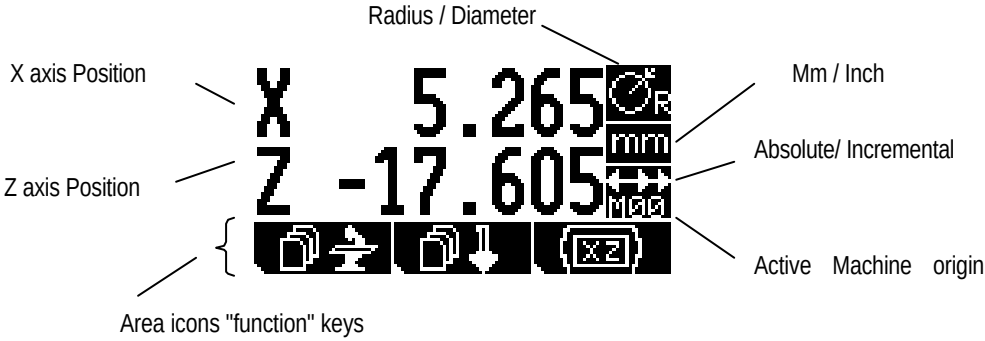
It's possible to cancel the axis reference point search, by pressing //, even in this case it will not be possible to work with the stored offsets because of origins not found.

☑ *It's also possible, if the PV2 display in stand-by mode, to switch on the presetter by pressing any key, for ex. after 30 min., of no use or after pressing the function key* OFF *which is in the menu parameters*  *. Even in this case you will be asked to reach the reference points after a more then eight hours of inactivity.*

☑ *In case of mechanical maintenance or technical servicing of the digital read-out, the zero reference point may move a few tenths! In this case, you must repeat the machine origin presetting procedure as decribed in paragraph 9.1 " NC MACHINE ORIGINS "*

6.3.2 DISPLAY MODE

Soon after having found the references, the P238 digital read-out will be in the digital read-out mode, starting the MO: E238 machine origin.
The dimension display window (see next figure) shows the X and Z axes position, if the X axis dimension is expressed in Radius or in Diameter, if the unit of measure is millimeters or inches, the active machine origin number and finally if the displayed position is an absolute dimension or a temporary incremental zero setting.



To change the digital read-out setting, press the "function" key (X2), the key icons will change as shown in the following figure:

To change the display, just press the desired setting key. For example, if you press the key inch, you'll obtain the following result:

In general pressing:

mm you'll choose to display in millimetres, and the light will show mm
inch you'll choose to display in inches, and the light will show inch
RAD you'll choose the radius display, and the light will show R
DIAM you'll choose the diameter display, and the light will show D
ABS you'll choose the machine active absolute origin, the light will show

you'll choose to set to zero the axes in the incremental mode, the light will show

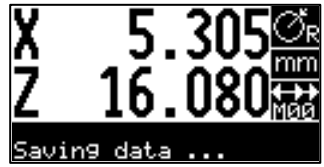
If you press the key, you'll leave the digital read-out setting mode.

In the digital read-out display mode, it is possible to set the axis position directly from the keyboard.

☑ *Procedure of setting to zero or axes resetting.*

- Press the key relative to the interested axis (For ex: X);
- Type in the desired dimension (For ex: 1 2 3 . 4);

- Press ;
- The set dimension will be recorded as absolute machine origin 0 (E238); in this way it will be reset even in the following machine switching on.

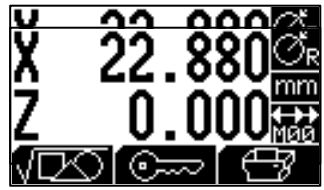


- In the X axis display will appear the number you set.

In case of error while entering the new dimension, it's possible to rectify it, by deleting a number at a time with the key or cancel the entire procedure, by pressing the key .

☑ *The dimension sign (if negative) must be entered first .*

6.3.3 QUICK LABEL PRINTING



In the display mode it's possible to print a label at the same time of a tool measure.

Press the key ALT

Press the key

Move the axes to measure the tools radius, press the key (the key background becomes black);

then measure Z and press , in the end press ; you'll get a print out such as:


```
***  my company          ***
X22.88    Z0.000    M00(R)
measured by Elbo Controlli
```

6.3.4 AXES LOCATION REMOTE READING

When the display mode is activated, that is when on the LCD it will appear the axes position, it's possible to ask again through the COM1 communication serial door, the axes location reading. The connected apparatus (PC) will have to send the character STX (Hex 02), and it will receive as a reply a string such as:

```
X  10.205 Z 123.505 M 12A R M
012345678901234567890123456789
```

where;
X axis position (characters 0-8)
Z axis position (characters 10-18)
Active Machine origin (characters 20-23)
Absolute / Incremental origin reference (character 24)
Radius / Diameter reading (character 26)
Millimeters / Inch reading (character 28)

7. MEASURING

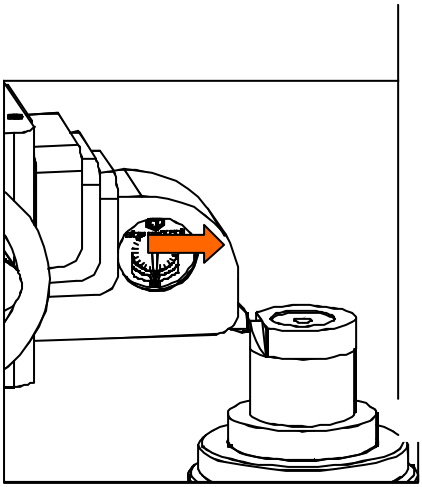
7.1 FOREWORD

The two E238 versions have different measuring systems. The E238-ARA mechanical mono-gauge for axes collimation, E238-PULSAR, has the Panvision industrial vision system.

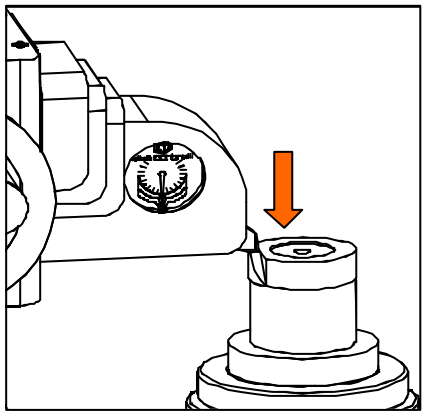
7.2 MEASURING WITH E238-ARA

Measuring with ARA, incorporates a dial gauge, this is done by bringing the dial gauges stylus to the edge of the tool. Then by fine adjustment touch the stylus to the tool until the indicator's needle is at 0 (highlighted in green)

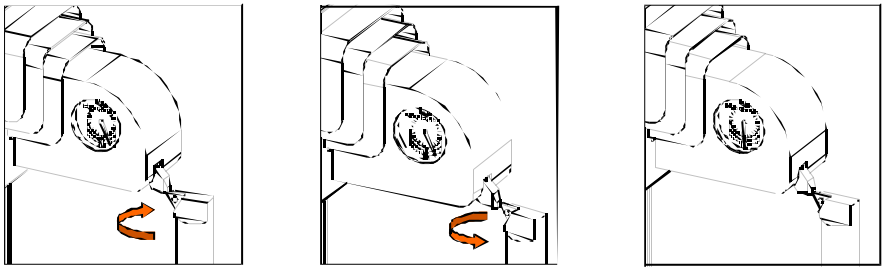
X axis measurement



Z axis measurement



While measuring the X dimension, it is important to remember to find the largest outermost dimension. This is accomplished by rotation the tool assembly in the spindle while the stylus has contact with the tool.



Search of the maximum tool tangency

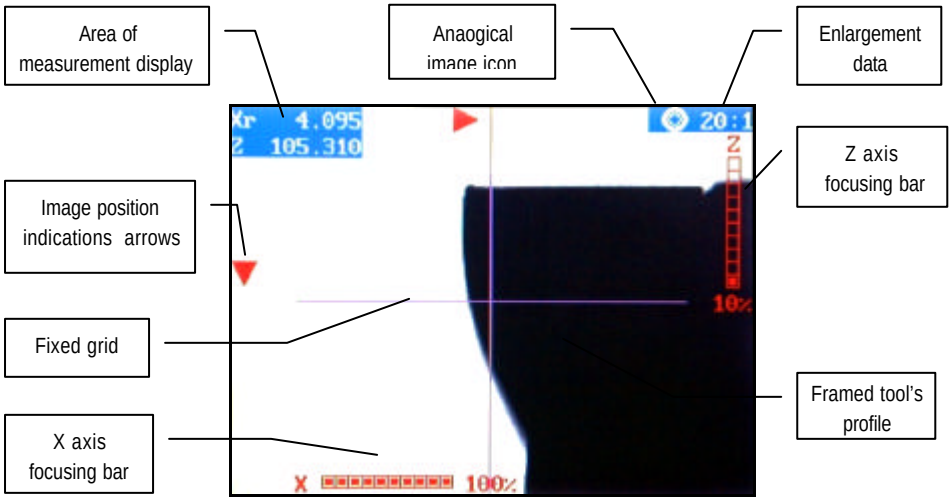
7.3 MEASURMENTS WITH E238-PULSAR

The E238 PULSAR is equipped with Panvision, the most compact and affordable system of industrial vision, which was planned exclusively for tool measurement.
The principle is the same of that one of profile optical projectors: a collimated light source throws a profile tool between the two elements on an image sensor C-MOS through a suitable purpose of restarting.
The tool profile captured by the image sensor, is displayed in real time (25 frame/sec) on a LCD colour screen of 5,6" diagonal; the total viewing area is about 6.4 mm. X 4.8 mm., Also available is the function of zoom hardware, which allows you to duplicate the enlargements on screen, displaying an area of about 3.2 mm. X 2.4 mm. (40X).
To make taking of the measurement easier, it is possible to choose the digital representation with the maximum contrast (white/black), an alternative to the taken analogical image (greys scale). Furthermore Panvision is equipped with two bars for the focusing control of image, one takes the focus of X axis measurement's point, the other one for the Z axis, helping the operator to find out easily the point of maximum tangency of tool.
Finally it is however possible to measure angles and rays through direct comparison between the tool profile and those ones of displayable grid on screen.
These characteristics allow it to overcome a traditional optical projector's performances: best contrast of the visualized image (30:1), angle of bigger view (50°), absence of error of parallax between grid and image, control bars, focusing, selectable enlargement report; but the real advantage is the removal of measurement subjectivity, typical of optics systems, which makes the measurements objective and repetitive.

