

USER'S MANUAL

V3 / V4 / V5 / V6 / V8

750 50 0045 03



Dear customer, congratulations for choosing a TRIMOS measuring instrument. For more than 40 years, our products have built up an excellent reputation in terms of quality, accuracy and longevity. For full satisfaction with the present product, we recommend to read this user's manual carefully.

750 50 0045 03 Version 1.8 / 2021-01

Valid for following firmware versions:

Module 1.31
Mainboard 2.40
Sensor 3.32

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1. SAFETY REGULATIONS

1.1 Important Information

In order to prevent any damages due to wrong manipulation, please carefully read the following instructions. TRIMOS will not accept any responsibility in case of damages caused by inadequate use not in line with the present manual.

1.2 Security Symbols

The following security symbols are used in this manual:



General warning, utilisation advice



Risk of electric shock



Electrostatic protection

1.3 General Warnings



Protection against electrostatic interferences:

Static electricity can damage the electronic components of the instrument. In order to prevent this type of damages, avoid any contact with the connector pins.



In order to prevent any changes of the instrument performance or any accident, the instrument should never be dismantled.



If, for any reason, the electronic unit has to be opened, only authorized personnel are allowed to do so.



Do not expose the instrument, its components and accessories to rain or any projection of fluids. Avoid penetration of foreign substances into the connectors and the instrument openings.



Do not cover or wrap the display unit during use. The unit must be kept well ventilated to avoid any overheating.



In case of problems with the instrument or any of its parts (no display, overheating, abnormal smell...), immediately switch off the instrument and disconnect the power supply. Please contact your local TRIMOS agent.



This is a high accuracy instrument. Particular care should be taken during its entire operational lifetime. Pay special attention to the following specific points :

- Use the instrument on a stable, smooth and clean surface plate.
- Avoid any shock to prevent the instrument from losing its characteristics.
- Use the instrument in a vibration free area.
- Avoid exposure to direct sunlight and excessive humidity.
- Avoid proximity of heating or air conditioning systems.
- Respect the advised environmental conditions.

2. INSTRUMENT DESCRIPTION



2.1 Instrument

1. Upper probe holder (V4 ÷ V6)
2. Screw for the adjustment of the floating probe suspension
3. Handle for carriage displacement
4. Transport safety screw for locking of probe suspension (chromium plated)
5. Lower probe holder
6. Insert holder (V3 ÷ V6)
7. Measuring insert
8. Operating handle for the displacement of the instrument
9. Button for activation of air cushion and programmable functions keys (V4 ÷ V6)
10. Base with air cushion system for instrument displacement (V4 ÷ V6)
11. Handwheel for carriage displacement / Activation of manual/motorised movement (V5 ÷ V6)
12. Buttons for motorised displacement (V5 & V6)

2.2 Interfaces/Connectors

21. Mini USB connector (on top of display unit)
22. Connector for electronic perpendicularity probe (V6 & V8)
23. Connector for RS232 communication (on lower right side of height gauge)
24. AC adaptor connection (on lower right side of height gauge)

2.3 Display

31. Status symbols (battery level, units, active functions, etc.)
32. Upper display line
33. Lower display line
34. Visual signal of function activation
35. On/Off key (power ON / OFF)
36. Print-out of data
37. Function key: Selection of height and diameter - centerline measurements / Validation key
38. Function buttons and numeric keypad.
39. Zero setting of the display

3. SETTING UP

3.1 Packing List

The standard packing of the instrument includes the following elements:

1. Instrument with display unit and measuring insert holder
2. Measuring insert
3. Setting gauge
4. Charging unit
5. Protection cover (V5 & V6)
6. User's manual (V4 ÷ V6) / Quick guide (V3)
7. Calibration certificate



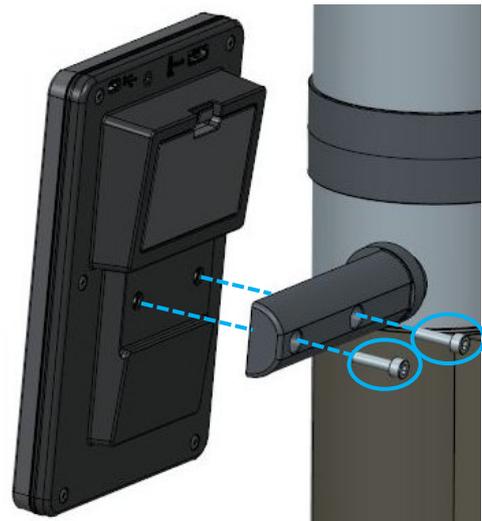
While unpacking, carry the instrument by lifting it by its displacement handle (8) and body. **In NO case should the instrument be carried by the handle for carriage displacement (3).** Keep the original packaging for future transportation. If the instrument has been stored at a temperature below 5°C, wait a few hours before unpacking to prevent the instrument parts from condensation. Condensation can affect sensitive parts of the instrument.

3.2 Setting-up

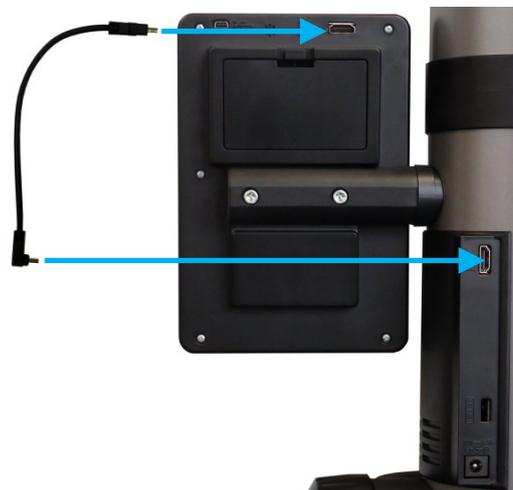
After unpacking, prepare the instrument as follows:

1. Clean the pads positioned underneath the base using a clean cloth, slightly dampened with alcohol.
2. Position the instrument with care on a clean measuring plate.

3. Mount the display unit on its support using the 2 screws..



4. Connect the HDMI cable between the instrument and the display unit.

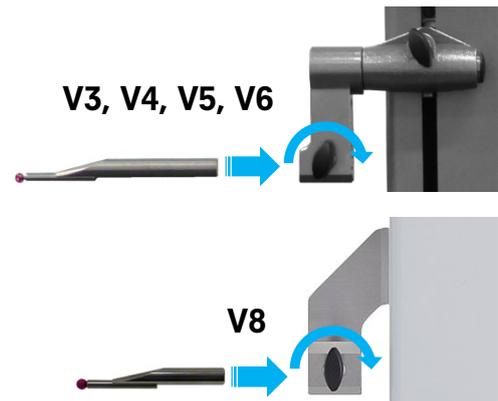


The straight connector shall be connected to the display unit and the right-angle connector to the instrument.

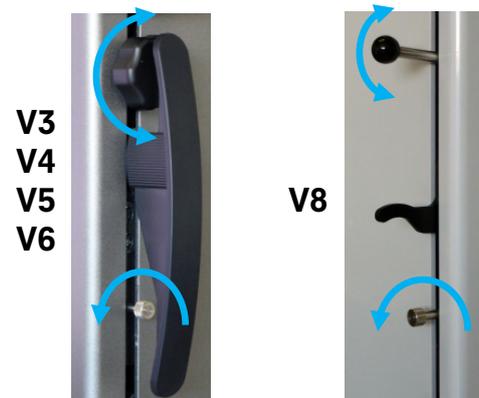


Static electricity can damage the electronic components of the instrument. In order to prevent this type of damages, avoid any contact with the connector pins.

5. Slide the measuring insert into the holder and lock it, using the knob. Take care to position the eccentric probes correctly.



6. Release the transport safety screw.
7. Check / adjust the floating probe suspension balancing (§ 10.3).



8. If the instrument does not switch on or in case of low battery level, proceed to a full loading of the batteries (plug in the charging unit to the instrument). Empty batteries are fully loaded in about 3 hours.



Only use the charging unit supplied with the instrument to load the batteries. It is not necessary to wait until the battery pack is fully charged. The instrument becomes operational immediately after having connected the charging unit. It is not dangerous to leave the charging unit connected. Permanently plugged-in instruments automatically switch to trickle charge mode. The batteries are of Lithium-ion type. An excessive room temperature can affect the battery capacity and therefore the instrument autonomy. It is not recommended to load the battery in case of room temperature superior to 40C°. Incorrect loading of the battery can result in a decrease of capacity, overheating, or even an explosion and cause important damages. The battery can be loaded and unloaded 300 times before a significant reduction of their capacity. The number of loading cycles and the autonomy can vary according to use and operating conditions.

4. GETTING STARTED

4.1 Displacement Modes : Manual/Motorized

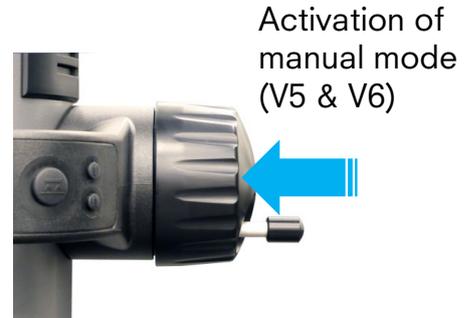
4.1.1 Manual Displacement Mode

V3, V4 & V8

The manual displacement of the carriage is carried out with the help of the handle. This is the only possible displacement mode for V3 & V4. The V8 has a fine adjustment.

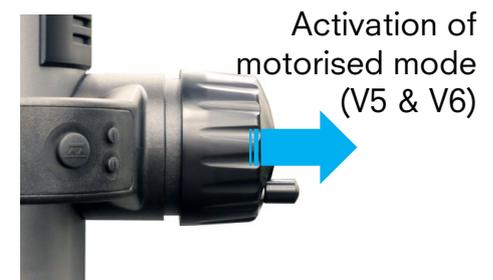
V5 & V6

Push the handle inwards in order to pass into manual mode. In manual mode, V5 & V6 are used in the same way as V3 & V4.



