



TESA
TECHNOLOGY

Quickstart document

HEIGHT GAUGES

for MICRO-HITE 2016 (MH 2016)

for MICRO-HITE+M 2016 (MH+M 2016)



This document is confidential and only to be used internally by the company that has purchased one of the height gauges mentioned above. Before duplicating or transmitting it to third parties without any connection to the use of these instruments, an official request has to be sent to TESA SA.

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Quickstart document

1 INTRODUCTION

1.1 Acknowledgements

Dear user,

We would like to thank you for having chosen TESA as your metrology partner. We thank you for your confidence in purchasing one of our high-end height gauges from our MICRO-HITE or MICRO-HITE+M range.

Your metrological concerns are important to us and we are convinced that this instrument will meet your expectations. We are constantly striving to develop solutions adjusted to your needs.

The result? Your satisfaction for many years. Our pleasure? To know that our products help you meet your needs in research, development and production in a quick and efficient way, and for a long time.

The whole TESA team welcomes you to our family of TESA product users.

Your TESA team

1.2 Warning

This instruction manual must be read by every technician or operator before the installation, maintenance or use of the instrument. Not adhering to certain instructions regarding its use could lead to malfunction or deterioration of the instrument.

1.3 Copyright

The content of this document has been created subject to subsequent modifications without prior notice. All modification rights are reserved.

The French version is the reference language. All other language versions are only translations.

1.4 Preamble

The MICRO-HITE or MICRO-HITE+M is the result of more than 70 years of experience in the conception and production of high-precision measurement equipment. It has been designed to meet the needs of a production environment and to offer its users an affordable, quick and precise way for dimensional control of small or large workpieces in workshops or laboratories.



This document describes the first steps for quick and easy handling of both our manual range MICRO-HITE 2016 and our motorised range MICRO-HITE+M 2016.



With the exception of features specific to the automatic movement of the gauge, the software provided is the same for all models, which allows an experienced user of manual height gauges to easily use an automatic height gauge (and vice versa).

1.5 Symbols

Several different types of symbols are used in this manual. They give important information that has to be taken into account in order to correctly use the measuring instrument.

Position	Description
	Not adhering to these instructions can lead to incorrect measurement results.
	Corresponds to help for better use of the product.

2 PRESENTATION

2.1 General description

N°	Description
1	Cap cover
2	Electronic system reading the position (sensor + scale)
3	Fixing knob of the measuring carriage
4	Handle for manual probe displacement
5	Connector for accessory
6	Information LED
7	Probe support
8	Probe
9	Guiding and support faces
10	Cast-iron base
11	Rotary control handle or handwheel for displacement
12	Electric pump
13	Electric pump switch
14	Control panel
15	Touchscreen
16	Adjustable arm for control panel
17	Protective housing



The table above shows a motorised height gauge. Apart from No. 4 and 11, all elements of the manual height gauges are identical. The MICRO-HITE doesn't have a handle for motorised displacement (No. 4).



Fig. Description of the constitutive elements of the TESA MICRO-HITE+M

3 INSTALLATION, SECURITY & MAINTENANCE

3.1 Location

The instrument has to be installed in a location satisfying the general required conditions, but also the specific and very precise conditions regarding the environment, power supply, etc. It is essential to be able to identify important factors and to correctly prepare the zone the instrument is installed and used in.

3.2 Place of use

In order to use the instrument correctly, the following precautions have to be taken into account:

- Avoid placing the instrument close to a window, door, cooling or heating system.
 - Avoid causing recurrent temperature variations due to direct exposure of the instrument to the sun.
 - Avoid installing it close to other machines that could induce large electromagnetic fields.
-

3.3 Lighting

Use indirect or fluorescent light. Avoid direct exposure to the sun or any other strong light.

3.4 Measuring surface

Choose a surface free of any vibrations that could lead to measurement or reading errors despite the stability of the mechanical and electronic components.

Make sure that the surface can carry the weight of the machine and the workpiece to be measured. Ideally, the surface should not have any splits or joints.

It is recommended to use a measuring surface that is big enough to enable smooth and easy movements of the instrument around the workpiece to be measured if the latter cannot be displaced manually.