.

In fact Panvision is able to analyse the tool and find out the measurement points on the tool profile with a 1 um resolution. The operator can decide to measure on the central fixed grid with the visualized analogical comparators on screen, automatically obtaining a measurement, in real time from the sum between the coordinates of central grid and the relative position of the image.

In both cases the measurement are continuously shown on screen, in order to have all the necessary information in the same location.



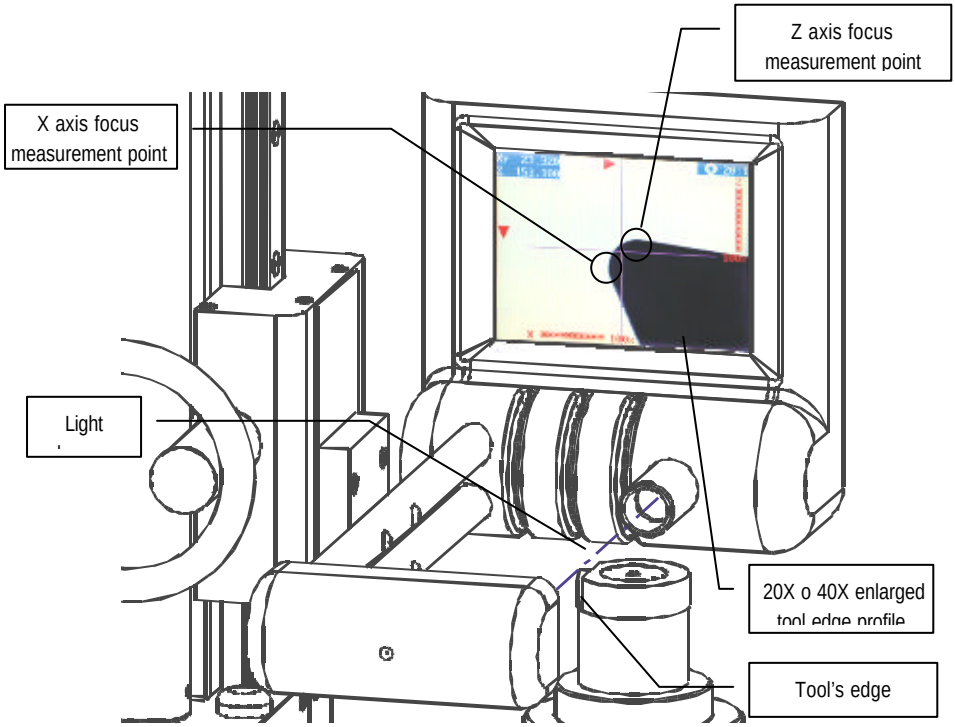
7.3.1 FOCUSING OF IMAGE

With Panvision the measurements are taken like those with an optical profile projector; it is necessary to frame the tool's profile on the screen, bringing it inside the light beam through the rapid and fine adjustments.

Before doing this operation it is necessary to rotate the spindle to be sure that the tool's orientation is that of maximum value of measure, and in this case, even the point with the best focusing of image.

On the screen two control bars are always visible for the image focusing (one per axis) expressed in percentage from 0% to 100%; it is enough to rotate an edge to obtain the highest possible percentage on the bar of the interested axis, to obtain the best focusing.

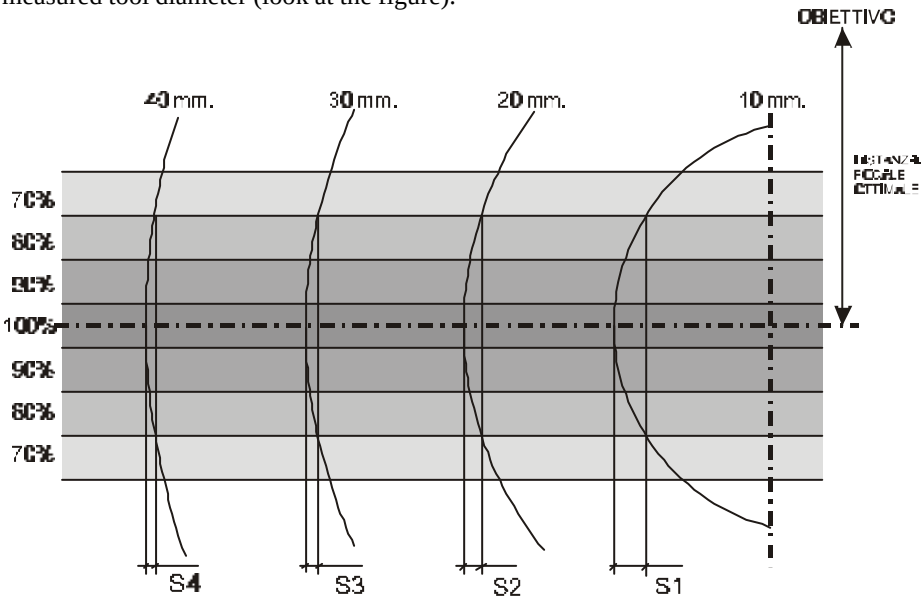
☑ *The dimension that the Panvision takes as reference are those ones concerning X and Z measurement points. Look at the following picture.*



The area that Panvision takes as reference for the focusing are those ones referring to the two measurement points X and Z. Look at the following figure.

The maximum percentage of focus is 100% of the image on the screens viewable area. This is a circular area of about 5mm at the center of the screen
There will be some cases where it won't be possible to reach the maximum of 100% (for example with worn out edges or without any angle of rake): you must reach the highest possible value, in order to guarantee the same precision of measurement.
Achieving the maximum obtainable value of focus, even if it is less then 100% you can still achieve the maximum theoretical measurement error of about .001mm
Don't forget that the point where we have to measure is that one relative to the maximum tangency of tool, and that the focusing is necessary only to facilitate the

research; in fact the maximum tangency will be always in correspondence with the maximum value of focusing. Therefore using a value of focusing different from the maximum obtainable, an imprecision will be done during the measurement.
In particular you can observe that if with a maximum obtainable value of 100% the measurements are done at 80%, you create a “S” imprecision, which is a function of measured tool diameter (look at the figure).



On the basis of these considerations we repeat the necessity to always reach the best obtainable focus, eventually finding the maximum tangency on the fixed grid as described previously in the paragraph 7.3.5.

7.3.2 MENU OF PANVISION SETTINGS

Access the functions of Panvision settings by pressing the button ; the menu is structured on two levels and it is possible to pass from one to the other and vice versa by pressing the same button.
The menu of the Panvision settings has a higher priority than do the other functions of PV2 digital read-out; in fact, the Panvision settings can be changed at any time, the measurements will remain frozen until the change has been saved.

So by pressing , this icon will appear:

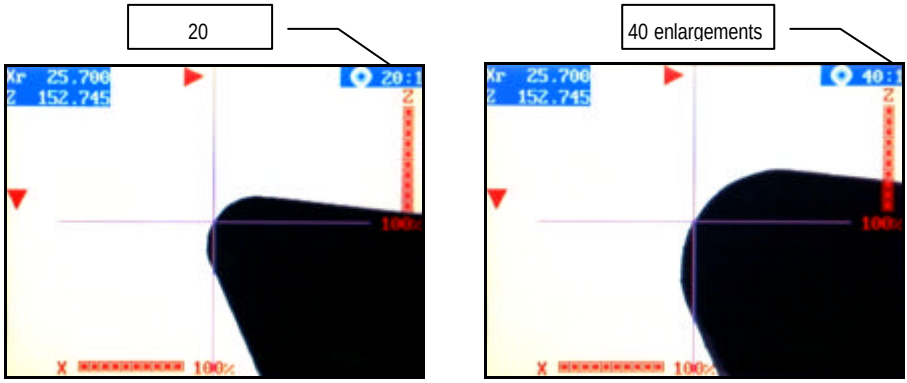
To visualize the second level of setting out press again 

At the end press  , to come back to the functions of digital read-out.

☑ *The menu of Panvision settings freezes the digital read-out's working, including the measurement, therefore there is a timer, which after 10 seconds, the functions of the digital readout will reappear.*

7.3.3 SETTING OF ENLARGEMENT'S RATIO

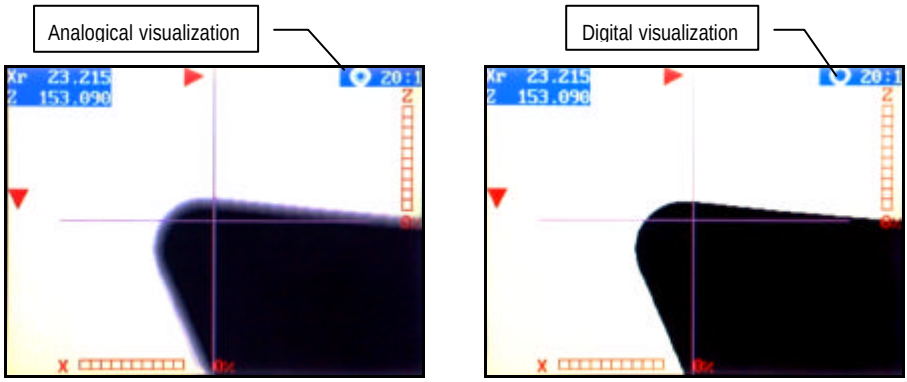
This characteristic allows you to modify the enlargement's ratio of image on screen, in order to facilitate the collimation/inspection of smaller tools.
To change the image's size, access the Panvision menu, press the button  , then press the button  . At every pressure the system will commute the enlargement's report, underlining in the right upper side on screen the factor of active enlargement.



The same checked tool with 20 and 40 enlargements

7.3.4 SETTING OF ANALOGICAL/DIGITAL VISUALIZATION

The Panvision allows us to change the visualization of the image on screen from analog (scale of greys) to digital (white and black).
It is particularly useful during the operation of manual collimation of points, for example in the geometric calculations, for a better perception of image's edge.
To change the mode of visualization access the Panvision menu, press twice on the button  ; then press the button  . with every pressing of the button the visualization changes from analog to digital and vice versa, underlining in the right upper side on the screen the active modality.