4.1.2 Motorized Displacement Mode (V5 & V6)

Pull the handle outwards to work in motorized mode. In this mode, the rotating handle can be tucked inside for ergonomic reasons.



The motorized displacement is carried out with the 2 buttons situated behind the handle. For other motorized displacement methods, see § 10.4.

Rapid Displacement

A prolonged pression on one of the buttons causes a rapid movement in the chosen direction. The carriage will continue its displacement as long as the pressure is maintained.

Slow Displacement (Probing)

A short pressure causes a continuous displacement in probing speed, i.e. speed used for measuring. As soon as the probe gets in touch with a surface, a measurement is made.

Release of Probe

When the probe is in contact with the part (after probing), a short pressure on the button for the opposite direction allows to release the probe (ca. 0.5 mm).

Movement Stop

While displacing in low speed mode, a short pressure on the button for the same direction as that of the displacement will stop the movement.

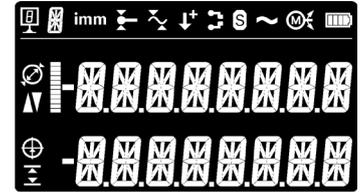


4.2 Setting into Operation

1. Switch on the instrument by pressing button **On/Off** during 2 seconds. All segments of the display will light up.
Switch off the instrument by pressing the same button until the instrument turns off.



> 2 s



2. The display will ask for the reference position. Move the measuring carriage slowly across the mark indicating the reference position with the help of the handle for carriage displacement (the acquisition of reference is carried out by displacing the carriage upwards). An acoustic signal will confirm that the reference has been detected and the display starts counting. If the display does not start counting, repeat the sequence.



Note :

This procedure is automatically carried out in motorized mode (V5 & V6). The probe will position itself at the same level as the reference gauge (see below).

3. The instrument is now asking for the probe constant. This function compensates the dimension and the deflexion of the measuring insert when probing downwards and upwards (reversed surfaces, diameters). The last stored probe constant value will be displayed.



or



Note 1 :

This procedure may be interrupted by pressing on the probe constant key or on the **Validation key**. The latest probe constant value measured is then recorded.

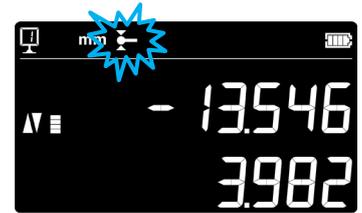
Note 2 :

The start mode can differ, according to the instrument configuration (§ 9).

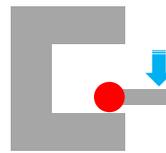
- Use the setting gauge supplied with the instrument to carry out this operation.

Note:

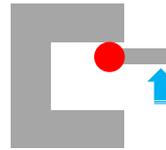
A different setting gauge may be used. In this case, its dimension must be configured in the set-up menu (§ 9).



- Move the measuring insert downwards (use the handwheel for the displacement of the measuring carriage) until it touches the surface and an acoustic signal confirms the measurement (=probing).



- Without moving any part (instrument and gauge), move the measuring insert towards the top and perform the same sequence on the upper surface of the setting gauge.



- Repeat the sequences 5 and 6 one more time. This allows establishing the probe constant more precisely.

2x

- The screen will display the setting gauge value during the latest probing, as well as that of the new probe constant. The instrument is then ready to be used.



In motorized mode (V5 & V6) this procedure can be automatically carried out by pressing the key opposite

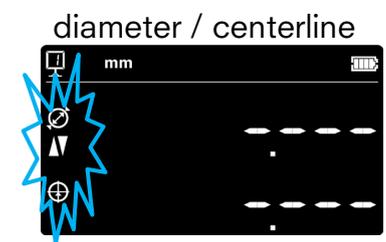
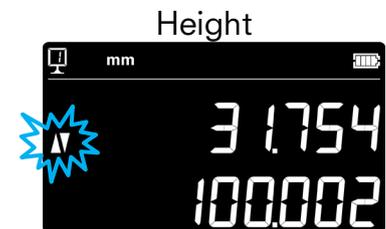


The probe constant needs to be checked and stored again after each measuring insert change, after change of its position in the holder, after each adjustment of the measuring force or adjustment of the floating probe suspension.

5. MAIN FUNCTIONS

5.1 Selection of Height and Diameter / Centerline Measurements

To select the functions of height measurements or diameter/centreline distances, press the *Function key*. The corresponding symbol will be displayed.

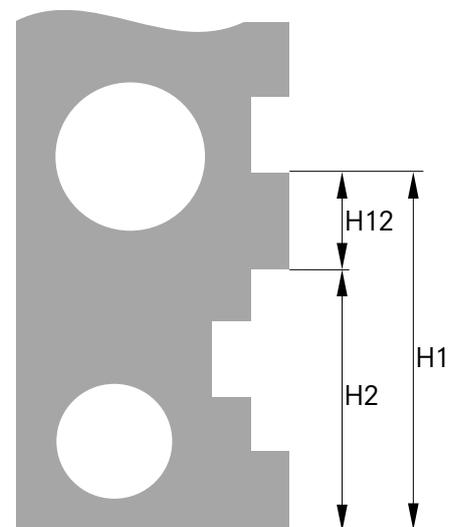


5.2 Height Measurements

H1 = Height measurement downwards (▼)

H2 = Height measurement upwards (▲)

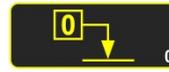
H12 = Chain dimensions



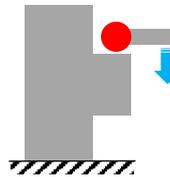
1. Select height measurement mode.



2. Set the display at zero or at a preset value with the measuring insert probing a reference surface (see § 5.11 and § 5.4.2).



3. Probe the surface to be measured downwards or upwards. The probing indicator will display the progression of the measuring force application. When the right force is reached, an acoustic signal will confirm the measurement.

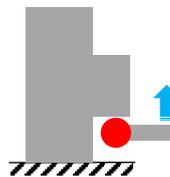


Note:

The first line of the display indicates the height measured.

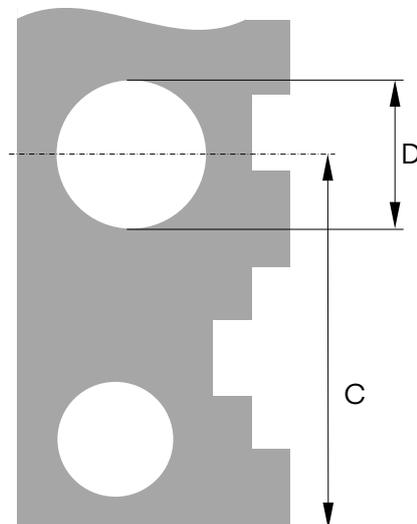
The second line indicates the distance from the former height measurement (chain of dimensions).

This display mode can be configured (§ 6.7).



5.3 Diameter and Centerline Measurements

D = Diameter measurement (\varnothing)
 C = Centreline measurement (\oplus)



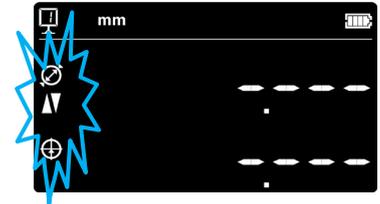
1. Set the display at zero or at a preset value on a reference surface (see § 5.11 and § 5.4.2).



or

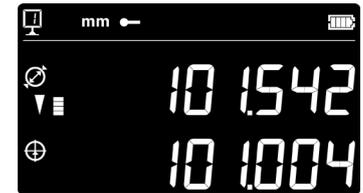
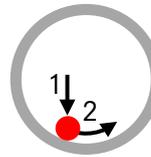


2. Select the diameter / centerline mode by pressing the *Function key*.

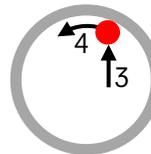


3a. **Internal diameter :**

Position the measuring insert into the bore near the reversal point (1) and engage the measuring force until acoustic signal. Move the part (or the instrument) laterally to determine the reversal point (2). A double beep sounds if SmartReverse is on (§9).

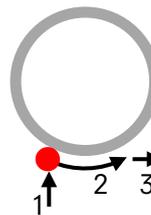


4a. Probe a point near the reversal point on the side opposite the diameter (3). Move the part (or the instrument) laterally to determine the reversal point (4). Diameter and centreline values are displayed on the 1st and 2nd lines of the display respectively.

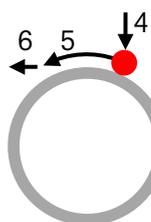


3b. **External diameter**

Set the measuring insert off centre on the lower shaft profile near to the reversal point (1) and engage the measuring force until acoustic signal. Move the part (or the instrument) laterally to determine the reversal point (2). It is automatically stored. Remove the measuring insert slowly to the side, off centre (3).



4b. Probe a point near the reversal point on the side opposite the diameter (4). Move the part (or the instrument) laterally to determine the reversal point (5). Remove the measuring insert to the side, off centre (6). Diameter and centreline values are displayed on the 1st and 2nd lines of the display respectively.



5. When the measuring insert is removed, the display remains frozen on the diameter and centerline values.
Restart with point 3a or 3b for a new measurement.

5.4 References

5.4.1 Selection of References

The use of references allows a parallel measurement starting from different points of origin (=references). The current reference is mentioned at the top left hand side of the display. For reference change, press reference key and enter the reference number.