3.5 Cleanliness

Make sure the gauge is used on a clean surface, so that there is no dust, condensation or metal filings. The supports and scales have to be perfectly clean without any oily particles on it.

3.6 Vibrations

Floors of companies are constantly at risk of vibration due to different reasons: CNC and other machines, transportation vehicles and any other source of vibrations. These vibrations can directly influence the metrological performances of the machine.

3.7 Electric power supply

Stability

When the instrument is powered electrically via the cable connected to the network, make sure that the electric power supply of the machine is as stable as possible, as it could otherwise damage the system. If the electric network the machine is connected to does not provide sufficient stability, it is highly recommended to use an additional device to avoid any damage. These devices can be found locally.

Power cable

Do not use any other power cable than the one provided with the instrument.

Transformer

Do not use any other transformer than the one provided with the instrument.

Voltage

Do not use the instrument with any other voltage than the one indicated in the technical specifications of the instrument.

3.8 Batteries

Interchangeability

MICRO-HITE height gauges are provided with batteries easily accessible and removable from the instrument.

Recharging the batteries

The batteries are only to be recharged with the charger provided with the height gauge (TESA reference: 00760245).



Not adhering to this rule can cause irreversible damage to the instrument or its instability.

3.9 Final use

The instrument is to be used for measurements only.

3.10 Storage

It is important to respect the storage temperature limit indicated in the specifications of the instrument.

3.11 Cleaning

Only use a dry, lint-free cloth for cleaning the instrument. Do not use aggressive solvents.

3.12 Opening elements

Never try to open the control panel or the height gauge. Access is only allowed to qualified and authorised personnel.



If a person not authorised opens one of these elements, the warranty period automatically ends.

4 INSTALLATION

4.1 Packaging

Each MICRO-HITE or MICRO-HITE+M instrument is delivered in packaging developed to protect it from shocks and corrosion.



Only transport the height gauge in this packaging. Any other transport using unofficial packaging is not recommended and will not be covered by TESA in case of dispute.

4.2 Unpacking & installation

- 1 Bring the pallet as close as possible to the installation area.



- 2 Remove the accessories and panel boxes as well as the document folder from the pallet.



- 3 Take the power supply and cables out of the box.



- 4 Remove the masterpiece from the box and its plastic bag. Clean its base before placing it on the granite table.



- 5 Remove the probe and its support from the box. Mount the probe on the support. Do not forget to tighten the assembly with the tightening wheel.



- 6 Accessories are now ready to be used.



- 7 Remove the top two protection foam pieces from the box.



- 8 With a second person, take carefully the gage out of the box.



It is highly recommended not to do this step alone. Two persons are required to avoid any damage of the instrument in case of a shock or an uncontrolled movement. Because of the weight of the instrument, it is not recommended to lift the unit on your own.



- Carefully place the height gauge on the measuring surface keeping it in a horizontal position.



The MICRO-HITE+M are equipped with a handle directly fixed on the carriage system.



This handle is used for manual fast displacement of the probe between two measurement zones. It is very fragile and no force whatsoever must be applied on it, except for the force applied for normal displacement during a measurement.

It cannot be used as a handle when moving the instrument as it could be heavily damaged or completely broken.

- 10 Delicately remove the plastic cover protecting the base of the height gauge.



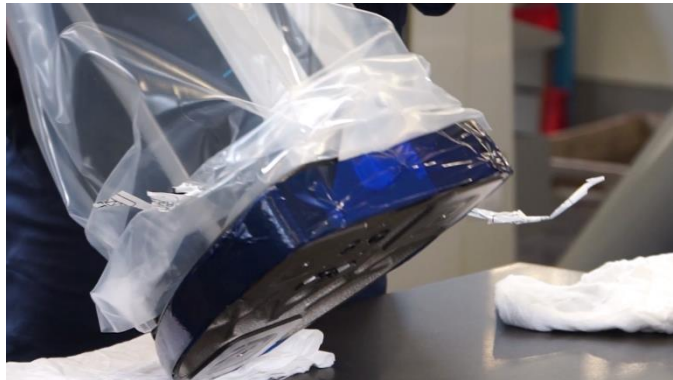
- 11 Make sure you have access to the air bearings.