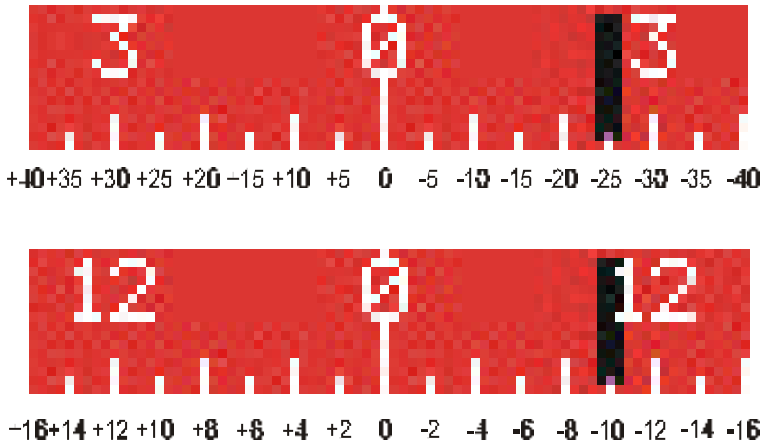
The same tool, out of focus to underline the difference, displayed on screen in the two different modes.

☑ *The modes of visualization on screen doesn't influence in any way the tool's measurement by Panvision, neither in fixed grid not in autocollimation mode.*

7.3.5 MEASUREMENT ON FIXED GRID

Panvision offers two possibilities of measurement: on fixed grid or with autocollimation.
The measurements on fixed grid use the same techniques of an optical projector of profiles: you have to shift with fine movement the axes of machine till to bring the tool's profile in tangency with the central grid of screen.

The measurement with a profile projector is influenced by the capacity of operator to distinguish the best focusing of image and its tangency with a serigraphic line (which covers the image) on the projection screw; it means that it is a subjective measurement. The same operation with Panvision allows everyone to get the same result, since the image's profile is analysed electronically, and the measure is underlined on the scale of an analog comparator, visualized on screen. The analog scale allows taking the measurement as if you were using a traditional mechanical hand comparator; it appears when the image is in proximity of central grid and has a resolution of 1 µm and an excursion of 80 µm: ± 40 µm in relation with the central grid.



X axis analog comparator

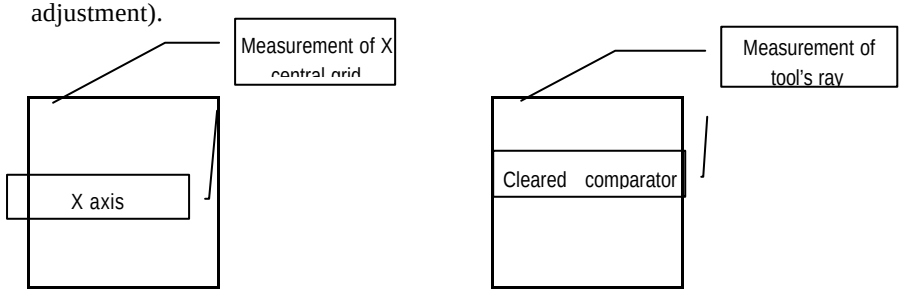
The other advantage is the possibility of quickly measuring the tool without any imprecision (par.7.3.1).

To define the measurement mode access the Panvision menu, by pressing the button  , then press the button  . At every pressing of the button you will change the measurement from fixed grid to autocollimation and vice versa.

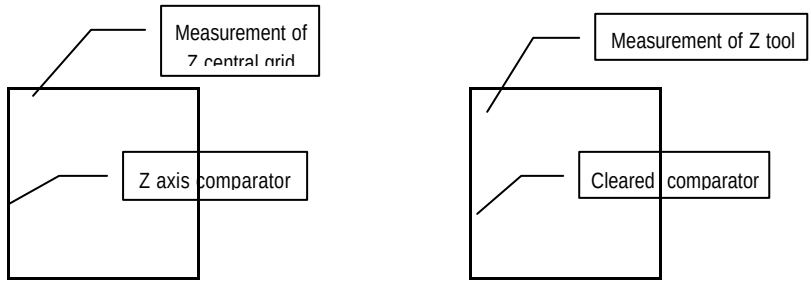
☑ *Procedure of collimation on fixed grid*

- Set the tool on screen (rapid movement)
- Check that the tool's edge is without any dust, any debris or any other impurity, which could modify the result of measure.
- Focus the image, on the axis, which is intended to be the measured, by rotating the spindle.

- Bring the image in proximity of the grid, making the analog comparator appear.
- Research the point's maximum tangency by rotating the spindle and observing the analog comparator.
- Collimate the image with the grid, clearing the analogical comparator (fine adjustment).



X axis collimation



Z axis collimation

☑ *In function of parameter (Panvision color) par.8 x, the tool's profile changes colour in collimation with analogical comparator if the focusing reaches 100%.*

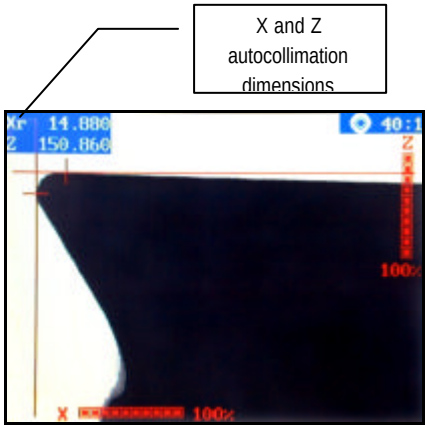
7.3.6 AUTOCOLLIMATION

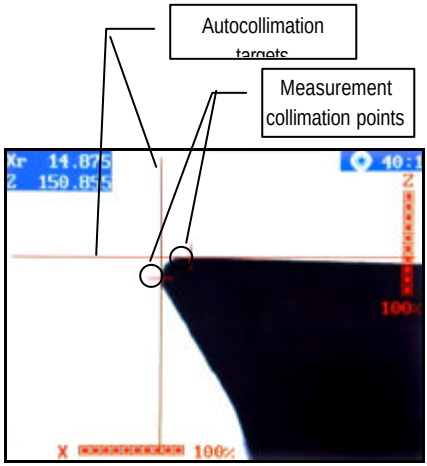
With autocollimation it is not necessary to bring the image in collimation in a fixed point of screen; in fact it is enough to set the tool in the visual area of screen so that Panvision can measure it.

This way the measurement is the result of algebraic sum between the relative position of image on screen and the position of central grid: observing the pictures of previous paragraph, for example that one referring to the collimation of X axis, we can note that the tool's measurement was already obtainable without clearing the comparator. In fact it was enough to sum up the measurement of central grid with that one of analog comparator (-0,025), to get the tool's final measure 14,880 as found out at the end of collimation.

In reality the movement of the analog comparator is not limited to 80um, but covers all the visual area, about 6,4 mm x 4,8 mm, allowing Panvision to do the algebraic sum and to visualize its result on screen in real time.

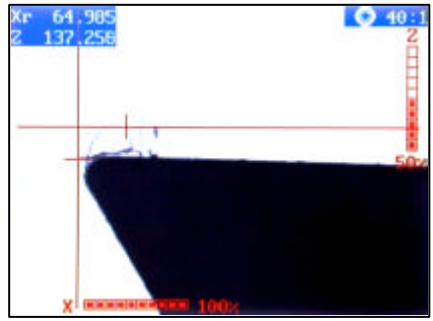
Of course to be able to measure on all the visual area doesn't exclude the necessity to focus the image and research the maximum tangency to obtain correct measurements.





Autocollimation in different points of the screen

We can observe the images of the measurement of the same tool, we had used for the measurement on fixed grid: you can note the presence of little differences in the dimensions, which have been relieved automatically in the different points of screen. That is due to the resolution of the Presetting machine (0,005 mm), which gives the absolute reference of grid center, to which the rounding of Panvision showing the measure must be added (the vision's system has a resolution of 0,001mm), establishing an uncertainty margin of 7-8um. To that you must add the errors, due to the lenses' work of objective and light, and also the geometrical errors of the same Presetter inside the visual field. Therefore it is reasonable to expect a measurement's precision decay in the range of hundredths of millimeter.
This is the limit of measurements with autocollimation, which, if on one hand allows more speed and simplicity of measure, on the hand introduces more margin of uncertainty than the same measure, which has been taken on fixed grid. You must take into account the type of measured tool and the demanded precision of the operation.



☑ *Procedure of collimation with autocollimation*

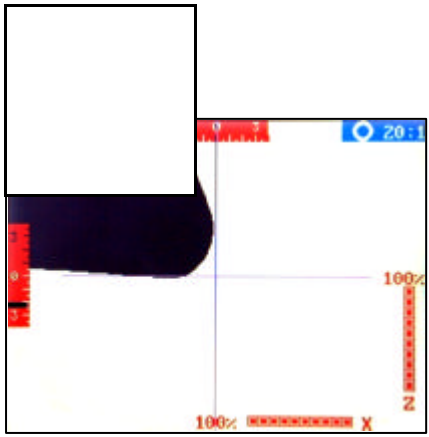
- Set the tool in the screen (rapid movement)
- Make sure the tool's edge is without any dust, shavings, or any other impurity, which could modify the result of measurement.
- Focus the image on the axis of measurement and always rotate the spindle, check numerically that the measurement you have taken expresses the maximum tangency of tool. Always clean the tool.