Note :

It is possible to choose the number of references (from 1 to 9). To configure the number of references, see § 9. If the number of references is limited to 2, a single press on the reference key will swap to the other reference (no need to enter the reference number)

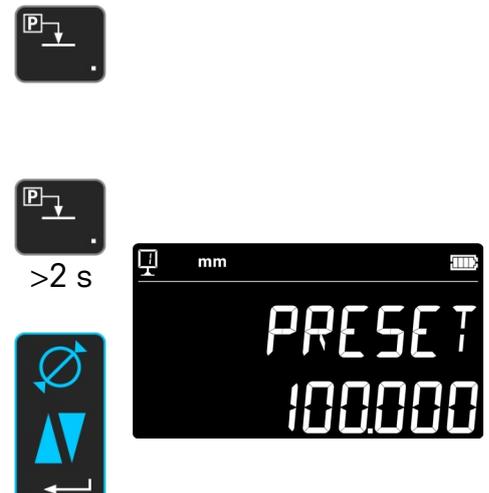


5.4.2 Assignment of a Preset Value to a Reference

By pressing the Preset key, the previously entered preset value for each selected reference will be taken into consideration for height measurements, centerline distances or Min / Max values.

In direct mode (see § 6.7), the preset is executed at the current position of the probe.

A preset value can be assigned to each reference. Select the required reference and press the **Preset** key longer than 2 seconds. Enter the value and confirm by pressing the **Validation key** key.



5.5 Selection of the Resolution

To modify the display resolution, press key opposite



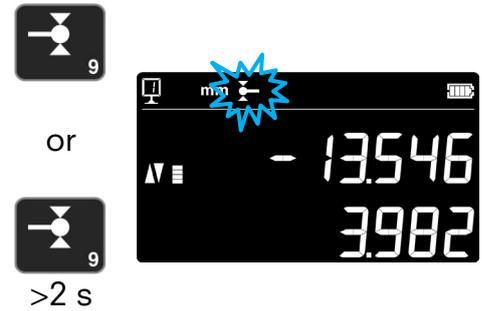
5.6 Setting / Memorizing of the Probe Constant

To check and memorize the probe constant, press the following key and follow the same sequence as for "Setting into operation" (§ 4.2, points 4 to 8).

Note:

The current constant value is shown on the second line of the display by pressing this key once. A second pressure interrupts the acquisition of constant and brings the instrument back into height measuring mode.

The constant value of the probe can also be manually (§ 6.6).



5.7 Selection of the Measuring Unit

Measurements can be performed either in mm or in inch. To change the unit, press the *mm/in* key. The active unit is displayed on the top left of the display.

Note:

It is possible to lock in the required measuring unit (§ 9).

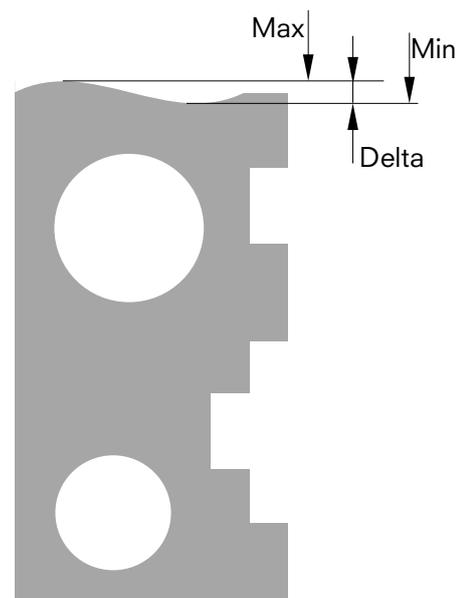


5.8 Measuring in Min / Max / Delta Mode

Max = Measurement of maximum value (↗)

Min = Measurement of minimum value (↘)

Delta = Difference between Max and Min (↔)



The measurements in mode Min, Max Delta have always to be done with the probe being in contact with the surface.

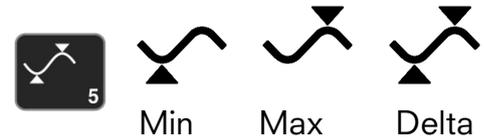
It allows to determine the following values :

Min : Minimum value of the measured surface

Max : Maximum value of the measured surface

Delta : Difference between the maximum and minimum value

To select the Min, Max or Delta mode, press the key on the keyboard. By pressing the same key several times, the required mode will be displayed. To quit this mode, press the **Function key**.

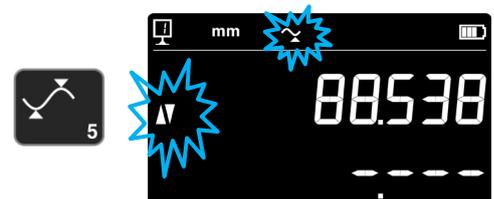


Note:

In manual mode, the difference between the Min and the Max should not exceed ± 1 mm. When motorisation is activated, a closed-loop control is used to monitor the surface over the entire measuring range of the instrument.

5.8.1 Measuring in Min or Max Mode

1. Select Min or Max function. The corresponding indicator shows the activated mode.

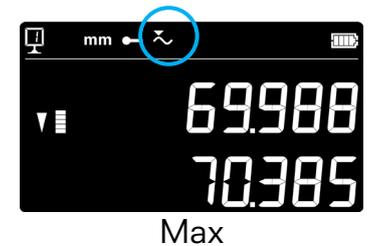


2. Probe the surface to be measured and displace the insert or the piece along the part to be analysed. The 1st line on the display shows the instantaneous position of the probe. The 2nd line indicates the minimum, respectively maximum value reached.



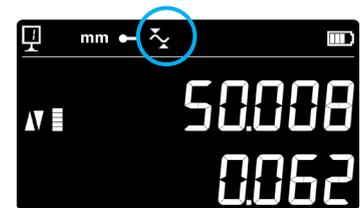
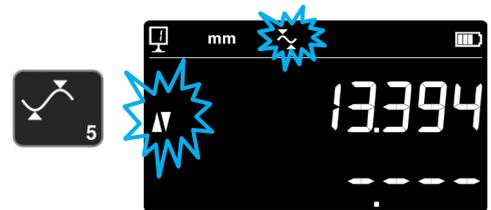
Note :

A zero setting or a preset reinitialize the display on the minimum or maximum value measured.



5.8.2 Measuring in Delta Mode

1. Select Delta function. The corresponding indicator shows the activated mode.
2. Probe the surface to be measured and displace the insert or the piece along the part to be analysed. The 1st line on the display shows the instantaneous position of the probe. The 2nd line indicates the difference between the maximum and minimum (=Delta) measured.



Delta

Note :

By pressing the **Zero** key, the Delta mode will be reset and the display will show zero.

5.9 Average Between 2 Last Measurements

Averages :

M1 = Between 2 centerlines

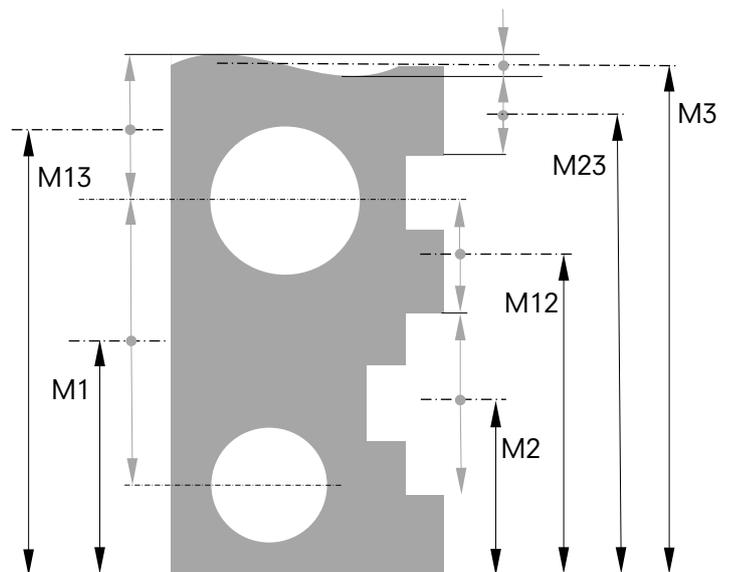
M2 = Between 2 heights

M3 = Between Min et Max

M12 = Between centreline and height

M13 = Between centreline and Min or Max

M23 = Between height and Min or Max



By pressing this key, the average between the 2 last height measurements, centerline, Min or Max is determined. These various measurements can be combined with each other.



Note:

It is possible, after calculation of an average value, to give the calculated position a zero value or Preset value.



or



5.10 Difference Between 2 Last Measurements

Distances:

D1 = Between 2 centerlines

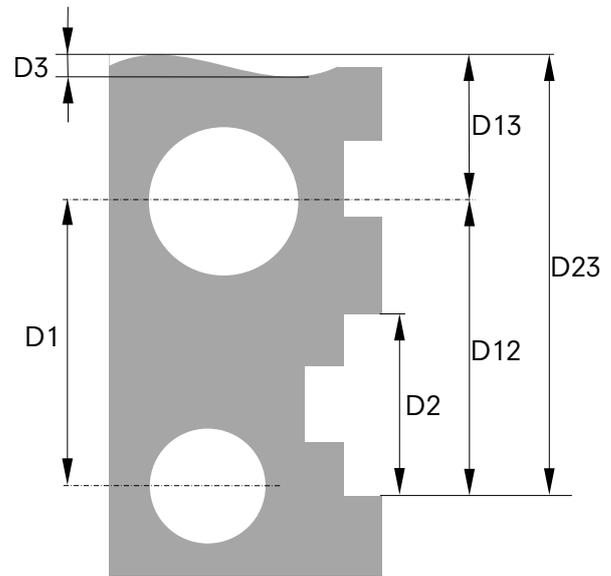
D2 = Between 2 heights

D3 = Between 2 values Min-Min, Min-Max or Max-Max

D12 = Between centreline and height

D13 = Between centreline and Min or Max

D23 = Between height and Min or Max



By pressing the difference key, the distance between the 2 last height measurements, centerline, Min or Max is determined and mentioned on the 2nd line of the display. These various measurements can be combined with each other.