- 12 Remove the grease from the instrument base surface. Use a non-aggressive solvent to do so.



13 Install the instrument vertically on the clean granite plate (or any other support).



14 Remove the protective plastic cover.



15 Carefully remove the panel arm protection.



16 Carefully remove the protective tape from the base, the handle and the gage top's cap.



17 Remove the two screws from the front shipping bracket.



18 Carefully pull the plate off.



19 Carefully remove the shaft protection (where the probe holder is going to be mounted).



20 Mount the probe support and its probe on the shaft.



21 Remove the panel from its box.



22 Screw the control panel on the articulated support.



Any cable connections have to be established while the instrument is turned off. Make sure that the instrument is turned off each time the control panel/height gauge cable is connected or disconnected.

23 Connect the control panel to the height gauge.



- 24 Make sure that the battery is correctly installed in the height gauge.
- 25 Connect the height gauge to a power source using the power supply unit for direct main operation or later use (with batteries once they are charged).



5 SIMPLIFIED USER MANUAL

5.1 Panel

The control panel of your height gauge has been developed to enable an ideal navigation through its software and an intuitive use. Its keyboard is separated in four sets of keys that are easily distinguishable by their functionality. The control panel below is defined for motorised height gauges type MICRO-HITE+M. The panel provided with manual models has fewer functionalities in zone No. 1.

To improve your user experience, most of the functions available via the keyboard of the control panel are also available via the touchscreen (with touchscreen only technology, swiping the screen is not possible).



N°	Description
1	Measurement zone + numerical keyboard <ul style="list-style-type: none">• Start a measurement (on MH+M)• Define the type of measurement: axis or bore (on MH)• Insert a numerical value
2	Calculation zone <ul style="list-style-type: none">• Calculate differences or averages• Manage references• Change measuring units• Manage transmission of data• Access to secondary functions
3	Software navigation <ul style="list-style-type: none">• Turn the instrument on or off• Access to online help• Validate or cancel actions• Go back to main menu• Displace selection of options
4	Validation of contextual options

5.2 Starting

Pushing the electric pump switch button will activate the pump creating an air cushion enabling the instrument displacement on the granite table.

The instrument can be switched on pressing the  button from the panel keyboard.

5.3 Initialisation

In general, the initialisation process is the first step after turning on the instrument. It consists in moving the sensor in front of the reference mark, which is located approximately at 15 cm from the instrument base.

MICRO-HITE+M

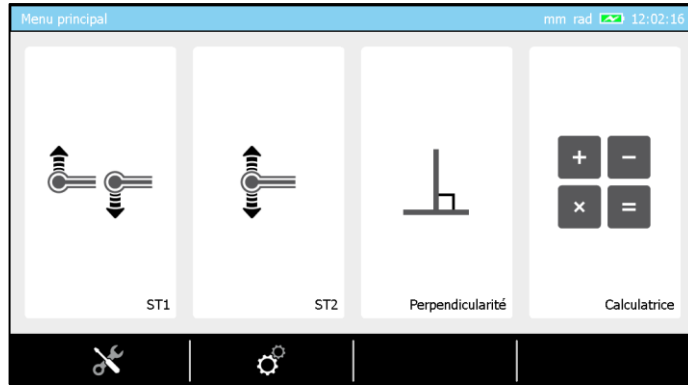
The probe will move automatically in order to detect the reference mark. No action from the user is required. Wait until the process ends.

MICRO-HITE





The probe will have to be moved manually by the user in order to detect the reference mark. Once the mark is found, the instruments beeps and the software enters in ST1/ST2 mode or displays the main menu (user selection in system options).