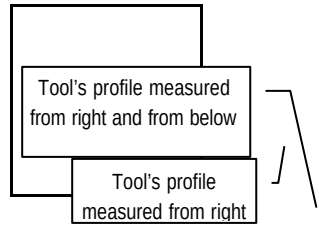
☑ *When "NO OBJECT" appears, it means that it is not possible do measurements with autocollimation (ex.:because nothing is set) and the visualized dimensions indicate the position of machine axes.*

☑ *While working with autocollimation, the digital read-out PV2 displays the same dimensions of Panvision and not the axes' movement; this condition is pointed out by blinking asteriskes next to the dimensions.*

7.3.7 PARTICULAR CASES OF COLLIMATION

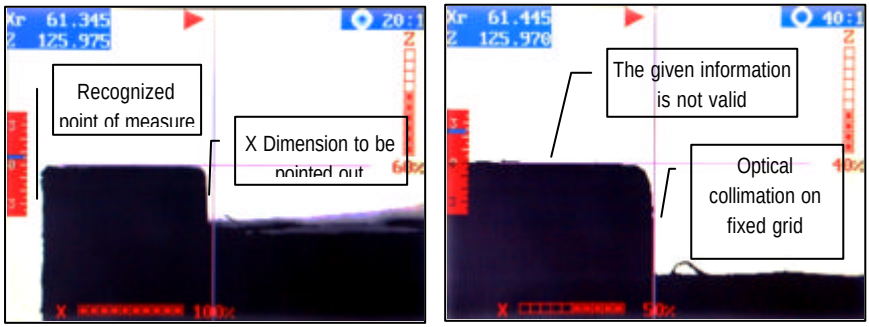
Panvision is able to recognize automatically the orientation of the tool and to measure it from left to right for X axis and from above or from below for Z axis.
The operator has to do nothing: once the tool is set, the system analyses the image and sets up the suitable sense of collimation.
The priority is given to measurements from left for X axis and from the top for Z axis: it means that with two valid measurements for X axis, only the left one will be considered.





Of course it is always possible to choose between autocollimation or collimation on fixed grid: in both cases Panvision recognizes automatically the side of tool to be measured.

Furthermore by observing the position of the focusing bars it is possible to recognize the sense of active collimation, in fact these ones shift in accordance with the suitable sense of measure. Although Panvision is able to recognize and measure the tool's profile in any way it is directed, there are particular cases, in which the interested measurement cannot be done automatically or with the help of comparators. This happens when the point to be measured, (see photo below), is inside in comparison to the tool's profile.



In these cases the measurement must be done manually using the instrument like a profiles' projector. So we advise you to enlarge the detail setting to 40X, focus it observing the measurement's point in analog (the indication of the focusing bar is not correct since it is referring to the recognized measurement's point); so set to the digital visualization, find the maximum tangency and collimate optically the point of measurement with the fixed grid.

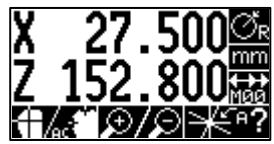
7.3.7 CHECKING OF ANGLES WITH PANVISION

Together with the fixed grid it is possible to measure angular profiles on the screen. Making the axes of this grid collimate with the tool's profile, it is possible to read on the goniometer, the inclination of a straight line (for ex. angles of rake, etc.).

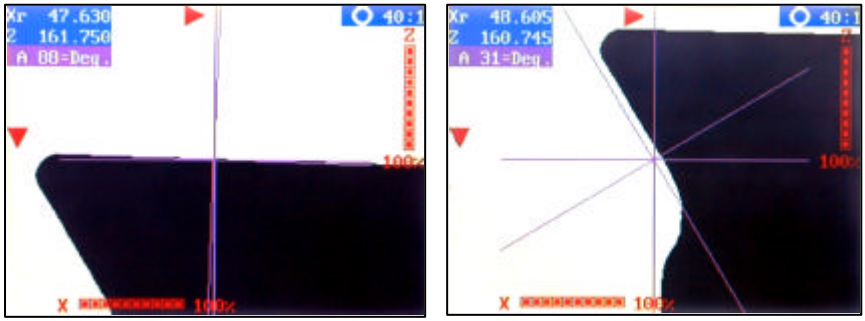
To visualize or rotate the angular grid, recall the Panvision menu pressing :

Push , to visualize the icons of angle setting;

Pushing the buttons and , it is possible to rotate the grid clockwise or counter clockwise one degree every time.



For a continuous rotation keep the button pushed for a few seconds.
Push the button △? to directly set the desired angle. To remove the angular grid from screen it is necessary to enter zero degrees.

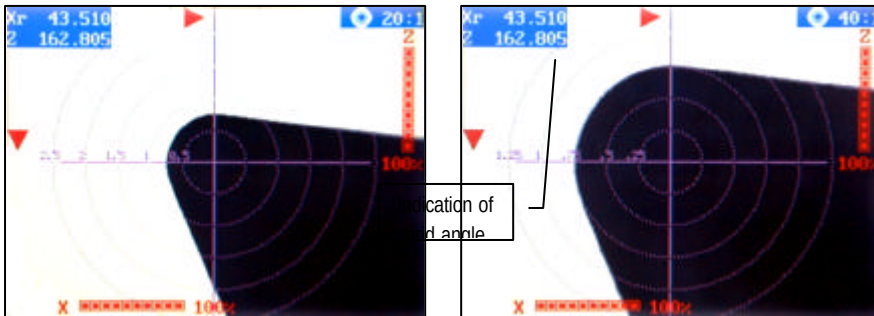


Display of angular grid for optical check of tools

7.3.8 RADIUS CHECKING WITH PANVISION

In the same way as with the angular grid it is possible to display the circular grid on screen; making the tool's profile coincide with the circumference's arc, which are on the grid, it is possible to take its radius (for ex. the radius of an insert, etc.).

To display the circular grid on screen, recall the Panvision menu pressing twice  , then the button ◎; at every pressure the visualization of circular grid will be started or defused.
Of course the grid's scale, which is shown in mm, is updated in function of auto enlargement modes.



Optical check of radius with circular grid

8. MACHINE PARAMETERS

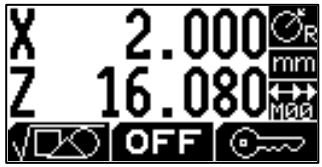
8.1 FOREWORD

Machine parameters are the particular data which allow the Tool Presetter electronics to suit all conditions of use, modifying the dialogue language, the projector timer, the RS-232 serial output configuration, and the possible instrument measure compensation and for PULSAR version, the Panvision configuration.
All that data is stored in the tool presetter memory exactly like the tool data.

☑ *The data is memorized in storage like FLASH, where they last even after 10 consecutive years of inactivity.*

To have access to the parameters from the main screen, press the key ALT that allows you to reach the alternative functions marked by the key.

Press the button  .



A password is now requested as to protect the following pages from unwanted modifications.
Enter the default "elbo" password pressing in rapid sequence:

2 times the key 3, wait for the cursor to shift;

3 times the key 5, pause;

2 times the key 2, pause;

3 times the key 6;

press  .

8.2 PARAMETERS PAGE 1/4

If you enter the right password you can access the first parameters page. The flashing cursor places itself on the language setting, which is used for text messages.

To modify the setting, press  it is possible to choose among Italian, English, French, German, Spanish, Portuguese, Dutch, Danish, Swedish; press  to confirm.

The second setting concerns the logo (text of 16 characters) which is displayed in the print headings (essentially the Company or department name).

Enter the alphanumeric text following the instructions given in the previous paragraph, using the keys   , to move the cursor to the left or to the right, the key  to cancel unwanted characters, and at the end confirm by pressing  .

The next part relates to the combination of colors used on screen of Panvision to visualize image and information on screen.

Setting this parameter you can also choose if and for which axis change the color of image (from red to green) to indicate the proper measurement of radius/diameter and length (100% focusing and approach to grid).

Refer to the following schedule to choose the suitable configuration:

	Background	Image	Image OK X axis	Image OK Z axis	Dimensions Icons	Bars M.F., Comparator	Angular fixed grid	Circular grid
0	WHITE	RED	GREEN	GREEN	BLUE	BLUE	BLUE	MAGENTA
1	WHITE	BLACK	BLACK	BLACK	BLUE	RED	MAGENTA	MAGENTA
2	BLACK	MAGENTA	MAGENTA	MAGENTA	GREEN	GREEN	GREEN	CYAN
3	BLACK	RED	GREEN	GREEN	CYAN	CYAN	CYAN	MAGENTA
4	WHITE	RED	GREEN	RED	BLUE	BLUE	BLUE	MAGENTA
5	WHITE	BLACK	BLACK	BLACK	BLUE	RED	MAGENTA	MAGENTA
6	BLACK	MAGENTA	MAGENTA	MAGENTA	GREEN	GREEN	GREEN	CYAN
7	BLACK	RED	GREEN	RED	CYAN	CYAN	CYAN	MAGENTA
8	WHITE	RED	RED	GREEN	BLUE	BLUE	BLUE	MAGENTA
9	WHITE	BLACK	BLACK	BLACK	BLUE	RED	MAGENTA	MAGENTA
10	BLACK	MAGENTA	MAGENTA	MAGENTA	GREEN	GREEN	GREEN	CYAN
11	BLACK	RED	RED	GREEN	CYAN	CYAN	CYAN	MAGENTA
12	WHITE	RED	RED	RED	BLUE	BLUE	BLUE	MAGENTA
13	WHITE	BLACK	BLACK	BLACK	BLUE	RED	MAGENTA	MAGENTA
14	BLACK	MAGENTA	MAGENTA	MAGENTA	GREEN	GREEN	GREEN	CYAN

15	BLACK	RED	RED	RED	CYAN	CYAN	CYAN	MAGENTA

The configurations of basic color are four, divided into four groups, which are different according to images change of color; for 0-3 the image changes color to indicate that there are conditions of valid measurements for X axis or for Z axis; for the configurations 4 -7 change of color only for X axis; configurations
8-11, change of color only for Z axis, and configurations 12-15 no color change.
The setting of this parameter has no value for the owners of ARA model, which has no Panvision vision system. Insert the wanted color configuration (0-15) and confirm with  .

The last part of this page is the password for the configuration access. Enter the new password of a maximum of 8 characters; be sure to cancel all the characters of the password one and to write it (the new password) down in a safe place!

To move the cursor to the next part without modifying the settings, press only  , to move to the next page always press  , to exit at any moment from the parameters setting storing the modifications, press  .

☑ *Make sure not to forget the password, because you will then need to cancel all of the tool presetter storage to enter into the menus where the password is necessary.*

8.3 PARAMETERS PAGE 2/4

The second parameters page concerns the RS-232. serial output configuration. They are all fields with specific choices, therefore, to change the setting press the key  when it shows the desired value, confirm you choice pressing  .

The first two parts concern the communication speed, the COM1 in/out port can be set with a speed from 300 to 19200, the COM2, only for output, with a speed from 300 to 9600 BPS.
The next part is used for setting the serial port where the labels are sent to print, that is where the presetter is connected to label printer. The last part instead shows where the printer is connected or the software to send the printout data.