5.11 Zero Setting of the Display

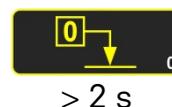
In height measuring mode a zero setting will be done on the last surface measured by pressing the zero setting key.

In diameter / centerline mode a zero setting will be done on the last centerline distance measured.

In Min or Max mode a zero setting will be done on the last Min or Max value measured.



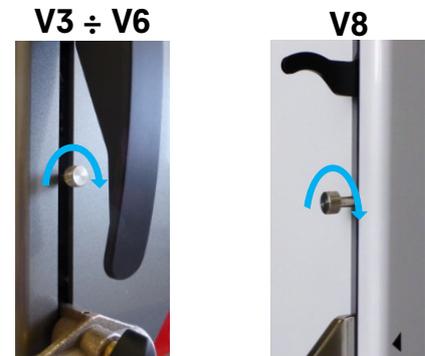
If the same key is pressed for more than 2 seconds, the current position of the probe will be initialized to the preset value of the current reference, regardless of the last probing.



6. SECONDARY FUNCTIONS

6.1 Perpendicularity Measurement

The carriage must be blocked before every perpendicularity measurement.



6.1.1 With lever indicator

1. Mount a lever indicator in the insert holder.
2. Lightly press the lever of the indicator against the face to be measured and adjust zero.
3. Displace the carriage of the instrument vertically in order to check the perpendicularity of the face.

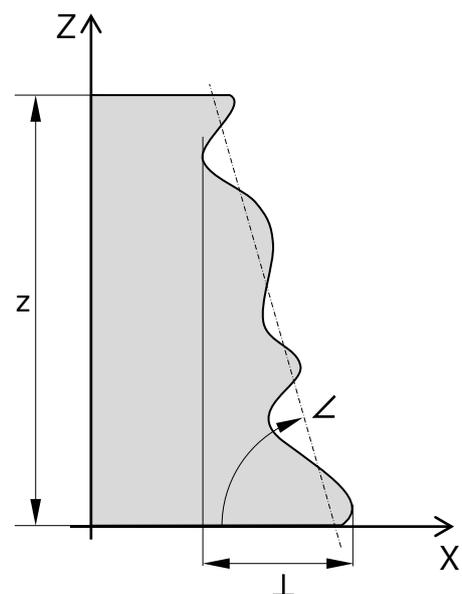


The base of the instrument **must be perfectly parallel to the face to be measured** in order to ensure an optimal precision.

6.1.2 With Electronic Probe (V6 & V8)

The perpendicularity measurement is obtained with the values shown on the drawing opposite:

- z Distance
- ⊥ Perpendicularity
- ∠ Inclination



1. Lift the electronic perpendicularity probe with its measuring insert holder.

V6



2. Connect the perpendicularity probe to the measuring column.

V8



3. Place the part to be measured against the probe, taking care that the contact is maintained on the whole part to be measured. Bring the carrier to its starting position.



In order to ensure an optimal measuring precision, the base of the instrument must be **perfectly parallel with the face to be measured**.

4. Select the perpendicularity measuring function by pressing the key opposite during 2 seconds: The probe measurement (X) appears on the first line of the display. The height measured (Z) is displayed on the second line.



5. Initialize display by pressing the zero setting key. The measurement starts as the key is pressed.

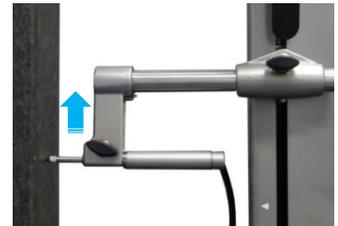


Note:
The acquisition speed is about 10 points per second.

- Slowly move the probe along the face to be measured. Z values (vertical axis) and X (horizontal axis) are displayed live during the displacement.

Note :

By pressing the *Print* key during the perpendicularity measurement, X and Z values are transferred via interfaces USB et RS232 (§ 7).



- When the displacement is over, press the *validation key*. The display freezes and shows the perpendicularity (⊥) on the first line of display and distance (Z) on the second one. Display of Z value is deliberately limited to 2 decimal digits.



- The inclination (angle) can be displayed by pressing one of the key opposite. The value is displayed on the second line of the display, in decimal format.



For a new perpendicularity measurement, restart from point 5. To quit this mode, press again *validation key*.

6.2 Measurement History (Buffer)

6.2.1 Access to the buffer

Each measurement made is stored in a buffer that can contain 99 values. Once this number is reached, each new measurement replaces the oldest value.

To access the buffer, press the following key for 2 seconds.



>2 s

To exit the buffer without operation, press the same key for 2 seconds.



>2 s

6.2.2 Navigation in the buffer

To navigate in the buffer, the keys opposite can be used.

Each value is displayed as follows:

- 1st display line: Position in the buffer and function
- 2nd display line: Measured value



6.2.3 Operations on buffer values

Selection of values

It is possible to select 2 buffer values to perform calculations between them.

To do this, navigate to the desired value and press the function key. The value will flash. Select the next value by navigating and selecting as described above.



Calculation of the difference

By pressing the *Delta* key, the difference of the two selected values is calculated and displayed on the 2nd display line.

If no buffer value is selected, the displayed value will be the difference between the maximum and minimum value contained in the buffer.



Calculation of the average

By pressing the *Mean* key, the average of the 2 selected values is calculated and displayed on the 2nd display line.

If no buffer value is selected, the displayed value will be the average of all buffer values.



Calculation of min / max

If no value of the buffer is selected, a simple press on the *Min/Max* key will determine the minimum value of the buffer.

Long press (> 2 s) on the *Min/Max* key will determine the maximum value of the buffer.



>2 s



6.2.4 Sending buffer data

When the buffer is open, pressing the *data transfer* key button sends all buffer values (§ 7).



6.2.5 Clearing the buffer

A long press on the key opposite erases all the values of the buffer.

Values are cleared when the instrument is turned off.



>2 s

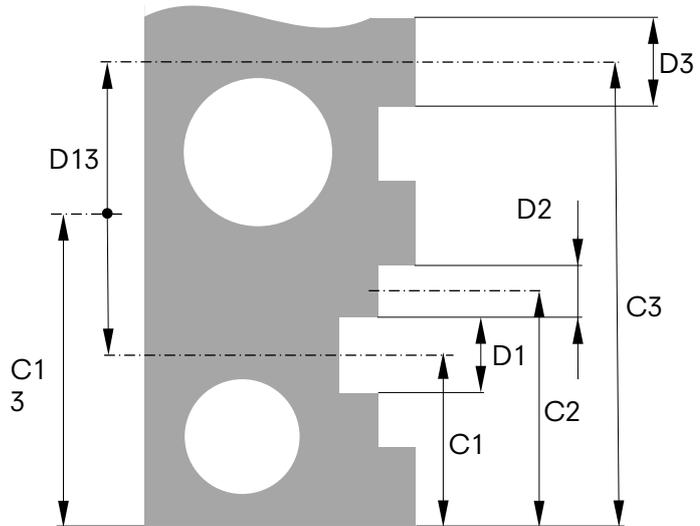
6.3 Distance and Centerline Measurement

- D1 = Internal distance
- C1 = Centerline corresponding to D1

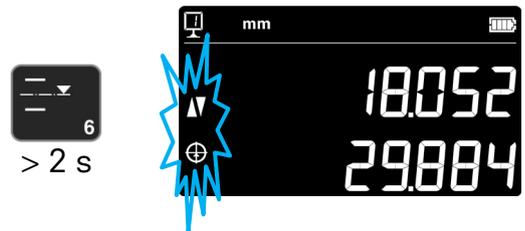
- D2 = Distance between 2 faces in same direction
- C2 = Centerline corresponding to D2

- D3 = External distance
- C3 = Centerline corresponding to D3

- D13 = Distance between 2 centerlines
- C13 = Average between 2 centerlines



This function allows the centerline and distance measurements between 2 surfaces that are not diameters. To activate it, press the key opposite during 2 seconds. The "height" and "centreline" modes indicators start blinking.

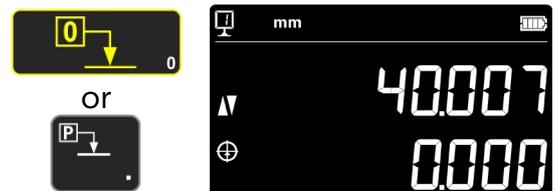


Probe the 1st surface, then the 2nd one. When the measuring force is released after the 2nd measurement, the distance and centerline values are frozen on the 1st and 2nd line of the display, respectively.



Zero or Preset on centerline

It is possible to give a *Zero* or *Preset* value to the centerline measured.



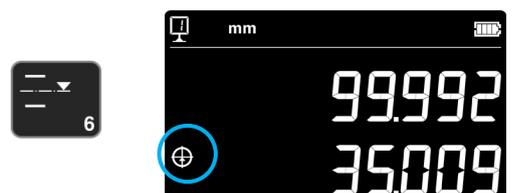
Distance between 2 centerlines

By pressing the difference key, the distance between the 2 last centerlines is determined and mentioned on the 2nd line of the display.



Centerline average

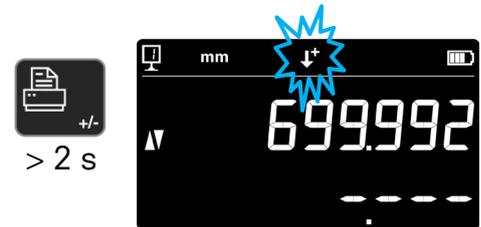
By pressing this key, the average of the 2 last centerlines is determined.