5.4 Main menu

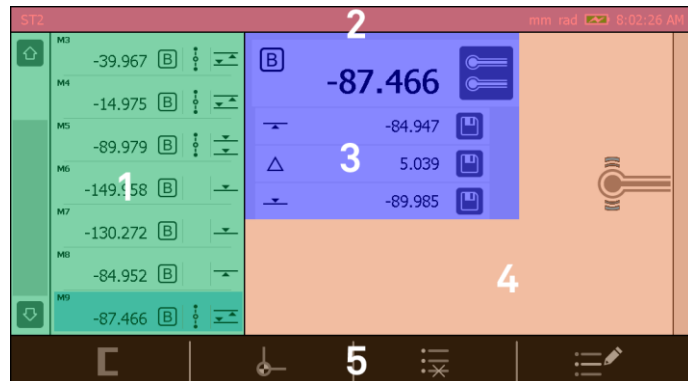
Once the initialisation process has been performed, the software will display by default its main menu.



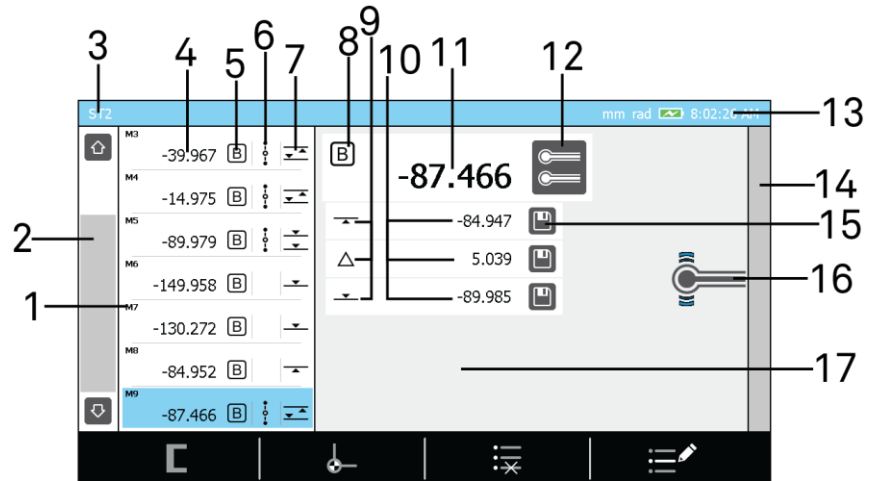
Four main modes are displayed on this page.

Mode	Description
	ST1 <ul style="list-style-type: none"> Allows quick measurements in one probing direction, without the need to calibrate the probe prior to it. The probing direction must be identical as the one used to define the current reference.
	ST2 <ul style="list-style-type: none"> Allows quick measurements in two probing directions Probe calibration is mandatory before any access to the mode
	Perpendicularity To measure using an accessory as IG13 probe and define perpendicularity or straightness errors.
	Calculator Allows to proceed to the following calculations: <ul style="list-style-type: none"> With values inserted manually With values previously measured To save a customised function that takes (or not) into account the results measured previously.

5.5 Measurement mode





N°	Description
1	Measurements' list
2	Status bar
3	Main and secondary results of the last measure
4	Help zone
5	Contextual actions (options are displayed regarding the software active page and the action the user performs)



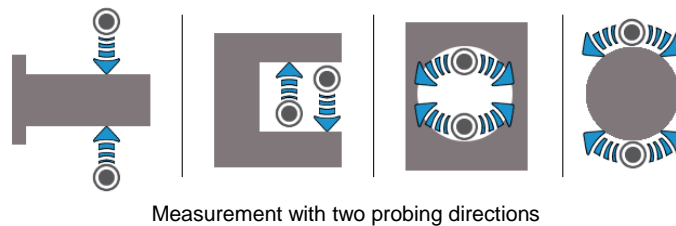
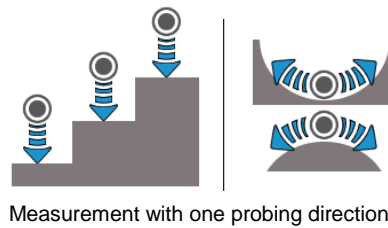
N°	Description
1	Block title • Label automatically created • Editable name
2	Scroll bar In order to move up/down in the measurements' list
3	Active mode
4	Calculated or measured value
5	Active reference when creating the block
6	Block characteristic
7	Block action
8	Active reference
9	Icons related to secondary results
10	Secondary results The values are not automatically saved in the measurements' list
11	Main result Is automatically saved as last block in the measurements' list
12	Single/double probing Valid for MICRO-HITE only
13	System state Displays hour, units and active peripherals
14	Measuring force Displays the status of the pressure applied on the probe
15	Save In order to save the wanted secondary result as a block in the measurements' list
16	Help picture
17	Help text Zone defined to display texts in order to help the user when going through processes and modes.