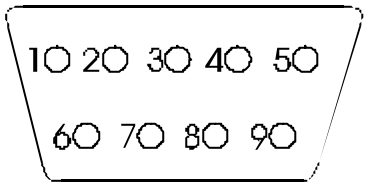
In case of connection to a personal computer, we advise you to use the COM1 port, leaving the COM2 for the printer.

The communication parameters of the two serial doors are:

- 300, 600, 1200, 2400, 4800, 9600, 19200 (only COM1) BPS
- 8 data bit
- 1 o 2 stop bit
- no parity
- no handshake

The connections are with a standard D-type connectors, 9 male poles, having the following configuration:

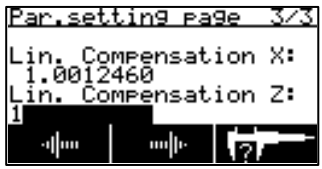
- pin 5: common 0 V
- pin 3: Rx
- pin 2: Tx



8.4 PARAMETERS PAGE 3/4

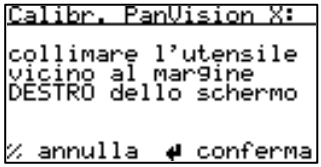
The third parameters page is for the machine measuring compensation.
Further, the use at temperatures considerably different by 20°C, or as a consequence of accidental bumps, it may be necessary modify the measurements taken from the tool presetter as to return them to the correct dimensions.
To do this it's necessary to modify the two compensation parameters for X and Z axis which, acting as a multiplier of the effected measure, rectify the discovered error.
The multiplier dimension can be reckoned and introduced from the keyboard, but it's more useful to find it out from the machine by pressing the key [▬].

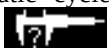
The digital read-out windows will appear: collimate tool with a known measurement or a gauge block and enter the correct dimension. In the example to the right we have hypothesized a reading of 100.025 mm. for the X axis, instead of the real movement of 100 mm. Pressing [↵], PV2 recognize the compensation parameter and stores it.
The maximum allowed correction is +/- 1%.
To cancel the compensation enter the dimension

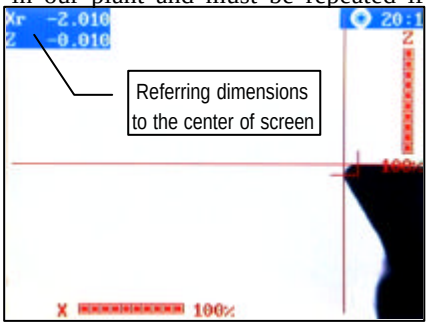


"1".

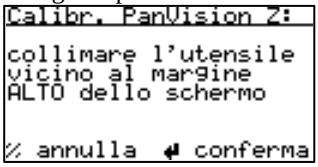
8.5 PARAMETERS PAGE 4/4



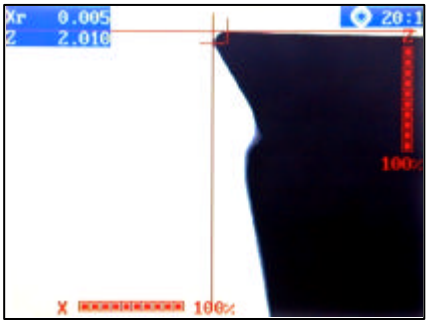
The last page of parameters is dedicated to the compensation of measurements taken by Panvision with autocollimation.
These parameters fit the real optical enlargement of Panvision to the movement of the machine. In fact every vision system has some characteristically unique values, determined by the lenses' working, by the mechanical tolerances of objective and of supports, which must be correlated with the movement's measurement to give origin to the right manual measurements.
This operation of calibration is already done in our plant and must be repeated if Panvision is replaced, or simply to increase the precision inside a narrow field of measure, rather than at full screen.
Even in this case it is possible to calculate and insert manually the values, but it is more convenient to do the automatic cycle of calibration, pressing the button 
The PV2 digital read-out starts the autocollimation and asks to collimate any tool in four points of the screen:



To set the tool, it is better if the type of tool used is of the highest precision. Focus it on the X axis; move the axes bringing the image to center, relative to the Z axis and in proximity with the right margin which you want to calibrate the X axis, press  ; move the image in proximity of the left margin and confirm with  ;



Do the same operation for the Z axis, bringing the image in central position for the X axis and focusing the Z axis; collimate the tool first in upper side and then at the bottom as demanded by PV2.



Incorrect points can be cancelled pressing  .

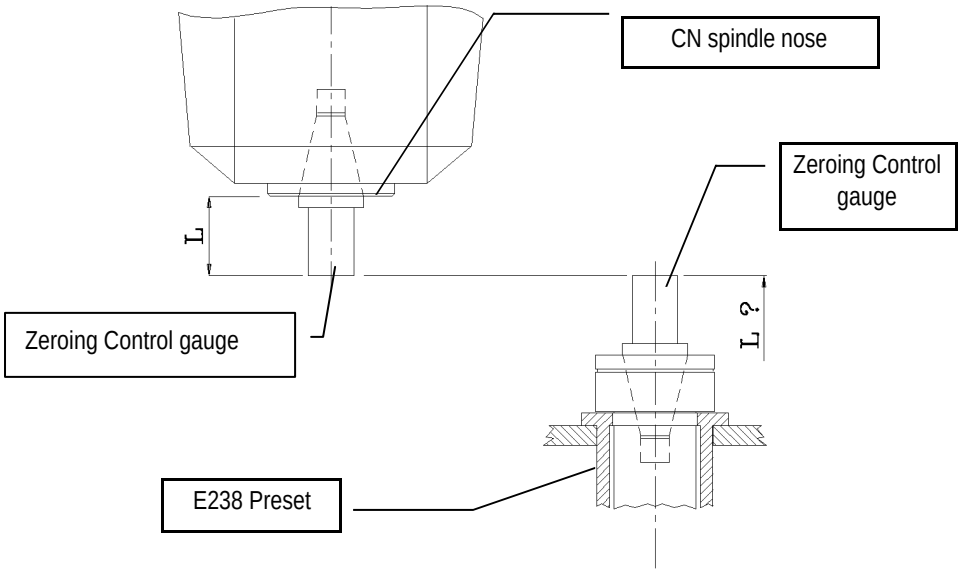
At the end of calibration the calculated values will be inserted in the corresponding fields.

The maximum allowed correction is of +/- 10% in comparison with the nominal enlargements. Confirm the two calculated values pressing  ; all the proceedings for the parameter modifications will stop and the writing Saving data ... will appear, meaning that the new dimensions have been recorded in the FLASH storage and will be active even the next time the machine is switched on.

9. MACHINE ORIGINS

9.1 NC MACHINE ORIGINS

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

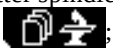


This process has been included in the tool presetter functions which is able to self-learn the origin for each machine.
It is possible to specify for each machine either as radius or as diameter, the unit of measure and also the counting direction or the exchange of the single axes (settings which are particularly useful for measuring lathe tools).

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.
You can store up to 99 NC machine origins and can be associated with a name or the machine description of 16 alphanumeric characters.

☑ *Procedure to preset the NC machine origins*

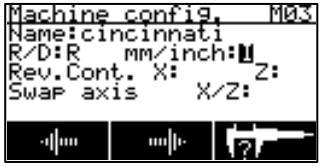
To define a new machine origin proceed as follows:

- Insert a master gauge, previously measured on the NC machine, in the tool presetter spindle.
- Press  ;
- In case they haven't been yet reached, PV2 starts with the research of reference points of axes, otherwise the list of already defined machines appears.

- Select with the keys  and  the writing "add new machine"; the machine number is automatically given and it will be the first one available from the 99 allowed; press  ;

- Type in the name of the machine desired then press  ;
- To have access to the functions of inserting or modifying of machine origins the password is demanded; enter "elbo", press  ;
- The cursor moves to the R/D field, select with the key  to set the X axis dimension measurement mode: R= radius, D= diameter. Press  ;

- The cursor moves to the mm/inch field, select with the  key to set the machine unit of measurement to M= millimeters, I= inches. Press  ;

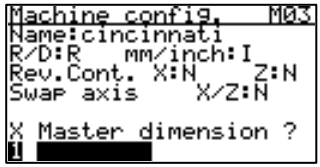


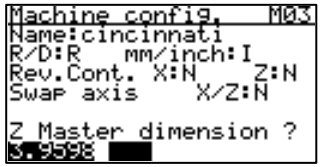
- The cursor moves to the Rev cont X field, press

ALT if you'd like to reverse X axis counting, then press ⏎. Do the same with Z axis. These settings are useful for the measurement of special or lathe tools: N= normal counting direction, Y= reverse counting. Press ⏎;

- With the last setting is possible to swap the tool presetter axes, selecting Y with the key ALT, the vertical axis become X and the horizontal become Z. This is always useful in case of lathe tools.

- After having set the machine configuration it is necessary to measure the origin, therefore press ;
- Insert the X gauge dimension (for ex. 1), press ⏎;
- Insert the Z gauge dimension (for ex. 3.9598), press ⏎;





- Collimate the gauge X axis dimension and press ⏎;
- Collimate the gauge Z axis dimension and press ⏎;

The n° 2 machine origin is now defined and shown in the list.

By pressing //, you must exit from the machine menu, and you can see that the display shows "M03" as the active machine and, if the axes have not been moved after the gauge measurement, even these dimensions will coincide with those set.

9.2 ACTIVATING A NC MACHINE ORIGIN

At this stage, all the machines origins, where the tools to be measured are to be used, have been recorded in the tool presetter memory.
These values would be worthless if they could not be recalled or converted during tool presetting operations. Proceed as follows:

☑ *Procedure to activate a NC machine origin*

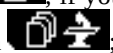
- press  , if it is demanded research the reference points and press  again;
- The previously set machine list will appear; as you can see, the cursor places itself on that machine which is currently active;
- Select with the  keys  and the machine whose origin must be recalled, or, if you know it, just enter the number. Once the cursor underlines the selected machine, press  ;
- The selected machine settings are displayed, to activate it press  ,or  again·

The displayed dimensions, regarding the requested machine, will be immediately updated. This machine will be pointed out in the special dimensions display screen with the writing "Mxx", where xx is the number of the active machine. Consequently, all measurements will be valid only for the number of activated NC machine.