6.4 Inversion of the Measuring Direction

It is possible to invert the measuring direction to obtain positive measuring values in both directions (upwards and downwards starting at zero). This function is mainly used when the part to be measured is higher than the measuring range of the instrument.

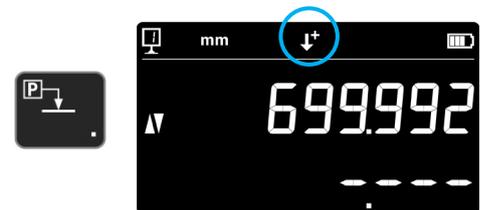
Press +/- key during 2 seconds to revert the direction of measurement. The inversion indicator of the measurement direction starts blinking.



Preset

Immediately after having inverted the measuring direction, the preset value of the active reference will be replaced by the last measured value (height or centerline) before the inversion.

By pressing the *Preset* key, this last value will be displayed. Afterwards, the Preset value will be the initially entered one. The inversion indicator of the measurement direction is displayed as long as this mode remains active.



Procedure:

1. Perform measurements in a normal way
2. Turn the part when having reached the limit of the instrument range
3. Invert the measuring direction
4. Probe the last surface or centerline measured before
5. Press the *Preset* key (the last measured value will be displayed)
6. Continue measuring



Quit

Quit the function of inversion of the measuring direction by pressing once again the +/- key during 2 seconds



6.5 Probe Holder Change

This function allows to pass from one probe holder to another while keeping the same origin.

Press the key opposite during 2 seconds to activate the probe holder change function



Procedure to follow

1. Before taking out the insert probe a reference surface of centerline and activate the probe holder change mode. The function symbol is blinking..



2. Mount the probe on the other probe holder.
3. Probe the same surface again, or reference centreline.

4. Press **Preset** key (the display mentions the latest measured value.



This procedure can be interrupted at any time by pressing the **Validate** key.



6.6 Manual Recording of the Probe Constant

The probe constant can be introduced manually. To do so, press the opposite function key during 2 seconds and enter the requested value with the numeric keypad.

Confirm by pressing the **Function** key.

The registered value is taken into account during measurements. Each new constant acquisition replaces the old one.



The constant is an essential element during bidirectional measurements. Great caution should be applied for the interpretation of the measurements results when this value is entered manually.

6.7 Display Modes

In height measuring mode, 2 ways are possible to display the measured value :

"Standard" display

The upper line of the display permanently indicates the current position of the probe. It remains frozen at the measured value during probing.

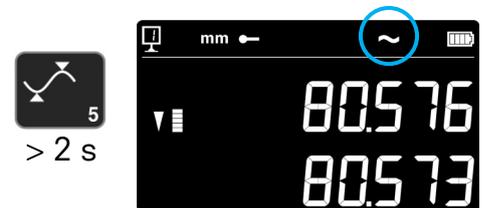
During probing the lower line indicates the distance from the former height (Dimension in chain).

When the measuring force is released, this value is replaced by that of the last measurement.

"Direct" display

The upper line of the display permanently indicates the current position of the probe. It does not remain frozen during probing.

The lower line indicates the frozen value of the last measurement.



Activate the "direct" display mode by pressing the key opposite during 2 seconds. Do the same to deactivate this mode. When the "direct" display mode is activated, the symbol opposite appears at the top of the principal display.

Note 1:

The "standard" and "direct" display modes only apply to height measurements.

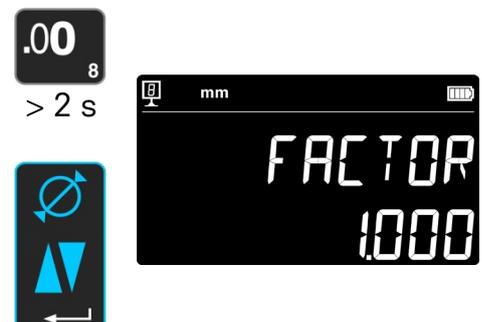
Note 2:

In this mode, sending data transfers the current position of the insert and not the value of the last probing.

6.8 Shrinking Factor

A shrinking factor can be entered here, for example for measuring injection moulds. This function allows in general "distending" or "shrinking" the measuring system by a defined factor.

To activate this function, press the key, shown at the right, during 2 seconds. Enter the shrinking factor (value between 0.7 and 1.2) and confirm by pressing *Validation Key*.



When the shrinking factor is different from 1, the following symbol appears at the top of the main display.



6.9 Temperature Compensation

When the ambient temperature differs from 20°C, it is possible to compensate the measurement according to the actual room temperature and the thermal expansion coefficient of the part. The displayed values are then recalculated to the standard temperature 20 °C.

To activate the temperature compensation, press the following button during 2 seconds



Enter the real room temperature (value between 10 and 40, unit [°C]) and confirm by pressing *Validation Key*.



Enter the value of thermal expansion coefficient of the part (value between 0 and 200, unit [10^{-6} K^{-1}]) and confirm by pressing *Validation Key*.



If the entered temperature is different from 20 °C, the function indicator will display "T".



7. DATA TRANSFER AND PRINT-OUT

The instrument offers 2 communication ports:

Mini USB

This connector is placed at the back of the display unit. It allows a very simple connection to a PC for the transmission of data, upgrades, diagnosis, etc.



RS232

This connector is placed at the back of the height gauge. It allows a classic connection with external devices equipped with RS232 interfaces, such as printer or PC. It is also the port used for wireless communication.



Note:

Measured values will be transferred in identical and simultaneous manner to both ports.

7.1 USB Connection

A mini-USB cable is required for the connection to a PC, as well as the communication software TrimosDataTransfer.

Cable

Cable USB A-Mini B: TA-EL-014 (ref. 332 02 0002)

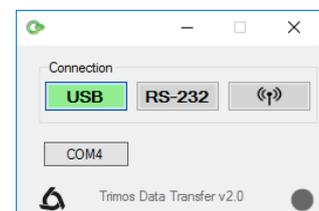
Software

The software TrimosDataTransfer is freely available on www.trimos.ch, in the corresponding product section.



Data transfer procedure

1. Start TrimosDataTransfer
2. Connect the instrument to the PC with TA-EL-014 cable and wait for the connection to be established
3. Click on the application to which the data has to be transferred (i.e. Microsoft Excel)
4. Press **data transfer** key: the value is displayed at the place having the focus. Data can also be sent automatically after each measurement (§ 9).



Format

The format of the value sent corresponds to the numeric value of the display in ASCII characters.

In diameter / Centerline mode, if both values are sent simultaneously (§ 9) they are separated by a LF (Line Feed).

7.2 RS232 Connection

Connection to a serial printer

Printer TA-EL-032

The RS232 cable, the charger and a support to fix the printer to the instrument are included.



Connection to a PC with RS232 cable

Cable TA-EL-112



Wireless connection to a PC

Wireless data transmission system TA-EL-022



Software

The TrimosDataTransfer software is available free of charge at www.trimos.com in the relevant product section.

Any other RS232 communication software (Vmux, Hyperterminal, WinWedge etc.) can be used.



Data transfer procedure

1. Connect the RS232 cable or Wireless Transmission System to the serial port of the instrument.
2. Start and configure the communication software.
3. Press the Data Send Key. The data can also be sent automatically after each probing (§ 9).

Data transmission (according to Opto-RS)

- Speed: 4800 baud
- ASCII code: 7 bits
- Parity: pair
- Stop bits: 1
- Handshake: without



Format

The format of the value sent corresponds to the numeric value of the display in ASCII characters.

In diameter / centerline mode, if both values are sent simultaneously (§ 9) they are separated by an EOT (End Of Transmission).

8. REMOTE CONTROL OF THE INSTRUMENT

The instrument can be remotely-controlled by ASCII commands via the RS232 interface.

- The RS232 interface shall be configured to OPTO RS (see § 9).
- Up to 64 commands can be executed simultaneously.
- When a set of commands is executed, it is not possible to access keyboard functions.
- After the first error, all following commands are cancelled.
- When an error occurs, no new command is accepted except: "ERR?", "!ERR" et "RST".

8.1 Command attributes

Some commands can only be executed if the instrument is in a given configuration (command attributes). If a command is sent while the attribute is not respected, an error will be generated.

List of command attributes:

1. ATTR_REF => The reference must have been passed
2. ATTR_CONST => The probe constant must have been taken.
3. ATTR_MOTOR => The motorised mode must be switched on.

8.2 List of commands

Attribute	Command	Description
1, 2	PRI	Prints the currently displayed value.
1, 2	?	Prints the currently displayed value.
1, 2	CLE	Resets the min and max values.
	ID?	Prints a short description (TRIMOS_V{num}_{height}_{serial}).
1	IN	Sets the current unit to inch.
1	MM	Sets the current unit to millimetre.
	KEY0	Locks all the keys of the keypad (alias of: LCK0123456789.E).