5.6 ST1 & ST2 modes


The two main modes integrated in the height gauge range are defined by the names **ST1**  and **ST2** . These are the most frequently used modes. The major difference between these two measurement modes is closely linked to the features (height, diameter etc.) that will be determined during one measurement sequence. The determination of certain features does not require an inversion of the probing direction, while others entirely depend on it.



Mode	Description
ST1	<ul style="list-style-type: none"> • Lengths measurement in only one probing direction. • The calibration of the probe is not necessary.
ST2	<ul style="list-style-type: none"> • Lengths measurement in two probing directions. • The calibration of the probe is mandatory.

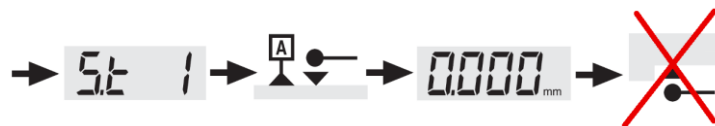


ST1



The access to ST1  mode does not require the determination of the probe constant. After entering in this mode, the first mandatory step is to define a reference.

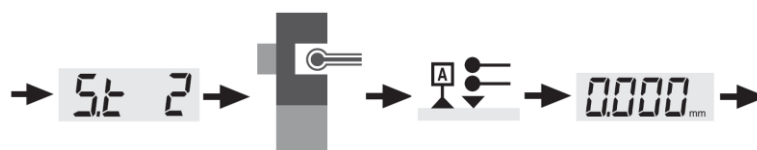


All measurements regarding the same reference have to be carried out by probing in a direction similar to the one chosen when the active reference has been captured.

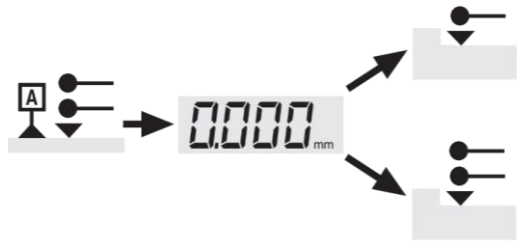


ST2

Each time when entering ST2  mode, it is necessary to calibrate the probe . This must be done using the masterpiece delivered with your instrument. For more details regarding this process please refer to the user manual. Once this has been carried out, the software will ask you to define a reference (always by double probing).






























Then you can perform your measurements in both probing directions (up or down).










6 CONTEXTUAL ACTIONS

6.1 General actions





Definition	
	Cancel Allows you to cancel the current process or to leave a mode without saving any changes.
	Delete Allows you to delete the selected value.
	Return Allows to come back to the previous page.
	Cartesian coordinates Allows to work in Cartesian coordinates.
Deg	Change angle unit Allows you to change the unit of the displayed angles. The new unit is "degree".
	Delete value or letter Allows you to delete the last character entered when manually entering a name or a value.
DMS	Change angle unit Allows you to change the unit of the angles displayed. The new unit is "degree, minute, second".
	Validate Allows you to validate the current process or to leave a mode while saving any changes.
	Edit Allows you to edit the name of a selected measurement block in the memory.
	Pause Allows you to pause the active process.
	Execution Allows you to start a measurement process or restart it in case it was paused before.
	Polar coordinates Allows you to work in polar coordinates.
	Change graph Allows you to change the type of graph displayed when measuring culmination points.
Rad	Change angle unit Allows you to change the unit of the angles displayed. The new unit is the "radian".
	Recall Allows you to recall a file from the USB key.
	Cancel last measurement Allows you to carry out the last measurement in the memory again.
	Save Allows you to save on the USB key.
= 0.00	Zero setting Allows you to quickly set the selected value to zero.
	Ignore Allows you to avoid certain steps of procedures and to directly access the result.
	Delete block Allows you to delete the last block of the measurement memory.
	Utility services Access to the menu for maintenance of the height gauge as well as access to its information.
	Update Starting update of the selected option.
	System options Access to general parameters of the system.