9.3 MODIFICATION OF A NC MACHINE ORIGIN

To modify a machine origin or just to change the name, follow this procedure:

☑ *Procedure for modifying the machine origin*

- Press  , if you just turned on the power research the reference points and press again  ;
- Following the previous instructions, select the machine to be modified, press  ;

- The selected machine settings are displayed, press ;
- To have access and insert or modify the machine origins functions the password is requested; Select “elbo”, press
- It’s now possible to modify the name or the axes configuration, placing the cursor on the desired field with the keys and then change the settings as was already shown in par. 9.1
- To modify the origin, press and proceed as shown in par. 9.1.

9.4 CANCELLATION OF A MACHINE ORIGIN

To cancel memory from the machine origin, follow this procedure:

☑ *Procedure for cancelling a machine origin*

- Press , if it is requested, research the reference points and press again ;
- Following the previous instructions, select the machine to be cancelled, press ;

- The selected machine settings are displayed, press, ;

- Confirm the cancellation pressing ; or cancel it by pressing .

- The machine "M01" has been cancelled.

9.5 MACHINE ORIGIN PRINTING

It is also possible to print the set machines list. Proceed as follows:

☑ *Procedure for printing the machine origin*

- Press ; if it is requested, research the reference points and press again ;

- Press ;

- Press ;

The print format is the following:

LOGO
(par. 8.2)

```
1     ***  my company          ***
2     List of machines configuration
3
4     Nr.  Name              R/D M/I -X -Z X~Z
5     M0 : E238               R   M   N  N  N
6     M1 : mandelli           R   M   Y  Y  N
7     M2 : okuma              R   M   N  N  N
```

```
8     M3 : cb ferrari        R   M   N  N  N
9
0     end of machine used

      12345678901234567890123456789012345678901
```

☑ *The numbers beside and under the list do not concern the print but identify the line and column number for better understanding of the format; at the end of every line there are the characters CR (Hex 0D) and LF (Hex 0A).*

9.6 CHANGING OF SPINDLES

When you have different rotating spindles, follow these instructions for their replacement.

☑ *Procedure for replacing rotating spindles*

- Position the column away from the spindle: x-axis all way to left and Z-axis at its maximum width and height respectively
- Poll the rotating spindle upwards while holding it parallel to the column.
- Degrease, clean and lubricate the removed spindle before placing it in a sufficiently protected place.
- Degrease, clean and lubricate the spindle holder seat and the replacement spindle holder.
- Insert the replacement spindle, making sure to insert it while keeping it parallel with the column.

☑ *When performing the operations as described above, make sure that you do not displace the axial support bearing from its seat, which is located at the bottom of the rotating spindle seat.*

In case there aren't rotating spindles available but only adapters, follow this procedure.

☑ *Procedure for replacing spindle adapter*

- Remove the adaptor (if any), degrease it, clean it and place it in a suitably protected place.
- Degrease and clean the spindle holder and the new adapter.
- Place the adapter into the spindle holder.

☑ *In case of spindle replacement, always check the lubrication state as described in par. 12.1.4.*

10. TOOLS SET

10.1 FOREWORD

Different from other "entry-level" tool presetters, the E238 is not only able to store measurements, but can also divide them into so called "tool sets ".
A tool set is a set including all the tools necessary to do a particular job on an assigned machine.
If, for example, a DRW0123 piece to be processed needs one milling-machine for roughing, one for finishing, drilling and boring; these four tools will constitute the drw0123 "set" in the E238 machine memory and it will be possible to use the same corrector number used by the NC in its "part-program", as to have an absolute data correspondence to avoid possible errors.
E238 can manage 9 tool sets with a total capacity of at least 500 tools (the exact storable correctors number depends on the number of fields used up in each of them, therefore it could go up to 800).

10.2 CREATION AND MEASUREMENT OF A TOOL SET

It's not necessary that the creation and measurement procedures are executed at the same time, as a matter of fact the set could be defined first and manually assembled second and then measured. In this case, refer to the next paragraph.
To define and measure a new tool set, proceed as follows:

☑ *Procedure for a tool set making and measurement*

- Press  ;
- With the keys  and  , select "add new tool-set", press  ; in case they weren't already reached, PV2 starts the research of reference points; when the operation is concluded you have to repeat the procedure from the first step;

- The new tool set page will be displayed, enter the name set and press  ;

- Write the machine origin number to be activated for the tool measurement (the origin must be already defined), press .
  The words below show the tool number in the set: zero because new, and the storage available capacity estimated in tool quantities.

  It's possible to choose the machine origin directly from the list: press ; the machine list will appear, select with the keys and the machine whose origin you'd like to recall, or, if you know it, simply enter its number. Once the selected machine highlighted press ;

- The selected machine number is shown in the tool set configuration page, press to confirm.

- To go on, see paragraph 10.4

10.3 TOOL SET MODIFICATION

It's possible to modify the tool set by adding, deleting, or measuring the tools or changing the name and/or the machine assignation.
To modify a tool set proceed as follows:

☑ *Procedure for modification of the tool set*

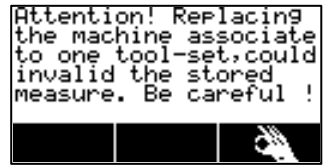
- Press ;
- With the keys and , select the tool set to be modified, press ;

- To modify the set name or to assign it to another machine, press ; otherwise press ;

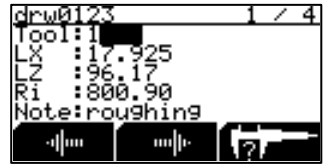
- In case they weren't already reached, PV2 starts the research of reference points; when the operation is concluded, you have to repeat the procedure from first step;
- If you've pressed , the cursor allows you to modify the set name, at the end press ;

- It is then possible to change the assigned machine number by pressing ;

- If you change the machine assignation, the warning that it is necessary to again change the tools measurement appears. Press ;

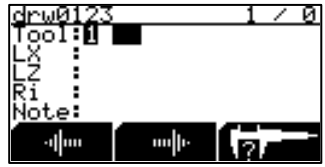


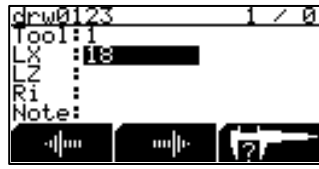
- Otherwise it shows directly the page of the first defined (recorded) tool, and it is possible to carry out the modifications as explained in the next paragraph.



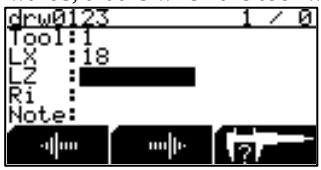
10.4 TOOL INSERTIONS AND MODIFICATIONS (RECORD)

- This page contains the information for every single tool; the set name appears in the heading, with the displayed tool progressive number and after the "/" the tools number in the set.
  Enter the tool corrector number which will use the NC machine; up to 4 numeric characters are allowed (i.e. 1, 01, 0101). Press .



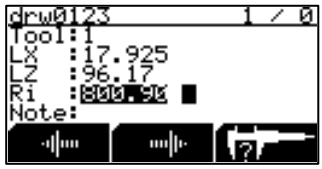


- The cursor moves to the field referring to the X tool dimension; there are two ways of inserting the tool measurement: it's possible to introduce them manually (theoretic a dimensions) and measure the tools afterwards, that is when the tool will be assembled, or measure them directly. To measure them, skip the next two points. To introduce them manually, key in the desired dimension and press ;



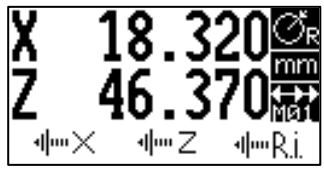
- Key in Z axis dimension, press ;

- Enter the insert radius dimension, press . The insert radius is usually required only for lathe tools. If necessary it can also be used to introduce any other numerical dimension relating to the tool, for example second multi-cutting tools corrector, spindle rotation speed, axes feed speed and so on. In the example we've introduced 800.90, which could refer to the spindle rotation (800 RPM) and the processing speed. (90 mm/min).



- On the contrary, in case of direct measurement, press the key ;

- Measure the tool on the interested axis and press the relative key or , until the background becomes black. Now the measurement is acquired and ready to be transferred to the tool page.
Of course it's possible to acquire the measure of both axes and the insert radius before going back to the tool page pressing ; or to discard the acquired measurements press .



The axes settings (radius/diameter, mm/inch) are locked because they are defined by the machine origin, which is associated to the tool set, to guarantee safty of error measurement processing.

- After the tool insertion or measurement, the cursor moves to the notes field, where it is possible to insert any type of remark: tool code,

description and so on… up to 16 characters. At the end press ⏎;

- The tool page is completed, and the cursor places itself on the page of the next tool. Go on with the entire tool set insertion and measurement, when finished, press //.

☑ *In the tools insertion, the only compulsory field is the tool corrector number, the remaining can be temporarily left empty or not used, thus saving the storage for more insertions.*

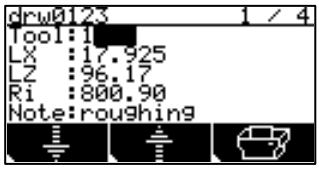
☑ *Note! The tool set, newly made or modified, will be permanently stored in the Flash memory only when the message* Saving data ... *appears, That is necessary, when you change a set or exit from the mode* !

10.5 EDITING FUNCTIONS OF RECORDS

During the insertion or modification of records (page of a single tool), different functions, which simplify the proceedings, are available. Let's see them.

10.5.1 RAPID RECORD SLIDING

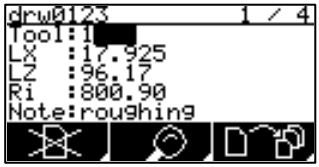
By pressing the key ALT, you have access to the function keys alternative functions. Press it until the cursor direction icons ↓ and ↑ will appear.



Now press ↓, and the cursor will go to the next record (until the end of the set), or press ↑, and it will come back to the previous (until the set beginning).

10.5.2 RECORD CANCELLATION

Press the key ALT, until the cancellation icon appears, and then press the corresponding key;

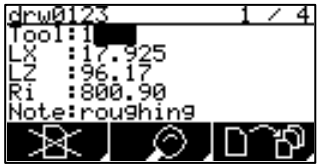


Confirm the record cancellation, BY pressing ↵, or cancel it by pressing //.