Attribute	Command	Description
	KEY1	Unlocks all the keys of the keypad (alias of: ULK0123456789.E).
1	AXI	Sets the current mode to "Axis".
1	DIA	Sets the current mode to "Diameter".
1	DEL	Sets the current mode to "Delta".
1	NOR	Sets the current mode to "Normal" (height).
1	MAX	Sets the current mode to "Maximum".
1	MIN	Sets the current mode to "Minimum".
	MOD?	Prints the current mode ("NOR", "DIA", "AXI", "MIN", "MAX" or "DEL").
1, 3	POS+{num}	Moves the probe to the selected relative position.
1, 3	POSA+{num}	Moves the probe to the selected absolute position.
1, 2, 3	PROD	Performs a downwards measurement (in probing speed)
1, 2, 3	PROU	Performs an upwards measurement (in probing speed)
	POSE	Enables the automatic of the position after a move.
	POSD	Disables the automatic of the position after a move.
1	ZERO	Initializes the display to zero
1, 2	PRE	Displays the preset value.
1, 2	PRE+{num}	Sets the preset value.
	PRE?	Prints the preset value.
	REFx	Selects the reference mode (where 'x' is 1 to 9)
1	RES2	Sets the resolution to 0.001 mm or 0.00005 in.
1	RES3	Sets the resolution to 0.01 mm or 0.0005 in.
	RST	Resets the device (restarts the device) (it is managed like the "ERR" command)
	UNI?	Prints the current measure unit.
1	UNI1	Enables the inch <-> millimeter conversion
1	UNI0	Disables the inch <-> millimeter conversion
	VER?	Prints all the firmware versions of the instrument with a label for each.

Attribute	Command	Description
	VER1?	Prints the firmware version of the module without label.
	VER2?	Prints the firmware version of the mainboard without label.
	VER3?	Prints the firmware version of the sensor without label.
	PCAL?	Prints the last calibration date.
	NCAL?	Prints the next calibration date.
	LCK+{seq}	Locks specific keys. ('seq' = '0123456789.E' and '+' or '-')
	ULK+{seq}	Unlocks specific keys. ('seq' = '0123456789.E' and '+' or '-')
	LN20	Disables the second line of the display.
	LN21	Enables the second line of the display.
	PONCE[1 0]	Enables/Disables "Print once" for the probed values.
	PONCE?	Prints the "Print once" state.
1, 2	CHHOLD	Selects the probe holder change mode.
1	CONST	Selects the "constant" function.
	CONST?	Prints the "constant" value.
	ERR?	Prints information on the last error.
	!ERR	Reset the error state. Used in place of a parse error, or to replace an executed command that produced an error.
	UERRE	Unknown error enable (instrument locks after an error)
	UERRD	Unknown error disable + double beep (double beep after an error)
1	DPM0	Transfer of diameter only (DIAMETER)
1	DMP1	Transfer of centerline only (CENTER)
1	DMP2	Simultaneous transfer of diameter and center distance (BOTH)
1	DMP3	Alternate data transfer (ALTERN)
1	DMP4	Simultaneous transfer of diameter and centre distance. The values are separated by a semicolon. (BOTH SEP)
1	SM0	Disables the SmartReverse mode
1	SM1	Activates the SmartReverse mode
1	PA0	Manual data transfer
1	PA1	Automatic data transfer

9. CONFIGURATION

Various parameters of the instrument can be configured, Press the **Validation** key during 2 seconds to enter set-up menu

A simple pressure on **Validation key** validates the choice and allows passing on to the next menu.

Quitting the set-up mode is automatically made after passing the last menu. It is however possible to quit at any moment by pressing the **Validation key** during 2 seconds.



> 2 s

Control of probe weight balancing

This function allows adjusting the balancing of the probe weight.

1. Start-up display
2. As soon as a movement of the carriage is detected, a numeric value corresponding to the position of the double carriage is displayed.
3. The carriage is considered as balanced when **OK** is displayed in neutral position. The balancing procedure is described in § 10.3.

1.



2.



3.



Measuring force adjustment

The measuring force can be electronically adjusted from 0.75 N to 1.5 N. To adjust, press the keys opposite. Factory setting: 1N



Number of references definition

The number of references available for the user can be defined (1 ÷ 9). To do so, press keys opposite.



Air cushion adjustment (V4 ÷ V8)

The air flow of the pump can be adjusted according to the quality of the work table with the help of the keys opposite.



Probing filter

Probing sensitivity can be adjusted, depending on the type of insert used :

- SHORT: For short and stiff inserts (best accuracy)
- MEDIUM: For medium long and slightly rigid inserts
- LONG: For long and less rigid inserts

Note:

Probing filters "MEDIUM" and "LONG" reduce the probing robustness. Precision and repeatability can differ from specifications according to the user.



SmartReverse

The *SmartReverse* function facilitates the measurement of diameters. By activating this function, the user is warned by a specific audible signal and a blinking of the measured values that the reversal point has been reached.

- SMART: SmartReverse mode enabled
- STANDARD: SmartReverse mode disabled



Sending data in diameter and centerline mode

It is possible to configure the sending of data of diameter and centerline measurement modes (§5.3 and §6.3).

- BOTH: Simultaneous sending of diameter / distance and center distance. The values are separated by an LF or EOT (see § 7).
- DIAMETER: Sending diameter / distance only
- CENTER: Sending the center distance only
- ALTERN: Sends the diameter / distance at the first press of Print button and the center distance at the second press.
- BOTH SEP: Simultaneous sending of diameter/distance and centre distance. The values are separated by a semicolon (;).



Data transfer mode

The transfer of measured values can be configured according to 2 modes :

- MANUAL: The transfer of the measured value is simply carried out by pressing the data transfer button.
- AUTO: The measured value is automatically transferred after each probing.



Press opposite button to select requested mode.

2nd line of display

In height measurement mode, the 2nd line of display can be masked.

- ON: 2nd display line activated
- OFF: 2nd display line off



Programmable button I (V4 ÷ V8)

Various functions can be attributed to programmable button 1:

- REF: change of reference
- PRESET: Preset
- ZERO: Zero setting (by default)
- PRINT: Data transfer (PRINT)
- SUR/DIA: Height/Diameter-centerline
- MOT UP: Movement upwards (motorised mode only)



Press the keys opposite to select the requested functions.

Programmable button II (V4 ÷ V8)

Various functions can be attributed to programmable button 2:

- REF: change of reference
- PRESET: Preset
- ZERO: Zero setting
- PRINT: Data transfer (PRINT)
- SUR/DIA: Height/Diameter-centerline (by default)
- MOT DOWN: Movement downwards (motorised mode only)

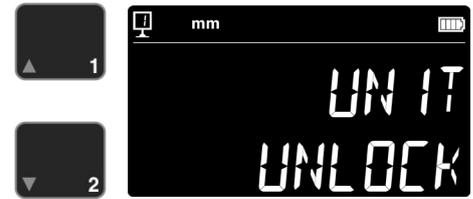


Press the keys opposite to select the requested functions.

Unit blocking

The active unit can be blocked. Therefore it will not be possible to change it in work mode.

- UNLOCK: Unit can be changed
- LOCK: Current unit locked



Size of reference gauge

If the measuring insert calibration has to be made with another reference gauge than that delivered with the instrument, the height of the gauge can be entered with the help of the numeric keypad.



Standby mode

The instrument can switch to standby mode after a predefined time (5 ÷ 120 min).

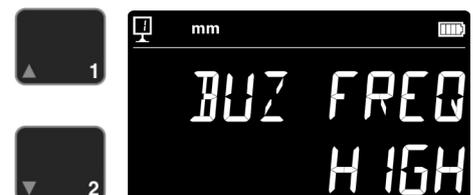
To define time before standby, press keys opposite. "OFF" means that the instrument will never switch to standby mode.

In standby mode the blue LED flashes at about 0.5 Hz. When the battery is charging, it flashes at about 2 Hz.



Frequency of buzzer

The acoustic signal (buzzer) frequency can be adjusted with the keys opposite.



Volume of buzzer

The acoustic signal (buzzer) volume can be adjusted with the keys opposite.



Function after start-up

The function immediately available after starting-up of the instrument can be selected with the keys opposite.

- CONST: Constant (by default)
- DIST: Height mode
- DIA: Diameter-centerline mode
- DELTA: Delta mode
- MAX: Max mode
- MIN: Min mode



Serial number

This function gives the serial number of the instrument. Press the opposite keys to display the model and measuring range of the instrument.



Firmware version

This function indicates the version number of the various firmwares making up the instrument.

- MODULE: Display firmware
- MAINBRD: Main card firmware (V4 ÷ V8)
- SENSOR: Probing system firmware



Press opposite keys to display the various firmware versions.

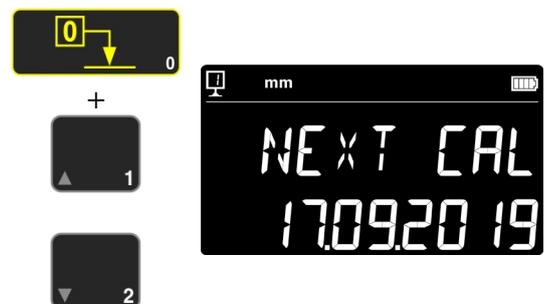
Latest calibration date

The date of the latest calibration is displayed. Format: *dd.mm.yyyy*. This information cannot be modified.



Next calibration date

The date of the next calibration can be entered manually. (Format: *dd.mm.yyyy*). By pressing the **Zero** key, the number of the day starts blinking. It can be modified with the opposite keys. Follow the same procedure for month and year.



10. APPLICATION AND ADJUSTMENTS

10.1 Probing

The measurement precision is directly linked to the quality of contact between the probe and the part to be measured (\Rightarrow probing). The instrument offers all tools allowing an optimal probing:

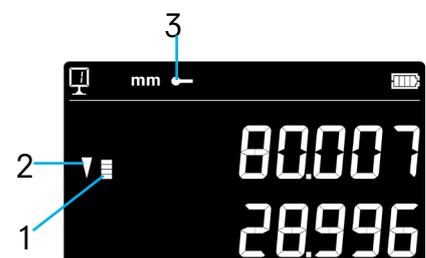
Probing indicator

Situated on the left of the measured value, it views the probing zone (1).

If the probing zone has been passed, the display shows **-.-.-** and an acoustic signal rings out as long as the indicator remains out of the probing zone.