	Change resolution 1 Allows you to increase the resolution of a graph (searching the culmination point) or to come back to measurement results' global details (after a program recall)
	Change resolution 2 Allows you to decrease the resolution of a graph (searching the culmination point) or to access measurement results' details (after a program recall)
	Modify angle unit Allows to modify the angle unit. The current active angle unit is degree.
	Modify angle unit Allows to modify the angle unit. The current active angle unit is DMS.
	Modify angle unit Allows to modify the angle unit. The current active angle unit is radian.
	Select Allows you to select all the blocks of the memory
	Deselect Allows you to deselect all the blocks of the memory
	Delete Allows you to delete all the blocks previously selected in the memory

6.2 Actions regarding ST1 & ST2 modes

Definition	
	Redefine reference Allows you to restart the process to define the active reference.
	Leave mode 'recall programme' Allows you to stop the current measurement programme (programme recall).
	Calibration of the insert with groove Allows you to define the calibration process of the insert by measurement of a groove.
	ISO table Allows you to display the ISO table of tolerances in order to quickly set the tolerances of the selected value.
	Indirect reference (PRESET) Allows you to take into account an offset regarding the active reference, so that you can work with an indirect reference.
	Probe constant Restarts the calculation procedure of the probe constant.
	Calibration of the insert with rib Allows you to define the calibration process of the insert by measurement of a rib.

6.3 Actions regarding Perpendicularity mode


Definition	
	Graph display Once all measurements finished, it is possible to display an overview of the scanning of the workpiece.
	Measurement window in Z Informs you of the range in Z (from the start of the measurement) in which the measurement will be carried out. Once the range has been exceeded, the measurement will automatically stop.
	Modify resolution Allows you to modify the resolution of the ordinate axis (variation of the probe travel) of the graph displayed. Attention, the entered value represents the total range of visualisation. This means that if the value 10 is entered, the displayed range will be -5 to +5.
	Back to measurement Allows you to go back to the measurement page.

6.4 Actions regarding Angle mode
















Definition	
	Gage block

	Allows you to manually enter the size of the standard used in order to calculate the angle of a workpiece. This value is stored in the memory as long as the instrument is not turned off.
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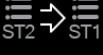

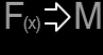
6.5 Actions regarding *Min, max, Δ* mode

Definition	
	Reference Allows you to take the reference into account in your measurement results or not.

6.6 Actions regarding *2D* mode

Definition	
	Angle between two lines Allows to calculate the angle between two selected lines.
	Angle by three points Allows to calculate the angle that make three elements represented either by simple points or circles. A combination of these two elements types is also possible.
	Circle by three points Allows to calculate the perfect circle going through three points, circles or a combination of these two elements' types.
	Bestfit circle Allows to calculate the best circle from more than three points or circles' centres.
	Line by two points Allows to calculate the perfect line going through two points, circles or a combination of these two elements' types.
	Bestfit line Allows to calculate the best line from three or more points or circles' centres.
	Distance Allows to calculate the distance between two points or circles centres.
	Perpendicular distance Allows to calculate the perpendicular distance between a point/circle and a line.
	Analyse and display results Allows to display measured and calculated data.
	Save result Allows to save a result in the main programme to be run later.
	Y axis as reference Allows to set a line as Y axis datum.
	Z axis as reference Allows to set a line as Z axis datum.
	Origin Allows to define a point or a circle centre as origin.
	Rotate for Y coordinate Allows to rotate the part to measure Y coordinates.
	Rotate for Z coordinate Allows to rotate the part to measure Z coordinates.

6.7 Actions regarding *Calculator* mode

Definition	
	Change memory Allows you to change from memory ST1 to measurement memory ST2 (or vice versa).
	Get function Allows to recall the customised function from a block.
	Customised function Allows you to create a customised calculation block with the previous result blocks.