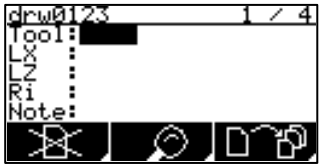
After the confirmation, the record will be cancelled.

10.5.3 INSERTING OF A RECORD BETWEEN TWO EXISTING RECORDS

Press the key ALT, until the icon appears, then press the corresponding key;

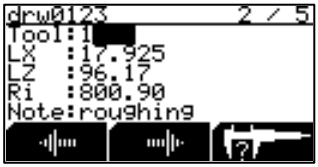


The tool is moved forward one position and an empty insertion of a new tool record page appears .



Insert the new tool record as previously shown, confirm by pressing ↵;

The cursor places itself on the original record again which has been moved into next position.



10.5.4 RECORD SEARCH

Press the key ALT, until the search icon appears, then press the corresponding key;

Insert the sought-after text (letters and/or numbers), confirm with .

The control panel searches in all tool records, the text information entered for that search. Once located the control panel will show the tool record.

Press , and the cursor will allow you to edit the chosen record.

On the contrary, pressing , it will go on with the search to locate the desired records, once found it will display the tool information.
Press any key to search a new text, press , to go back to the edit.

10.6 TOOL SET CANCELLATION

To delete a stored tool set proceed as follows: press  , select the chosen tool set pressing the keys  and  , confirm by pressing  ;

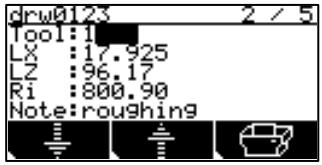
The set information is displayed, press  ;

confirm the cancellation by pressing  , or cancel it by pressing  ;

the tool set has been cancelled.

10.7 LABEL PRINTING

If your tool presetter is connected to a printer it is easy to transfer the measurement data to labels. To carry out this procedure, after having measured and stored the corrections in the tool record, press the key  , until you see the printing icon  , then press the relative key.



The following information format will be printed:

```
1  ***  my company         ***
2  Set:drw0123           M:1
3  T:1    roughing
4  X17.925   Z96.17    r800.90
5  measured by Elbo Controlli
6
7
  12345678901234567890123456
```

☑ *The numbers beside and under the label are not part of the printing but identify the line and column number for a better format interpretation. At the end of every line there are the characters CR (Hex 0D) and LF (Hex 0A); the two empty lines are the label jump.*

☑ *Printed values are exclusively those stored in the tool record.*

10.8 TOOLS PRINTOUT

If your system is connected to a printer you can transfer on a paper, the data relating to a tool set.
To print, press  , select the chosen tool set by pressing the keys  and  , confirm with  .

All the set information will be displayed, press  ;

The printing format is the following:

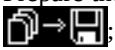
```
***  my company          ***
Set:drw0123              M:1

T:9      X:0          Z:28.5                 note:centre-bit
T:1      X:17.925     Z:96.17   r:800.90     note:roughing
T:5      X:8.02       Z:56.5                 note:finishing
T:6      X:0          Z:128.35               note:bit
T:8      X:0          Z:105.48               note:boring

measured by Elbo Controlli

12345678901234567890123456789012345678901234567890123456789012345678901234
```

☑ *The numbers listed under the label are not part of the printing but identify the line and column number for a better format interpretation. At the end of every line there are the characters CR (Hex 0D) and LF (Hex 0A).*

10.9 TOOL SET SAVING

By connecting a computer to the COM1 serial output, it is possible to transfer and save to a disk all of the information included in the tool set. On the computer you have to use communication software (HyperTerminal of Windows 95/98), in order to receive and store the transmission on a disk. It is not this manual' s aim to explain the communication software functioning. For this refer to the appropriate help or to the program distributor. For the parameter settings see par. 8.3.

To save the tool set, press  ;
the tool set directory will be displayed, press  ;

Prepare the PC for the text file reception, then press  ;
The tool set file is sent to the COM1 door, at the end of the transmission, press  to exit.

The file will have the format below:

```
S1drw0123M1
T9X0Z28.5Ccentre-bit
T1X17.925Z96.17R800.90Croughing
T5X8.02Z56.5Cfinishing
T6X0Z128.35Cbit
T8X0Z105.48Cboring
S2drw456M2
T1X-7.02Z67.98
T2X9.5Z78.12
T3X12.105Z86.58
  1211
 66
```

☑ *This function is to be used only for the data saving and successive recovery and together with the functions decribed in the next paragraph.*

We do not give details on the file format, because we explicitly forbid the modification of the tool database insert in the E238 storage.

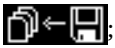
Software is available for Windows, which allows you to import and export tools set and machines, to measure, and to manage other information. With this optional software you may assign drawings for tooling and post process the sets in the format of 60 CNC post processors. The Demo version 30gg. can be downloaded at the following address:
www.elbocontrolli.it/dwn_italiano/gammatool.exe.

10.10 TOOL SET RECOVERY

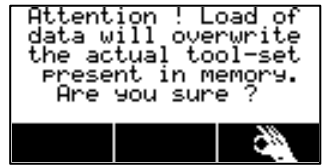
It is possible to retrieve on your control panel, a tool set previously archinved on a disk, provided the set had not been modified.

To recover the tool set press  ;

press  ;

press  ;

A warning message is displayed: All sets in storage will be cancelled, therefore it is convenient to save before loading the set already archived; in this case cancel the function by pressing //.



To continue the loading, press ;

PV2 will wait for transmission. It is therefore possible send a file from PC, following the instructions of the communication software.

If the transmission is successful, the message Saving data ... will appear soon after PV2 will display the directory of the recovered tool set.

Otherwise a communication error message will appear:

- TIMEOUT: the transmission didn't take place within the fixed time (10 sec. Or so).
- DATA FORMAT: the received data is not in the correct format; try it again with a lower transmission speed or shorter cables.
- CHECKSUM: the data is in the correct format but did not correspond with the control byte. Make sure it did not undergo alterations or external modifications, and then try it again as in the previous example.
- To continue the loading press .

11. GEOMETRIC CALCULATIONS

11.1 FOREWORD

This chapter is dedicated to the description of geometric calculation functions performed by the presetter. For each function it also describes the measurement procedure to be followed.

☑ *The necessary collimation points for geometrical calculation must be done visually with the fixed grid, which is automatically recalled choosing a geometrical function.*

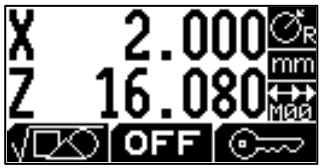
11.2 CIRCLE PASSING THROUGH FIVE POINTS

This function calculates and displays the radius of a circle passing through five unaligned points. The five-point (as opposed to the three-point) system enhances measuring accuracy, and is particularly useful in the case of shaped tool measurements, which are difficult to evaluate using the circular grid.

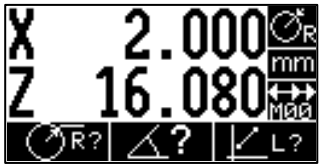
☑ *To reduce errors in calculation, choose five points as far as possible.*

☑ *Procedure to calculate radius/circumference through five points*

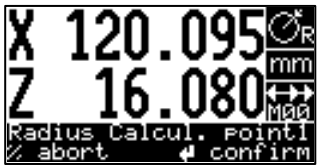
- From the display screen, press ALT, to show the alternative functions.
- Press √□.



- Press R?.



- It's now requested to collimate in sequence five points on the tool radius arc, confirming every point with the key ↵;



- Finally, the PV2 calculates the described radius dimension and displays the result
- It's possible to print the result by pressing :
- Press or to exit

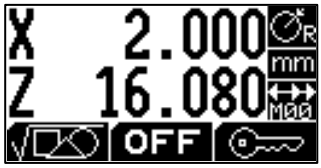
☑ *It's possible to cancel a point entered by mistake by pressing the key* .

11.3 INCLINATION ANGLE OF A STRAIGHT LINE

This function calculates and displays the angle inclination of a straight line passing through two points.

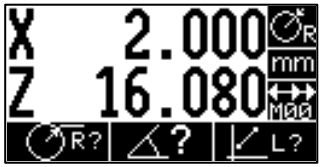
☑ *Procedure to calculate the angle inclination of a straight line*

- From the display screen, press , to show the alternative functions.

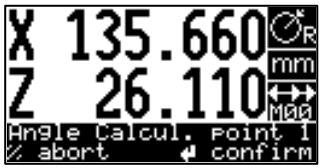


- Press .

- Press [ ].



- It will now be requested to collimate in sequence the two points on the interested segment confirming every point with the key [ ];



- At the end, the PV2 calculates the described angle dimension and displays the result.
- It's possible to print the calculation result pressing [ ]:

- Press [ ] or [ ] to exit.

☑ *It is possible to cancel a point entered by mistake by pressing the key* [ ].

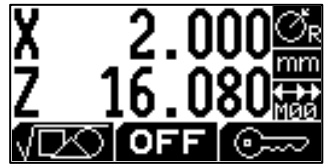
The angle in question refers to the Cartesian axis X+, Z+ and varies between ±180°, the result is expressed in degrees, hundredths and thousandths of a degrees.

11.4 DISTANCE BETWEEN TWO POINTS

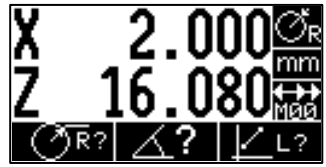
This function calculates and displays the linear distance between two identified points.

☑ *Procedure to calculate the distance between two points*

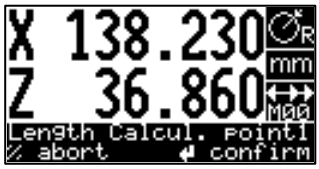
- From the display screen, press [ ], to show the alternative functions.



- Press [ ].
- Press [ ].



- It will be now requested to collimate in sequence two points at the end of the interested segment confirming every point with the key [ ];



- At the end, the PVZ calculates the segment length and displays the result.
- It's possible to print the calculation result by pressing [ ]:

- Press [ ] or [ ] to exit.

☑ *It's possible to cancel a point entered by mistake pressing the key* [ ].

12. MAINTENANCE

12.1 ROUTINE MAINTENANCE

The presetter does not need any specific maintenance, however we suggest the following maintenance.