Probing direction indicators

Besides the acoustic signal, the measurement is visually confirmed by the indicators of the probing direction (2) and by the probing symbol (3).

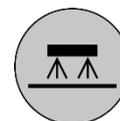


Acoustic signal

An acoustic signal confirms a correct measurement probing movement (measuring force set) and that the value has been taken.

10.2 Air Cushion (V4 ÷ V8)

The use of the air cushion facilitates the displacement of the instrument on the granite plate. The activation of the air cushion lifts the instrument at some μm . The air cushion is not only used for the displacement of the instrument in general but also when performing measurements (e.g. diameters). The main application is found particularly in industrial fields with large heavy parts. Small parts can be moved without activating the air cushion. This allows to significantly increase the autonomy of the instrument.



The air cushion force can be adjusted in the set-up menu (§ 9). It should be set on the minimum value allowing a comfortable displacement of the instrument.



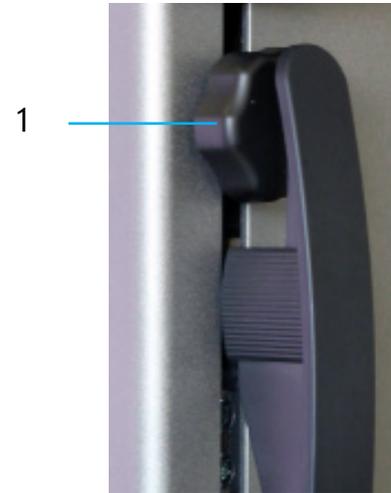
When using the air cushion displacement for measurement procedures, all functions e.g. zero or preset setting of the display should be done with air cushion to take into consideration the lifting amount of the instrument.

10.3 Adjustment of Floating Probe Suspension Balancing

In order to guarantee a constant measuring force in both directions (upwards and downwards), it is necessary to adjust the balancing of the floating probe suspension according to the probe in use.

The adjustment button of the floating suspension (1) allows compensating the weight of the probe in use.

A function facilitating the balancing can be found in the set-up menu (§ 9).



10.4 Other motorised movement methods (V5 & V6)

10.4.1 With keyboard keys

The carriage displacement in probing speed, as well as the release of the probe and stop of movement are possible with both keys opposite.

The use principle is similar to that for the use of motorized displacement keys.

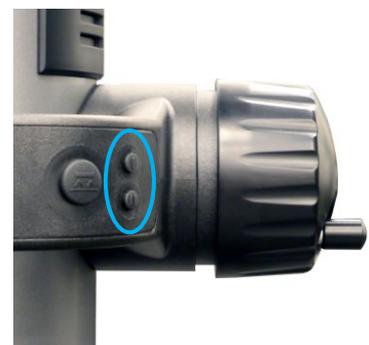


10.4.2 With programmable functions buttons

The motorized movement of the carriage is also possible thanks to the programmable function buttons.

When activated, they are used exactly like the motor buttons behind the handle.

To activate this mode: see § 9.



10.5 Service display

By pressing the following keys simultaneously, a service screen appears.

By pressing the function key (blue), the following information scrolls:

- Serial number (S/N)
- Model (TYPE)
- Measuring range (HEIGHT)
- Firmware versions (MODULE, MAINBRD, SENSOR)
- Reset the wireless connection (BLU.TOOTH RESET)



+



>2 s



10.5.1 Resetting the wireless connection

When the instrument has been paired with a wireless data transmission system TA-EL-022, the connection is permanent.

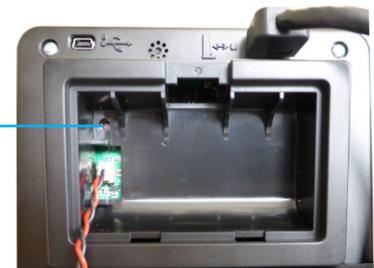
To cut this connection, press the key on the right. The text "OK" appears for one second to confirm the action.



10.6 Resetting of the Instrument

In case of blocking, it is possible to force the resetting of the electronics. To do so, open the lid at the back of the display and press the Reset button (1) with the tip of a pencil.

1



10.7 Cleaning

The plastic parts, the display unit as well as the painted parts of the instrument should be cleaned using a slightly dampened (watered) fabric. Clean the air cushion pads using a clean fabric, slightly dampened with alcohol.



The use of solvents such as acetone, white spirit, trichloethylene, petrol or others for cleaning must absolutely be avoided!

11. AFTER SALES SERVICE

11.1 Replacement of Battery Block

When the instrument autonomy is not sufficient anymore, the battery block must be replaced :

1. Get a battery block from your TRIMOS agent (Trimos réf.: 3704 0021).
2. Open the lid at the back of the display.
3. Remove the old battery block and replace it by the new one (pay attention to the connector polarity).
4. Close the lid tightly.
5. Load the new batteries.



11.2 Recycling of Electronic Components



Disposal of Waste Electrical and Electronic Equipment (WEEE) applicable throughout the European Union and other European countries with separate collection programs

This symbol, found on the product or its packaging, indicates that it should not be treated as household waste. It should be handed over to an official collection point for the recycling of electrical and electronic equipment. A correct recycling of this product will help to preserve the environment and the natural resources. For more detailed information about the recycling of this product, please contact your local authorities or your TRIMOS supplier.

11.3 Complaints / Repairs

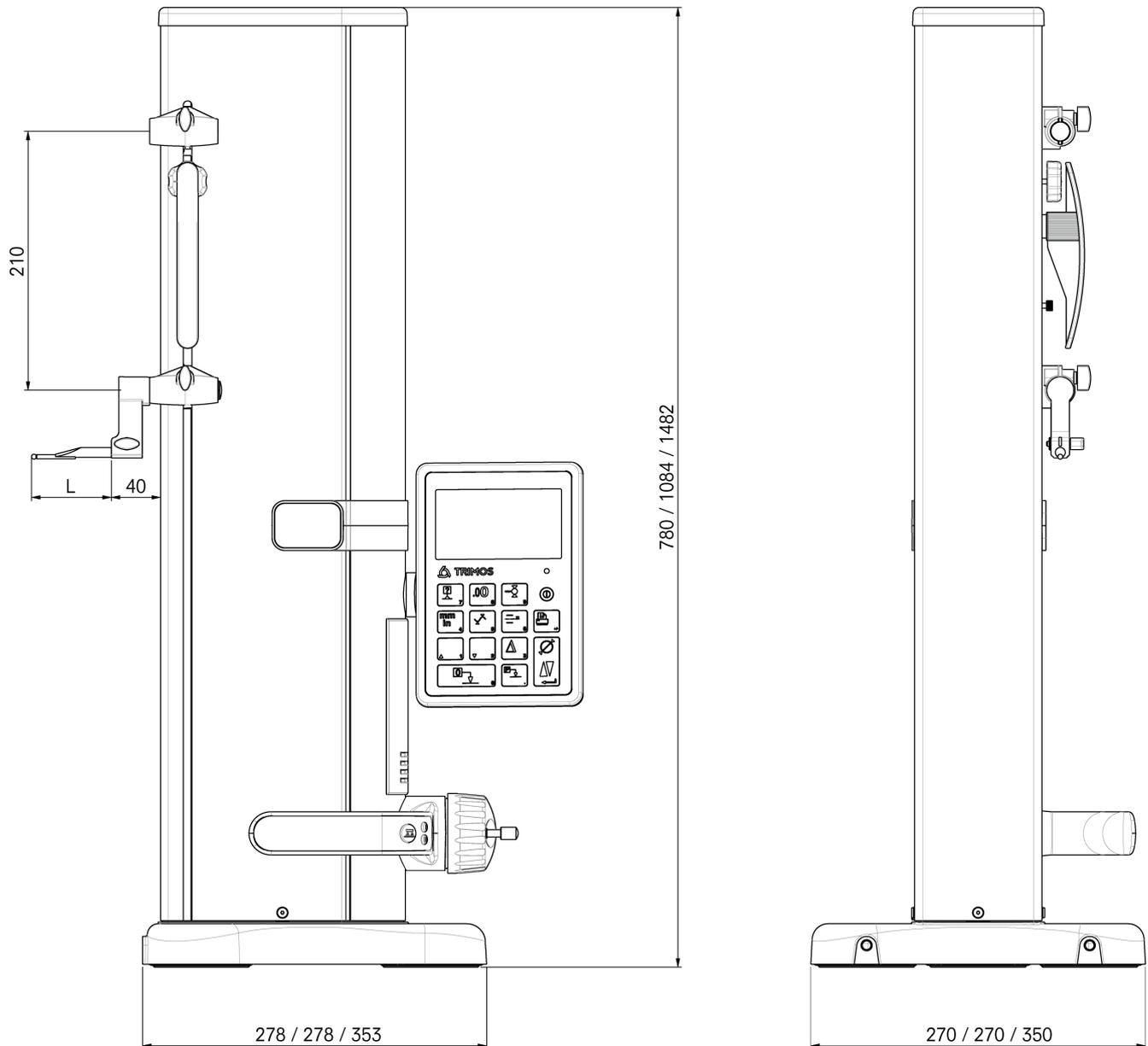
In case of problems, please contact your local TRIMOS agent.
For any transport, use the original packing or an adequate one.

11.4 Agents

You can find the official TRIMOS agents list on the website www.trimos.ch.