12.1.1 CONTROL PANEL CLEANING PV2

The polycarbonate control panel should be cleaned with a clean cloth and suitable grease-removing products. Do not use solvents.

12.1.2 CLEANING PANVISION (PULSAR)

Like the panel, even Panvision must be cleaned with a clean cloth and a suitable degreaser (no solvents or abrasive products). For the optical parts (lenses and light) it is recommended to use antistatic cloth, eventually dampening the surface with spray or detergent liquids that are safe for optical lenses.

12.1.3 CLEANING OF THE LINEAR GUIDEWAYS

It's a good rule to periodically remove dust and grease from the slides.
To do this, pass a clean cloth on the linear guide on both axes, moving the cart from one end to the other.

12.1.4 LUBRICATION OF A ROTATING SPINDLE

Periodical lubrication is recommended according to usage and the environment in which the tool presetter is installed (usually every 3-6 months). To perform a further lubrication, proceed as follows:

☑ *Rotating spindle lubrification procedure*

- Move the column in a position, which allows you to safely remove the spindle with out obstruction.
- Carefully remove the spindle by lifting straight up and parallel with the column.
- Degrease and clean the spindle ground.
- If the rotating spindle ground surfaces are dry, lubricate them using a bearing grease (i.e. Clubber NBU 15 or similar).
- Place the rotating spindle into the spindle holder, ensuring that you keep it parallel with the column.

☑ *When performing these operations, make sure that you do not displace the axial support bearing from its seat, which is located in the bottom of the spindle seat.*

13. TROUBLE SHOOTING

13.1 FOREWORD

This chapter is dedicated to solving the most common problems that arise during the tool presetter use. Each problem is associated with a series of checks to be carried out and corrective actions. The list obviously cannot contain all possible problems and their solutions; if necessary, consult your local distributor.

13.2 PROBLEMS, CAUSES AND SOLUTIONS

PROBLEM: the tool presetter does not switch on.

CAUSE: *general power supply failure.*
SOLUTION: check the connection with the external power supply circuit; check any external switches and/or fuses and, if damaged, replace them

CAUSE: *Tool presetter power supply failure.*
SOLUTION: check the power cord connection on the PV2 back (see installation); Check the power supply for proper current.

CAUSE: *fuse blown.*
SOLUTION: disconnect the power cord (A) from the display back, the fuse (F) check to see if it is still functioning; if necessary replace it with one of the same type (rapid - 1,2A).

PROBLEM: the tool presetter switches off after a few minutes of functioning

CAUSE: *after 30 minutes of no use the tool presetter goes in STAND-BY mode*
SOLUTION: press any key

CAUSE: *supply voltage incorrect or subject to excessive variations*
SOLUTION: power the tool presetter with the voltage specified on the identification plate of the feeder: usually 115-230Va.c. ± 10%.

PROBLEM: Axes calculation is incorrect but produces repeated measurements.

CAUSE: *The linear compensation machine parameter is wrong.*
SOLUTION: Modify the axis machine parameter at issue, setting it at the original dimension (see par. 8.2).

PROBLEM: Calculation is incorrect and the measurements are not repetitive

CAUSE: *Measurement system connector is not properly connected.*
SOLUTION: See next problem.

CAUSE: *Measurement system or measuring read-out is faulty.*
SOLUTION: See next problem.

CAUSE: *The monogauge push-rod side, due to an impact, is no longer parallel to the ARA machine axes.*
SOLUTION: Remove the monogauge protection carter, loosen the screw that block the push-rod, and rotate the push-rod to reset the parallelism with the axes.

PROBLEM: Axes counting does not take place.

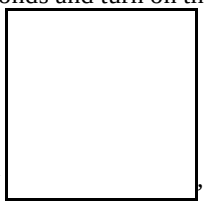
CAUSE: *Measuring system connector is disconnected.*
SOLUTION: It is possible that one of the connectors of the measurement system has been detached from the control panel; obviously to restore normal conditions, all that is needed is to re-insert it into its appropriate seat (see installation).

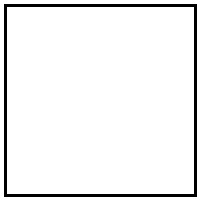
CAUSE: *Faulty measurement system or digital read-out.*
SOLUTION: If the problem relates to the both axes, it is likely that the fault is in the digital read-out or in the cable; otherwise it's due to the measuring system. Contact the Technical assistance department for replacement of the faulty component.

PROBLEM: Problems during the editing of stored data.

CAUSE: Because of lacking of power during the saving of data, the stored content can change (origins, tools).

SOLUTION: Complete cancellation of information storage.

Then switch off the presetting machine, disconnecting the power supply, wait a few seconds and turn on the presetting machine again, while pressing the key  , until the message



appears.

PROBLEM: How to update the software of digital read-out.

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

SOLUTION: For the operation it is necessary to have a personal computer to be connected to the COM1 port of PV2 digital read-out.
Download from Internet www.elbocontrolli.it the necessary software for updating, following the site's instructions; connect PC to presetter and follow the instructions, which will appear on screen.

PROBLEM: Panvision doesn't switch on

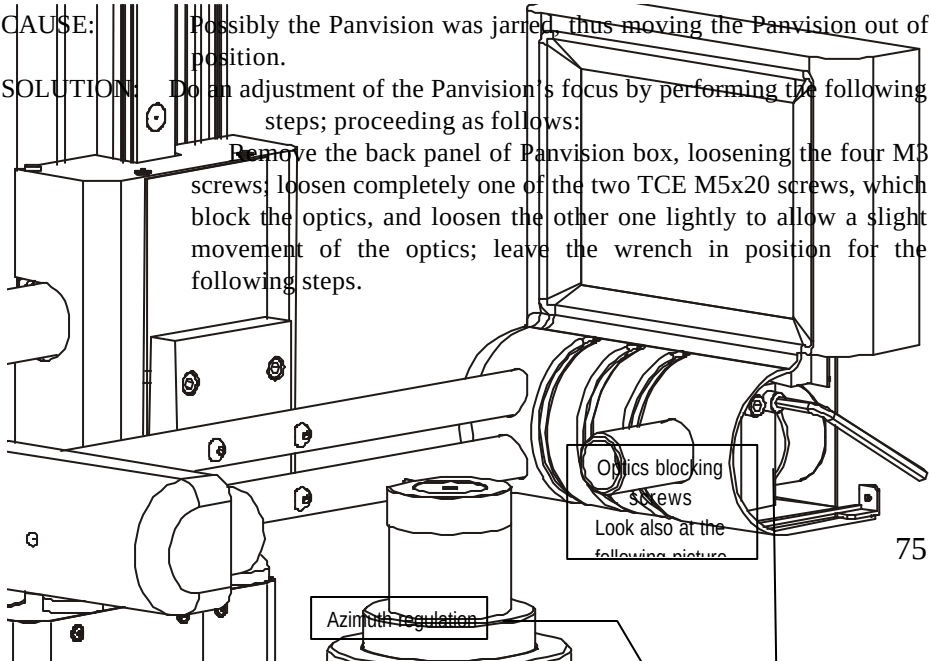
CAUSE: Data cord for Panvision not plugged in

SOLUTION: Verify the right data line is plugged in connector on the presetter column and eventually also the one on the back side of PV2; refer to paragraph 5.5.

PROBLEM: Panvision fixed grid is not parallel to preset axes and/or the image's focus is not at the point of maximum tangency of the tool.

CAUSE: Possibly the Panvision was jarred, thus moving the Panvision out of position.

SOLUTION: Do an adjustment of the Panvision's focus by performing the following steps; proceeding as follows:
Remove the back panel of Panvision box, loosening the four M3 screws; loosen completely one of the two TCE M5x20 screws, which block the optics, and loosen the other one lightly to allow a slight movement of the optics; leave the wrench in position for the following steps.



To adjust the focus, insert the master gauge in the spindle, collimate the master gauge on the fixed grid, assuring that the master gauge and the appropriate spindle is perfectly cleaned, rotate the spindle to find the maximum tangency with an analog comparator and lock the spindle. In this condition you have to get the maximum percentage of focusing: with little movements adjust the position of lenses in the direction of the arrows, shown on the Panvision, paying attention that the optical excursion within 100% is about 0,5 mm. Using the same master gauge with the fixed grid, check Azimuth by slowly rotation the spindle clockwise or counter-clockwise to get a satisfactory regulation. During this procedure use always the locking screw to lock the lenses between adjustments, securing the spindle in place; furthermore pay attention not to move the lenses forwards or backwards to affect the focus calibration.

Once the Panvision is in focus, secure the Panvision screen in place by tightening the Allen screws.

PROBLEM: The autocollimation gives different measurements on different points of the screen.

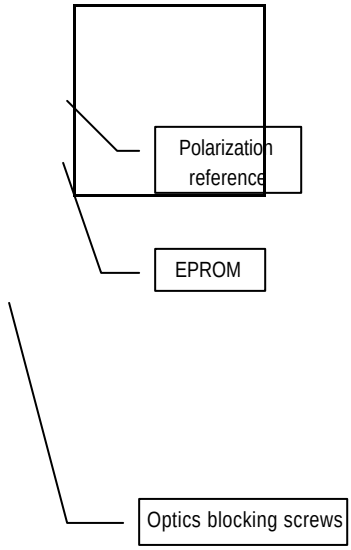
CAUSE: Incorrect calibration.

SOLUTION: Do a new Panvision calibration following the instructions of paragraph 8.5

PROBLEM: How to update the Panvision software

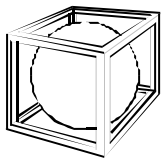
CAUSE: Installation of new options and/or updated functions.

SOLUTION: In case it would be necessary to update the Panvision software it is necessary to replace the EPROM inside the control panel: First turn off the presetter by disconnecting the power cord. Remove the back panel of box loosening the four M3 screws; locate the EPROM on the Panvision card (see below figure), remove it by carefully using a small flat screwdriver, insert the new EPROM, paying attention to the reference position of polarization.



14. DISPOSAL

When it is necessary to dispose the tool presetter, due to its becoming obsolete or for other reasons, dispose of its in accordance with the legislation in force and fully in accordance with the environmental requirements, if necessary by calling in a specialty company.
Sole responsibility for disposal rests with the final owner.



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