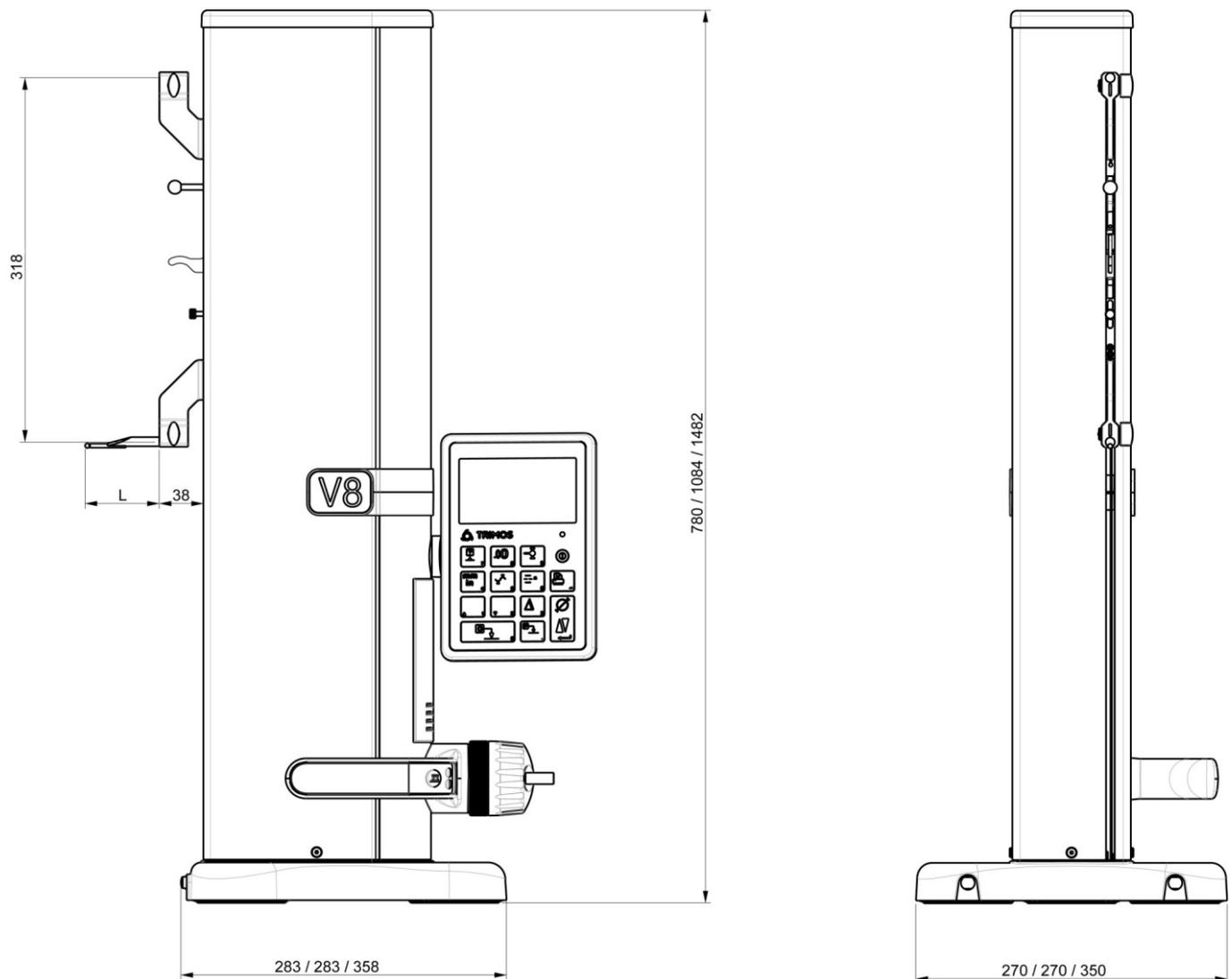
12. DIMENSIONS

12.1 V3, V4, V5, V6



L: depends on the measuring insert used

12.2 V8



L: depends on the measuring insert used

13. TECHNICAL SPECIFICATIONS

V3		400	700
Measuring range	mm (in)	407 (16)	711 (28)
Application range	mm (in)	508 (20)	812 (32)
Max. permissible errors, B_{MPE}	μm	7	8
Repeatability, R_{MPE}	μm	2 (\varnothing : 4)	
Perpendicularity deviation (frontal), S_{MPE}	μm	10	15
Max. resolution	mm (in)	0.001 (0.00005)	
Measuring force	N	0.75 ÷ 1.5	
Autonomy	h	40	
Data output		USB / RS232	
Air cushion		No	
Protection grade of measuring system (CEI 60529)		IP67	
Weight	kg	21	24
Max. weight of measuring insert & holder	g	400	
Max. manual displacement speed	mm/s	1000	
Operational temperature	$^{\circ}\text{C}$	+10 ÷ +40	
Storage temperature	$^{\circ}\text{C}$	-10 ÷ +40	
Relative humidity (operation and storage)	HR	5 ÷ 75 % (without condensation)	

V4		400	700
Measuring range	mm (in)	407 (16)	711 (28)
Application range	mm (in)	719 (28)	1023 (40)
Max. permissible errors, B_{MPE}	μm	4.5	6
Repeatability, R_{MPE}	μm	2 (\varnothing : 4)	
Perpendicularity deviation (frontal), S_{MPE}	μm	10	15
Max. resolution	mm (in)	0.001 (0.00005)	
Measuring force	N	0.75 ÷ 1.5	
Autonomy	h	20	
Data output		USB / RS232	
Air cushion		Yes	
Protection grade of measuring system (CEI 60529)		IP67	
Weight	kg	21	24
Max. weight of measuring insert & holder	g	400	
Max. manual displacement speed	mm/s	1000	
Operational temperature	$^{\circ}\text{C}$	+10 ÷ +40	
Storage temperature	$^{\circ}\text{C}$	-10 ÷ +40	
Relative humidity (operation and storage)	HR	5 ÷ 75 % (without condensation)	

V5		400	700	1100
Measuring range	mm (in)	407 (16)	711 (28)	1110 (44)
Application range	mm (in)	719 (28)	1023 (40)	1422 (56)
Max. permissible errors, B_{MPE}	μm	2.5 + L(mm)/300		
Repeatability, R_{MPE}	μm	2		
Perpendicularity deviation (frontal), S_{MPE}	μm	5	8	11
Max. resolution	mm (in)	0.0005 (0.00005)		
Measuring force	N	0.75 ÷ 1.5		
Autonomy	h	12		
Data output		USB / RS232		
Air cushion		Yes		
Protection grade of measuring system (CEI 60529)		IP67		
Weight	kg	21	24	33
Max. weight of measuring insert & holder	g	400		
Max. manual/motorised displacement speed	mm/s	1000/70		
Operational temperature	°C	+10 ÷ +40		
Storage temperature	°C	-10 ÷ +40		
Relative humidity (operation and storage)	HR	5 ÷ 75 % (without condensation)		

V6		400	700	1100
Measuring range	mm (in)	407 (16)	711 (28)	1110 (44)
Application range	mm (in)	719 (28)	1023 (40)	1422 (56)
Max. permissible errors, B_{MPE}	μm	2 + L(mm)/400		
Repeatability, R_{MPE}	μm	1 (\varnothing : 2)		
Perpendicularity deviation (frontal), S_{MPE}	μm	5	8	11
Max. resolution	mm (in)	0.0001 (0.000005)		
Measuring force	N	0.75 ÷ 1.5		
Autonomy	h	12 *		
Data output		USB / RS232		
Air cushion		Yes		
Protection grade of measuring system (CEI 60529)		IP40		
Weight	kg	21	24	33
Max. weight of measuring insert & holder	g	400		
Max. manual/motorised displacement speed	mm/s	1000/70		
Operational temperature	°C	+10 ÷ +40		
Storage temperature	°C	-10 ÷ +40		
Relative humidity (operation and storage)	HR	5 ÷ 75 % (without condensation)		

The above values have been determined according to ISO 13225 with the standard insert (TA-MI-101)
 R_{MPE} is defined as twice the standard deviation (2s) over 20 height measurements.

* If an electronic perpendicularity probe remains connected, the autonomy may decrease

V8		400	700	1100
Measuring range	mm (in)	406 (16)	710 (28)	1109 (43)
Application range	mm (in)	724 (28)	1028 (40)	1427 (56)
Max. permissible errors, B_{MPE}	μm	1.2 + L(mm)/1000		
Repeatability, R_{MPE}	μm	0.4 (\varnothing : 1)		
Perpendicularity deviation (frontal), S_{MPE}	μm	5	8	11
Max. resolution	mm (in)	0.0001 (0.000005)		
Measuring force	N	0.75 ÷ 1.5		
Autonomy	h	12 *		
Data output		USB / RS232		
Air cushion		Yes		
Protection grade of measuring system (CEI 60529)		IP40		
Weight	kg	21	24	33
Max. weight of measuring insert & holder	g	150		
Max. manual displacement speed	mm/s	1000		
Operational temperature	$^{\circ}\text{C}$	+10 .. +40		
Storage temperature	$^{\circ}\text{C}$	-10 .. +40		
Relative humidity (operation and storage)	HR	5 ÷ 75 % (without condensation)		

The above values have been determined according to ISO 13225 with the standard insert (TA-MI-119)
 R_{MPE} is defined as twice the standard deviation (2s) over 20 height measurements.

* If an electronic perpendicularity probe remains connected, the autonomy may decrease

14. DECLARATION OF CONFORMITY

DECLARATION DE CONFORMITE KONFORMITÄTSERKLÄRUNG DECLARATION OF CONFORMITY



TRIMOS déclare que les instruments de mesure
TRIMOS erklärt, dass die Messgeräte
TRIMOS declares that the measuring instruments

V3, V4, V5, V6 & V8

sont conformes aux directives suivantes :
mit folgenden Richtlinien übereinstimmen :
conforms with the following directives :

CEM / EMV / EMC :

EN 61326-1:2013
IEC 61326-1:2012 (ed2.0)

FCC 47, part 15, Class B

Sécurité / Sicherheit / Safety :

IEC 61010-1



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